# A Closer Look at Coaching: What do Coaches and Teachers do in the MyTeachingPartner Coaching Model?

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By

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# ABSTRACT

The present dissertation takes a multi-study approach to explore coaches' and teachers' behaviors in the implementation of a coaching intervention, MyTeachingPartner (Pianta et al., 2008), and their association with positive changes in teachers' practice. Study 1 assesses coaches' ability to provide objective and valid ratings of teacher-child interactions. Study 1 finds that coaches do provide valid ratings of teacher-child interactions that correspond well with observers' ratings of teacher-child interactions. However, coaches also show a tendency to rate teachers with whom they have higher-quality relationships as showing higher-quality teacher-student interactions. Study 2 examines the variation in coaches' implementation of MyTeachingPartner by looking at specific features of the model, the association between this variation and changes in teachers' ability to analyze their interactions with children, their self-efficacy and their observed teaching practice, and the ways in which these associations outcomes vary as a function of teachers' years of education and their level of observed practice at the beginning of the intervention. Findings indicate that although variation in coaches' implementation is minimal, it was significantly associated with changes in teachers' outcomes. Study 3 looks to the teacher's side of the coaching dyad by examining how teachers analyze their practice during coaching conferences, as well as the degree of change in teachers' analysis and its associations with teacher and classroom characteristics, and changes in practice during the process. Study 3 finds that although teachers engage in certain features of analysis, most teachers did not assess the effectiveness of their practice during the coaching conference, and teachers' display of analysis remained stable across the coaching conferences. Teachers that analyze their practice more were also found to have less years of experience and to be teaching more challenging classrooms.

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APPROVAL OF THE DISSERTATION

This dissertation, "A Closer Look at Coaching: What do Coaches and Teachers do in the MyTeachingPartner Coaching Model?", has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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# DEDICATION

I dedicate this work to my former teacher-students in rural Colombia whose love for students and insatiable desire to learn and improve inspired me to engage and keep going in these doctoral studies. I may be very far away from all of you, but I keep you in my mind and in my heart. My only hope is to do work that truly makes a difference in your lives.

I also dedicate this work to my boyfriend Tony. Your love and support during this process, even while you were writing your own dissertation, helped me persevere and made this world possible. You truly are an inspiration of devotion and dedication to your work and your students, thank you for sharing this process with me. Finally, this work is dedicated to my family. Gracias por creer en mí, por apoyarme en este proceso y por crear y compartir el deseo de lograr una Colombia mejor. Me enorgullece mucho saber que desde nuestros lados cada uno está poniendo su granito de arena.

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# A Closer Look at Coaching: What do Coaches and Teachers do in the MyTeachingPartner Coaching Model?

## Rationale and Conceptual Link across the Three Dissertation Studies

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## The Three-Manuscript Dissertation: Overview

This proposal presents a line of research exploring coaches' and teachers' behaviors in the implementation of a coaching intervention, MyTeachingPartner (Pianta et al., 2008), and their association with positive changes in teachers' practice. This dissertation follows the requirements of the manuscript-style dissertation option, as defined in the Curry School of Education Ph.D. Dissertation Manual (2010). The manuscript-style dissertation option call for students to submit an introduction (linking document) describing the conceptual and theoretical linkages among all three manuscripts, and three papers ready for submission, In adherence with these guideline, I am the first author on the three studies included in this dissertation.

All three studies are conceptually linked while representing a unique contribution to the field. The remainder of this dissertation discusses the rationale for the current line of research and the theoretical framework shared by the three studies. In addition, each of the three manuscripts is presented in its entirety.

**A Closer Look at Coaching: What do Coaches and Teachers do in the MyTeachingPartner Coaching Model?**

In the most recent version of the Programme for International Student Assessment (PISA), 15-year-old American students performed either around or below average in assessments of math, reading and science when compared to students from other developed nations (Organization for Economic Cooperation and Development, 2013). These findings show that the American educational system is still on the road to achieving the goal of "prepar[ing] students to succeed in college and the workplace and to compete in the global economy" (US Department of Education, 2009). One of the most promising avenues to achieve the goal of improving students' achievement and preparation is through effective teachers. Research has shown that high-quality teachers have a major impact on students' learning and development (Aaronson, Barrow & Sander, 2007; Curby et al., 2009; Hamre & Pianta, 2001; Nye, Konstantopoulos & Hedges, 2004; Pianta, Belsky, Vandergrift, Houts & Morrison, 2008; Rivkin, Hanushek & Kain, 2005; Rockoff, 2004), but the average student is currently not being exposed to high-quality learning opportunities in the classroom (Bill and Melinda Gates Foundation, 2012; La Paro et al., 2009; NICHD ECCRN, 2002, 2005). This means that even though effective teachers can help students be better prepared for their post-graduation years, only a few students have the opportunity to benefit from these teachers. These findings emphasize the need to improve teaching effectiveness.

For decades most schools have relied on workshops to meet the professional development needs of in-service teachers (Knight, 2002; Snell, Forston, Stanton-Chapman & Walker, 2013; Stein, Smith & Silver, 1999). However workshops typically have teachers adopt a passive learning role (Knight, 2002; Pianta, 2011) and do not provide spaces for

teachers to actively process the information in ways that have direct implications for their teaching (Belanger, 2011; Kolb, 1984; Larochelle & Bednarz, 1998). Not surprisingly, evaluations have suggested that by themselves these workshops may have few effects on teachers' practice, making them a less effective approach to improve teaching effectiveness (Garet, Porter, Desimone, Birman & Yoon, 2001; Joyce & Showers, 1980; Tschannen-Moran & McMaster, 2009).

As the field looks for more effective approaches to professional development, many have turned to coaching, a professional development model aimed at establishing one-on-one learning opportunities for teachers to receive support to improve their teaching practice (Boatright, Galluci, Swanson, Van Lare & Yooon, 2008; Neuberger, 2012). Unlike workshops, coaching requires teachers to take a more active role in their learning processes and promotes an examination of their current practice by providing teachers with opportunities to receive frequent feedback and support (Denton & Hasbrouck, 2009).

Efficacy evaluations of coaching interventions have found positive impacts, both on teachers' practice and on children's learning across different age levels and subject of focus (Allen, Pianta, Gregory, Mikami & Lun, 2011; Bradshaw, Pas, Goldweber, Rosenberg & Leaf, 2012; Domitrovich et al., 2009; Hindman & Wasik, 2012; Landry, Swank, Smith, Assel & Gunnewig, 2006; Pianta, Mashburn, Downer, Hamre & Justice, 2008; Powell, Diamond & Burchinal, 2012; Raver et al., 2008). However, evaluations of large-scale implementation of coaching interventions have yielded mixed results (Bryant et al., 2009; Gamse et al., 2008), which may be due to larger variation in the model's implementation in large-scale interventions where it is harder to provide close supervision and support to all the coaches to ensure that they are adhering to the standards for a high fidelity and quality implementation. Reviews of studies assessing implementation processes show that when

the core components of an intervention are implemented as intended by the developers and these components are delivered through high-quality process, the intervention has impacts that are at least twice as large than when the same intervention is poorly implemented (Durlak & DuPre, 2008).

On the other hand, given the amount of time and engagement that coaching from teachers, the degree to which they engage with the coaching intervention may also affect the impact of the process on the teacher. Prior research has found that teachers that are more engaged with coaching interventions show more change on their practice at the end of the process than less engaged teachers (Domitrovich, Gest, Gill, Jones & DeRousie, 2009; LoCasale-Crouch et al., 2013).

These findings highlight the need to understand what both coaches and teachers do during coaching, their association with teacher and students outcomes, and whether there are any criteria that can be used to identify teachers that may need more support to effectively engage in the coaching process. Differences in either coaches' implementation or teachers' engagement with the intervention can lead to the same coaching model having different effects for teachers and students, decreasing the probabilities of positive impacts for all participants (Dane & Schneider, 1998; Durlak & DuPre, 2008).

Despite the need for research on coaches' implementation and teachers' engagement in coaching models, most research on coaching has focused on assessing its effects, with little exploration of the processes that take place during coaching interactions (Gupta & Daniels, 2012; LoCasale-Crouch, Cabell, Jimenez & Taylor, in press; Mraz, Algozzine & Watson, 2008; Powell & Diamond, 2013; Sheridan et al., 2009). This information is crucial for coaching models because it exposes aspects of the implementation process where modification or extra support could be useful to improve not only this specific intervention,

but other similar coaching models as well (Isner et al., 2011; Powell & Diamond, 2013; Sheridan, Edwards, Marvin & Knoche, 2009). To contribute to this line of research the goal of this dissertation is to take a closer look at coaches' and teachers' behaviors in the implementation of a coaching intervention, MyTeachingPartner (Pianta et al., 2008).

**Coaching**

Although coaching has been gaining popularity in educational settings, there is still a lack of clarity on its definition due to the generic use of the concept to refer to other types of professional development and the use of other names (e.g. mentoring, consultation) to describe coaching-like practices (D'Abate, Reddy & Tannenbaum, 2003; Isner et al., 2011; LoCasale-Crouch et al., in press; Pas et al., in press). Although all these interventions share the goal of improving teachers' practice through sustained interactions between two or more people, coaching interventions are usually based on a clinical supervision model focused on individual classroom observations, and they involve a cycle that includes a pre-observation discussion, observation, and post-observation discussion (or conference) (Hsieh, Hemmeter, McCollum & Ostrosky, 2009; National Center on Quality Teaching and Learning, 2012; Neuberger, 2012; Rhodes, Stokes & Hampton, 2004). Unlike mentoring, which focuses on the overall growth of less experienced teachers, coaching supports teachers across all ranges of expertise (D'Abate, Reddy & Tannenbaum, 2003; National Association for the Education of Young Children (NAEYC) & National Association of Child Care Resources and Referral Agencies (NACCRRA), 2011). Likewise, while consultation interventions focus on supporting teachers on resolving a specific issue through individualized intervention with a student or a group of students, coaching focuses on the development of skills and practice of teachers (Denton & Hasbrouch, 2009; NAECY & NACCRA, 2011)

Not surprisingly given the lack of clear definitions, coaching programs take a variety of different approaches to achieving the same goal of improving teacher effectiveness (American Institutes for Research, 2005; Isner et al., 2011; Knight, 2009a). Most coaching models in K-12 settings focus on improving teachers' general (or subject-specific) practice by helping them integrate research-based practices (Knight, 2009b) from theoretical frameworks such as the Five Standards Instructional Model (Teemant, Wink & Tyra, 2011), the Framework for Teaching (Danielson, 2007) or The Big Four (Knight, 2009a) through stand-alone professional development approaches. Other models, particularly popular in early childhood and in the prevention field, use coaching as a support to help teachers improve their implementation of a specific curriculum (Becker, Bradshaw, Domitrovich & Ialongo, 2013; Domitrovich et al., 2008; 2009; Reinke, Stormont, Webster-Stratton, Newcomer & Herman, 2012).

**MyTeachingPartner**

MyTeachingPartner (MTP, Pianta et al., 2008) is a coaching model that has been used both as a stand-alone intervention (Allen et al., 2011; Downer et al., 2013) and as a curricular implementation support (Downer, Jimenez Herrera et al., 2012). MTP is a web-mediated coaching model aimed at improving teachers' interactions with students by providing opportunities for teachers to observe their practice, to receive skills training in identifying appropriate and inappropriate responses to children's cues and in understanding how these responses contribute to children's learning, and to receive support focused on each teacher's instruction and interactions with children (Downer et al., 2011; Mashburn et al., 2010).

MTP uses the Teaching through Interactions (TTI, Hamre, Pianta et al., 2013) framework as its basis for defining effective teaching practices. The TTI model describes

three domains of teacher-student interactions: Emotional Support which focuses on how the classroom environment supports students' social and emotional functioning; Classroom Organization, which includes the classroom processes related to organization and management of students' behavior, time and attention; and Instructional Support, which focuses on the way that teacher-student relationships promote knowledge they can use by supporting their cognitive and language development. Findings from multiple studies show that students in classrooms in which teachers use these practices demonstrate more positive social and academic development (Allen, et al., 2013; Burchinal, Vandergrift, Pianta & Mashburn, 2010; Curby et al., 2009; Dominguez, Vitiello, Maier & Greenfield, 2010; La Paro et al., 2009; Sabol, Soliday Hong, Pianta & Burchinal, 2013).

MTP's theory of change (Hamre, Downer, Jamil & Pianta, 2012) states that in order for teachers to organize learning experiences that promote children's acquisition of the knowledge and skills, teachers need to be able to know, see, do and reflect on the practices included in the TTI framework. In MTP teachers engage in these processes through coaching cycles (see Figure 1) that begin with teachers videotaping themselves in the classrooms and sending the video to their coach (step 1). After observing the video, coaches select clips that can focus teachers on a specific aspect of their interactions and provide written prompts for teachers' to examine their interactions with students (step 2). After the teachers respond to the coaches' prompts (step 3), they have phone conferences to discuss the prompts and the video (step 4), and to develop a plan for the next cycle (step 5), when the process begins again. In typical MTP implementations these cycles of feedback occur every two to three weeks over the course of a school year.

Evaluations of the implementation of MTP with early childhood and secondary teachers demonstrate that teachers improve their interactions with students after

participating in the intervention (Allen, Pianta, Gregory, Mikami & Lun, 2011; Downer et al., 2013; Pianta et al., 2008). Specifically, participating early childhood teachers more consistently noticed and responded to children's cues, used strategies that facilitated children's higher-order thinking skills, provided intensive feedback, engaged children in instruction, and intentionally promote language development through back and forth conversations (Downer et al., 2013; Pianta et al., 2008).

These positive effects on teacher practice led to positive effects on students' learning and development (Allen et al., 2011). Students in early childhood classrooms whose teachers participated in MTP had higher scores on language and literacy assessments in the spring of the school year than children whose teachers only had access to a video library of effective teacher-student interactions (Downer et al., 2011; Mashburn et al., 2010). Secondary students showed gains in their achievement the year after the intervention (Allen et al., 2011), as well as increases in their positive peer interactions (Mikami, Gregory, Allen, Pianta & Lun, 2011) and improvements in their behavioral engagement in the classroom (Gregory, Allen, Mikami, Hafen & Pianta, 2013).

Although the majority of studies on MTP have focused on program impacts, a few recent papers have focused on teachers' engagement, showing that teachers vary in their engagement and in their assessment of coaching's usefulness (Downer, LoCasale-Crouch, Hamre and Pianta, 2009). This variation is related to teachers' improvement in their instructionally supportive practices at the end of their participation in MTP (LoCasale-Crouch et al., 2013).To date, however, these studies have focused on the teachers' engagement with the overall intervention and have not looked in detail at the way in which the teacher engages with the individual activities of the coaching process and how their behaviors during these activities are related to MTP's effectiveness. At the same time, there

is a lack of studies examining coaches' implementation of MTP and its association with the model's positive impacts on teachers and students.

The papers in this dissertation help refine our understanding of what happens during MTP's implementation and how that is related to its effectiveness by unpacking three elements of coaching. The first two papers hone in on the coaches' side of the coaching process with the first paper looking at whether teachers are able to accurately perceive teachers' practice, a skill that is essential to their performance as a coach; and the second paper looking at the extent to which coaches vary in their implementation of key features of MTP and the association between this implementation and teacher outcomes. Finally, the last paper delves into the teachers' contribution to the coaching process by looking into how teachers analyze their practice during coaching conferences, the degree of change in analysis that teachers show throughout the coaching process, and its associations both with teacher and classroom characteristics, and changes in practice during the process. Taken together these studies provide important new insights on the process of coaching, by exploring not only what coaches and teachers do during their coaching interactions, but also how those actions are related to coaching's effectiveness. Furthermore, these studies advance our knowledge of the processes of teachers' learning and change through professional development, providing useful information for the development and improvement of effective interventions for in-service teachers.

**Coaches Accuracy at Assessing Teachers' Effectiveness in Interacting with Students**

Like most coaching models in MTP the observation of teachers in the classroom is the first step of the coaching cycle. While observing, coaches are expected to identify effective and less effective practices so that they can discuss them with the teachers and help them learn to be objective observers of their practice (Pianta et al., 2008). In MTP,

coaches need to accurately see effective and less effective practices, as defined by the TTI model, to successfully lead teachers through the coaching process. If coaches lack this skill they may have difficulty identifying and addressing the practices that need to be improved, which may decrease MTP's effectiveness.

Coaches' observational skills may have other uses within the larger school context, particularly given the recent focus on teacher effectiveness. Coaches are frequently observing and assessing teachers' interactions with children over extended periods of time and are in a unique position to gather information about these interactions and to provide reliable ratings of teacher-student interactions. Given states and communities' current efforts to identify reliable, easy to implement, cost-effective measures of indicators of quality (Bill and Melinda Gates Foundation, 2012; Goe, Bell & Little, 2008; Howes et al., 2008; Partee, 2012; Zaslow, Tout, Halle & Forry, 2009; Zaslow, Tout & Halle, 2011) if coaches can provide reliable ratings, these ratings could be a useful addition to their assessment portfolio.

Study 1 provides a closer look at the reliability of coaches' ratings by assessing the extent to which coaches' ratings of teacher-student interactions correspond with observers' ratings in a validated observational instrument. Evaluations of the ratings of other raters of teacher-student interactions, such as principals and students, have shown biases in the ratings. Furthermore, although there is not much research on the influence of the professional relationship in ratings in educational contexts, research from other fields shows that positive relationships between supervisors and subordinates can influence supervisors' ratings of the subordinates' performance, with subordinates with higher quality relationships with their supervisors obtaining higher performance ratings than subordinates with lower quality relationships (Breuer, Nieken & Sliwka, 2011; Duarte, Goodson &

Klich, 1994; Ferris, Munyon, Baski & Buckley, 2008; Lefkowitz, 2000; Ostroff, 1993; Tsui & Barry, 1986). Therefore, the study also examines the possibility of a bias in coaches' ratings due to the quality of the coach-teacher relationship. Findings from this study will expand our understanding of the degree to which coaches have one of the skills needed to properly support teachers in the improvement of their practice. These findings provide useful information for program developers and practitioners about the need for including training and supports for coaches to improve their skill of assessing teacher-student interactions. Furthermore, these findings will contribute useful information for practitioners and policymakers' search for reliable, cost-effective measures of indicators of teacher quality.

**Variation in Coaches' Implementation of MTP**

To ensure the successful implementation of a coaching intervention, coaches not only need to have the skills required to provide effective coaching to teachers, such as the skill to assess teacher practice, they also need to understand the coaching model and be able to implement it just as the developers intended to. If coaches don't have a clear understanding of the coaching process and are properly supported in their implementation of the model, they may end up implementing the same intervention in different ways. Even if coaches implement the intervention in the same way, teachers may differ in their level of engagement with the coaching model. Research on the implementation of MTP has shown variation between coaches in the number of cycles that their teachers complete (Downer et al., 2009). At the same time, studies on other coaching models have found variation within coaches, with coaches varying the intensity of certain activities and the time spent on coaching depending on the teachers' initial practices (Becker et al., 2013; Reinke et al., 2013). Even though research in other preventive interventions shows that variation in the

implementation of an intervention can affect its outcomes (Dane & Schneider, 1998; Durlak & DuPre, 2008), there is a lack of research regarding variation in coaching's implementation and its relation with teacher outcomes (Gupta & Daniels, 2012; LoCasale-Crouch et al., in press; Mraz et al., 2008; Powell & Diamond, 2013; Sheridan et al., 2009).

Study 2 takes a closer look at coaches' implementation of MTP by documenting variation in coaches' implementation of two steps of the MTP process: the provision of written prompts and the conference. Two features implemented through the written prompts, identified based on MTP's theory of change (Hamre et al., 2012), are examined: coaches' clear focus on teacher-student interactions and the cognitive challenge they provide. To assess the conference the study analyzes teachers' ratings of its usefulness. Finally, the study assesses the coach-teacher relationship, an overall implementation feature. This study seeks to determine the extent to which coaches vary in their implementation of these elements of the coaching process as well as the ways in which this variation may have consequences for a range of teacher outcomes, including teachers' analysis of their interactions with students, feelings of self-efficacy and observed teaching practice.

By examining the association of the implementation of MTP features and teacher outcomes, the findings from this study point to features of coaching interventions that need to be properly supported by program developers and practitioners in order to ensure that interventions such as MTP maintain their positive impacts across different interventions. Findings from this study should inform coaches' selection, as well as the development of coaches' training and support modules that can create the conditions necessary for a high-quality implementation of MTP. Furthermore, these findings can also inform the development and improvement of similar coaching models that could emphasize in their

process the application of the features highlighted in the study to increase their possible impacts on teacher and student outcomes.

**Teacher Analysis in Coaching Conferences**

Until now, this dissertation has focused only on the coaches' side of the coaching equation. However, due to coaching's highly interactional nature and to the active role that it puts on teachers, not only what coaches do, but also what teachers do during their intervention can have an effect on the outcomes for teachers at the end of the intervention.

MTP shares with other coaching models (American Institutes for Research (AIR), 2005; Ellison & Hayes, 2009) the inclusion of is reflection as one of the processes that promote change in teachers' practice (Hamre et al., 2012). Within reflection, MTP places a particular focus on teachers' skill in analyzing their teaching practice and the impact it has on their students. Analysis involves taking apart a complex process in order to look at its specific components and understand how they work and how they are related to each other (Hamre et al., 2012). As applied to teaching within the MTP model teachers are expected to make explicit connections between (a) their goals for students, and their thoughts and feelings, (b) their practice and (c) students' development and learning.

In an MTP cycle, teachers have two opportunities to engage in this analytical process: their responses to the coaches' prompts, and the coach-teacher conference. Previous studies have found that teachers show high levels of variability in their analysis of their practice in written prompts, and that who display more analysis also make more significant improvements in their observed practice (Baldanza, Jiménez Herrera, LoCasale-Crouch & Cabell, 2013). There is, however, little research examining the nature and consequences of teachers' analysis during coaching conferences. Study 3 addresses this gap using data from the 4Rs+MTP study, in which MTP was used to support the

implementation of the 4Rs social-emotional learning curriculum in elementary classrooms (Jones, Brown, Hoglund & Aber, 2010). The study provides the first descriptive information on teachers' analysis of their practice during the coaching conferences and assesses the role that teacher and classroom characteristics play in enhancing teachers' analysis. This assessment will provide useful information for coaching models to identify those teachers that may need extra support to successfully analyze their practice. The study also assesses the association between teachers' display of analysis and changes in their practice and implementation of the 4Rs curriculum over the course of the intervention. Since there is a lack of research on this association (Akbari, 2007; Griffiths, 2000; Korthagen & Wubbles, 1995), this study constitutes an initial exploration of the process, and its findings could have implications for the development of effective teacher professional interventions that help teachers translate their analysis of their practice into an improved practice that leads to improved student outcomes.

**Bringing it all Together: Understanding what Coaches and Teachers Do in a Coaching Intervention**

Together, the three papers that comprise this dissertation take us one step further in the process of identifying key elements of the coaching process in MTP that are related to teacher and student outcomes and that should be emphasized during its implementation to ensure positive impacts after participation in the intervention. The results of these studies will provide useful information, both for MTP and for similar coaching models. For MTP, the results of these studies can guide the design of a support structure that provides coaches provides knowledge, practice and experience they need to implement this coaching model with high fidelity and quality. These studies also highlight elements of coaching that lead to better teacher learning and practice, and that could be used by coaching models similar to

MTP in order to improve their impact on teachers and students. The remainder of this dissertation presents each one of the three studies in full.

## References

Aaronson, D., Barrow, L., & Sander, W. (2007). Teachers and student achievement in Chicago public high schools. *Journal of Labor Economics, 25,* 95-135

Allen, J., Gregory, A., Mikami, A., Lun, J., Hamre, B., & Pianta, R. (2013). Observations of effective teacher-student interactions in secondary school classrooms: Predicting student achievement with the Classroom Assessment Scoring System—Secondary. *School Psychology Review, 42,* 76-98

Allen, J., Pianta, R., Gregory, A., Mikami, A., & Lun, J. (2011). An Interaction-Based Approach to Enhancing Secondary School Instruction and Student Achievement. *Science, 333*, 1034-1037

American Institutes for Research (2005). *Conceptual overview: Coaching in the professional development impact study.* Retrieved from http://albaniarsimin.wikispaces.com/file/view/Coaching+in+the+Professional+Development+Impact+Study+(Final,+Jan.+2005,+Updated).pdf

Baldanza, M., Jiménez Herrera, M., LoCasale-Crouch, J., & Cabell, S. Q. (2013). *Teacher reflection: Associations with change in teacher practice and children's engagement.* Poster presented at the 2013 Biennial Meeting, Society for Research in Child Development. Seattle, WA.

Becker, K. D., Bradshaw, C. P., Domitrovich, C., & Ialongo, N. S. (2013). Coaching teachers to improve implementation of the Good Behavior Game. *Administration and Policy in Mental Health and Mental Health Services Research.* Advance online publication. doi: 10.1007/s10488-013-0482-8

Belanger, P. (2011). *Theories in adult learning and education.* Farmington Hills, MI: Barbara Budrich Publishers.

Bill and Melinda Gates Foundation (2012). *Gathering feedback for teachers. Combining high-quality observations with student surveys and achievement gains.* Retrieved from: http://www.metproject.org/downloads/MET_Gathering_Feedback_Research_Paper.pdf

Boatright, B., Galluci, C., Swanson, J., Van lare, M., & Yoon, I. (2008) Coaching for instructional improvement: Themes in research and practice. *Washington State Kappan, 2,* 3-5

Bradshaw, C. P., Pas, E. T., Goldweber, A., Rosenberg, M. S., & Leaf, P. J. (2012). Integrating school-wide Positive Behavioral Interventions and Supports with tier 2 coaching to student support teams: The PBISplus model. *Advances in School Mental Health Promotion, 5,* 177-193

Breuer, K., Nieken, P., & Sliwka, D. (2011). Social ties and subjective performance evaluations: an empirical investigation. *Review of Managerial Science.* Retrieved from http://www.springerlink.com/content/rw36318525383m8g/

Bryant, D., Wesley, P., Burchinal. P., Sideris, J., Taylor, K., Fenson, C., & Iruka, I. (2009). *The QUINCE-PFI study: An evaluation of a promising child care provider training. Final report.* Chapel Hill, NC: FPG Child Development Institute.

Burchinal, M., Vandergrift, N., Pianta, R., & Mashburn, A. (2010). Threshold analysis of association between child care quality and child outcomes for low-income children in pre-kindergarten programs. *Early Childhood Research Quarterly, 25,* 166-176.

Curby, T. W., LoCasale-Crouch, J., Konold, T. R., Pianta, R.C., Howes, C., Burchinal, M., … Barbarin, O. (2009). The relations of observed pre-K classroom quality profiles to children's achievement and social competences. *Early Education and Development, 20,* 346-372

D'Abate, C. P., Eddy, E. R., & Tannenbaum, S. I. (2003). What's in a name? A literature-based approach to understanding mentoring, coaching, and other constructs that describe developmental interactions. *Human Resource Development Review, 2,* 360-384

Dane, A. V., & Schneifer, B. H. (1998). Program integrity in primary and early secondary prevention: Are implementation effects out of control? *Clinical Psychology Review, 18,* 23-45

Danielson, C. (2007). *Enhancing professional practice: A framework for teaching* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development

Denton, C. A. & Hasbrouck, J. (2009). A description of instructional coaching and its relationship to consultation. *Journal of Educational and Psychological Consultation, 19* 150–175.

Dominguez, X., Vitiello, V. E., Maier, M. F., & Greenfield, D. B. (2010). A longitudinal examination of young children's learning behavior: Child-level and classroom-level predictors of change throughout the preschool year. *School Psychology Review, 39,* 29-47.

Domitrovich, C. E., Bradshaw, C. P., Paduska, J. M., Hoagwood, K., Buckley, J. A., Olin, S., … Ialongo, N. S. (2008). Maximizing the implementation quality of evidence-

based preventive interventions in schools: A conceptual framework. *Advances in School Mental Health Promotion, 1* (3), 6-28

Domitrovich , C. E., Gest, S. D., Gill, S., Bierman, K. L., Welsh, J. A. & Jones, D. (2009) Fostering high-quality teaching with an enriched curriculum and professional development support: The Head Start REDI Program. *American Educational Research Journal 46* 2, 567-597

Domitrovich, C. E., Gest, S. D., Gill, S., Jones, D., & DeRousie, R. S. (2009). Individual factors associated with professional development training outcomes of the Head Start REDI program. *Early Education and Development, 20,* 402-430

Downer, J., Jimenez Herrera, M., Stuhlman, M., Bourassa, K., Brown, J., Gologor, B., & Wong, P. (2012). *Coaching quality and teachers' implementation of the 4Rs social-emotional and literacy curriculum: Testing the link between two levels of intervention fidelity.* Paper presented at the Society for Research on Educational Effectiveness spring conference, Washington D.C.

Downer, J. T., LoCasale-Crouch, J., Hamre, B., & Pianta, R. (2009). Teacher characteristics associated with responsiveness and exposure to consultation and online professional development resources. *Early Education and Development, 20,* 431-455

Downer, J. T., Pianta, R. C., Burchinal, M., Field, S., Hamre, B. K., LoCasale-Crouch, J., … Scott-Little, C. (2013). *Coaching and coursework focused on teacher-child interactions during language/literacy instruction: effects on teacher outcomes and children's classroom engagement.* Manuscript submitted for publication.

Downer, J. T., Pianta, R. C., Fan, X., Hamre, B. K., Mashburn, A., & Justice, L. (2011). Effects of web-mediated teacher professional development on the language and literacy skills of children enrolled in prekindergarten programs. *NHSA Dialog, 14,* 189-212. doi:10.1037/t08945-000

Duarte, N. T., Goodson, J. R., & Klich, N. R. (1994). Effects of dyadic quality and duration on performance appraisal. *Academy of Management Journal, 37,* 499−521.

Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology, 41,* 327-350

Ferris, G. R., Munyon, T.P., Baski, K. & Buckley, M. R. (2008). The performance evaluation context: Social, emotional, cognitive, political, and relationship components. *Human Resource Management Review, 18,* 146-163.

Gamse, B. C., Jacob, R. T., Horst, M., Boulay, B., Unlu, F., Bozzi, L., … Rosenblum, S. (2008). *Reading First impact study. Final report.* Washington D.C.: National Center

for Education Evaluation and Regional Assistance, Institute of Education Sciences, US Department of Education. Retrieved from: http://ies.ed.gov/ncee/pdf/20094038.pdf

Garter, M. S:, Porter, A. C., Desimone, L., Birman, B. F., & Suk-Yoon, K. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38,* 915-945

Goe, L., Bell, C., & Little, O. (2008). *Approaches to evaluating teacher effectiveness: A research synthesis.* Washington DC: National Comprehensive Center for Teacher Quality. Retrieved from: http://files.eric.ed.gov/fulltext/ED521228.pdf

Gregory, A., Allen, J. P., Mikami, A. Y., Hafen, C. A., & Pianta, R. C. (2013). Effects of a professional development program on behavioral engagement of students in middle and high school. *Psychology in the Schools.* Advance online publication. doi: 10.1002/pits.217

Gupta, S. S. & Daniels, J. (2012) Coaching and professional development in early childhood classrooms: Current practices and recommendations for the future. *NHSA Dialog: A Research-to-Practice Journal for the Early Childhood Field, 15,* 206-220

Hamre, B. K., Downer, J. T., Jamil, F. M., & Pianta, R. C. (2012). Enhancing teachers' intentional use of effective interactions with children: Designing and testing professional development interventions. In R. C. Pianta, W. S. Barnett, L. M. Justice & S. M. Sheridan (Eds.) *Handbook of early childhood education.* New York: Guilford Press

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

Hindman, A. H., & Wasik, B. A. (2012). Unpacking an effective language and literacy coaching intervention in Head Start: Following teachers' learning over two years of training. *The Elementary School Journal, 113,* 131-154

Howes, C., Pianta, R., Bryant, D., Hamre, B., Downer, J., & Soliday-Hong, S. (2008). *Ensuring effective teaching in early childhood education through linked professional development systems, quality rating systems and state competencies: The role of research in an evidence-driven system* (pp. 1-16). Arlington, VA: National Center for Research on Early Childhood Education

Hsieh, W., Hemmeter, M. L., McCollum, J. A., & Ostrosky, M. M. (2009) Using coaching to increase preschool teachers' use of emergent literacy teaching strategies. *Early Childhood Research Quarterly, 24,* 229-247

Isner, T., Tout, K., Zaslow, M., Soli, M., Quinn, K., Rothenberg, L., & Burkhauser, M. (2011). *Coaching in early care and education programs and Quality Rating and*

*Improvement Systems (QRIS): Identifying promising features.* Report produced for the Children's Services Council of Palm Beach County. Washington, DC: Child Trends.

Jones, S. M., Brown, J. L., Hoglund, W. L. G., & Aber, J. L. (2010) A school-randomized clinical trial of an integrated social-emotional learning and literacy intervention: Impacts after 1 school year. *Journal of Consulting and Clinical Psychology, 78,* 829-842

Joyce, B., & Showers, B. (1980). Improving inservice training: The messages of research. *Educational Leadership, 37,* 379–385.

Knight, J. (2009a). *Coaching: Approaches and perspectives.* Thousand Oaks, CA: Corwin Press

Knight, J. (2009b). Instructional coaching. In J. Knight (Ed.) *Coaching: Approaches and perspectives* (pp. 29-55). Thousand Oaks, CA: Corwin Press

Knight, P. (2002). A systemic approach to professional development: Learning as practice. *Teaching and Teacher Education, 18,* 229-241.

Kolb, D. A. (1984). *Experiential learning: experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall.

La Paro, K. M., Hamre, B. K., LoCasale-Crouch, J., Pianta, R. C., Bryant, D., Early, D., … Burchinal, M. (2009). Quality in kindergarten classrooms: observational evidence for the need to increase children's learning opportunities in early education classrooms. *Early Education and Development, 20,* 657-692.

Landry, S. H., Zucker, T. A., Solari, E., Crawford, A. D., & Williams, J. M. (2012). History, scale up, and improvements of a comprehensive, statewide professional development program in Texas. In C. Howes, B.K. Hamre, & R.C. Pianta (Eds.), *Effective early childhood professional development: Improving teacher practice and child outcomes* (pp. 159-189). Baltimore, MD: Paul H. Brookes

Larochelle, M., & Bednarz, N. (1998) Constructivism and education: beyond epistemological correctness. In M. Larochelle, N., Bednarz & J. Garrison (Eds.) *Constructivism and education* (pp. 3-22). Cambridge, UK: Cambridge University Press

Lefkowitz, J. (2000). The role of interpersonal affective regard in supervisory performance ratings: A literature review and proposed causal model. *Journal of Occupational and Organizational Psychology, 73,* 67-85.

LoCasale-Crouch, J., Cabell, S. Q., Jimenez, M., & Taylor, M. (in press). Research on consultation in early childhood programs. In W. P. Erchul & S. M. Sheridan (Eds.),

*Handbook of research in school consultation: empirical foundations for the field,* (2nd edition). New York: Routledge.

LoCasale-Crouch, J., DeCoster, J., Cabell, S. Q., Pianta, R. C., Hamre, B. K., Downer, J. T., … Roberts, A. (2013). *Unpacking intervention implementation: Teacher responsiveness as a mediator of intervention quality of delivery and change in teaching practice.* Manuscript in preparation

Mashburn, A. J., Downer , J. T., Hamre, B. K., Justice, L. M. & Pianta, R. C. (2010). Consultation for teachers and children's language and literacy development during pre-kindergarten. *Applied Developmental Science, 14,* 179-196

Mikami, A. Y., Gregory, A., Allen, J. P., Pianta, R. C., & Lun, J. (2011). Effects of a teacher professional development intervention on peer relationships in secondary classrooms. *School Psychology Review, 40,* 367-385

Mraz, M., Algozzine, B., & Watson, P. (2008). Perceptions and expectations of roles and responsibilities of literacy coaching. *Literacy Research and Instruction, 47,* 141-157

National Association for the Education of Young Children (NAEYC) & National Association of Child Care Resources and Referral Agencies (NACCRRA) (2011). *Early Childhood Education Professional Development: Training and Technical Assistance Glossary.* Retrieved from: http://www.naeyc.org/GlossaryTraining_TA.pdf

National Center on Quality Teaching and Learning (2012). *Practice-based coaching.* Retrieved from http://eclkc.ohs.acf.hhs.gov/hslc/tta-system/teaching/docs/practice-based-coaching.pdf

Neuberger, J. (2012) Benefits of a teacher and coach collaboration: A case study. *The Journal of Mathematical Behavior, 21,* 290-311

NICHD ECCRN (2002). The relation of global first.grade classroom environment to structural classroom features and teacher and student behaviors. *The Elementary School Journal, 102,* 367-387

NICHD ECCRN (2005). A day in third grade: A large-scale study of classroom quality and teacher and student behavior. *The Elementary School Journal, 105,* 305-323

Nye, B., Konstantopoulos, S., & Hedges, L. V. (2004). How large are teacher effects? *Educational Evaluation and Policy Analysis, 26,* 237-257

Ostroff, C. (1993). Rater perceptions, satisfaction and performance ratings. *Journal of Occupational and Organizational Psychology, 66,* 345-356.

Organization for Economic Cooperation and Development (2013). *Lessons from PISA 2012 for the United States, strong performers and successful reformers in education.* Retrieved from OECD website: http://www.keepeek.com/Digital-Asset-Management/oecd/education/lessons-from-pisa-for-the-united-states_9789264207585-en#page2

Partee, G. L. (2012). *Using multiple evaluation measures to improve teacher effectiveness. State strategies from round 2 of No Child Left Behind Act waivers.* Washington, DC: Center for American Progress. Retrieved from: http://files.eric.ed.gov/fulltext/ED539743.pdf

Pianta, R. C. (2011). *Teaching children well. New evidence-based approaches to teacher professional development and training.* Washington, DC: Center for American Progress. Retrieved from: http://www.americanprogress.org/issues/education/report/2011/11/29/10663/teaching-children-well/

Pianta, R. C., Belsky, J., Vandergrift, N., Houts, R., & Morrison, F. J. (2008). Classroom effects on children's achievement trajectories in elementary school. *American Educational Research Journal, 45,* 365-397

Pianta, R. C., La Paro, K. M., & Hamre, B. K. (2008). *Classroom Assessment Scoring System (CLASS), Manual, Pre-K.* Baltimore: Paul H. Brookes.

Pianta, R. C., Mashburn, A. J., Downer, J. T., Hamre, B. K. & Justice, L. (2008) Effects of web-mediated professional development resources on teacher-child interactions in pre-kindergarten classrooms. *Early Childhood Research Quarterly 23* 4, 431-4

Powell, D. R., & Diamond, K. E. (2013). Studying the implementation of coaching-based professional development. In T. Halle, A. Metz, I. Martinez-Beck (Eds.) *Applying Implementation Science in Early Childhood Programs and Systems* (pp. 97-116). Baltimore, MD: Brookes Publishing

Powell, D. R., Diamond, K. E., & Burchinal, M. (2012). Using coaching-based professional development to improve Head Start teachers' support of children's oral language skills. In C. Howes, B.K. Hamre, & R.C. Pianta (Eds.), *Effective early childhood professional development: Improving teacher practice and child outcomes* (pp. 13-29). Baltimore, MD: Paul H. Brookes

Raver , C. C., Jones, S. M., Li-Grining, C. P.; Metzger, M., Champion, K. M. & Sardin, L. (2008) Improving preschool classroom processes: Preliminary findings from a randomized trial implemented in Head Start settings. *Early Childhood Research Quarterly, 23,* 10-26

Reinke, W. M., Stormont, M., Webster-Stratton, C., Newcomer, L. L., & Herman, K. C. (2012). The Incredible Years Teacher Classroom Management program: Using

coaching to support generalization to real-world classroom settings. *Psychology in the Schools, 49,* 416-428

Rhodes, C., Stokes, M. & Hampton, G. (2004). *A Practical Guide to Mentoring, Coaching and Peer-networking. Teacher Professional Development in Schools and Colleges.* London: Routledge Falmer.

Rivkin, S. G., Hanushek, E. A., & Kain, J. F. (2005). Teachers, schools, and academic achievement. *Econometrica, 73,* 417-458

Rockoff, J. E. (2004). The impact of individual teachers on student achievement: Evidence from panel data. *The American Economic Review, 94,* 247-252

Sabol, T. J., Soliday Hong, S. L., Pianta, R. C., & Burchinal, M. R. (2013). Can rating pre-k programs predict children's learning? *Science, 341,* 845-846

Scott, S. E., Cortina, K. S., & Carlisle, J. F. (2012). Understanding coach-based professional development in Reading First: How do coaches spend their time and how do teachers perceive coaches' work? *Literacy Research and Instruction, 51,* 68-85

Sheridan, S. M., Edwards, C. P., Marvin, C. A., & Knoche, L. L. (2009). Professional development in early childhood programs: Process issues and research needs. *Early Education and Development, 20,* 377-401

Snell, M. E., Forston, L. D., Stanton-Chapman, T. L., & Walker, V. L. (2013). A review of 20 years of research on professional development interventions for preschool teachers and staff. *Early Child Development and Care, 183,* 857-873

Stein, M. K., Smith, M. S., Silver, E. A. (1999). The development of professional developers: Learning to assist teachers in new setting in new ways. *Harvard Educational Review, 69,* 237-269

Tschannen-Moran, M., & McMaster, P. (2009). Sources of self-efficacy: four professional development formats and their relationship to self-efficacy and implementation of a new teaching strategy. *The Elementary School Journal, 110,* 228-245

Tsui, A. S., & Barry, B. (1986). Interpersonal affect and rating errors. *Academy of Management Journal, 29,* 586-599.

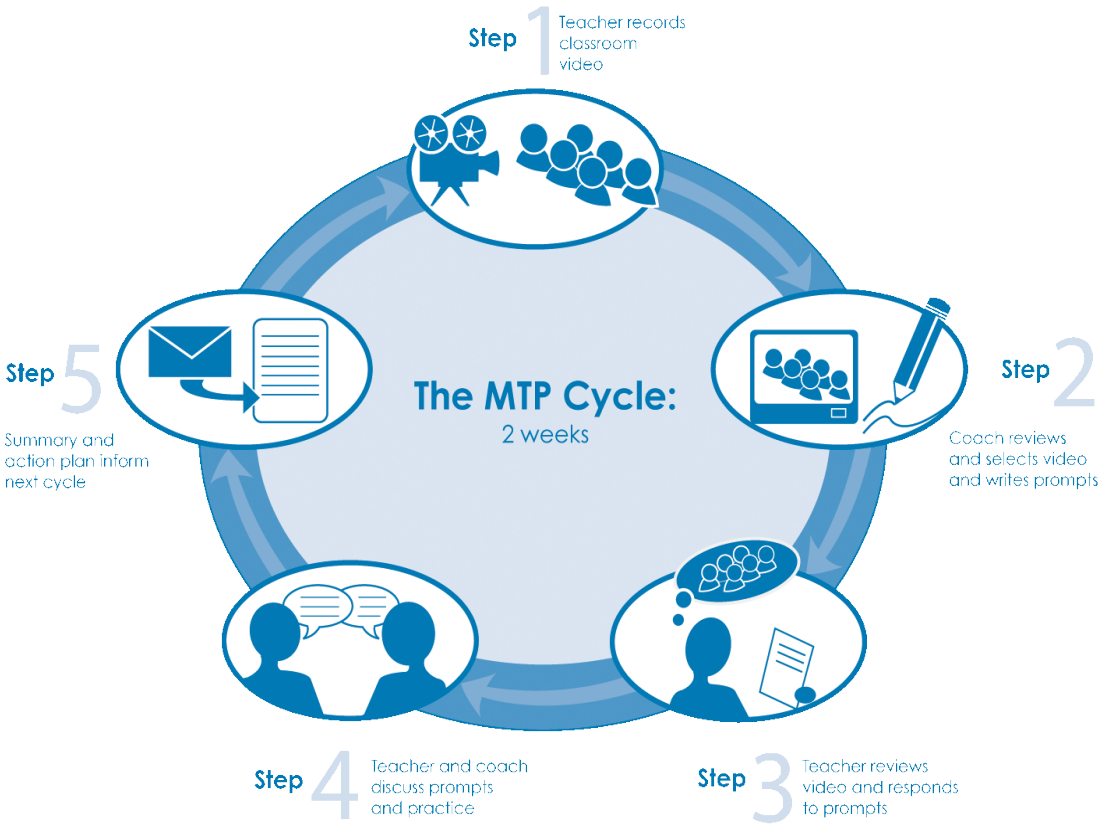
US Department of Education (2009). *Race to the Top program. Executive summary.* Washington D.C.: Author

Zaslow, M., Tout, K., & Halle, T. (2011). Differing purposes for measuring quality in early childhood settings: Aligning purpose with procedures. In M. Zaslow, I. Martinez-

Beck, K. Tout & T. Halle (Eds.), *Quality measurement in early childhood settings* (pp. 389-410). Falls Church, VA: Paul H. Brookes Publishing Co.

Zaslow, M., Tout, K., Halle, T., & Forry, N. (2009). *Multiple purposes for measuring quality in early childhood settings: Implications for collecting and communicating information on quality.* OPRE Issue Brief. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, and Child Trends.

Figure 1. *MyTeachingPartner Coaching Cycles*



# Reliability and Validity of Coach Ratings as an Assessment of Effective Teacher-Student Interactions

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## Abstract

This paper assesses coaches' ability to provide objective and valid ratings of teacher-child interactions. The study examines the association between a coach-ratings measure, the Teacher Knowledge and Skills Scale (TKSS), and the Classroom Assessment Scoring System (CLASS), an observational measure that has been found to be a valid assessment of teacher-child interactions. The study also examines the association between one possible source of bias, the coach-teacher relationship, and the coaches' ratings of teacher-child interactions. A sample of 162 early childhood teachers and 15 coaches participating in a coaching intervention participated in this study. Results show a strong correspondence between coaches' and observers' ratings of teacher-child interactions, as well as a tendency for coaches to rate teachers with whom they have higher-quality relationships more favorably. The paper discusses possible ways in which the coaches' ratings can be improved and used to have a more reliable, cost-effective way to assess teacher-child interactions.

## Can Coaches Be Good Raters of Teacher-Child Interactions in Early Childhood Settings?

As part of the current efforts to improve early childhood education, states and communities are searching for reliable, easy to implement, and cost-effective measures for indicators of quality in early childhood education programs (Howes et al., 2008; Zaslow, Tout, Halle & Forry, 2009; Zaslow, Tout & Halle, 2011). In addition, interventions that target early childhood programs are often interested in documenting whether or not their efforts to improve teachers' practice have been successful. A recent study by Sabol, Soliday Hong, Pianta & Burchinal (2013) found that observational assessments of teacher-child interactions are the strongest predictor of children's learning in early childhood education settings. Observation is often considered the gold-standard in assessment of teacher-child interactions (Cash, Hamre, Pianta & Myers, 2012; Domitrovich et al., 2009; Hassel, 2009; Pianta, 2006; Pianta & Hamre, 2009; Raver et al., 2008). However, observations can be costly and labor-intensive, posing an obstacle for assessing teacher-child interactions in practice (Blanton, Sindelar & Correa, 2006; Howes et al., 2008). This obstacle has generated a need for cost-effective assessments of teacher-child interactions.

Coach ratings of teacher-child interactions may be one alternative to costly observational measures. Coaching can be defined as a professional development model focused on providing teachers with individualized support to improve their teaching practice (Boatright, Galluci, Swanson, Van Lare & Yoon, 2008; Neuberger, 2012). In this form of professional development, coaches regularly observe teachers and provide feedback based on their observations. Thus, coaches are in a privileged position to assess teacher-child interactions. The present study assesses coaches' ability to provide valid ratings of teacher-child interactions by examining the association between a coach-ratings

measure, the Teacher Knowledge and Skills Scale (TKSS), and the Classroom Assessment Scoring System (CLASS), an observational measure that has been selected by the Office of Head Start as the instrument to be included in the monitoring process of its programs due to its validity and reliability (Burchinal, et al., 2010; Curby et al., 2009; Dominguez et al., 2010; Domitrovich et al., 2009; La Paro et al., 2009; Sabol et al., 2013), and the assessment of behaviors related to child development and later achievement (Office of Head Start, 2013) . These two measures were developed based on the Teaching Through Interactions framework (Hamre, Pianta et al., 2013). The study also looks into coaches' ability to provide objective ratings of teachers' interactions with children by examining the association between one possible source of bias, the coach-teacher relationship, and the coaches' ratings of teacher-child interactions.

**Assessing Teacher-Child Interactions**

Although observation is often considered the gold standard when assessing teacher-child interactions, researchers on K-16 teachers' performance have previously used reports from informants such as principals (Gray, 2010; Jacob & Lefgren, 2008), students (Kyriakides, 2005; Potvin, Hazari, Tai & Sandler, 2009), and even parents (Ostrander, 1996) as a cost-effective alternative to observational assessments, due to its high cost and logistical challenges. Although these reports may be affected by bias (e.g. principals may resort to un-standardized ways to assess their teachers [Bill and Melinda Gates Foundation, n.d.; Weisberg, Sexton, Mulhern & Keeling, 2009]), research has shown that they can provide valid assessments of teachers' behavior (Bill and Melinda Gates Foundation, 2012; Doumen, Koomen, Buyse, Wouters & Verschueren, 2012; Harris & Sass, 2009; Li, Hughes, Kwok, & Hsu, 2012).

However, some of these reports may be difficult to use in early childhood. Directors of early childhood education centers often do not have the time to regularly observe teachers in their classrooms (Arend, 2010; Guernsey & Ochshorn, 2011; Riley & Roach, 2006), thus limiting the reliability of director assessments of teacher-child interactions. Furthermore, although student ratings have been used to assess teacher-child interactions (Bill and Melinda Gates, n.d.; Kyriakides, 2005; Li et al., 2012; Potvin, Hazari, Tai & Sandler, 2009), there are concerns about using this method with young children. Young children may be confused by the tasks that rating their teacher would involve, they may have difficulties responding to verbal direction, and they may not respond consistently (National Research Council, 2008). Given these limitations, it is important to identify additional sources for reports on teachers' interactions with children in early childhood.

**Coaches as Raters**

In the past decades coaching interventions have begun to gain popularity, particularly in early childhood education (Domitrovich, et al., 2009; Driscoll & Pianta, 2010; Isner et al., 2011 Pianta et al., 2008; Powell et al., 2010; Raver, et al., 2008). Head Start's National Center on Quality Teaching and Learning (2012) identifies coaching as an effective professional development approach to support teachers' practice in the classroom and defines it as a cyclical approach that involves planning, observations of teachers' practice in the classroom and reflection and feedback about the practice. This widespread use of coaching means an extensive availability of coaches as possible reporters of teachers' interactions with children.

Coaches are in a unique position to assess teachers' interactions with children because of the amount of time they spend observing classrooms. Coaches repeatedly observe teachers' interactions with children over long periods of time (Becker, Bradshaw,

Domitrovich & Ialongo, 2013; Domitrovich et al., 2009; Isner et al., 2011; Pianta et al., 2008; Raver et al., 2008), which provides them with a large amount of information about these interactions and can increase the coaches' ability to reliably assess teachers' practice (Bill and Melinda Gates Foundation, 2012). However, coaches, just like other reporters, are susceptible to bias.

One type of bias that has been identified in general performance assessment situations is the dyad-specific bias (Hoyt, 2000) which refers to bias attributable to the raters' perception of specific ratees. For instance, a coach may rate higher those teachers who show more commitment to the coaching process, regardless of their observed level of teacher-child interactions. Dyad-specific bias may be of special concern with coaches' ratings because the constant interaction that is fundamental to a successful coaching process may promote closer relationships between coaches and teachers. These relationships may, in turn, bias the coaches' ratings of that specific teacher with coaches rating higher the teachers with whom they have higher-quality relationships. A similar concern is brought up by critics of principal ratings to assess teachers, who mention relationship bias as one of the elements that negatively affects principals' evaluations (Gray, 2010; Harris & Sass, 2006; Jacob & Lefgren, 2008; Ostrander, 1996).

Although there is not much research on the influence of the professional relationship in assessments in educational contexts, research from other fields shows that positive relationships between supervisors and subordinates can influence supervisors' ratings of the subordinates' performance. Research has found that subordinates with higher quality relationships with their supervisors obtain higher performance ratings than subordinates with lower quality relationships, after controlling for their objective performance (Breuer, Nieken & Sliwka, 2011; Duarte, Goodson & Klich, 1994; Ferris,

Munyon, Baski & Buckley, 2008; Lefkowitz, 2000; Ostroff, 1993; Tsui & Barry, 1986). Since a similar bias could be affecting coach ratings, the present study examines the associations between coach-teacher relationships and coaches' ratings of teacher interactions with childre.

**The present study: Teaching Through Interactions framework**

The purpose of this study is to assess the extent to which coaches can provide objective ratings of teacher-child interactions that correspond with observers' ratings in a validated observational instrument. Two specific questions were addressed: 1) To what extent are the coaches' ratings associated with the observational ratings made of teachers' classrooms by trained observers?; and 2) To what extent are the coaches' ratings associated with the quality of the coach-teacher relationship, both independently or in association with the observers' ratings? Knowing if bias affects coach ratings would allow us to develop strategies to reduce it and help coaches improve their ability to provide objective rating of teacher-child interactions.

Previous research on performance assessment has found that raters not only tend to rate higher the ratees with whom they have higher-quality relations, but that they also have an increased level of investment in the observation process when they were observing employees with whom they have higher-quality relationships (Antonioni & Park, 2001). A similar increased investment in our study could improve the coaches' recall of effective interactions, leading to more accurate ratings. Thus, the quality of the coach-teacher relationship could affect the coaches' ratings by leading coaches to provide higher more accurate ratings (closer to the observers' ratings) for those teachers with whom they have higher-quality relationships. Based on this research we hypothesize that coaches will

provide higher and more accurate ratings to teachers with whom they report higher-quality relationships.

The two measures of teacher-child interactions used in this study (the TKSS and the CLASS) are based on the Teaching Through Interactions framework (TTI; Hamre, Pianta et al., 2013), a research-based model of effective teacher-child interactions. The TTI framework focuses in three domains of teacher-child interactions: (a) emotional support, which includes how teachers promote social and emotional functioning in the classroom; (b) classroom organization, which includes "processes related to the organization and management of children's behavior, time, and attention in the classroom" (Pianta, La Paro & Hamre, 2008, p. 3); and (c) instructional support, which encompasses the teacher's efforts to promote learning in its classroom. In spite of the theoretical differentiation between these three domains, recent studies have found that an overall factor including elements from all domains predicts children's outcomes across developmental domains (Hamre, Hatfield, Pianta & Jamil, 2013).

## Method

### Participants

The data for this study were collected as part of a larger intervention aimed at improving teacher-child interactions for early childhood teachers. The intervention was implemented in nine sites across the United States. The present study includes data on 153 teachers who participated in the coaching condition of the intervention, and their 15 coaches.

The 15 coaches participating on this study were all female, and the majority were White or Caucasian (13), with only 2 coaches identifying themselves as African-American. Most of the coaches had at least a Master's degree (10), while the remaining coaches either

were education specialists or had a professional diploma (3), or had a doctoral degree (2). Coaches' years of teaching experience ranged from 1.5 to 32 years, with a mean of 14.73 years (SD=9.74). Each coach was working with an average of 11 teachers (range 6 to 14).

Like coaches, participating teachers were mostly females (91.4%), but their race/ethnicity was more diverse, with 43.2% of the teachers being African-American, 35.7% White or Caucasian, 14.6% Hispanic, 1.9% Asian and 3.1% Other. Half of the teachers (50.6%) participating in the intervention were working in a Head Start program and 36.4% were located in a public school. 39.1% of the teachers had an associate's degree or less, 37.2% had a Bachelor's degree and 23.7% had a Master's degree or higher. The teaching experience of these teachers ranged from 0 to 43 years, with a mean of 14.56 years (SD=9.56).

**Procedures**

Teachers in this study participated in the MyTeachingPartner coaching intervention (MTP; Pianta, Mashburn, Downer, Hamre & Justice, 2008). This intervention focuses on providing teachers with opportunities to receive feedback and support on their interactions with children (Pianta, et al., 2008). This intervention consists of a web-mediated coaching process in which every two weeks teachers videotape themselves in an activity in the classroom and mail the tape to their coach. The coach watches the entire tape and provides written prompts for each video, focusing teachers on a specific aspect of their interactions. Teachers and coaches then have phone conferences to discuss the prompts and to develop a plan for the next cycle, when the process begins again. The number of coaching cycles a teacher completed varied, with teachers completing an average of 10 cycles (range from 1 and 21).

**Measures**

**Coach ratings of teacher-child interactions.** At the end of the intervention coaches were asked to complete the TKSS (Author, 2008a) for each of the teachers with whom they worked. This 22-item scale measures coaches' perceptions of the quality with which a teacher is interacting with the children and includes items from each one of the three domains of the TTI framework, such as "Teacher provides kids with comfort and assurance" and "Teacher gives kids hints when they can't figure the response out". For this scale coaches were asked to select the response that reflected how much they had seen the teacher engaging in the specified behavior on a 5-point Likert scale in which 1 was *Never* and 5 was *Very Frequently.* This measure showed high internal consistency, with an alpha of .967.

**Observational measure of teacher-child interactions.** The Classroom Assessment Scoring System, CLASS (Pianta, La Paro & Hamre, 2008), is an observational instrument scored from 1 *(low)* to 7 *(high)* that assesses teacher-child interactions (Hamre, Pianta, et al., 2013). Previous research using the CLASS has shown the predictive validity of this measure in relation to children's academic, language and social skills (Curby et al., 2009; Mashburn et al., 2008; Sabol et al., 2013).

For the purpose of this study, a team of observers trained on the CLASS coded the first 30 minutes of videos submitted by the teachers during the coaching process. Training consisted of a presentation of short videos that illustrated the CLASS dimensions, followed by a practice coding of five master-coded videos. In order to be able to code, observers had to pass a reliability test in which they needed to score within one point of the master code in 80% of the scores for five videos. During the time the observers were coding they attended weekly meetings to avoid drift on their codes due to rater bias. This study used the overall CLASS score at the end of the intervention, which averaged the scores for the tapes sent by

teachers during the last four months of the intervention year (between March and June). All segments were double coded and inter-rater reliability was conducted across all footage, with ICCs calculated at the tape level ranging from .42-.51. Internal consistency was calculated using the scores for the three CLASS domains, resulting in an alpha of .83, showing good internal consistency of the measure.

**Coach-teacher relationship.** The Teacher-Coach Relationship Scale (TCRS, Author, 2008b) was used to assess coaches' perceptions of a teacher's engagement in the experience and relationship with the coach. This 7-item scale was adapted from a previous version used in research with preservice teachers. The measure is set on a response scale from 1 (Strongly Disagree) to 5 (Strongly Agree). Examples of the items include "I have a good relationship with the teacher," "I am comfortable sharing ideas with the teacher," and "Interactions with the teacher leave me annoyed and frustrated" (reverse item). The internal consistency of the TCRS in this study was high (alpha = .92)

**Data analysis**

A hierarchical linear regression was conducted to examine the degree to which the observational ratings of teacher-child interactions (measured by the CLASS) and the quality of the coach-teacher relationship (as measured by the TCRS) predicted the coaches' ratings of these interactions (measured by the TKSS). This regression controlled for the coaches' years of education and of teaching experience, and the number of coaching cycles in which the teacher participated. To account for the fact that teachers are nested in coaches, the analyses were run in HLM7 Student with a two-level model in which teachers were nested within coaches. The first step of the regression added the observational ratings of teacher-child interactions to the model and the second step added the quality of the coach-teacher relationship. To test the hypothesis that coaches provide more accurate

ratings of teachers with whom they have a higher-quality relationship in the third step we added an interactional term between the observers' ratings and the coach-teacher relationship.

## Results

The goal of this study was to assess coaches' ability to provide objective ratings of teacher-child interactions that correspond with a previously validated observational measure. Descriptive statistics and bivariate correlations are presented in table 1. These correlations show that the coaches' ratings have a moderate positive correlation with both the observers' ratings and the coach-teacher relationship.

### Associations between coaches' and observers' ratings

The first research question examined the extent to which coaches' ratings of teacher-child interactions are associated with observational ratings in a validated instrument. Model 2 in Table 2 presents the results of the first step in the linear regression that examined this association. This analysis found a strong correspondence between observers' and coaches' ratings of teacher-child interactions, even after adding the quality of the coach-teacher relationship to the model (see Model 3 in table 2, $\beta = .649$, $p < .001$). This means that after taking into account the association between the coaches' ratings and their relationship with the teachers, teachers' interactions with children receive similar ratings from the coaches and from the trained observers.

### Role of coach-teacher relationship

Next, the extent to which coaches' ratings are associated with the quality of the coach-teacher relationship was assessed. Models 3 and 4 present the last steps of the linear regression. Model 3 includes the quality of the coach-teacher relationship and observers'

ratings of the teacher-child interactions, while Model 4 adds an interactional effect between the quality of the coach-teacher relationship and the observers' ratings.

These analyses show that (a) there is a significant relation between the quality of the coach-teacher relationship and coaches' ratings ($\beta = .203$, $p = .005$), but (b) there is no significant relation between the interaction of the quality of the coach-teacher relationship and the observers' ratings, and the coaches' ratings ($\beta = .154$, $p = .150$). This means that coaches tend to give higher ratings to teachers with whom they have a higher-quality relationship, regardless of the level of effective teacher-child interactions identified by an objective observer. Coach-teacher relationship explained 14% of the variance in the coaches' ratings after controlling for the observers' ratings of teacher-child interactions. These findings confirm our hypothesis of a tendency of coaches to report higher levels of teacher-child interactions when they have a higher-quality relationship with a teacher, but they also provide evidence to reject the hypothesis that coaches may provide more *accurate* ratings to teachers with whom they have a higher quality relationship.

## Discussion

The goal of this study was to establish whether coaches' ratings of teacher-child interactions could be a cost-effective alternative to observational instruments, by providing objective ratings that are associated with trained observers' ratings in a validated observational instrument. The study provides evidence that coaches can provide ratings of teacher-child interactions that correspond well with observers' ratings. The results failed to confirm our initial hypothesis of the association between coaches' ratings and the coach-teacher relationship differing depending on the observers' ratings of teacher-child interactions. The results did show, however, that coaches' tend to rate teachers' interactions with children higher when they have a higher-quality relationship with them. In summary

coaches' ratings corresponded well with observers' ratings and this association was the same across teachers, regardless of the quality of the coach-teacher relationship. This finding provides support to the use of coaches' ratings to assess teacher-child interactions.

The use of coaches as reporters of teacher-child interactions has several advantages. Classroom observation is already one of the coaches' main tasks, and in these observations the coaches are already focused on the teacher's practice. Coaches typically focus both on behaviors that are promoting children's learning and development or that should be improved to achieve the desired goal. Since coaches are already collecting information about effective teacher-child interactions, a coach-reported measure such as the one used in this study would not be a demanding extra task on the coaches. This, added to the short length of the instrument, allows coaches to quickly provide ratings of their teachers' interactions with children.

The TKSS may also be a measure that could be used for other reporters, such as program directors, to rate teachers. A measure that allows directors to focus on specific interactions in the classroom provides a standardized way to assess teacher-child interaction and it could be an improvement from ratings that tend to be based on less standardized information, such as informal parent feedback and walk-throughs (Davidson-Taylor, 2002; Jacob & Lefgren, 2008; Skretta, 2007). Although this study presents evidence of the coaches' ability to provide objective, valid scores on the TKSS, further research would be needed to assess if this is a measure that is feasible for program directors to use given their constraints to regularly observe classrooms, and whether or not they can also provide reliable and valid scores.

Although this study provides evidence regarding the correspondence between coaches' and trained observers' ratings of teacher-child interactions, coaches' tendency to

provide higher ratings to those teachers with whom they have higher-quality relationships could generate doubts about the effectiveness of the use of their ratings. Further research is required to understand this bias. Research in similar fields regarding the mediating role of the rater's affect in the association between the relationship and the ratings (Judge & Ferris, 1993) could be a starting point for further research. Affect could influence the information that coaches attend to, how they interpret it, how they select it to make judgments and how they recall it (Forgas & George, 2001). This influence could lead coaches to unintentionally interpret their observations in a way that matches their initial perception of the teacher (Duarte et al., 1994). In a way, this bias then may be a result of unavailability to the coach of complete information about the teacher's interactions with children.

One way to reduce this tendency on coaches would be to train them to use all the relevant information to make the ratings. This training could include a process in which coaches are trained and then required to take detailed notes of their teacher observations using the required framework (in this case the TTI). The process of taking these detailed notes would allow coaches to base their ratings in specific interactions seen in the observation instead of their general impression after the observation. It would also provide the coach with a written record of what happened in the classroom that could be used to both to inform the coaching process and to make the ratings, decreasing the need for the coach to recall these interactions and providing a more accurate account of the teacher-child interactions. Similar rater trainings, focused on improving the observational process of raters in other fields, have found that such trainings effectively increase the reliability of the reporters' ratings (Kline & Sulsky, 2009; Noonan & Sulsky, 2001; Roch & O'Sullivan, 2003).

Another way to increase the precision of this assessment of teacher-child interactions is to use it in combination with reports from other sources that could complement each other and provide a more complete picture of what happens in the classroom. Previous research has found that multisource assessments are more reliable than single reporter assessments (Bill and Melinda Gates Foundation, 2012; Li, Hughes, Kwok, & Hsu, 2012). Some monitoring systems of early childhood programs already collect other ratings of teacher-child interactions such as teacher self-reports ratings (Howes et al., 2008). These reports, along with ratings from teacher aides or from other teachers that observe the teacher, could be used to complement the coaches' ratings. Since these ratings are already being collected as part of the monitoring systems they would not be an extra burden on the teachers, maintaining the cost-effectiveness of the measure. The present study only shows how a measure of coaches' ratings of teacher-child interactions could be a valuable addition to a multisource assessment. However, further research would be needed to assess the reliability and validity of other reporters' ratings in early childhood education and of a multisource assessment.

Although this study interpreted the significant relation between the coach-teacher relationship and the coaches' ratings as a bias in the coaches' ratings due to the quality of the relationship, it is also possible that coaches engage in higher-quality relationships with teachers that show higher levels of teacher-child interactions. A higher level of teacher-child interactions may facilitate the coaching process and increase the opportunities for coaches to provide positive feedback and reinforcement, creating a positive climate in the coaching process that is more conducive to higher-quality coach-teacher relationships. Further research is needed to better understand how a high-quality coach-teacher

relationship develops in order to improve our understanding of its relation with coaches' ratings.

If coaches are to be used as reporters of teacher-child interactions in the context of high-stakes decision making, there is a need to consider the effects of this task on the coaching process. The coach-teacher relationship has been identified as an important mechanism behind coaching's effectiveness (Cox, 2012; Vukovich, 2009; Wehby et al., 2012). Introducing the assessment as part of the coaches' task may endanger the establishment of a positive relationship between the coach and teacher because it may change it from a helping one to an evaluative one. If researchers or policymakers are going to use coaches as reporters of teacher-child interactions, this assessment should be framed as part of a process to help the teacher improve in the classroom and to identify program-wide issues that should be targeted in future professional development efforts.

**Limitations**

This study has several limitations. One of them is the role of coaches' training in the study. In MTP coaches received training on the TTI framework, which is the basis for both the CLASS and the TKSS. This type of coaches' training, however, is an exception from what coaching interventions usually do, especially in Head Start Settings. In most cases, coaches' expertise is assumed to be a prerequisite for the job and training is not provided. Coaches are usually left on their own when trying to figure out how to implement the coaching intervention (Galluci, Van Lare, Yoon & Boatrights, 2010). Research has found that training can increase raters' accuracy (Cash et al., 2012; Hoyt & Kerns, 1999), so it is possible that that coaches who not trained in the CLASS would not provide reports that corresponded as highly with observed interactions. Future research should examine whether coaches without training are able to provide reliable reports on the TKSS.

A second limitation in this study concerns the timing of measurement. While observational data were a composite of the last four months of observers' ratings of teacher-child interactions, the coaches' ratings were only collected once at the end of the year. Coaches were asked to base their ratings on the last observations they made of the teachers' practice, which typically varied from March though June. Better aligning the timing of assessments may improve the level of correspondence between coach ratings and observations.

**Summary**

The present study provides initial evidence of coaches' ability to rate teachers' interactions with children in a way that corresponds with observers' ratings in a validated observational instrument. However, the results also show that the coaches rate teachers' interactions with children higher when they have a higher-quality relationship with them. Despite this limitation, coaches' ratings could be a cost-effective option for programs and policymakers interested in assessing teacher-child interactions. To improve the reliability of coaches' ratings programs and policymakers could provide coaches with tools to help them use all the relevant information to make their ratings, or they could use coaches' ratings along with ratings of other reporters of the teachers' practice to increase the reliability of the measure. Further research is needed to examine the validity of the suggested multisource assessment in relation to both other validated assessments of teacher-child interactions (e.g. classroom observations), but also to children outcomes, as well as the effectiveness of coaches' training to increase the reliability of their assessments.

## References

Antonioni, D., & Park, H. (2001). The relationship between rater affect and three sources of 360-degree feedback ratings. *Journal of Management, 27,* 479-495. doi:10.1177/014920630102700405

Arend, L. E. (2010). *The current state of early childhood education programs: How early childhood center directors manage their human resources.* (Doctoral dissertation). Retrieved from Proquest Dissertations and Theses (3411817).

Becker, K. D., Bradshaw, C. P., Domitrovich, C., & Ialongo, N. S. (2013). Coaching teachers to improve implementation of the Good Behavior Game. *Administration and Policy in Mental Health and Mental Health Services Research.* Advance online publication. doi: 10.1007/s10488-013-0482-8

Bill and Melinda Gates Foundation (no date). *Learning about Teaching. Initial Findings from the Measures of Effective Teaching Project.* Retrieved from: http://www.gatesfoundation.org/college-ready-education/Documents/preliminary-findings-research-paper.pdf

Bill and Melinda Gates Foundation (2012). *Gathering Feedback for Teachers. Combining High-Quality Observations with Student Surveys and Achievement Gains.*

Bollen, K. A. (1989). A new incremental fit index for general structural models. *Sociological Methods & Research, 17,* 303–316. doi:10.1177/0049124189017003004

Breuer, K., Nieken, P., & Sliwka, D. (2011). Social ties and subjective performance evaluations: an empirical investigation. *Review of Managerial Science.* Retrieved from http://www.springerlink.com/content/rw36318525383m8g/

Byrne, B. M. (2001). *Structural equation modeling with AMOS. Basic concepts, applications, and programming.* Mahwah, NJ: Lawrence Erlbaum Associates.

Burchinal, M., Vandergrift, N., Pianta, R., & Mashburn, A. (2010). Threshold analysis of association between child care quality and child outcomes for low-income children in pre-kindergarten programs. *Early Childhood Research Quarterly, 25,* 166-176. doi:10.1016/j.ecresq.2009.10.004

Cash, A. H., Hamre, B. K., Pianta, R. C., & Myers, S. S. (2012). Rater calibration when observational assessment occur at large scale: Degree of calibration and characteristics of raters associated with calibration. *Early Childhood Research Quarterly, 27,* 529-542. doi:10.1016/j.ecresq.2011.12.006

Cox, E. (2012). Individual and organizational trust in a reciprocal peer coaching context. *Mentoring and Tutoring: Partnership in Learning, 20,* 427-443. doi:10.1080/13611267.2012.701967

Curby, T. W., LoCasale-Crouch, J., Konold, T. R., Pianta, R. C., Howes, C., Burchinal, M., . . . Barbarin, O. (2009). The relations of observed pre-K classroom quality profiles to children's achievement and social competence. *Early Education & Development, 20,* 346-372. doi:10.1080/10409280802581284

Davidson-Taylor, C. (2002). Is instruction working? Students have the answer. *Principal Leadership, 3,* 30-35. Retrieved from http://www.nassp.org/tabid/2043/default.aspx

Domitrovich , C. E., Gest, S. D., Gill, S., Bierman, K. L., Welsh, J. A. & Jones, D. (2009). Fostering high-quality teaching with an enriched curriculum and professional development support: The Head Start REDI Program. *American Educational Research Journal 46* 2, 567-597. doi:10.3102/0002831208328089

Doumen, S., Koomen, H. M. Y., Buyse, E., Wouters, S. & Verschueren, K. (2012). Teacher and observer views on student-teacher relationships: convergence across kindergarten and relations with student engagement. *Journal of School Psychology, 50,* 61-76. doi:10.1016/j.jsp.2011.08.004

Downer, J. T., Locasale-Crouch, J., Hamre, B. & Pianta, R. (2009). Teacher characteristics associated with responsiveness and exposure to consultation and online professional development resources. *Early Education and Development, 20,* 431-455. doi:10.1080/10409280802688626

Driscoll, K. C. & Pianta, R. C. (2010). Banking time in Head Start: Early efficacy of an intervention designed to promote supportive teacher-child relationships. *Early Education and Development, 21,* 38-64. doi:10.1080/10409280802657449

Duarte, N. T., Goodson, J. R., & Klich, N. R. (1994). Effects of dyadic quality and duration on performance appraisal. *Academy of Management Journal, 37*, 499−521. doi:10.2307/256698

Ferris, G. R., Munyon, T.P., Baski, K. & Buckley, M. R. (2008). The performance evaluation context: Social, emotional, cognitive, political, and relationship components. *Human Resource Management Review, 18,* 146-163. doi:10.1016/j.hrmr.2008.07.006

Forgas, J. P., & Gorge, J. M. (2001). Affective influences on judgments and behavior in organizations: An information processing perspective. *Organizational Behavior and Human Decision Processes, 86,* 3-34. doi:10.1006/obhd.2001.2971

Galluci, C., Van Lare, M. D., Yoon, I. H., & Boatright, B. (2010). Instructional coaching: Building theory about the role and organizational support for professional learning.

*American Education Research Journal, 47,* 919-963. doi:10.3102/0002831210371497

Gray, J. J. (2010). *Are Principals Good at Identifying Effective Teachers? A Comparison of Teachers' Principal Ratings and Residual Gain on Standardized Tests.* (Doctoral dissertation) Retrieved from Proquest Dissertations and Theses. (305206320)

Guernsey, L., & Ochschorn, S. (2011). *Watching teachers work. Using observation tools to promote effective teaching in the early years and early grades.* Washington, DC: New America Foundation

Hamre, B.K., Hatfield, B., Pianta, R.C., & Jamil, F. (2013). Evidence for general and domain-specific elements of teacher-child interactions: Associations with preschool children's development. *Child Development*. Advance online publication. doi: 10.1111/cdev.12184

Hamre, B. K., Pianta, R.C., Downer, J. T., Decoster, J., Mashburn, A.J., Jones, S., … Hamagami, A. (2013). Teaching through interactions: testing a developmental framework of effective teaching in over 4,000 classrooms. *Elementary School Journal, 13,* 461-487. doi: 0013-5984/2013/11304-000

Hassel, B. C. (2009). *How Should States Define Teacher Effectiveness?* [Power Point slides]. Retrieved from: http://www.publicimpact.com/publications/PublicImpact-How_Should_States_Define_Teacher_Effectiveness.pdf

Howes, C., Pianta, R., Bryant, D., Hamre, B., Downer, J., & Soliday-Hong, S. (2008). *Ensuring effective teaching in early childhood education through linked professional development systems, quality rating systems and state competencies: The role of research in an evidence-driven system* (pp. 1-16). Arlington, VA: National Center for Research on Early Childhood Education

Hoyt, W. T. (2000). Rater bias in psychological research: When is it a problem and what can we do about it? *Psychological Methods, 5,* 64-36. doi: IO.I037//I082-9S9X.5 1,64

Hoyt, W. T. & Kerns, M. D. (1999). Magnitude and moderators of bias in observer ratings: A meta-analysis. *Psychological Methods, 4,* 403-434. doi: 1082-989X/99/S3.00

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6,* 1–55. doi:10.1080/10705519909540118

Isner, T., Tout, K., Zaslow, M., Soli, M., Quinn, K., Rothenberg, L., & Burkhauser, M. (2011). *Coaching in early care and education programs and Quality Rating and Improvement Systems (QRIS): Identifying promising features.* Report produced for

the Children's Services Council of Palm Beach County. Washington, DC: Child Trends.

Jacob, B. A. & Lefgren, L. (2008). Can principals identify effective teachers? Evidence on subjective performance evaluation in education. *Journal of Labor Economics, 26,* 101-136. doi: 10.1086/522974

Judge, T. A., & Ferris, G. A. (1993). Social context of performance evaluation decisions. *Academy of Management Journal, 36,* 80-105. doi:10.2307/256513

Kline, T. J. B., & Sulsky, L. M. (2009). Measurement and assessment issues in performance appraisal. *Canadian Psychology, 50,* 168-171. doi: 10.1037/a0015668

Kreft, I. & De Leeuw, J. (1998). *Introducing Multilevel Modeling.* London: Sage Publications.

Kyriakides, L. (2005). Drawing from teacher effectiveness research and research into teacher interpersonal behaviour to establish a teacher evaluation system: A study on the use of student ratings to evaluate teacher behaviour. *Journal of Classroom Interaction, 40,* 2, 44-66. Retrieved from http://www.jciuh.org/

La Paro, K. M., Hamre, B. K., Locasale-Crouch, J., Pianta, R. C., Bryant, D., Early, D., … Burchinal, M. (2009). Quality in kindergarten classrooms: Observational evidence for the need to increase children's learning opportunities in early education classrooms. *Early Education and Development. 20,* 657-692. DOI:10.1080/10409280802541965

Lefkowitz, J. (2000). The role of interpersonal affective regard in supervisory performance ratings: A literature review and proposed causal model. *Journal of Occupational and Organizational Psychology, 73,* 67-85. doi: 10.1348/096317900166886

Li, Y., Hughes, J. N., Kwok, O. & Hsu, H. (2012). Evidence of convergent and discriminant validity of child, teacher, and peer reports of teacher-student support. *Psychological Assesment, 24,* 54-65. doi: 10.1037/a0024481

LoCasale-Crouch, J., & Hamre, B. K. (2008a). *Teacher Knowledge and Skills Survey.* Unpublished manuscript, Center for the Advanced Study of Teaching and Learning, University of Virginia.

LoCasale-Crouch, J., & Hamre, B. K. (2008b). *Teacher-Coach Relationship Scale.* Unpublished manuscript, Center for the Advanced Study of Teaching and Learning, University of Virginia.

Mashburn, A. J., Downer, J. T., Hamre, B. K., Justice, L. M. & Pianta, R. C. (2010). Consultation for teachers and children's language and literacy development during

pre-kindergarten. *Applied Developmental Science, 14,* 179-196. doi:10.1080/10888691.2010.516187

Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., … Early, D. M. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development, 79,* 732-749. doi: 10.1111/j.1467-8624.2008.01154.x

National Center on Quality Teaching and Learning (2012). *What do we know about coaching?* Retrieved from http://eclkc.ohs.acf.hhs.gov/hslc/tta-system/teaching/docs/What-Do-We-Know-About-Coaching.pdf

National Research Council. (2008). *Early Childhood Assessment: Why, What, and How?* Washington, DC: The National Academies Press.

Neuberger, J. (2012). Benefits of a teacher and coach collaboration: A case study. *The Journal of Mathematical Behavior, 21,* 290-311. doi:10.1016/j.jmathb.2011.12.004

Noonan, L. E., & Sulsky, L. M. (2001). Impact of frame-of-reference and behavioral observation training on alternative training effectiveness criteria in a Canadian military sample. *Human Performance, 14, 3-26.* doi: 10.1207/S15327043HUP1401_02

Office of Head Start (2013). *Use of Classroom Assessment Scoring System (CLASS$^{TM}$) in Head Start.* Retrieved from http://eclkc.ohs.acf.hhs.gov/hslc/sr/quality/class

Ostrander, L. R. (1996). *Multiple Judges of Teacher Effectiveness: Comparing Teacher Self-Assesments with the Perception of Principals, Students and Parents.* Paper presented at the Annual Meeting of the American Educational Research Association (New York, NY, April 8-12). Retrieved from http://eric.ed.gov/?id=ED399267

Ostroff, C. (1993). Rater perceptions, satisfaction and performance ratings. *Journal of Occupational and Organizational Psychology, 66,* 345-356. doi: 10.1111/j.2044-8325.1993.tb00544.x

Pianta, R.C. (2006). *Standardized Classroom Observations from Pre-K to 3$^{rd}$ Grade: A Mechanism for Improving Access to Consistently High Quality Classroom Experiences and Practices During the P-3 Years.* Discussion paper 103, Early Childhood Research Collaborative. Retrieved from http://humancapitalrc.org/dp_catalog/DP103.pdf

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., La Paro, K. M., & Hamre, B. K. (2008). *Classroom Assessment Scoring System (CLASS), Manual, Pre-K.* Baltimore: Paul H. Brookes.

Pianta, R. C., Mashburn, A. J., Downer, J. T., Hamre, B. K. & Justice, L. (2008). Effects of web-mediated professional development resources on teacher-child interactions in pre-kindergarten classrooms. *Early Childhood Research Quarterly, 23,* 431-451. doi:10.1016/j.ecresq.2008.02.001

Potvin, G., Hazari, Z., Tai, R. H. & Sandler, P. M. (2009). Unraveling bias from student evaluations of their high school science teachers. *Science Education, 93,* 827-845. doi: 10.1002/sce.20332

Powell, D. R., Diamond, K. E., Burchinal, M. R., & Koehler, M.J. (2010). Effects of an early literacy professional development intervention on Head Start teachers and children. *Journal of Educational Psychology, 102,* 299-312. doi: 10.1037/a0017763

Raver, C.C., Jones, S. M., Li-Grining, C.P., Metzger, M., Champion, K. M., & Sardin, L. (2008). Improving preschool classroom processes: Preliminary findings from a randomized trial implemented in Head Start settings. *Early Childhood Research Quarterly, 23,* 10-26. doi:10.1016/j.ecresq.2007.09.001

Riley, D. A., & Roach, M. A. (2006). Helping teachers grow: Toward theory and practice of an "emergent curriculum" model of staff development. *Early Childhood Education Journal, 33,* 363-370. doi: 10.1007/s10643-006-0068-0

Roch, S. G., & O'Sullivan, B. J. (2003). Frame of reference rater training issues: recall, time and behavior observation training. *International Journal of Training and Development, 7,* 93-107. doi: 10.1111/1468-2419.00174

Sabol, T. J., Soliday Hong, S. L., Pianta, R. C., & Burchinal, M. R. (2013). Can rating pre-k programs predict children's learning? *Science, 341,* 845-846. doi: 10.1126/science.1233517

Skretta, J. (2007). Using walk-throughs to gather data for school improvment. *Principal Leadership, 7,* 16-23. Retrieved from http://www.nassp.org/tabid/2043/default.aspx

Tsui, A. S., & Barry, B. (1986). Interpersonal affect and rating errors. *Academy of Management Journal, 29,* 586-599. doi:10.2307/256225

Vukovich, G. (2009). *The ethic of care: A qualitative study on the relationship between coach and teacher.* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (304844875).

Wehby, J. H., Maggin, D. M., Partin, T. C. M., & Robertson, R. (2012). The impact of working alliance, social validity, and teacher burnout on implementation fidelity of

the Good Behavior Game. *School Mental Health, 4,* 22-33. doi: 10.1007/s12310-011-9067-4

Weisberg, D., Sexton, S., Mulhern, J., & Keeling, D. (2009). *The Widget Effect: Our National Failure to Acknowledge and Act on Differences in Teacher Effectiveness.* New York, NY: The New Teacher Project.

Zaslow, M., Tout, K., & Halle, T. (2011). Differing purposes for measuring quality in early childhood settings: Aligning purpose with procedures. In M. Zaslow, I. Martinez-Beck, K. Tout & T. Halle (Eds.), *Quality measurement in early childhood settings* (389-410). Falls Church, VA: Paul H. Brookes Publishing Co.

Zaslow, M., Tout, K., Halle, T., & Forry, N. (2009). *Multiple purposes for measuring quality in early childhood settings: Implications for collecting and communicating information on quality.* OPRE Issue Brief. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, U.S. Department of Health and Human Services, and Child Trends.

Table 1. *Descriptive Statistics and Correlations.*

| | | | Correlations | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 |
| 1. Coaches' years of education | 18.47 | .75 | - | -.252* | -.016 | -.002 | .276* | 303* |
| 2. Coaches' years of teaching experience | 14.73 | 9.74 | | - | -.120 | -.026 | .079 | .053 |
| 3. Number of coaching cycles | 10.86 | 3.58 | | | - | .384* | .526* | .389* |
| 4. Observational ratings of teacher-child interactions | 4.48 | .526 | | | | - | .438* | .570* |
| 5. Coach-teacher relationship | 4.27 | .829 | | | | | - | .552* |
| 6. Coaches' ratings of teacher-child interactions | 3.614 | .765 | . | | | | | - |

* $p < .01$

Table 2. *Prediction of Coach Rating Scores of Teacher-Child Interactions (TKSS) by Observed Ratings (CLASS Scores) and Quality of Coach-Teacher Relationship (TCRS), and the Interaction between CLASS and TCRS.*

| | Model 1[a] β (p) | Model 2[b] β (p) | Model 3[b] β (p) | Model 4[d] β (p) |
|---|---|---|---|---|
| Intercept | -4.11 (.031) | -3.46 (.071) | -1.80 (.357) | -1.88 (.343) |
| Level 1 (teacher) | | | | |
| Number of coaching cycles | .088 (<.001) | .046 (.001) | .022 (.148) | .022 (.149) |
| Observational ratings | | .728 (<.001) | .649 (< .001) | .665 (<.001) |
| Coach-teacher relationship | | | .203 (.005) | .235 (.002) |
| Observational ratings x coach-teacher relationship | | | | .154 (.150) |
| Level 2 (coach) | | | | |
| Coaches' years of education | .036 (.002) | .346 (.003) | .273 (.017) | .276 (.017) |
| Coaches' years of teaching experience | .015 (.058) | .013 (.097) | .009 (.245) | .008 (.284) |
| Deviance | 320.404 | 271.866 | 265.587 | 267.985 |

[a] Unconditional model, includes only covariates. [b] Includes covariates and observational ratings. [c] Adds the coach-teacher relationship to model 1. [d] Adds the interaction between observational ratings and coach-teacher relationship to model 2.

# Variation in Coaches Implementation of a Coaching Intervention and its Association with Teacher Outcomes: Results from MyTeachingPartner.

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**Abstract**

The present study examines the implementation of MyTeachingPartner by looking at the variation in coaches' implementation of specific features of the model (clear focus on interactions, cognitive challenge, teachers' ratings of conference usefulness and coach-teacher relationship), the association between this variation and changes in teachers' ability to analyze their interactions with children, their self-efficacy and their observed teaching practice, and the ways in which these associations outcomes vary as a function of teachers' years of education and their level of observed practice at the beginning of the intervention. Findings indicate that although variation in coaches' implementation is minimal, it was significantly associated with changes in teachers' outcomes. There was no evidence that teachers' years of education moderated the association between implementation and teachers' outcomes, but teachers with initial lower-quality practice showed more change in practice and less change in self-efficacy when they perceived the conference to be more useful.

**Variation in Coaches Implementation of a Coaching Intervention and its Association with Teacher Outcomes: Results from MyTeachingPartner.**

Coaching is a professional development model aimed at establishing one-on-one learning opportunities for teachers to receive support regarding their teaching practice (Boatright, Galluci, Swanson, Van Lare & Yooon, 2008; Neuberger, 2012). In early childhood education settings several interventions (Domitrovich, Gest, Gill, Bierman et al., 2009; Pianta, Mashburn, Downer, Hamre & Justice, 2008; Powell, Diamond, Burchinal & Koebler, 2010; Raver, et al., 2008), as well as Quality Ratings and Improvement Systems (QRIS) and their professional development projects include coaching as one of their strategies (Isner et al., 2011). Evaluations found positive impacts on both teachers' practice and students' outcomes across different content areas (Domitrovich, Gest, Gill, Bierman et al., 2009; Hindman &Wasik,2012; Landry, Swank, Smith, Assel & Gunnewig, 2006; Pianta et al., 2008; Powell et al., 2010; Raver et al., 2008).

However, most of this research has neglected the *process* of coaching implementation (Galluci, Van Lare, Yoon & Boatright, 2010; Gupta & Daniels, 2012; LoCasale-Crouch, Cabell, Jimenez & Taylor, in press; Power & Diamond, 2013; Sheridan, Edwards, Marvin & Knoche, 2009; Zaslow et al., 2010). Individual coaches may differ in their implementation by taking varying approaches to their work with teachers and they may also differentiate their implementation of the intervention to match each teacher's specific needs. Thus teachers being coached as a part of the same intervention model may be receiving somewhat different experiences. Knowing how coaches implement an intervention and how this implementation is related to teacher outcomes can provide useful information about possible improvements to the intervention (Isner et al., 2011; Powell & Diamond, 2013; Sheridan et al., 2009). Better understanding of this process can also

highlight elements that should be emphasized during coaches' training to ensure the intervention's effectiveness.

The present study examines the implementation of MyTeachingPartner (MTP; Pianta et al., 2008), a coaching model designed to improve early childhood teachers' interactions with children, found to have positive impacts on teacher practice and child outcomes (Downer et al., 2011, 2013; Mashburn, Downer, Hamre, Justice, & Pianta, 2010; Pianta et al., 2008). More specifically, this study documents variation in coaches' implementation of specific features of MTP at two levels: between coaches and across each coach's teachers. The study examines (a) the association between this variation and changes in teachers' ability to analyze their interactions with children, their self-efficacy and their observed teaching practice, and (b) the ways in which these associations between coaching implementation and teacher outcomes may vary as a function of teachers' years of education and their level of observed effectiveness at the beginning of the intervention.

**Coaching in Early Childhood: MyTeachingPartner**

Coaching can lead to improvement in teachers' practices (Bryant et al., 2009; Domitrovich, Gest, Gill, Bierman et al., 2009; Hindman & Wasik,2012; Landry, Anthony, Swank & Assel, 2011; Raver et al., 2008; Zhai, Raver & Li-Grining, 2011) and children's school readiness skills (Bierman et al., 2008; Hindman & Wasik, 2012; Landry et al., 2006; Raver et al., 2009; 2011). Most recent research on coaching in early childhood, however, relies on evidence from efficacy trials, which tend to assess a small number of coaches who receive extensive training and support in comparison with the low levels of support that coaches in real-life implementations tend to receive (Bryant et al., 2009; Isner et al., 2011) Thus it is not surprising that studies on the implementation of these coaching models suggest fairly high levels of fidelity and relatively little variation in the quality of

implementation (Downer, LoCasale-Crouch, Hamre & Pianta, 2009; Reinke, Herman, Stormont, Newcomer & David, 2013). However, if these models are to be successful at large scale, there is a need to determine whether these same levels of fidelity and quality can be achieved with larger numbers of coaches. Otherwise the impacts of the interventions are likely to be much smaller when used in practice due to the inherent difficulty to supervise coaches and ensure that they are implementing the intervention with high quality in large scale implementation (Dane & Schneider, 1998; Durlak & DuPre, 2008).

MTP is an example of a coaching model that is increasingly being implemented at this large scale, with 164 community coaches implementing it with more than a thousand teachers as of the summer of 2013 (Teachstone, 2013). MTP is a web-mediated coaching model aimed at improving teachers' interactions with students by providing opportunities for teachers to observe their practice, receive skills training in identifying appropriate and inappropriate responses to children's cues and for understanding how these responses contribute to children's learning, and to receive individualized support focused on each teacher's instruction and interactions with children (Downer et al., 2011; Mashburn et al., 2010).

MTP is implemented through coaching cycles that begin with the teachers videotaping themselves in the classrooms and sending the video to their coach. After observing the teachers' video, coaches begin their implementation of two key steps in the coaching process: (a) the provision of written prompts, in which the coach selects three clips from the video and writes accompanying prompts that focus teachers on elements of their interactions through specific questions, and (b) the conference, where coaches and teachers further discuss the teachers' response to the prompts, as well as any other concerns

the teacher may have about the practice. In the conference the coach and teacher come up with an action plan for the next video recording where a new MTP cycle starts.

Although several studies have documented the impact of MTP on teachers' practice and child outcomes (Downer et al., 2011, 2013; Mashburn et al., 2010; Pianta et al., 2008), most research on the implementation of MTP has relied on a study with only a few coaches and very little variability in the quality of implementation across coaches (Downer et al, 2009). The present study uses data from a larger efficacy trial, with 15 community based coaches, to examine the extent to which variation in coaches' implementation of MTP may have important implications for the impact of the intervention on teachers. A previous study using data from this trial provided a global assessment of implementation quality and focused on teachers' responsiveness to the coaching implementation and its association with changes in their teaching practice (LoCasale-Crouch et al., 2013). This study found that coach-rated teacher engagement and number of cycles completed are significantly associated with the quality of teachers' instructional support at the end of the intervention. The study also found that teachers' responsiveness to coaching mediates the association between teacher-rated coaching quality and change in instructional support. The present study expands on these findings by taking a closer look at the components of the intervention and examining the ways in which components that are closely aligned with the intervention theory of change, including the quality of the written prompts, teacher-coach conferences, and the coach-teacher relationship, are associated with a broader set of teacher outcomes.

**Variability in Coaching Implementation**

By zeroing on teachers' practice, coaching moves from a one-size-fits-all model (e.g. group training workshops) to an intervention that is individualized to the teachers'

specific needs. This type of intervention lends itself to variability in implementation. Coaches' implementation of coaching may vary at two levels: individual coaches may have different approaches to the intervention leading to variability *between* coaches (e.g. Bryant et al., 2009; Downer et al., 2009) and coaches may also adjust their coaching to respond to each teacher's characteristics and specific needs, leading to variability in implementation across teachers *within* each coach's practice (Reinke, Stormont, Webster-Stratton, Newcomer & Herman, 2012). For instance, research has shown that coaches differentiate the support they provide teachers by spending more time with those that need more help improving their teaching practices (Becker, Bradshaw, Domitrovich & Ialongo, 2013; Reinke et al., 2013).

Among the many elements of coaching that may vary between and within coaches, it is particularly important to focus on the key features of the intervention as defined by the theory of change that sets the foundation for the coaching model (Powell & Diamond, 2013). According to MTP's theory of change, coaches following the MTP model need to provide opportunities for the teacher to gain knowledge of the specific teacher-student interactions that contribute to children's learning and development (Hamre, Downer et al., 2012). MTP relies on the Teaching through Interactions (TTI, Hamre, Pianta et al., 2013) framework to provide a detailed description of these teaching practices. The TTI describes three domains of teacher-student interactions: Emotional Support focused on how the classroom environment supports students' social and emotional functioning; Classroom Organization, that includes the classroom processes related to organization and management of students' behavior, time and attention; and Instructional Support, that focuses on the way in which teacher-student relationships promote the gaining of usable knowledge for the students.

The theory of change behind MTP states that teachers learn how to be objective observers of their practice as coaches focus them on specific interactions in videotapes of their own classrooms, and ask them to think about how their practice impacts the development of the children in the classroom. To be effective, these opportunities need to be provided in the context of a non-judgmental, supportive relationship between coach and teacher (Pianta et al., 2008).

The present study assesses coaches' variation in the implementation of two steps of the MTP process where they enact MTP's theory of change: the provision of written prompts and the conference. In the provision of written prompts two features are examined: coaches' clear focus on teacher-student interactions and the cognitive challenge they provide. To assess the conference the study analyzes teachers' ratings of its usefulness. Finally, the present study assesses an overall implementation feature, the coach-teacher relationship. The MTP theory of change suggests that each of these features should relate to more positive teacher outcomes.

**Coaches' clear focus on interactions.** To be able to improve their interactions with students, teachers need to know what interactions are effective and they need to be able to identify those interactions in their practice. A recent study by Hamre, Pianta and colleagues (2012) found that improvements in teachers' skill in identifying effective teacher-student interactions were associated with improvements in their instructional practices. To facilitate teachers' identification of effective teacher-student interactions, coaches implementing MTP are expected to focus teachers on the interactions from the video that are going to be discussed in the prompts by providing detailed descriptions of the actions that comprise those interactions, and by framing these interactions in the broader TTI framework in a clear, succinct way (See Table 1 for high and low exemplars of MTP prompts). Through

this process, coaches draw teachers' attention to specific interactions, supporting teachers in the process of learning to identify them in their practice. Coaches also help teachers frame these interactions in a specific framework for effective practice, laying the foundation for teachers to create a new set of cognitive schemas based on this framework that will allow teachers to have more positive automatic responses in the classroom (Downer, Jamil, Maier & Pianta 2012).

**Coaches' cognitive challenge.** Cognitive challenge refers to the process through which the MTP coach: (a) helps teachers identify how the practices that they are trying out in the classroom are affecting their students, and (b) assists them in visualizing how their previous knowledge of the children in the classroom can help inform their choice of the most appropriate practice in a given situation, as well as the effects of these choices (see Table 1 for exemplars). Although coaches' cognitive challenge has been highlighted as an important skill for delivering the intervention with quality (American Institutes of Research, 2005; Pas et al., in press; Reinke et al., 2012; Sheridan et al., 2009), little research has been done regarding the quality of implementation of this skill and its association with coaching's effectiveness.

**Teacher perceptions of conference usefulness.** Spillane, Reiser & Reamer (2002) highlight the role that participants' perceptions of an intervention play in implementation assessments by providing information about how they make sense of the intervention and incorporate it in their practice. Researchers have found associations between teachers' positive perceptions of the intervention's usefulness and improved outcomes (Biggs, Vernberg, Twemlow, Fonagy & Dill, 2008; Durlak &DuPre, 2008; Ringwalt et al., 2003). In a previous study on MTP, LoCasale-Crouch and colleagues (2013) found that teachers' perceptions of intervention usefulness were significantly associated to changes in

instructional support, one of the three domains of interactions in the TTI framework, but did not examine whether this element of implementation predicted to other anticipated outcomes, such as teacher self-efficacy and their ability to analyze their teaching practice.

**Coach-teacher relationship.** Trusting, supportive coach-teacher relationships are the basis of many effective coaching programs (Pianta et al., 2008; Reinke et al., 2013; Sheridan et al., 2009; Wehby et al., 2012), including MTP. A high-quality coach-teacher relationship characterized by high levels of trust and positive affect can influence the coaching intervention's effectiveness by allowing teachers to stay focused on the content of the coaching without having to worry about possible misuses of the information gathered, and by creating an environment where teachers can share their difficulties and ask for help without fear. In a study of factors associated to the teachers' fidelity of implementation of an educational intervention for children at risk, Wehby and colleagues (2012) found that the coach-teacher relationship was the only variable that had significant effects on teachers' fidelity of implementation. Within MTP coaches work to form positive relationships in both their written responses to teachers' video as well as during conferences. As just one example, the first written prompt within each MTP cycle is entitled "Nice Work" and highlights an element of the teachers' practice that is going well. This element of MTP was designed, in part, to explicitly aid in the formation of a positive relationship between the coach and teacher.

## The Role of Teacher Characteristics: Education and Initial Practice

Beyond knowing which elements of a coaching program may be related to positive outcomes, it is important to know for whom these elements may be most effective. Participating in a coaching intervention places several demands on teachers, and some teachers may not be properly equipped to respond to these demands. For instance, a teacher

with poor analytical skills may require more scaffolding from the coach to be able to assess her practice. In this case, high levels of cognitive challenge may be above what the teacher can thoughtfully respond to and may lead to a less analytical response from the teacher and to a decrease on the teacher's engagement on the intervention. Instead, this teacher may benefit from lower levels of cognitive challenge that match her abilities and support improvements in her analytical skills.

There is also evidence that the effectiveness of teachers' practice at the beginning of coaching may be an important factor in how they respond (Downer et al., 2009). Teachers that begin coaching with a more effective teaching practice show higher levels of engagement in coaching, which may be an indicator that some of the elements that characterize an effective teacher may also put these teachers in a better position to make the most of coaching.

**Current Study**

This study assesses the degree in which coaches vary in their implementation of MTP, both between coaches and within each coach's teachers, and how this variability may be associated with changes in teachers' practice, their skills in analyzing their interactions with students, and their feelings of self-efficacy after participating in the intervention. More specifically, the study addresses four questions: (a) To what extent do coaches vary in their implementation of MTP (variation between coaches)? (b) To what extent do coaches differentiate their implementation of MTP across teachers (variation within coach)? (c) Is this variability associated with changes in teachers' practice, analysis of their interactions with students, and self-efficacy? and (d) Are these features of coaching implementation more strongly associated with teacher outcomes among teachers with different levels of education and/or initial teaching practice?

The hypotheses in this study are that coaches' implementation of the MTP features will vary, both between and within coaches. Based on the MTP theory of change teachers are expected to demonstrate improvements in their skills in analyzing their interactions with children, increases in self-efficacy, and more effective observed practice when coaches offer higher quality implementation (i.e., coaches provide teacher with higher levels of clear focus on interactions and cognitive challenge, and establish a higher-quality relationship with teachers, and when teachers rate their conferences as more useful). Finally, teachers with more experience teaching in pre-K settings and with a higher-quality practice at the beginning of the intervention are expected to benefit more from these features of coaching implementation.

## Method

### Participants

The data for the current study were collected as part of the National Center for Research on Early Childhood Education (NCRECE) Professional Development Study, an evaluation of professional development aimed at improving teacher-student interactions among early childhood teachers. The NCRECE study took place in nine sites across the United States. To participate in NCRECE, teachers had to be the lead teacher of a publicly funded classroom where the majority of children were eligible for kindergarten next year and did not have an IEP. To be eligible, instruction in the classrooms had to be in English for the majority of the day and the sites had to provide high speed internet access to teachers. Because this study focuses on unpacking the elements of the coaching process that are associated with positive teacher outcomes the study included only those teachers that were randomly assigned to receive coaching and that completed at least 5 cycles. This decision was made to ensure that all participants in the study were sufficiently exposed to

coaching. This requirement led to the removal of 25 teachers for the final sample of this study, leaving a sample of 146 teachers.

Teachers in this study were 91.8% female, 43.8% African-American, 34.2% White or Caucasian, 13.7% Hispanic, 2.1% Asian and 3.4% Other. Of the participating teachers, 47.9% were working in a Head Start program and 39.7% were located in a public school. One third of the teachers (32.9%) had an associate's degree or less, 39% had a Bachelor's degree and 24.7% had a Master's degree or higher. The teaching experience of these teachers range from 1 to 43 years, with a mean of 14.72 years (SD=9.75)

All 15 coaches participating in this study were female. Two of the coaches identified themselves as African-American while the remaining 13 identified themselves as White. Ten coaches had a Master's degree, 3 were education specialists or had a professional diploma, and 2 had a doctoral degree. Coaches had an average of 14.73 years of teaching experience (SD=9.73, range 1.5 to 32 years). Coaches worked with an average of 10 teachers, with a range between 5 and 14 teachers assigned to each coach (SD=2.81).

**Measures**

**Prompt and response coding instrument.** As part of the coaching process, coaches provided written prompts to teachers. According to the MTP manual and training in each coaching cycle coaches were supposed to write three prompts where they made observations from the video and asked questions to the teacher focused on a specific aspect of those observations. After reading each prompt and watching the accompanying video, teachers provided a written response in preparation for their conference. Thus, each prompt writing cycle consisted of three coach prompts and three teacher responses.

Written transcripts of each cycle were coded with a rubric that included items to assess coaches' clear focus on teacher-child interactions and cognitive challenge, and

teachers' analysis (see Table 1). The coding instrument included items both at the individual prompt or response level and at the cycle level (for these items coders assessed all three prompts or three responses and provided an overall score). The items in this instrument were coded using a 3-point Likert scale with 1 being the lowest score and 3 being the highest.

Cycles were coded by a team of coders trained to reliability. Training consisted of a presentation of the instrument along with examples for each anchor of each item (low, mid and high). Coders then participated in a joint coding session of two cycles with master coders that included discussion and explanation of the master codes. Following training, each coder was required to take a reliability test in which they needed to match the master codes for at least 80% of the items for two cycles to be considered reliable. Additional support was provided to coders if they did not pass this test and a second reliability test was administered. After passing the reliability test, coders participated in weekly drift meetings to ensure continued reliability on the instrument. All cycles were double-coded and intraclass correlations coefficients (ICCs) calculated for each of the scales showed high agreement between coders on the scores (see Table 1 for a description of the scales).

During their year-long participation in MTP, teachers completed an average of 11 cycles (range between 5 and 21). For this study three cycles for each teacher were coded: one cycle at the beginning of the coaching, one in the middle and one at the end of the process. These cycles were chosen to provide an overview of implementation across the year and to match as accurately as possible the cycles for which teachers were asked to rate the usefulness of the conferences. To assess the overall level of coaches' clear focus on interactions and cognitive challenge, the scores from the three cycles coded were averaged. To assess changes in teachers' analysis of teacher-student interactions in their written

responses to prompts the scores from prompt responses during the teachers' first (pre) and last (post) cycles were used.

**Teacher-rated conference usefulness.** Teachers were asked to rate the quality of the usefulness of the conference they had with their coach at three different times throughout the coaching process (in the fall, at the end of the winter and in the spring). The scale used for these ratings included ten items in a 4-point Likert scale in which 1 was *Strongly disagree* and 4 was *Strongly agree*. The conference usefulness scale included items such as "This meeting will help me improve the quality of my instruction" and "I gained a better understanding of the CLASS during this meeting". For this study all scores were averaged into one overall score. This scale had high internal consistency (α = .926).

**Coach reported coach-teacher relationship.** The Teacher-Coach Relationship Scale (TCRS, LoCasale-Crouch & Hamre, 2008) was used to assess coaches' perceptions of a teacher's engagement in the experience and relationship with the coach at the end of the intervention. The measure includes 7 items and has a response scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Examples of the items include "I have a good relationship with the teacher," "I am comfortable sharing ideas with the teacher," and "Interactions with the teacher leave me annoyed and frustrated" (reverse item). The internal consistency of the TCRS in this study was high (α = .909)

**Teacher self-efficacy.** Teachers were asked to complete a shortened version of the Teacher's Sense of Self Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) at the beginning and at the end of the coaching process. This scale includes 9 items that assess teachers' judgment of capabilities to bring about desired outcomes of student engagement and learning, even among students who may be difficult or unmotivated. Items are rated on a 9-point Likert scale where 1 means *nothing* and 9 means *a great deal*. Previous research

has found that this measure has high internal consistency and concurrent validity with measures of other job-related constructs such as job satisfaction (Klassen et al., 2009). In this study the scale's internal consistency (Cronbach's alpha) was between .880 (post) and .911 (pre)

**Teacher practice.** Assessments of teacher practice were made using the Classroom Assessment Scoring System, CLASS (Pianta, La Paro & Hamre, 2008). This observational instrument assesses the three domains of teacher-student interactions included in the TTI framework (Hamre, Pianta et al., 2013). Previous research using the CLASS has shown the predictive validity of this measure in relation to student outcomes (Curby et al., 2009; Dominguez et al., 2010; Mashburn et al., 2008).

For the purpose of this study, a team of observers trained on the CLASS coded the first 30 minutes of videos submitted by the teachers during the coaching process. Training consisted of a presentation of short videos that illustrated the CLASS dimensions, followed by a practice coding of five master-coded videos. In order to be able to code, observers had to pass a reliability test in which they needed to score within one point of the master code in 80% of the scores. During the time the observers were coding they attended weekly meetings to avoid drift on their codes due to rater bias.

Based on recent research demonstrating a core element of Responsive Teaching being measured by all dimensions of CLASS (Hamre, Hatfield, Pianta & Jamil, 2013) this study used the overall CLASS score at the beginning (between September and December) and the end of the intervention (between March and June). All tapes were double coded and inter-rater reliability was conducted across all footage, with a resulting ICCs of .766 at the tape level. Internal consistency was calculated using the scores for the CLASS domains, resulting in an alpha of .83, showing good internal consistency of the measure.

**Data analysis**

All analyses were conducted using Mplus version 6.11 and missing data was addressed by using full information maximum likelihood estimation. An unconditional means multilevel model was conducted to assess the amount of variance in each of the variables of coaching implementation. Next, we calculated the intraclass correlation (ICCs) for the outcomes to assess whether a multilevel model was required for the analyses predicting teacher outcomes. The ICCs for all outcomes were below .05 (teacher practice ICC = .022, analysis of teacher-student interactions ICC = .047, self-efficacy ICC = .015) and the largest design effect was of 1.423. These two elements indicate that multilevel modeling is not necessary for these analyses (Peugh, 2010). However, in order to control for the nesting of teachers within coach, the following analyses were run with the TYPE=COMPLEX option in Mplus, which computes the standard errors by taking into account the non-independence of the data (Muthén & Muthén, 2010).

A path analysis was conducted to assess the association between the MTP implementation features (clear focus on teacher-student interactions, cognitive challenge, conference usefulness and coach-teacher relationship) and teachers' analysis of teacher-student interactions, self-efficacy and practice. This regression controlled for teachers' initial scores on all outcomes, their years of education, and whether teachers were in a Head Start center or in a center associated with a public school.

A second set of analyses was conducted to examine the degree to which teachers' practice at the beginning of the intervention and their years of education moderated the association between MTP features and teacher analysis of teacher-student interactions, self-efficacy and practice. The first step to respond to this question was to calculate interactions terms between each MTP features and teachers' practice at the beginning of the

intervention or their years of education. Individual models were then run to check whether each interactional term was significantly associated with any of the outcomes.

## Results

Table 2 shows the descriptive statistics for the predictors and outcomes in this study, as well as the amount of missing data for all variables in the models. The data in this study was collected at the teacher level. However, since the focus of the paper is on coaches' implementation, Table 2 presents descriptive statistics both at the teacher and the coach level (after averaging the scores of the teachers working with each coach).

### Amount of variance between and within coaches

The first research question examined the extent to which the implementation of coaching varied between- and within-coaches. The results for an unconditional means model (see Table 2) revealed that overall there is little variation in the coaches' implementation of specific features of MTP, which means that in general all coaches implemented MTP in fairly similar ways with all their teachers. Each coaching feature had different amounts of variance to explain, with coaches' clear focus on interactions within written prompts having the least amount of variance and coach rated coach-teacher relationship having the most variance, meaning that coaches were most consistent in their clear focus on interactions that they provided teachers, and they differed the most in the quality of the relationship that they established with their teachers.

The results also showed that, with the exception of teacher-reported conference usefulness, all the MTP features had a significant amount of variance explained at both the between- and the within-coach level. Most of the variance on the coaches' clear focus on interactions within written prompts was explained at the between-coach level (68%), which means that each coach showed similar amounts of clear focus on interactions in all her

teachers' prompts, but there were differences between coaches in the amounts of focus that they showed to their teachers. On the other hand, most of the variance on coaches' cognitive challenge and on their relationship with teachers is explained at the within-coach level, with coaches providing different amounts of cognitive challenge and establishing relationships of varying quality with each of their teachers. Finally, all of the variance in the teacher-reported conference usefulness was explained at the within-coach level, which means that teachers working with the same coach reported different levels of conference usefulness.

**Association between coaching implementation and teacher outcomes**

The bivariate correlations between the variables are presented in Table 3. These correlations show different patterns for each of the MTP features: while the teachers' report of conference usefulness is significantly and positively related to teacher analysis, self-efficacy and practice at the end of the intervention; coaches' clear focus on interactions is not related to any of these outcomes. The coach-teacher relationship is significantly and positively related with teacher analysis and practice at the end of the intervention, while coaches' cognitive challenge is significantly but negatively related to teacher analysis.

Table 4 shows results from the multivariate regression analyses predicting teacher outcomes from MTP implementation features. The results examining associations between the coach-teacher relationship and teacher outcomes were consistent with the initial hypotheses. Teachers with whom coaches reported a higher-quality relationship showed more change in their analysis of teacher-student interactions and in their observed practice; however the quality of the coach-teacher relationship was not associated with teachers' changes in self-efficacy.

Results also suggested that teachers who perceived their conferences as more useful showed more change in their self-efficacy. Teachers' perceptions of conference usefulness, however, were not significantly associated with teachers' analysis or their practice.

Contrary to the hypotheses, the extent to which coaches had a clear focus on interactions and provided teachers with cognitive challenge were either not associated with teacher outcomes or were associated with poorer outcomes. When coaches' written prompts provided teachers with higher levels of cognitive challenge, teachers demonstrated less improvement in their self-efficacy at the end of the intervention. Cognitive challenge was not related to the remaining teacher outcomes. Although the degree to which coaches focused on relevant interactions was not associated with changes in teachers' analysis of teacher-student interactions or self-efficacy, when coaches provided teachers with higher levels of clear focus on interactions, teachers showed less improvement in their observed practice over the course of the coaching process.

**Moderation of teachers' years of education and initial level of teacher practice**

The final research question examined the extent to which associations between coaching implementation and teacher outcomes may vary as a function of teacher years of education and initial levels of teacher practice. There was no evidence that teachers' years of education moderated the association between implementation and teachers' outcomes. These features of MTP tended to have similar relations with teacher outcomes regardless of whether teachers had an AA, BA, or Master's degree. However, the association between teacher-rated conference usefulness and two of the three teacher outcomes (teachers' practice and their self-efficacy at the end of the intervention) did vary as a function of teachers' initial practice (see Table 4). Contrary to hypotheses, there was a stronger positive association between teacher-rated conference usefulness and change in teacher practice for

teachers who showed lower levels of practice at the beginning of the year (Figure 1). In contrast and consistent with hypotheses, teachers' change in self-efficacy was more strongly positively associated with teacher-rated conference usefulness for teachers who started the year with more effective practice (Figure 2).

## Discussion

Previous studies have highlighted the need to identify how the implementation of different strategies in coaching is related to its effectiveness (LoCasale-Crouch et al., in press; Sheridan et al., 2009; Zaslow et al., 2010). The goal of the present study was to assess the variation in coaches' implementation of a coaching model in an effectiveness trial, and to assess the association between this variation and changes in teachers' analysis, self-efficacy and practice.

Although this study found some variation in coaches' implementation of MTP features, the variation was minimal. This is notable given that this MTP trial included 15 coaches working in 9 different sites across this country and thus we anticipated higher levels of variation among coaches. However, it is important to consider that although this study included a larger sample of coaches than most studies previously reported on coaching, it was still a research study where researchers provided high levels of training and support to coaches through weekly individualized support session with NCRECE staff as well as weekly group conferences with other coaches. Coaches' clear focus on interactions within written prompts was the feature that showed the least variation in the implementation, which is not surprising given that it is one of the elements of the MTP coaching process on which coaches received the most training and support (Pianta, Funk, Hamre, & Hadden, 2008). The level of support given to coaches in this study is likely to exceed that given in more typical coaching interventions delivered at-scale. For example, in

a multi-case study of coaching in QRIS, Isner and colleagues (2011) found that most sites did not formally monitor coaches' implementation of the intervention and that formal supervision was rare and when it happened it was infrequent. In such a context it would be more likely to find larger variation in coaches' implementation.

The study also found that for the majority of the MTP features assessed in this study most of the variation was found to be within each coach's teachers rather than between coaches. This means that coaches implement MTP in a slightly different manner with each of the teachers that they work with, with each teacher receiving different levels of MTP's key features. Coaches may be taking advantage of the individualized nature of coaching by matching their implementation of MTP to each teacher's specific needs. For instance coaches may adjust the amount of cognitive challenge that they provide each teacher depending on the teacher's openness to the process in order to ensure the teacher's continued engagement in coaching. Differences in coaches' implementation of MTP between teachers may also be related to the coaches' experience of the process and their affinity for working with certain teachers. Further research looking at the associations between coach and teacher characteristics and coaches' implementation of MTP could provide more information regarding this variation in implementation.

In spite of the small amount of variation in the implementation of MTP's features, this variation was found to be significantly associated with changes in teachers' outcomes. This study corroborates previous work highlighting the important role of a high-quality coach-teacher relationship in coaching interventions (Wehby et al., 2012). When coaches reported a better relationship with a teacher there were more positive changes in the teachers' skill in analyzing their own teaching practice within the written component of the MTP process and, most importantly in observations of teaching from fall to spring. A high-

quality coach-teacher relationship may be especially important for MTP because teachers will be more willing to engage in discussions about their less effective interactions with students and how to improve their teaching practice if they feel that they are in a safe, supportive environment. These results, however, need to be interpreted with caution because the study's design does not permit the establishment of a causal relationship between the variables. It is also possible that coaches establish a higher-quality relationship with teachers that are more responsive to the intervention, as demonstrated by positive changes in their analytical skill and observed practice.

Variation in teacher-reported conference usefulness was also found to be related to positive change in teachers' self-efficacy, although it was not found to be related to changes in teacher practice or their level of analysis. Teachers that perceived the conferences as useful were likely to see them as tools that increased their teaching competence. Because teachers' assessment of their teaching competence is one of the judgments that teachers make when assessing their capability to achieve the desire outcomes (Tschannen-Moran & McMaster, 2009), an increase in this perception would have then lead to an increase in their self-efficacy at the end of the intervention.

On the other hand, the direction of some of the other associations identified in this study was unexpected. Higher levels of cognitive challenge in written prompts were associated with less change in teachers' self-efficacy across the year. Although this finding goes against our initial hypothesis, it may be a reflection of teachers being in an early stage of their learning process. In their evaluation of how different formats of professional development impacted teachers' self-efficacy and the implementation of an intervention, Tschannen-Moran & McMaster (2009) found decreases in teachers' self-efficacy when they participated in formats that provided teachers with opportunities to reassess their practice,

but increases when they also received coaching. The authors hypothesized all teachers had an initial dip when they recalibrated their self-efficacy but that only the teachers that had coaches' support to successfully implement the intervention had been able regain their self-efficacy. Particularly in MTP, by pushing teachers to think about how specific interactions impact their students a coach providing high levels of cognitive challenge may have led teachers to question their ability to engage in effective interactions with students, temporarily affecting their self-efficacy. It is possible that because of the complexity of the interactions taught in MTP, teachers in this study were still in the process of improving their practice and were not able to see their successful implementation, maintaining the initial dip in self-efficacy.

Researchers have proposed that some level of doubt about their effectiveness with children may promote teachers' reflection and motivation to learn and improve (Wheatley, 2002). Supporting this idea, Guo, Dynia, Yeager Pelatti & Justice (2014) found that students of teachers with low self-efficacy but high levels of effective instructional interactions with students showed the greatest gains in language and literacy after participating in a book reading intervention, possibly due to a higher degree of motivation to learn accompanied by an environment that is conducive to learning. For this study, we would expect that the decrease in teachers' self-efficacy would lead to improvements in practice by increasing teachers' motivation to improve their classroom. Further research is needed to examine this hypothesis and provide a more complete picture of the development of self-efficacy in professional development interventions and its relation with changes in practice.

The amount of clear focus on interactions that coaches provided teachers in their written prompts was negatively associated with changes in practice. Given evidence from

other studies that teachers who are able to identify specific elements of teacher practice in videos demonstrate more changes in teaching practice (Hamre, Pianta et al., 2012), this finding was quite unexpected. As with the coach-teacher relationship, it may be that the direction of causality that this study assumed, with coach behaviors impacting teacher outcomes, may be flawed. It is possible that throughout the coaching process, coaches identified teachers that were changing less in their practice, and chose to provide more clear focus on interactions to help them identify their own ineffective practices in order to be able to improve them. In this case the negative association found in this study would be evidence of the coaches' increased efforts to help the teachers benefiting the least from the process to improve their teaching practice. Additional research is needed to unpack the direction of causality between coach and teacher behaviors within coaching models.

This study also examined whether features of MTP were more or less important for particular teachers, those with more years of education or lower initial levels of teacher effectiveness. Although most features had similar associations with teacher outcomes regardless of these individual characteristics, teachers with initial lower-quality practice showed more change in practice but less change in self-efficacy when they perceived the conference to be more useful. This finding contributes to previous research that has found that teachers' practice at the beginning of the intervention can affect the association between an intervention's implementation and teacher outcomes (Downer et al., 2009). It is important to keep in mind, however, that the variation in teachers' ratings of the usefulness of the conferences was small and that the difference between teachers that rated the conferences high and those who rated them low was of one point on a Likert scale, which shows the small difference between these two groups. The fact that features of MTP had similar associations with teacher outcomes regardless of teachers' years of education is

noteworthy given the range of educational levels of the teachers in this study and suggests that the model may be useful across a diverse set of teachers.

**Limitations and Conclusions**

Besides its inability to establish causal relations and the possibility of relations of reverse causality between the implementation of the highlighted MTP features and teachers outcomes, there are a few additional limitations to this study. First, the study focuses on the implementation of features that are key to one specific intervention, MTP. Other coaching models have highlighted the importance of features such as the quality of the coach-teacher relationship and the level of cognitive challenge (AIR, 2005; Domitrovich, Gest, Gill, Jones et al., 2009; Reinke et al., 2012). However, other features such as the clear focus on interactions are particular to the MTP's theory of change and the framework for which it was designed and may not be relevant to other coaching models.

Another limitation of this study is that it had a relatively limited assessment of one of the major elements of MTP: the coach-teacher conference. The current study relied only on teachers' reports of the usefulness of these conferences, and teachers were quite positive about the conferences. Future studies assessing the implementation of the coaching conference should include analyses of the actual discussions taking place in order to better capture a more nuanced and objective view of the conference.

Finally, coaches in this study showed a minimal amount of variation in their implementation of the MTP features examined. Although this means that teachers participating in MTP received similar interventions regardless of their coach, this small amount of variation limits the ability to test for association between variation in the implementation and teacher outcomes. This amount of variation could be related to the high amount of support and training that researchers provided coaches participating in this study.

If this is the case, assessments of coaching implementations with less support could show more variation in coaches' implementation that could show different associations with teacher outcomes from the ones identified in this study. Further research is needed to assess whether the variation and the associations identified in this study are replicated in large-scale coaching implementation in community settings.

Despite of these limitations, this study provides an initial exploration of the variation in the implementation of key features of a coaching model, both between and within coaches, and how this variation is associated with teacher outcomes, a question that has been frequently asked in previous reviews of coaching (Gupta & Daniels, 2012; Sheridan et al., 2009; Zaslow et al., 2010). The study found little variation in the implementation of MTP features, and for most of the features the majority of the variation was between each coach's teachers instead of within teachers. This small amount of variation, however, was found to be significantly associated with changes in teachers' outcomes at the end of the intervention. Further research is needed to continue this exploration and to assess whether these findings can be replicated with other coaching models. This initial exploration, however, provides us information about possible improvements to professional development models as well as about elements to consider when selecting and training coaches to ensure the best outcome possible for the intervention, especially when an intervention is going to be implemented at larger scales.

## References

American Institutes for Research (2005). *Conceptual overview: Coaching in the professional development impact study.* Retrieved from http://albaniarsimin.wikispaces.com/file/view/Coaching+in+the+Professional+Development+Impact+Study+(Final,+Jan.+2005,+Updated).pdf

Becker, K. D., Bradshaw, C. P., Domitrovich, C., & Ialongo, N. S. (2013). Coaching teachers to improve implementation of the Good Behavior Game. *Administration and Policy in Mental Health and Mental Health Services Research.* Advance online publication. doi: 10.1007/s10488-013-0482-8

Bierman, K. L., Domitrovich, C. E., Nix, R. L., Gest, S. D., Welsh, J. A., Greenberg, M. T., ... Gill, S. (2008). Promoting academic and social-emotional school readiness: The Head Start REDI program. *Child Development, 79,* 1802-1817.

Biggs, B. K., Vernberg, E. M., Twemlow, S. W., Fonagy, P., & Dill, E. J. (2008). Teacher adherence and its relation to teacher attitudes and student outcomes in an elementary school-based violence prevention program. *School Psychology Review, 37,* 533-549.

Boatright, B., Galluci, C., Swanson, J., Van Lare, M., & Yoon, I. (2008) Coaching for instructional improvement: Themes in research and practice. *Washington State Kappan, 2,* 3-5.

Bryant, D., Wesley, P., Burchinal. P., Sideris, J., Taylor, K., Fenson, C., & Iruka, I. (2009). *The QUINCE-PFI study: An evaluation of a promising child care provider training. Final report.* Chapel Hill, NC: FPG Child Development Institute

Cornett, J., & Knight, J. (2009). Research on coaching. In J. Knight (Ed.) *Coaching. Approaches and Perspectives.* Thousand Oaks, CA.: Corwin Press

Curby, T. W., LoCasale-Crouch, J., Konold, T. R., Pianta, R. C., Howes, C., Burchinal, M., . . . Barbarin, O. (2009). The relations of observed pre-K classroom quality profiles to children's achievement and social competence. *Early Education & Development, 20,* 346-372.

Dane, A. V., & Schneider, B. H. (1998). Program integrity in primary and early secondary prevention: Are implementation effects out of control? *Clinical Psychology Review, 18,* 23-45.

Dominguez, X., Vitiello, V. E., Maier, M. F., & Greenfield, D. B. (2010). A longitudinal examination of young children's learning behavior: Child-level and classroom-level predictors of change throughout the preschool year. *School Psychology Review, 39,* 29-47.

Domitrovich, C. E., Gest, S. D., Gill, S., Bierman, K. L., Welsh, J. A. & Jones, D. (2009). Fostering high-quality teaching with an enriched curriculum and professional development support: The Head Start REDI Program. *American Educational Research Journal 46* 2, 567-597.

Domitrovich, C. E., Gest, S. D., Gill, S., Jones, D., & DeRousie, R. S. (2009). Individual factors associated with professional development training outcomes of the Head Start REDI program. *Early Education and Development, 20,* 402-430.

Downer, J. T., Jamil, F., Maier, M., & Pianta, R. C. (2012). Implications of information processing theory for professional development of early educators. In C. Howes, B. K. Hamre & R. C. Pianta (Eds.), *Effective early childhood professional development: Improving teacher practice and child outcomes.* New York: Brookes Publishing Co.

Downer, J. T., LoCasale-Crouch, J., Hamre, B., & Pianta, R. (2009). Teacher characteristics associated with responsiveness and exposure to consultation and online professional development resources. *Early Education and Development, 20,* 431-455.

Downer, J. T., Pianta, R. C., Burchinal, M., Field, S., Hamre, B. K., LoCasale-Crouch, J., … Scott-Little, C. (2013). *Coaching and coursework focused on teacher-child interactions during language/literacy instruction: effects on teacher outcomes and children's classroom engagement.* Manuscript submitted for publication

Downer, J. T., Pianta, R. C., Fan, X., Hamre, B. K., Mashburn, A., & Justice, L. (2011). Effects of web-mediated teacher professional development on the language and literacy skills of children enrolled in prekindergarten programs. *NHSA Dialog, 14,* 189-212.

Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology, 41,* 327-350

Galluci, C., Van Lare, M. D., Yoon, I. H., & Boatright, B. (2010). Instructional coaching: Building theory about the role and organizational support for professional learning. *American Educational Research Journal, 47,* 919-963.

Guo, Y., Dynia, J. M., Yeager Pelatti, C., & Justice, L. M. (2014). Self-efficacy of early childhood special education teachers: Links to classroom quality and children's learning for children with language impairment. *Teaching and Teacher Education, 39,* 12-21.

Gupta, S. S. & Daniels, J. (2012). Coaching and professional development in early childhood classrooms: Current practices and recommendations for the future. *NHSA Dialog, 15,* 206-220.

Hamre, B. K., Downer, J. T., Jamil, F. M., & Pianta, R. C. (2012). Enhancing teachers' intentional use of effective interactions with children: Designing and testing professional development interventions. In R. C. Pianta, W. S. Barnett, L. M. Justice & S. M. Sheridan (Eds.) *Handbook of early childhood education.* New York: Guilford Press

Hamre, B.K., Hatfield, B., Pianta, R.C., & Jamil, F. (2013). Evidence for general and domain-specific elements of teacher-child interactions: Associations with preschool children's development. *Child Development.* Advance online publication. doi: 10.1111/cdev.12184

Hamre, B. K., Pianta, R. C., Burchinal,. M., Field, S., Locasale-Crouch, J., Downer, J. T., … Scott-Little, C. (2012). A course on effective teacher-child interactions: Effects on teacher beliefs, knowledge, and observed practice. *American Educational Research Journal, 49,* 88-123.

Hamre, B. K., Pianta, R.C., Downer, J. T., Decoster, J., Mashburn, A. J., Jones, S., … Hamagami, A. (2013). Teaching through interactions: testing a developmental framework of effective teaching in over 4,000 classrooms. *The Elementary School Journal, 113,* 461-487.

Hindman, A. H., & Wasik, B. A. (2012). Unpacking an effective language and literacy coaching intervention in Head Start: Following teachers' learning over two years of training. *The Elementary School Journal, 113,* 131-154.

Isner, T., Tout, K., Zaslow, M., Soli, M., Quinn, K., Rothenberg, L., & Burkhauser, M. (2011). *Coaching in early care and education programs and Quality Rating and Improvement Systems (QRIS): Identifying promising features.* Report produced for the Children's Services Council of Palm Beach County. Washington, DC: Child Trends

Klassen, R. M., Bong, M., Usher, E. L., Chong, W. H., Huan, V. S., … Georgiou, T. (2009). Exploring the validity of a teachers' self-efficacy scale in five countries. *Contemporary Educational Psychology, 34,* 67-76.

Landry, S. H., Swank, P. R., Anthony, J. L., & Assel, M. A. (2011). An experimental study evaluating professional development activities within a state funded pre-kindergarten program. *Reading and Writing, 24,* 971-1010.

Landry, S. H., Swank, P. R., Smith, K. E., Assel, M. A., & Gunnewig, S. B. (2006). Enhancing early literacy skills for preschool children: Bringing a professional development model to scale. *Journal of Learning Disabilities, 39,* 306-325.

LoCasale-Crouch, J., Cabell, S. Q., Jimenez, M., & Taylor, M. (in press). Research on consultation in early childhood programs. In W. P. Erchul & S. M. Sheridan (Eds.),

*Handbook of research in school consultation: empirical foundations for the field*, (2nd edition). New York: Routledge

LoCasale-Crouch, J., DeCoster, J., Cabell, S. Q., Pianta, R. C., Hamre, B. K., Downer, J. T., … Roberts, A. (2013). *Unpacking intervention implementation: Teacher responsiveness as a mediator of intervention quality of delivery and change in teaching practice.* Manuscript in preparation

LoCasale-Crouch, J., & Hamre, B. K. (2008). *Teacher-Coach Relationship Scale*. Unpublished manuscript, Center for the Advanced Study of Teaching and Learning, University of Virginia

Mashburn, A. J., Downer , J. T., Hamre, B. K., Justice, L. M., & Pianta, R. C. (2010). Consultation for teachers and children's language and literacy development during preschool. *Applied Developmental Science, 14*, 179-196.

Mashburn, A. J., Pianta, R. C., Hamre, B. K., Downer, J. T., Barbarin, O. A., Bryant, D., … Early, D. M. (2008). Measures of classroom quality in prekindergarten and children's development of academic, language, and social skills. *Child Development, 79,* 732-749.

Muthén, L. K., & Muthén, B. O. (2010). *Mplus user's guide.* Sixth edition. Los Angeles, CA: Muthén & Muthén

Pas, E. T., Bradshaw, C. P., & Cash, A. (in press). Coaching classroom-based preventive intervention. In M. D. Weist, N. A. Lever. C. P. Bradshaw, & J. Owens (EDs.). *Handbook of school mental health: Advancing practice and research* (2nd edition). New York: Springer

Peugh, J. L. (2010). A practical guide to multilevel modeling. *Journal of School Psychology, 48*, 85-112.

Pianta, R. C., Funk, G. W., Hamre, B. K., & Hadden, S. (2008). *MyTeachingPartner Consultancy Manual.* Unpublished manuscript

Pianta, R. C., La Paro, K. M., & Hamre, B. K. (2008). *Classroom Assessment Scoring System (CLASS), Manual, Pre-K.* Baltimore: Paul H. Brookes

Pianta, R. C., Mashburn, A. J., Downer, J. T., Hamre, B. K. & Justice, L. (2008) Effects of web-mediated professional development resources on teacher-child interactions in pre-kindergarten classrooms. *Early Childhood Research Quarterly 23*, 431-451.

Powell, D. R., Diamond, K. E., Burchinal, M. R., & Koehler, M. J. (2010). Effects of an early literacy professional development intervention on head start teachers and children. *Journal of Educational Psychology, 102,* 299-312.

Powell, D. R., & Diamond, K. E. (2013). Studying the implementation of coaching-based professional development. In T. Halle, A. Metz, I. Martinez-Beck (Eds.) *Applying*

*Implementation Science in Early Childhood Programs and Systems.* Baltimore, MD: Brookes Publishing

Raver , C. C., Jones, S. M., Li-Grining, C. P.; Metzger, M., Champion, K. M. & Sardin, L. (2008). Improving preschool classroom processes: Preliminary findings from a randomized trial implemented in Head Start settings. *Early Childhood Research Quarterly, 23,* 10-26.

Raver , C. C., Jones, S. M., Li-Grining, C., Zhai, F., Metzger, M. W., & Solomon, B. (2009). Targeting children's behavior problems in preschool classrooms: A cluster-randomized controlled trial. *Journal of Consulting and Clinical Psychology, 77,* 302-316.

Reinke, W. M., Herman, K. C., Stormont, M., Newcomer, L., & David, K. (2013). Illustrating the multiple facets and levels of fidelity of implementation to a teacher classroom management intervention. *Administration and Policy in Mental Health and Mental Health Services Research.* Advance online publication. doi: 10.1007/s10488-013-0496-2

Reinke, W. M., Stormont, M., Webster-Stratton, C., Newcomer, L. L., & Herman, K. C. (2012). The Incredible Years Teacher Classroom Management program: Using coaching to support generalization to real-world classroom settings. *Psychology in the Schools, 49,* 416-428.

Ringwalt, C. L., Ennett, S., Johnson, R., Rohrbach, L. A., Simons-Rudolph, A., Vincus, A., & Thorne, J. (2003). Factors associated with fidelity to substance use prevention curriculum guides in the nation's middle schools. *Health Education & Behavior, 30,* 375-391.

Sheridan, S. M., Edwards, C. P., Marvin, C. A., & Knoche, L. L. (2009). Professional development in early childhood programs: Process issues and research needs. *Early Education and Development, 20,* 377-401.

Spillane, J. P., Reiser, B. J., Reimer, T. (2002). Policy implementation and cognition: Reframing and refocusing implementation research. *Review of Educational Research, 72,* 387-431.

Teachstone (2013). *CLASS™ fact sheet.* Unpublished manuscript

Tschannen-Moran, M., & McMaster, P. (2009). Sources of self-efficacy: four professional development formats and their relationship to self-efficacy and implementation of a new teaching strategy. *The Elementary School Journal, 110,* 228-245.

Tschannen-Moran, M. & Woolfolk Hoy, A. (2001). Teacher efficacy: capturing an elusive construct. *Teaching and Teacher Education 17,* 783-805.

Wehby, J. H., Maggin, D. M., Partin, T. C. M., & Robertson, R. (2012). The impact of working alliance, social validity, and teacher burnout on implementation fidelity of the Good Behavior Game. *School Mental Health, 4,* 22-33.

Wheatley, K. F. (2002). The potential benefits of teacher efficacy doubts for educational reform. *Teaching and Teacher Education, 18,* 5-22.

Zaslow, M., Tout, K., Halle, T., Whittaker, J. V., Lavelle, B. & Child Trends (2010). *Toward the identification of features of effective professional development for early childhood educators.* Washington, DC: U.S. Department of Education. Office of Planning, Evaluation and Policy Development. Policy and Program Studies Service. Retrieved from: http://www2.ed.gov/rschstat/eval/professional-development/literature-review.pdf

Zhai, F., Raver , C. C., & Li-Grining, C. (2011). Classroom-based interventions and teachers' perceived job stressors and confidence: Evidence from a randomized trial in Head Start settings. *Early Childhood Research Quarterly, 26,* 442-452.

Table 1. *Items and Scale Descriptives of the Prompt and Response Coding Scales*

| Coach scales: | Alpha | ICC | High example | Low example |
|---|---|---|---|---|
| Clear focus on interactions | .788 | .874 | | |
| Identifies and defines dimension/indicator/behavior marker<br>Comments include specific details that draw the teacher's attention to a specific interaction in the video clip<br>The question(s)/statement(s) are logically connected to the dimension/indicator of focus<br>The structure of the prompt goes from broad to specific<br>The prompt provides the teacher with enough specific information to answer the question | | | In addition to the use of a variety of modalities and materials another indicator for ILF [Instructional Learning Formats] is effective facilitation by the teacher. This means that the teacher actively facilitates the students' involvement in the activity or lesson. In this clip you have the students stand and stretch before you have them recite the snowman poem and do hand motions to go along with it. Even though you are not fully in the picture we can see your arms moving as you lead the students first in the stretching activity and then in doing the motions for the snowman poem. We can also hear your voice as you say the words along with the students. How does your active involvement in leading the students in reciting the poem and doing the hand motions engage the students and keep them focused on the poem? How can you tell the students are engaged? | Continuing to think about the characteristics of a high quality Literacy Focus classroom (explicit purposeful systematic) please review this clip. During this conversation with the children you are introducing them to two new sets of printed marks. Please watch this clip and tell me what you notice yourself saying about the two sets of marks. Then please tell me which set of marks the children will remember and why you think they'll remember that set. |

| | | | | |
|---|---|---|---|---|
| Cognitive challenge | .827 | .739 | | |
| The question/statement requires the teacher to think deeply about their practice<br>The prompts are consistently challenging (coded at the cycle level) | | | The objective for the activity was to understand and use the words ""more"" and ""less"". You did a really nice job of explaining the concepts and providing the hands-on materials to make the concepts real for the children. When a positive emotional climate is combined with thoughtful teaching children's chances for success are maximized. You and Isi connect with your facial expressions as you count together. Check out the happy expression on Donna's face when you count to nineteen together and exclaim ""WOW!"" *What effect does this positive interchange have on Donna's behavior? How does this type of interaction with Donna (and with other children) aid her in meeting the objective of the activity?"* | Two other important indicators of the CLASS dimension of Positive Climate are positive communication and respect. When we use positive communication we often show verbal or physical affection and when we show respect we use eye contact; a warm calm voice; respectful polite language; and cooperation and/or sharing. This first short clip has a great example of physical affection as you give a high five to a child after he's successfully put on and shown you his nametag. Then in the second short clip I see a great example of respect as you talk with this child after circle time. *Please watch this second clip carefully and tell me what you do/say that lets the child know you respect him.* |
| Teacher scale | | | | |
| Analysis | .86 | .85 | | |
| Includes a description of a specific teacher-child interaction<br>Demonstrates knowledge of the dimension/indicator<br>Makes connections between their teacher-child | | | Question: What do you hear yourself saying that supports the Literacy Focus in this clip?<br><br>Response: I think that most of my students have learned that letters each have their own sound and they | Question: What else do you see yourself saying and/or doing in this clip that shows the children that you respect them?"<br><br>Response; I always like to praise the children at all times no matter how |

| | | |
|---|---|---|
| interactions and children's learning and development<br>Level of teacher engagement (coded at the cycle level)<br>Level of teacher reflection (coded at the cycle level) | know most of these sounds but in this clip I was trying to show them the importance of how the letters work when they are in a word. The reason I did this was because I knew that when I introduced the ""at"" family they would need to understand that the first letter changed and this was what changed the whole word. I was also trying to work with them on blending sounds because that is an important tool they will need as they begin to read." | big or little the task activity and communication with the children. This will allow the children to respond in a positive way. |

*Note.* The italized sections of the exemplars for high and low levels of cognitive challenge signal the portion of the prompt that exemplifies cognitive challenge. The rest of the prompt is presented to provide the question's context

Table 2. *Descriptive Statistics at Teacher and Coach Level, and Percentage of Variance Explained of Predictors at Each Level*

| | | | Teacher level | | Coach level n=15 | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % missing | Mean | SD | Mean | SD | Variance between (% of total) | Variance within (% of total) | Total Variance |
| Teacher years of education | 142 | 2.7 | 15.91 | 1.70 | 15.82 | .95 | - | - | - |
| Teacher in Head Start | 146 | 0 | .521 | .40 | .551 | .34 | - | - | - |
| Teacher in public school | 146 | 0 | .50 | .40 | .374 | .29 | - | - | - |
| Initial teacher analysis | 146 | 0 | 1.676 | .40 | 1.658 | .21 | - | - | - |
| Initial teacher observed practice | 142 | 2.7 | 3.743 | .36 | 3.739 | .1 | - | - | - |
| Initial teacher self-efficacy | 144 | 1.4 | 7.483 | .93 | 7.460 | .08 | - | - | - |
| Coaches' clear focus on interactions | 146 | 0 | 2.51 | .20 | 2.491 | .17 | .026 (68%) | . 012 (32%) | .037 |
| Coaches' cognitive challenge | 146 | 0 | 1.533 | .30 | 1.517 | .22 | .037 (40%) | . 055 (60%) | .092 |
| Conference usefulness | 145 | .7 | 3.507 | .40 | 3.502 | .05 | 0 (0%) | .160 (100%) | .160 |
| Coach-teacher relationship | 146 | 0 | 4.348 | .74 | 4.367 | .35 | .074 (14%) | .471 (86%) | .545 |
| Post teacher analysis | 146 | 0 | 1.695 | .40 | 1.685 | .15 | - | - | - |
| Post teacher observed practice | 141 | 3.4 | 4.065 | .45 | 4.061 | .11 | - | - | - |
| Post teacher self-efficacy | 131 | 10.3 | 7.897 | .83 | 7.883 | .16 | - | - | - |

*Note:* Correlations marked with ** are significant at the .01 level, and correlations marked with * are significant at the .05 level

Table 3. *Correlations between Variables*

| | 1 | 2 | 3 | 5 | 4 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Teacher years of education | - | -.331*** | .072 | .311*** | .218** | .030 | .136 | .273*** | .071 | .078 | .322*** | .238** | .168* |
| 2. Teacher in Head Start | | - | -.211** | -.104 | -.237** | -.010 | -.195* | -.052 | -.122 | -.145 | -.131 | -.224** | -.048 |
| 3. Teacher in public school | | | - | .028 | .209** | .010 | .075 | .083 | .012 | -.010 | .168* | .110 | -.062 |
| 4. Initial teacher analysis | | | | - | .350*** | .192* | .236** | .110 | .228** | .120 | .603*** | .307*** | .166* |
| 5. Initial teacher observed practice | | | | | - | .093 | .130 | .039 | .220** | .286*** | .310*** | .579*** | .146 |
| 6. Initial teacher self-efficacy | | | | | | - | .123 | .118 | .263** | -.013 | .190 | .057 | .518*** |
| 7. Coaches' clear focus on interactions | | | | | | | - | -.033 | .022 | -.074 | .081 | -.024 | .081 |
| 8. Coaches' cognitive challenge | | | | | | | | - | .156 | .143 | -.221** | .123 | -.107 |
| 9. Conference usefulness | | | | | | | | | - | .170* | .189* | .232** | .278*** |
| 10. Coach-teacher relationship | | | | | | | | | | - | .232** | .418*** | .005 |
| 11. Post teacher-analysis | | | | | | | | | | | - | .343*** | .091 |
| 12. Post teacher observed practice | | | | | | | | | | | | - | .152 |
| 13. Post teacher self-efficacy | | | | | | | | | | | | | - |

* $p \leq .05$. ** $p \leq .01$. *** $p \leq .001$

Table 4. *Relation between Coaching Implementation Variables and Teacher Outcomes*

| | Teacher analysis | | Observed practice | | Teacher Self-efficacy | |
|---|---|---|---|---|---|---|
| | Model I B (SE) | Model II B (SE) | Model I B (SE) | Model II B (SE) | Model I B (SE) | Model II B (SE) |
| Covariates | | | | | | |
| Initial analysis | .528 (.064)*** | .527 (.063)*** | .106 (.079) | .089 (.077) | -.019 (.074) | -.010 (.075) |
| Initial observed practice | .034 (.066) | .034 (.066) | .443 (.094)*** | .429 (.087)*** | .058 (.062) | .073 (.063) |
| Initial self-efficacy | .081 (.050) | .082 (.051) | -.009 (.056) | -.003 (.060 | .497 (.084)*** | .489 (.085)*** |
| Years of ed. | .116 (.060) | .117 (.064) | .071 (.071) | .090 (.072) | .218 (.087)** | .208 (.097)* |
| Head Start = 1 | .011 (.084) | .011 (.084) | -.062 (.071) | -.051 (.069) | .029 (.087) | .023 (.087) |
| Public school = 1 | .139 (.059)* | .139 (.059)* | .004 (.055) | -.002 (.052) | -.070 (.069) | -.060 (.072) |
| Predictors | | | | | | |
| Coaches' clear focus on interactions | -.069 (.071) | -.069 (.071) | -.111 (.043)** | -.114 (.037)** | -.015 (.066) | -.008 (.062) |
| Coaches' cognitive challenge | .089 (.061) | .089 (.062) | .025 (.063) | .020 (.056) | -.243 (.072)*** | -.239 (.073)** |
| Teacher-rated conference usefulness | -.004 (.063) | -.006 (.066) | .058 (.066) | .023 (.074) | .168 (.077)* | .195 (.084)* |
| Coach-teacher relationship | .137 (.065)* | .136 (.065)* | .242 (.087)** | .243 (.088)** | -.011 (.066) | -.010 (.066) |
| Moderation | | | | | | |
| Conference x initial teacher observed practice | | -.005 (.051) | | -.203 (.080)* | | .142 (.063)* |
| $R^2$ | .448*** | .449*** | .440*** | .478*** | .373*** | .392*** |

* p ≤ .05. ** p ≤.01. ***p≤.001

Figure 1. *Moderation of Initial Teacher Observed Practice on the Association between Conference Usefulness and Teacher Practice at the End of the Intervention.*

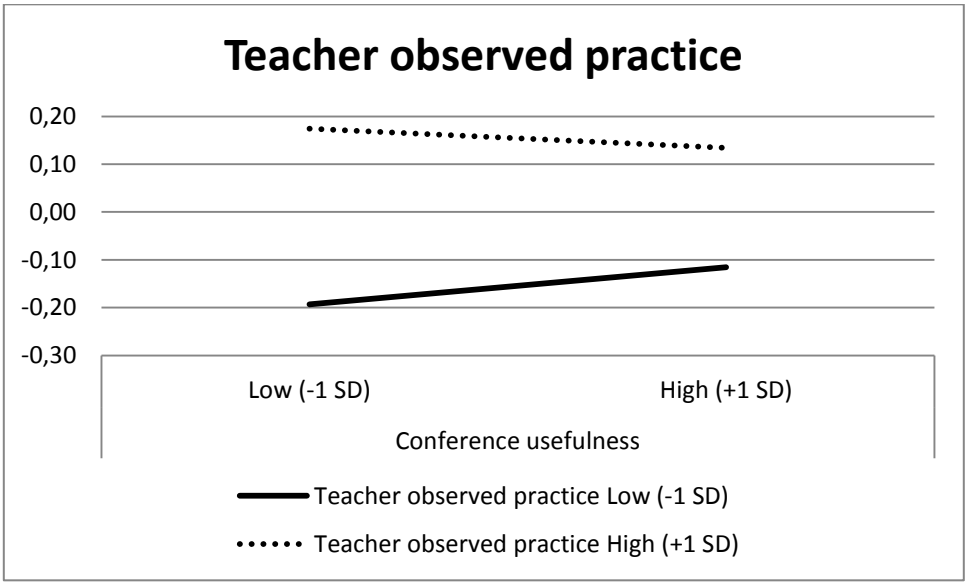
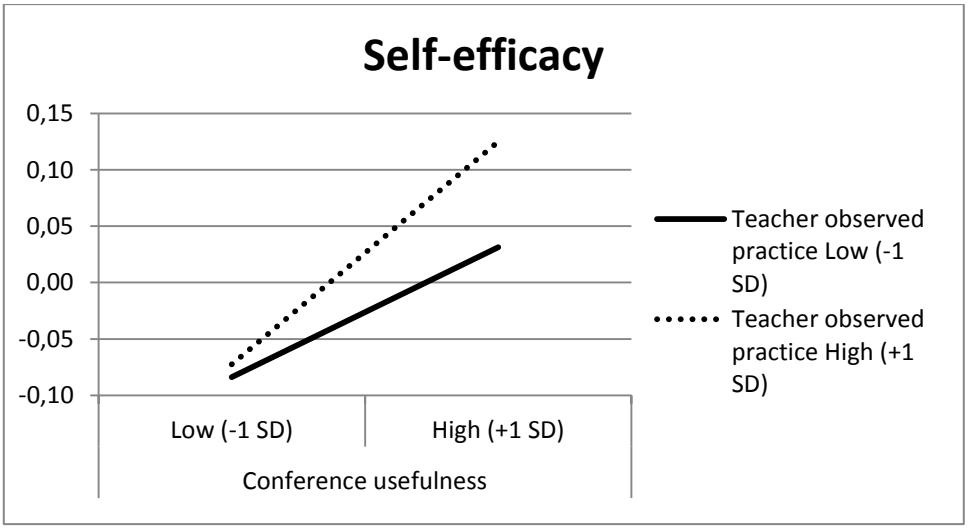


Figure 2. *Moderation of Initial Teacher Observed Practice on the Association between Conference Usefulness and Teacher Self-Efficacy at the End of the Intervention.*



# "How are my Actions Impacting my Students?":

# Understanding Teacher Analysis during Coaching Conferences

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**Abstract**

Teachers' reflection is conceived as a facilitator for change in teachers' practice by several coaching models. There is, however, a lack of research regarding *how* teachers reflect during coaching and whether reflection is actually associated with change in teachers' practice. The present study focused on teachers' analysis, one of the components of reflection. Specifically, the study examined teachers' analysis during coaching conferences and the degree to which teachers' display of analysis is associated with positive changes in teachers' practice, as well as with teacher and classroom characteristics. Through a mixed methods approach this study found that most teachers in this study engaged in descriptive analysis of their practice, and that the level of teachers' display of analysis remained stable across the coaching process. Findings also show that teachers' display of analysis of their practice was related to change in teachers' adherence to a curriculum, and that less experienced teachers and teachers in more challenging classroom display lower levels of analysis during the coaching conferences.

## "How are my Actions Impacting my Students?": Understanding Teacher Analysis during Coaching Conferences

Evaluations of professional development interventions have highlighted the positive effects of coaching models on teachers' practice and students' development and learning (Joyce & Showers, 1980; Pas, Bradshaw & Cash, 2014; Sailors & Shanklin, 2010; Zaslow et al., 2010). Coaching provides teachers with one-on-one learning opportunities that support the improvement of teachers' practice (Hsieh, Hemmeter, McCollum & Ostrosky, 2009; Neuberger, 2012; Rhodes, Stokes & Hampton, 2004). Several coaching models include teachers' reflection on their practice as one of the mechanisms in the models' theory of change of teachers' practice (American Institutes for Research (AIR), 2005; Ellison & Hayes, 2009; Hamre, Downer, Jamil & Pianta, 2012; Reinke, Stormont, Webster-Stratton, Newcomer & Herman, 2012). Thus, teachers participating in these coaching models are expected to reflect on their practice and how it affects students' learning and development, as well as to identify changes needed to improve (Denton & Hasbrouck, 2009). There is little research, however, on whether teachers successfully reflect during coaching. Even if teachers do reflect on their practice, there is also a dearth of research examining the association between teacher reflection and practice (Akbari, 2007; Griffiths, 2000; Korthagen & Wubbles, 1995), which brings into question the suitability of reflection as a process that facilitates change of teachers' practice.

Through a mixed-methods approach, the present study follows a group of teachers participating in a coaching intervention and examines their display of analysis, one component of reflection, during coaching. The study assesses change in teachers' analysis throughout the coaching intervention and the degree to which teachers' display of analysis is associated with positive changes in teachers' practice. The study also examines teacher

and classroom characteristics that may be associated with teachers' display of analysis during coaching. Focusing in greater depth on this element of the coaching process provides useful information for the development and refinement of coaching models (McGroder, Howard, Fishman, Rankin & Helsel, 2014; Sheridan, Edwards, Marvin & Knoche, 2009).

**Reflection in Coaching Conferences**

Coaching models provide teachers with content and pedagogical knowledge that teachers can add to their teaching repertoire to build a new, research-based, framework of effective teaching practice. Teachers' practice is expected to improve in part due to the teachers' adoption of this framework, which should guide teachers to include effective teaching practices in their daily interactions with students (AIR, 2005; Downer, Jamil & Maier, 2012; Hamre, Downer et al., 2012; Joyce & Showers, 1980; Veenman & Denessen, 2001).

Several coaching models highlight teacher reflection as the process through which teachers can engage in meaningful discussion of their practice and identify the need for a new framework of effective teaching practice (AIR, 2005; Ellison & Hayes, 2009; Hamre, Downer, Jamil & Pianta, 2012). Reflection is a process in which teachers examine their practice and identify ways to improve it. (Akbari, 2007; Hamre, Downer et al., 2012; Korthagen & Vasalos, 2009; Mena Marcos, Sanchez & Tillema, 2009). One key component of reflection is teachers' analysis of their practice. Analysis involves dissecting a complex process, such as teaching, in order to look at its specific pieces and understand how they work and how they are related to each other (Hamre, Downer et al., 2012). To analyze their practice, teachers make explicit connections among their thoughts, feelings and goals for students; their practice; and students' development and learning. Through this process

teachers identify the effect of their practice on students and assess its effectiveness by comparing the effect with their goal for students. This allows teachers to determine which practices need to be changed to improve their practice, opening the door for teachers to revise their framework for effective teaching practice.

Although there is significant variability in the type of activities and approaches that coaching models use to support teachers' improvement of their practice (AIR, 2005; D'Abate, Reddy & Tannenbaum, 2003; Isner et al., 2011; Pas et al., 2013), most models are based on a clinical supervision model that includes cycles of observations of teachers' practice and post-observation conferences (Hsieh, Hemmeter, McCollum & Ostrosky, 2009; Neuberger, 2012; Rhodes, Stokes & Hampton, 2004). In these cycles, coaches support teachers in observing their practice and developing an awareness of the teaching strategies they use in the classroom and how they impact students' learning and development. These coach-teacher conferences provide teachers with an opportunity to analyze their practice by discussing with their coaches what happened during the observation and reviewing how the teaching strategies used furthered the achievement of teachers' goals for students.

Studies assessing what coaches and teachers do during the conferences have focused on coaches' practice (Denton, Swanson & Mathes, 2007; Heineke, 2013; Ippolito, 2010) but, to our knowledge, there is no research examining whether in-service teachers are able to successfully analyze their practice in these conferences. Similar work with preservice teachers shows that simply providing teachers with the opportunity and the support to analyze their practice does not ensure that teachers will successfully do so. As a matter of fact, preservice teachers struggle to analyze their practice even when they participate in interventions where they receive support to engage in this process (Gelfuso & Dennis,

2014; Hertzog & O'Rode, 2011; Sewall, 2009). Coaching is designed to help teachers overcome similar struggles and successfully analyze their practice. Therefore, teachers' display of analysis is expected to improve throughout the coaching process. However, studies on mentoring and supervision show mixed support for this idea. For instance, Harford & MacRuairc's evaluation of a group supervision model (2008) found positive changes in teachers' display of analysis throughout the supervision year, while Gelfuso and Dennis (2014) found that even after increased support, preservice teachers participating in a supervised practice kept their discussions focused on students' behavior without connecting it to their practice, maintaining the same struggles to engage in analysis that they had shown at the beginning of the supervision process.

To assess how teachers display analysis in coaching conferences and how this skill changes during the coaching process, the present study follows a group of teachers participating in MyTeachingPartner (MTP; Pianta, Mashburn, Downer, Hamre & Justice, 2008). MTP is a coaching model that includes teachers' analysis of their practice through video-based observation and discussion as one of the mechanisms expected to help teachers improve their practice. A better understanding of how teachers analyze their practice during MTP coaching conferences could provide useful information for the improvement not just of MTP, but of other coaching models that also use analysis to promote change in teachers' practice and include coach-teacher conferences as a part of their coaching cycle (e.g. AIR, 2005; Ellison & Hayes, 2009; Reinke et al., 2012).

**MyTeachingPartner Coaching Model**

MTP is a web-mediated coaching model that has shown positive impacts both on teachers' practice (Allen, Pianta, Gregory, Mikami & Lun, 2011; Downer et al., 2013; Pianta et al., 2008) and on students' learning, development and behavior (Allen et al., 2011;

Downer et al., 2011; Gregory, Allen, Mikami, Hafen & Pianta, 2013; Mashburn et al., 2010; Mikami, Gregory, Allen, Pianta & Lun, 2011). In MTP, teachers participate in coaching cycles that begin with teachers videotaping their practice in the classroom and sending the video to their coach. After observing the teachers' video, coaches support teachers' analysis of their practice by providing them with written prompts focused on specific teacher-student interactions seen in the video. Teachers' responses to these prompts, as well as any other concerns that the teacher may have, are discussed during the conference, where coach and teacher also come up with an action plan for the next video recording, which starts a new cycle.

This process provides teachers with two opportunities to analyze their practice: their responses to the coaches' prompts, and the coach-teacher conference. Previous studies have shown that teachers participating in MTP successfully engage in analysis in their responses to coaches' prompts, and that those teachers that display more analysis show greater changes in their practice at the end of the intervention (Baldanza, Jiménez Herrera, LoCasale-Crouch & Cabell, 2013). The present study is, however, the first examination of teachers' analysis during MTP coaching conferences.

**Analysis and Teachers' Practice**

Teachers' analysis of their practice is not intended as the final outcome for teachers participating in coaching, but rather as a process that facilitates changes in their interaction with students. Even though the role that teachers' analysis of practice plays in improving teachers' practice is a tenet in theories of adult development and learning (Belanger, 2011; Kolb, 1984; Merriam, Caffarella & Baumgartner, 2007), and reflection is considered one of the key skills that teachers need to develop to be effective teachers (Darling-Hammond, 1998; National Council for Accreditation of Teacher Education, 2006; Valli, 1992), there

are very few studies that have examined this association (Akbari, 2007; Griffiths, 2000; Husu, Toom & Patrikainen, 2008; Korthagen & Wubbles, 1995). Although there are several studies that have examined the impact of teacher education and professional development on teachers' reflection (e.g. Cavanagh & Prescott, 2010; Harford & MacRuairc, 2008; Hertzog & O'Rode, 2011), none of them have gone on to assess the extent to which improvements in reflection ultimately changed teachers' practice. The lack of research on this association leaves open the question of the effectiveness of reflection, and thus analysis, as a process that facilitates change in teachers' practice. It is possible that even if a coaching model is successful at promoting teachers' analysis of their practice, this analysis is actually not leading to changes in teachers' practice after participating in the intervention. The present study addresses this question by looking at the association between analysis and change in teachers' practice throughout teachers' participation in MTP.

**Factors Associated with Teacher Analysis**

Given the hypothesized role of analysis in supporting the improvement of teachers' practice, it is also important to understand the characteristics of teachers and classrooms that may facilitate this process. Understanding these characteristics can inform coaches by helping them identify teachers that may need a higher level of support to successfully analyze their practice. Prior research suggests that teachers' years of experience, knowledge of effective practice and emotional exhaustion, as well as the level of challenge that a specific classroom poses for a teacher, may be associated to teachers' display of analysis of their practice.

With experience, teachers develop a set of skills that can enhance the analysis of their practice. For instance, more experienced teachers are better than novice teachers at focusing their attention on specific aspects of the classroom experience, and are quicker to

identify important patterns of behavior in a classroom and to generate more detailed hypotheses about what they see (Alger, 2006; Berliner, 1994; Hammerness et al, 2005; Williams & Grudnoff, 2011). Having these skills allows teacher to notice patterns in students' behavior more easily and to connect these patterns to their own practice in the classroom. Teachers may also be able to better analyze their practice if their knowledge of effective teaching practice is aligned with the framework presented by the coaching model. This alignment is likely to help teachers move more quickly into analysis of their practice because they start the coaching process with a better understanding of the types of teaching practices in which their coach is focusing, which decreases the time the coach will need to present this framework to the teacher.

Experience also helps teachers develop automated cognitive schemas that allow them to give a quick response to routine demands, freeing up cognitive skills such as attention and working memory to focus on other processes, such as analysis of their practice (Downer et al., 2012; Feldon, 2007; Moos & Pitton, 2013). However, teachers' analysis of their practice may be limited if they are facing excessive demands that require them to actively process incoming information, decreasing the cognitive resources available to analyze their practice. For instance, some have suggested that novice teachers struggle to analyze their practice because they are overwhelmed by their new duties in the classroom (Bransford, Derry, Berliner, Hammerness, & Beckett, 2005; Griffiths, 2000), which require them to use a large amount of their cognitive resources. Thus situations that overwhelm teachers' cognitive skills, such as if they are emotionally exhausted or are working in challenging classrooms, could drive teachers to show less analysis during their coaching conferences. If this is the case, coaches may need to provide additional support to these

teachers throughout the coaching process to ensure that they are able to successfully analyze their practice.

**Current study**

The present study uses a mixed-methods approach to examine teachers' analysis of their practice during coaching conferences. Study 1 presents a qualitative exploration of teachers' display of analysis in the conferences. The results from this study guided the development of a measure to assess teachers' display of analysis. Using this measure, study 2 looks at change in teachers' display of analysis throughout the coaching process, and the association between teachers' display of analysis and (a) changes in practice over the course of the intervention, and (b) their years of experience, knowledge of effective teaching practice, emotional exhaustion and classroom challenge

Based on prior research and on MTP's theory of change, teachers are expected to successfully analyze their practice during MTP's coaching conferences, and to show improvements on their analysis across the coaching conferences. However, given previous findings showing that teachers differ in the way they engage more generally with MTP (Downer, LoCasale-Crouch, Hamre & Pianta, 2009; LoCasale-Crouch et al., 2013), significant variation in both teachers' display of analysis and their growth rate is also expected. Similarly, teachers who show more analysis are expected to show greater improvements in teacher practice and implementation of the 4Rs curriculum during the intervention. Finally, while teachers' years of experience and their knowledge about effective teaching practice are expected to be positively associated with teachers' analysis, their emotional exhaustion and the level of challenge in their classroom are expected to be negatively associated.

## General Method

## Participants

Participants in this study were taking part of a pilot for 4Rs+MTP, an implementation of MTP that sought to improve teachers' general practice and their implementation of the 4Rs Program (Phillips & Roderick, 2007), a universal intervention for students that integrates social-emotional learning and literacy. The majority of the 35 teachers participating in this study were female (88.6%) and identified themselves as Non-Hispanic White (54.3%). The remaining teachers identified themselves as either Hispanic/Hispanic Biracial (31.4%) or African American (14.3%). The study included teachers of grades from third to sixth, with more teachers from lower grades (3rd grade: 37.1%; 4th grade; 31.4%, 5th grade: 22.9%; 6th grade: 8.6%). All participating teachers had an advanced degree and their years of experience ranged from 1 to 35, with an average of 10.62 years of teaching experience (*SD* = 7.02).

## Procedure

### Recruitment and Initial Training.

Schools that had previously expressed interest in implementing the 4Rs curriculum but had not yet implemented it were invited to submit an application to be eligible to participate in this study. Principals from six schools submitted an application and all schools were selected to participate in the intervention. Meetings were held in each school describing the project and inviting teachers from upper elementary grades to take part in the pilot. Teachers received an introductory 36-hours training in the 4Rs curriculum and in MTP's framework of effective teaching practice, as well as in the coaching process. This training was spread over three days before the start of the school year, and three days across the rest of the year. For the coaching portion of the intervention, teachers participated in eight 4Rs+MTP cycles with their corresponding coach in the months between October and

April. Only one of the teachers completed fewer than the intended eight cycles due to maternity leave.

## Study 1

Although teachers' analysis of their practice is used by many coaching models to promote change in teachers' practice, there is a dearth of research assessing whether teachers are able to successfully analyze their practice during coaching. To improve our understanding of teachers' display of analysis within the coaching conferences, Study 1 includes a review of teachers' discourse during the conferences with the goal of identifying features of analysis displayed by teachers in this context. Study 1 focused on the questions: "How do teachers analyze their practice in 4Rs+MTP coaching conferences?" and "To what degree do teachers engage in specific features of analysis?"

## Method

### Data Sources and Analysis

MTP coaches were asked to audio record all coaching conferences. The audio tapes for three out of the eight conferences (conferences 2, 4 and 6) were selected as data sources for this study. These conferences were selected because they captured regular coaching conferences (unlike conferences 1 and 8 that focus on setting up the beginning and end of the coaching process) as well as teachers' display of analysis right as they start the coaching process. The focus on these conferences also allowed an assessment of teachers' display of analysis at different points throughout the coaching process, separated by intervals of similar length.

Analysis of the conferences involved listening to the audio tapes of the conferences and identifying expressions where teachers displayed analysis. The conferences were analyzed by a group of graduate students and research assistants. Only one of the coders

had previous experience with MTP's coaching process, and none of the remaining coders had any experience with any other coaching models. To minimize the possible validity threat of the graduate student's previous coaching experience and to increase the reliability of the coding process all conferences were analyzed separately by two different coders and their results were jointly reviewed to reach an agreement on whether the expression showed analysis.

The audio tapes of the coaching conferences were analyzed using open and selective coding (Strauss & Corbin, 1998) guided by the definition of analysis. Initial categories were identified by coding teachers' expressions of each one of the three classroom processes that teachers need to consider to analyze their practice: their thoughts, feelings and goals for students; their practice; and students' development and learning (Hamre, Downer et al., 2012). The categories were expanded by looking at ways in which teachers made connections among these three processes, and this examination led to the identification of features of analysis displayed by teachers during the coaching conferences.

## Results

Six features of teachers' display of analysis were identified during the examination of the coaching conferences. This section presents a description of these categories, along with illustrating exemplars. Table 1 presents a summary of the number of teachers that displayed analysis in each of the assessed categories throughout the conferences, as well as the frequency with which they did it.

**Statement of the goals for practice.** One of the steps that teachers need to take to analyze their practice in the classroom is to make a connection between their goals for students, both in the short and in the long term, and their practice in the classroom. To engage in this step teachers need to be able to observe what they did in the classroom and

discuss the thought processes that lead to the choice of that specific practice. A teacher that is engaged in this feature of analysis would express why she made certain decisions in the planning process or in the classroom. This process can be seen in the following example:

> "In the moment, I didn't like what Jamie said. I wanted to engage them in deeper thinking, so one strategy that I use to do that is modeling. And I thought Claire was in the moment, [she] was a great one to model [a turn-and-talk]. I felt like that might have been a way to get her to the forefront […] because I wanted to take the attention away from him"

In this example this teacher provides a clear description of what her goal was when she asked Claire to do a turn-and-talk (a 4Rs strategy) stating what she wanted to achieve (to get students to engage in deeper thinking), what she thought she could do to get there (ask someone else to model the turn-and-talk) and the decisions she made based on that goal (bring Claire to the forefront of the classroom to model the turn-and-talk). By engaging in this feature of analysis the teacher focuses on the intentionality of her practice, reflecting on how each practice in her classroom is meant to have a particular impact on students. This feature of analysis sets the stage for teachers to establish whether a practice is effective by highlighting the expected outcome for students that constitutes the bar against which students' actual outcome is compared.

Most teachers in this study (57%) occasionally discussed the thought processes that led to their choice of specific teaching strategies, with only six teachers (17%) never discussing their goals for practice during the coaching conferences

**Awareness of the effect of what happens in the classroom on teachers' thoughts and feelings.** When teachers analyze the goals for their practice they make a connection between their expectations for students and their actions in the classroom. This second

feature of teachers' display of analysis allows teachers to notice the other side of the bidirectional connection between what happens in the classroom and their thoughts and feelings by allowing teachers to be aware of how a situation impacts them, either positively or negatively. Understanding this association opens the space for teachers to examine whether their practice in the classroom is guided by carefully assessed goals or ideas about developmentally appropriate practice or if it is an unsystematic reaction to what happened in the classroom that does not target any specific goals.

Teachers engaging in this feature of analysis discuss a specific situation that took place in the classroom and further their discussion by saying how it affected them. In the following example the teacher discusses how the actions of one of her students have affected her feelings about him:

> "Johnny has to talk all the time and it's usually about himself, and [in the video] he is talking over me. This is my ultimate pet peeve as a teacher. I think it's so rude. […] I started quietly letting him know that he's talking over me and I'm going to call on somebody else, but now I'm [on a] defense mechanism and I'm saying, "You're calling out. I'm not going to call on you until you stop calling out. If you raise your hand, I'll call on you."

This teacher describes how she feels when one of her students engages in what she considers as inappropriate behavior in the classroom, and how those feelings have led her to move from using subtle redirections to help him manage his behavior to using reactive strategies. Thus the teacher is aware that her behavior with Johnny is not driven by previously assessed instructional goals but by her negative emotions towards him. This awareness sets the stage for the teacher to take a step back and assess Johnny's behavior on its own merits by taking out the influence that her emotions have exerted on this

assessment. This assessment would also allow the teacher to think of factors that can be driving Johnny's behavior and rethink her choice of strategies to address those factors with the goal of helping him regulate his participation in class. Finally, this awareness could help the teacher be more attentive to her reactions to similar situations that she has recognized as triggers of certain emotions and to ensure that when facing these situations she can react in a more deliberate way.

Most teachers in this study (49%) consistently discussed how what happened in the classroom affected their thoughts and feelings and only five teachers (14%) never made such a statement.

**Focus on the effects of teachers' behavior on students' learning and behavior.** The previous two features focused on the connections teachers make between their practice, and their thoughts, feelings and goals for students. This next feature moves to the third classroom process that teachers need to consider to analyze their practice, the connection between their practice and students' learning and behavior. Making this link allows teachers to identify what specific elements of their behavior are causing a given response in students, providing important information for the teachers' analysis of how their practice is helping students achieve the goals teachers have set and whether their practice is being effective or ineffective. Teachers engaging in this feature of analysis reference a particular episode from the classroom, describing it in a way that shows that they are explicitly connecting what they did to the students' behavior and learning. For example, this teacher describes how a student's engagement in the classroom has improved due to some changes she made in her practice:

> "Karl was missing huge chunks of lessons because he wasn't focusing. So, [now I moved him to] that spot right next to me, and it's a huge improvement in his ability

> to participate […] I've noticed that, even though that's [still] a struggle, he's still getting more of the lessons now that he's up there. When he's doing turn-and-talks, they're focused. He's actually responding because he heard the question. Whereas, back here, he would give silly answers because he didn't know what was going on."

In this example, this teacher analyzed Karl's improved ability to concentrate and participate in the class after she implemented a new practice by having him sit beside her, and she explicitly connected this specific practice with Karl's improved behavior. Making this connection reinforces the teacher's self-efficacy by showing how her actions affect students, emphasizing the fact that she can help students achieve a specific goal by modifying her practice to target that goal. By looking at Johnny's response to her behavior this feature of analysis also provides the teacher with information regarding the outcome of her practice, which she can use to compare with the expected outcome to assess the effectiveness of her practice.

Most teachers (71%) made occasional references to the impact of their practice on students' behavior during their coaching conferences, and only five teachers (14%) failed to connect their practice to students' behavior in any of the coaching conferences.

**Assessment of practice's effectiveness.** To create a new framework of effective teaching practice teachers need to be able to identify the effectiveness of their practice and to evaluate whether specific strategies should be included in the new framework or if they should be taken out. To assess the effectiveness of practice teachers not only need to be able to identify the intended goal for their practice and the connection between their practice and students' outcomes, but they also need to connect these two pieces of information into a broader analysis of whether students' outcomes are what the teacher wanted them to be when she chose to engage in a specific practice. Thus, this broader

feature of analysis includes the comparison between teachers' intended goal for a practice and its actual outcome. The following is an example of a teacher engaging in this feature of analysis:

> "I asked him how he would feel about some sort of signal because I wanted to figure out a way to allow him to participate but also not be like "deer in the headlights" if I called on him. And at first he was a little hesitant, but then he was like, "All right." […] So, I gave him a few different [signals] that were subtle, so that when he was sitting in his seat, he's not doing something crazy like tapping his head when he feels all awkward by it. […] And the next time we had a group discussion I think he was excited about the signal because he was participating and speaking much more."

In this example the teacher compares her intended goal (for a shy student to participate more in the classroom) with the outcome (an increase in the student's participation). Because the intended and the actual outcome are the same this teacher can assess her practice of using a special signal with the student as effective and worthy of being included in her new framework for effective teaching practice. An accurate assessment of the effectiveness of teachers' practice is key for the creation of a framework for teaching practice that effectively leads to positive changes in teachers' practice.

The importance that making the broader connection between teachers' goals, practice and students' outcome has for the process of assessing the effectiveness of the practice is highlighted by the fact that even though only 6 teachers failed to mention the goals for their practice and only 5 teachers failed to make a connection between their practice and students' outcomes, only 15 out of the 35 teachers were able to assess the

practice's effectiveness by comparing their goals with students' behavior, with most teachers (57%) never assessing the effectiveness of their practice.

**Sharing ineffective practices.** Another element of teachers' display of analysis of their practice is the degree to which they identify less effective practices. When teachers engage in this feature of analysis, they present a specific interaction that was ineffective in achieving a desired goal and take responsibility for the ineffectiveness rather than suggesting it was a result of students' behavior or of other elements outside of the teachers' control. This process allows teachers to hold themselves accountable for both the achievements and the undesirable outcomes in the classroom, and to establish agency in the process of changing the latter. Take, for example, this teacher's elaboration of her attempt to balance student autonomy in resolving conflicts, with her own involvement:

> "I feel that is one area where I have trouble, resolving the [conflicts] they keep having because I want to let them work it out on their own and let them generate their own cool-down strategies, but when I step in, I find myself taking too much control in resolving the problem, and it does calm things for the day, or for the lesson, but the same [conflicts] will be there next time. I feel like that is one thing I am still adjusting to: letting go so they can work it out."

In this example the teacher recognizes a concern in her classroom, that students are not resolving conflicts on their own. The teacher then explains how even though her practice is helping students resolve their conflict and allowing her to move on with her regular classroom routines, this practice is ineffective in teaching students to independently resolve their conflicts, which is her ultimate goal. By engaging in this feature of analysis the teacher is identifying an undesirable outcome shown by her students, as well as how her practice is contributing to this outcome. This teacher takes responsibility of this outcome,

recognizing that her degree of control in resolving students' conflicts is a practice that she needs to change if she wants to achieve her ultimate goal of having students resolve their conflicts on the own. This analysis sets the stage for the teacher to think about alternative strategies that she could use to achieve the goal of helping students resolve their own conflicts, which should lead to a change in her practice.

Although 15 out of the 35 participants in this study (43%) shared less effective practices during their coaching conferences, only 9 (26%) teachers clearly stated that the lack of success in achieving their goal was due to their practice and not to elements out of their control (e.g. students, co-teachers, etc.), and none of these teachers consistently engaged in this type of analysis.

**Self-directed analysis.** Teachers can display analysis during the conferences by answering the coach's questions. However a higher level of analysis includes teachers engaging in self-directed analysis by building on the coach's questions and connecting their answers with other related aspects that they have thought about their practice. When teachers engage in this self-directed analysis they take the question being asked by the coach and synthesize it into a more complex query, proposing not simply one rote answer, but many interconnected responses that show the connection that they are making among their goals for students, their practice, and students' learning and behavior. Teachers may also engage in this type of analysis on their own without a question from their coach. The following teacher exemplifies this aspect of analysis:

> "Coach: How was it to watch yourself objectively this time?
>
> Teacher: I was like, "Wow, this conversation was really nice. I liked how the kids were thinking, coming up with their own questions." And I felt like maybe it was the way I was turning it back on them or taking a less strict approach on myself

> [what] made them feel more comfortable in sharing questions and ideas and [that] made the process much better. So I felt like the way they came up with [an answer] and then they [questioned it], I said, "Mmm, that's a good question!" So all of that was good, and I think that letting go of that feeling [of need of control], and also from our discussion after last time, when we talked about just giving the flow back to them, really helped bring the lesson home because I could take the microscope off of myself and get back to teaching in the moment."

In this example, we see the teacher providing a detailed answer to the coach's question. The teacher moves beyond a description of her feelings while watching herself, which was what the coach was asking her to do, and expresses what specifically from the experience made her feel those emotions by identifying that they were caused by her noticing how the change in her behavior resulted in a change in students' behavior. Finally, the teacher makes the connection between this analysis and a previous discussion, showing her awareness of how previous displays of analysis of her practice have led her to change her practice and to achieve the desired outcomes for students. In this process the teacher is bringing together different pieces of her analysis of her practice to achieve a new conceptualization of effective practice to add to her framework. Although most teachers participating in this study engaged in self-directed analysis at least once during their coaching conferences (60%), more than a third of the teachers never engaged in this feature of analysis.

## Discussion

Prior research on the process of coaching has focused on coaches' practices (Denton, Swanson & Mathes, 2007; Heineke, 2013; Ippolito, 2010). Study 1 complements this research by looking into the teacher side of the coaching equation through an

examination of teachers' display of analysis of their practice during coaching. Teachers' analysis of their practice is one of the processes that several coaching models include as a facilitator of teachers' improvement of their practice (AIR, 2005; Ellison & Hayes, 2009; Hamre, Downer, et al., 2012; Reinke et al., 2012). Findings show that, as intended by the coaching model, teachers participating in 4Rs+MTP analyze their teaching practice during coaching conferences. However, the analysis displayed by these teachers remains at the descriptive level with only a few teachers displaying a level of analysis that allows them to identify effective and less effective practices.

To analyze their practice, teachers need to look at specific pieces of their teaching practice and examine how these pieces work together. Most teachers in this study identified the three classroom processes that teachers need to consider to analyze their practice: teachers' thoughts, feelings and goals for students; their practice; and students' outcomes; and discussed how each of these aspects took place in the context of a specific teaching interaction. Study 1 also identified six features of analysis in which teachers examine the three processes and established connections between them: identifying the goals for their practice, being aware of the effect of what happens in the classroom on their thoughts and feelings, making connections between their practice on students' learning and behavior, assessing the effectiveness of the strategies, sharing ineffective practices and engaging in self-directed analysis.

The majority of the features of analysis identified by teachers referred to bidirectional connections (e.g., identifying the goal for students that drove the choice of a particular teaching strategy). However, the study also found that teachers were less likely to make a broader connection among these three processes and explicitly identify effective and less effective practices. In other words, most teachers participating in 4Rs+MTP

displayed descriptive analysis of their practice, which Hatton & Smith (1995) categorized as the lowest level of analysis. At this level, teachers describe the events that took place in the classroom (either teachers' practice or students' behavior) and justify them by connecting either: (a) their goals for students to their practice, (b) students' behavior to teachers' thoughts and feelings or (c) their practice to student outcomes. Fewer teachers in this study, however, displayed higher levels of dialogic analysis. This level of analysis involves teachers discussing what happened in the classroom, integrating the three classroom processes and recognizing consistencies and inconsistencies in this integration, such as an inconsistency between the initial goal that guided a teacher's practice and the actual outcome (Hatton & Smith, 1995). This integration process allows teachers to identify less effective practices that need to be changed in order to have the desired effects on students' learning and behavior, or effective practices that should be maintained in their framework of effective teaching practice to preserve the effectiveness of their practice.

The degree to which teachers' analysis of their practice can support improvements in their practice may be limited if teachers are not able to assess the effectiveness of the practice enacted during the coaching observation. Without this assessment, teachers will lack the information needed for them to modify their framework for effective teaching practice, leading to an interruption in the expected process of change of their teaching practice. Given that the identification of effective and less effective practices is crucial to improving teachers' practice, coaching models should increase the support provided for teachers to make connection between the three relevant classroom processes and assess the effectiveness of their practice.

## Study 2

The goal of the present study is to provide useful information for the improvement of coaching by examining teachers' display of analysis of their practice during coaching conferences. Findings from Study 1 describe *how* teachers display analysis, with most teachers displaying bidirectional features of teachers' analysis but few of them making broader connections and assessing the effectiveness of their practice. These findings are only a first step to improve our understanding of teachers' analysis of their practice within the coaching context, and questions remain regarding the degree of change in analysis throughout the coaching process, as well as the associations between teachers' analysis, change in teachers' practice during the intervention, and teacher and classroom characteristics.

To broaden our understanding of teachers' analysis of their practice during coaching conferences and its operation as a facilitator of change in teachers' practice, Study 2 focuses on three research questions: (a) Does teachers' display of analysis change throughout the coaching process?, (b) Is teachers' display of analysis related to changes in teachers' practice and implementation of the 4Rs curriculum during the intervention?, and (c) Are teachers' years of experience, knowledge of effective teaching practice, emotional exhaustion and current classroom challenge associated with teachers' display of analysis during the coaching conferences?

## Method

**Data Collection.** At the beginning of their participation in 4Rs+MTP, teachers completed an online questionnaire that included questions about them and their students. Teachers were also asked to submit videotapes of their implementation of a 4Rs lesson as part of their coaching cycles. All tapes were coded both for teacher practice and for the

adherence and quality of their implementation of the 4Rs lesson. Teachers submitted an average of 6.37 tapes (*SD* = .91, range 4-8).

**Measures**

**Teachers' display of analysis.** The scale for teacher analysis was developed based on the qualitative examination of the coaching conferences. The scale consisted of six items that assessed the extent to which teachers made connections among their goals for students, and their thoughts and feelings; their practice; and students' development and learning (see Appendix A). These items were coded in a 3-point Likert scale with 1 being the lowest score and 3 being the highest. Cronbach's alpha for this scale ranged between .63 and .73 across the three time points.

Conferences were coded by a team of coders that received training on how to reliably use the scale. Training consisted of a presentation of the instrument along with examples for each item, followed by a joint coding session of two conferences with master coders that included explanations of the master codes. The coding process began with two coders coding each conference. After their individual coding, the coders discussed any disagreements and decided on a final code. Disagreements in scores were resolved by going over the coders' notes and the tapes to establish whether one of the coders had missed an important element that had influenced the code. Intraclass correlation coefficients (ICCs) for individual items in each of the three time points ranged between .30 and .90. However, ICCs for the whole scale showed higher agreement between coders with ICCs ranging between .68 and .85 across the three time points, which deemed the scale as adequate for use in this study

**Video coding.** Videos submitted by teachers as part of their coaching process were coded both for implementation of 4Rs activities and practice. The videos were coded

separately for each of the measures by a team of coders trained to reliably use the measures. Training consisted of a presentation of each instrument, followed by a joint coding session of a set of master coded videos that included explanations of the master codes. After training, coders were required to code reliability videos. To show reliability, coders had to provide the same scores as the master code for at least 80% of the binary items, and they had to provide scores that were no more than one point off the master code scores for at least 80% of the items in a Likert scale. During the coding process coders participated in drift meetings to ensure the continued reliability on their use of the measure.

***Implementation of 4Rs activities.*** Video of the teachers' implementation of the 4Rs activities was coded with a rubric that included two scales: adherence and quality of implementation (see Appendix B). The adherence scale consisted of six items that assessed whether teachers implemented the core elements of the Applied Learning lesson, with items such as "Does the lesson include opportunities for independent and/or supervised skill practice?" These items were coded through a binary yes-no scale.

The quality scale consisted of eight items that assessed how well teachers were teaching the 4Rs curriculum, and they included questions such as "Would you say that the teacher tailors the lesson to be relevant to students' experiences?" These items were coded through a 5-point Likert scale where 1 was *Low* and 5 was *High.* Cronbach's alpha for this scale ranged was in average .781 across the eight time points, showing adequate internal consistency.

To assess inter-rater agreement on the scores, Kappas and ICCs were calculated both at the individual item and at the scale level across all videos for the adherence and quality items, respectively. The scales' ICCs show high coder agreement (Adherence =

.971 and Quality = .849), as well as the individual items' Kappas (adherence, average of .921 across the eight cycles) and ICCs (quality, average ICC of .706).

***Teacher practice*.** Assessments of teacher practice were made using the Classroom Assessment Scoring System Upper Elementary, CLASS (Pianta, Hamre & Mintz, 2010). This observational instrument uses a 7-point Likert scale and assesses the quality of teacher-student interactions in three domains: Emotional Support focused on how the classroom environment supports students' social and emotional functioning; Classroom Organization, that includes the classroom processes related to organization and management of students' behavior, time and attention; and Instructional Support, that focuses on assessing how teachers interact with students in a way that effectively supports their cognitive and language development. Previous research using the CLASS has shown the predictive validity of this measure in relation to student outcomes (Allen et al., 2013).

Coders double coded 84% of the videos, and the ICCs showed high agreement between coders, with values ranging between .689 and .880 across all CLASS dimensions.

**Teachers' knowledge about effective practice.** The Video Assessment of Interactions and Learning (VAIL) was used to assess teachers' knowledge about effective practice by focusing on teachers' skills in detecting effective interactions (Jamil, Sabol, Hamre & Pianta, 2013). The VAIL has been previously used to assess early childhood teachers' knowledge (Downer et al., 2013; Hamre, Pianta et al., 2012; Jamil et al., 2013) and has shown predictive validity to teacher practice (Hamre, Pianta et al., 2012). This assessment, based on the framework of effective practice used in MTP, was completed by teachers at the beginning of the intervention. Teachers were asked to watch two short videos of teacher-student interactions of between two to three minutes each. After watching the video teachers were asked to identify up to five strategies the teacher used in the video

to facilitate a particular type of effective interaction in the classroom and to provide a behavioral example of the strategy identified. Each strategy-example pair was coded on four criteria (Jamil et al., 2013): accurate mention of an interaction targeted in the video, accurate mention of a behavioral example from the video, match between the strategy and the example described, and number of unique interactions that the teacher was able to identify in the video (breadth). The scores for strategy, example and match were summed across the five possible responses. Resulting scores, as well as the total breadth score, were transformed to z-scores in order to get an overall score accounting for the scaling differences. Cronbach's alpha for this scale was .778

For this study, a new version of the VAIL was developed using video from upper elementary teachers in order to match the participating teachers' classrooms. All teacher responses were double coded. Each coder coded the teachers' responses individually and then the two coders met to discuss their scores, identify any disagreements and decide on a final code. Disagreements in scores were resolved by a joint revision of the teachers' response. An ICC of .974 for this scale showed high agreement between coders

**Emotional exhaustion.** Teachers were asked to complete the Emotional Exhaustion subscale from the Maslach Burnout Inventory-Educators Survey (Maslach, Jackson & Schwab, 1996). This 9-item scale assesses teachers' feelings of being emotionally over-extended and exhausted by their work through items such as "Working with people all day is really a strain for me". Items are rated on a 7-point Likert scale where 0 means *Never* and 6 means *Every day.* The Cronbach's alpha for this scale (.893) shows adequate internal consistency in this study.

**Classroom challenge-index.** An index to assess the level of challenge that a classroom poses to a teacher was calculated by using demographic information about the

classroom reported by the teacher (percent of: boys in the classroom, students with Individualized Education Program (IEP), students with Limited English Proficiency (LEP) and students that qualify for free and reduced lunch), as well as teacher reports on students' conduct problems and aggression.

***Conduct problems and aggression.*** At the beginning of the year teachers reported on individual students' conduct problems and aggression by completing the Behavioral Assessment System for Children (BASC, Reynolds & Kamphaus, 1998). In this scale teachers rate the degree to which a list of behaviors describes the student's behavior in the last 30 days. The scale includes 10 items for conduct-disordered behaviors (e.g. "the student is truant", "cheats in schools") and 14 items for aggressive behaviors (e.g. "the student shows off", "is a sore loser") rated in a 4-point Likert scale where 1 means *Never* and 4 means *Almost always.* Both scales showed adequate internal consistency (conduct problems Cronbach's alpha = .696, aggression Cronbach's alpha = .921). An overall scale score was calculated for each student and transformed into a t score that was compared with a nationally normed t score (62.9 for conduct problems and 63.5 for aggressive behaviors) to identify students that had higher-than-average levels of aggression and conduct problems (Jones, Brown, Hoglund & Aber, 2010). The number of students identified was summed to the classroom level to calculate a percentage of students with aggression and conduct problems in the teacher's classroom.

All the variables in this challenge-index were on a scale of 0 to 100 that reflected the percentage of students in the classroom that presented each one of the factors, with larger values showing higher levels of challenge in the classrooms. Because all scores were in the same scale the variables were averaged into one final score.

**Data Analysis**

All quantitative analyses were conducted using Mplus version 6.11 (Muthén & Muthén, 2010) Preliminary descriptive statistics (means and standard deviations), bivariate correlations, and percentage of missing data were examined for each variable. Missing data was addressed by using full information maximum likelihood estimation.

To assess the degree of change in teachers' display of analysis throughout the three conferences assessed a linear growth model was calculated. Loadings for all indicators to the intercept factor were set at 1, while loadings for the linear slope factor were set at 0, 1 and 2.

The first step to examine the association between teachers' display of analysis and change in teachers' practice and 4Rs implementation was to calculate the change in these outcomes. With this goal, individual unconditional quadratic growth curve models were calculated. In each one of these models all loadings from the indicators to the intercept factor were set to 1, loadings for the linear slope factor were consecutively set from 0 to 7 to reflect the linear growth in time across each cycle, and loadings for the quadratic slope factor were set to 0, 2, 4, 9, 16, 25, 36 and 49 to reflect the quadratic growth across the coaching cycles. The appropriate model for each of the 4Rs implementation dimensions and practice domains was identified based on the results of these growth models. If a growth model's results showed either significant change across the coaching process (significant linear or quadratic mean slope) or significant variation in teachers' rate of change (significant variance around the linear or quadratic slope), the next set of analysis used the estimates for the intercept, the linear and the quadratic slope from the growth model. If the results showed no significant change or no significant variation in teachers' rate of change, the average score of the dimension/domain across the eight coaching cycles was used as an outcome in the following analysis.

Five individual regression models (one for each dimension of 4Rs implementation and domains teachers' practice) were conducted to assess the association between teachers' display of analysis and their practice and implementation of the 4Rs curriculum, with teachers' display of analysis predicting either the intercept and the linear and quadratic slopes across the coaching process, or the average score.

A path analysis was conducted to examine the association between teachers' years of experience, knowledge of effective teaching practice, emotional exhaustion and classroom risk, and teachers' display of analysis.

## Results

The degree of change in teachers' display of analysis, and its associations with teacher and classroom characteristics, and with changes in teachers' practice after their participation in 4Rs+MTP were examined in Study 2.

### Change in Teachers' Display of Analysis

Contrary to our initial hypothesis regarding change in teachers' display of analysis throughout the coaching process, the results of a linear growth model (see Table 2) show no significant change and no significant variation in the level of analysis with which teachers started the coaching process or the rate of change showed during the coaching process. In other words, all teachers started the coaching process displaying similar levels of analysis, which remained stable throughout the coaching process. Because teachers' display of analysis was not found to change across the coaching process, the remaining models used the average analysis across all three time points.

### Analysis and Teachers' Practice

Table 3 presents descriptive statistics for each of the dimensions of 4Rs implementation and domains of teacher practice across each of the eight coaching cycles,

and results from the individual growth models for each outcome are presented in Table 4. The individual growth models found significant negative quadratic change for adherence, Emotional Support and Instructional Support, but no significant linear or quadratic change for quality of implementation or Classroom Organization. No significant variation around the rate of change was identified for any of the dimension/domains assessed. In other words, teachers' adherence to the 4Rs curriculum, Emotional Support and Instructional Support showed an inverse U-shaped trajectory with teachers' performance on these domains showing initial improvement, followed by a decline towards the end of the coaching process. On the other hand, teachers' quality of 4Rs implementation and Classroom Organization remained stable throughout the coaching process.

Based on these results, five individual regression models (one for each dimension of 4Rs implementation and domains of teachers' practice) were conducted to examine the association between teachers' average display of analysis and their practice and implementation of the 4Rs curriculum, with teachers' display of analysis predicting either the intercept, and the linear and quadratic slopes (for adherence, Emotional Support and Classroom Organization, Table 5) or the average score (for quality and Classroom Organization, Table 6) across the coaching process. The results from the individual regression models only show evidence of significant associations between teachers' display of analysis and linear and quadratic change of adherence to the 4Rs curriculum. Teachers that displayed more analysis showed a larger increase in their adherence to the curriculum throughout the coaching process, and showed less of a drop in adherence at the end of the process.

**Factors Associated with Teacher Analysis**

Bivariate correlations between teachers' years of experience, knowledge of effective practice, emotional exhaustion and classroom risk-index, and teachers' average display of analysis are presented in Table 7. Contrary to our initial hypotheses, these results show that only teachers' years of experience is significantly correlated with teachers' display of analysis, with more experienced teachers displaying less analysis during the coaching conferences. However, these results also show a trend level association between teachers' display of analysis and the classroom challenge-index, with teachers working in more challenging classrooms displaying more analysis during their coaching conferences.

Table 8 shows the results from the path analysis with teachers' years of experience, knowledge of effective practice, emotional exhaustion and classroom challenge-index predicting teachers' average display of analysis. These results are consistent with the findings from the bivariate correlations, with teachers' years of experience being negatively and significantly associated with teachers' display of analysis, while classroom challenge-index is significantly and positively associated with teachers' display of analysis. The path analysis did not identify any other significant associations.

## Discussion

Even though several coaching models include teachers' analysis of practice as one of the mechanisms expected to lead to improvements in teachers' practice (AIR, 2005; Ellison & Hayes, 2009; Hamre, Downer et al., 2012), there are very few studies that have actually looked at how teachers analyze their practice within coaching contexts and how this analysis is associated with change in teachers' practice. This study examined teachers' analysis of their practice in the conferences of MTP, a coaching model that includes analysis in its theory of change. Findings from this study show that most of the analytical comments made by teachers remained at the descriptive level, and that the level of

teachers' display of analysis remained stable across the coaching process. The study also shows that teachers' display of analysis of their practice was related to only one out of five dimensions of teachers' practice (teachers' adherence to the 4Rs curriculum), and that less experienced teachers and teachers in more challenging classroom display lower levels of analysis during the coaching conferences. This study improves our understanding of the operation of analysis as a facilitator of change of teachers' practice within coaching, adding to the growing literature on the *process* of coaching and the identification of factors associated with its effectiveness (McGroder et al., 2014; Sheridan et al., 2009).

**Teachers' Display of Analysis**

Previous research on teachers' analysis of their practice has focused on the content of preservice teachers' analysis (i.e. Gelfuso & Dennis, 2014; Hertzog & O'Rode, 2011; Rosaen, Lundeberg, Cooper, Fritzen & Terpstra, 2008). To our knowledge, the present study represents the first assessment of how in-service teachers display analysis of their practice during coaching conferences. Consistent with a few exceptional studies on the process of preservice teachers' display of analysis of their practice (Cavanagh & Prescott, 2010; Husu et al., 2008), Study 1 found that the majority of teachers displayed descriptive analysis and only a few engaged in higher-level analysis by making broader connections among the three classroom processes to assess the effectiveness of their practice. Teachers that display descriptive analysis of their practice are able to make simple connections between the classroom processes, improving their understanding of what happens in the classroom and creating a foundation for higher levels of analysis.

Engaging in descriptive analysis, however, may not provide teachers with the information they need to improve their practice. In order to modify their framework of effective teaching practice teachers need to be able to take a broader look to their classroom

and make more complex connections among their thoughts, feelings and goals for students; their practice; and students' outcomes (Van Manen, 1977). The role of analysis as a facilitator of change in teachers' practice may be limited if teachers are not able to engage in higher levels of analysis. Since coaching supports teachers to analyze their practice, teachers' display of analysis was expected to improve throughout the coaching process, moving from a descriptive to a dialogic level of analysis at the end of the process. On the contrary, findings from Study 2 show that teachers' display of analysis during the coaching conferences remained stable throughout the coaching process. This finding could be explained by inadequate levels of coaches' support of teachers' display of analysis or by a limited ability for in-service teachers to change their display of analysis.

Prior studies have found that not all coaches provide proper support for teachers to analyze their practice during conferences (Denton, Swanson & Mathes, 2007; Gelfuso & Dennis, 2014; Heineke, 2010; Ippolito, 2011). Coaches have been found to assume the role of experts during the conferences, asserting the changes that teachers need to make in their practice. This process leaves teachers with little room to critically look at their practice and identify the needed changes on their own, which limits the improvements that teachers can make to their display of analysis. In this case, teachers' display of analysis would remain stable throughout the coaching process. Since studies on the *process* of coaching, included this one, have focused either on the coaches' or the teachers' actions, there is no evidence to support or reject this expected association between coaches' actions and teachers' display of analysis. Given coaching's interactional nature, future studies would benefit from including information on both coaches' and teachers' actions in order to improve our understanding of coaching interactions, and how coaches' action are associated with both

teachers' actions during their process and their improvements in practice after participating in coaching.

On the other hand, because research on changes in teachers' display of analysis has focused either on preservice teachers or on comparing novice and expert teachers (Gelfuso & Dennis, 2014; Hertzog & O'Rode, 2011; Sewall, 2009; Tsui, 2009), there is little information regarding change in in-service teachers' display of analysis of their practice after their initial teaching years. Teachers' display of analysis is a key skill for novice teachers to learn how to effectively handle the novel demands that teaching places on them (Gelfuso & Dennis, 2014; Seban, 2009). Novice teachers' constant engagement in analysis of their practice, along with the development of cognitive skills needed to better assess what goes on in the classroom, could lead to improvements in teachers' display of analysis during their initial teaching years (Harford & MacRuairc, 2008; Seban, 2009). Expert teachers, however, may only analyze their practice when the desired student outcome is of critical importance (Dreyfus & Dreyfus, 1986; Tsui, 2009). Thus expert teachers have fewer opportunities to analyze their practice, perhaps limiting their ability to make improvements in this skill. Supporting teachers to create a framework of effective teaching practice and to automatize certain practices may facilitate teachers' performance in the classroom (Downer et al., 2012; Feldon, 2007), but further research should examine whether this automaticity leads to fewer opportunities for teachers to analyze their practice and whether this unintended potential consequence may have negative effects on teachers' practice.

**Analysis and Improvements in Teaching Practice**

This study also explored whether teachers' display of analysis of their practice helped promote change in their teaching. Findings show that in three out of the five

dimensions of teacher practice assessed (adherence, Emotional Support and Instructional Support) teachers showed initial improvements in these domains of practice, but these improvements waned at the end of the coaching process. These findings are unexpected given previous evidence of positive impacts of MTP in teachers' practice (Allen et al., 2011; Downer et al., 2013; Pianta et al., 2008). However, evaluations of other coaching interventions have found positive impacts in teachers' practice reflected in maintained practice quality for teachers in the intervention group, compared with deteriorating practice quality for teachers in the control group (Raver et al., 2008). Thus the fact that teachers' practice in this study either did not change or changed but returned to its original level could be evidence of positive impact of MTP on teachers' practice in this study. The present study did not include a control group that could confirm this hypothesis. However, an evaluation of the effects of MTP on students whose teachers participated in this study found positive impacts on several of the targeted student outcomes, including hostile attribution bias and use of aggressive negotiation strategies (Downer et al., 2014). This evidence supports the hypothesis of positive impacts on teachers' practice in the present study, especially considering previous findings showing that positive impacts on students whose teachers are participating in MTP are achieved through change in teachers' practice (Allen et al., 2011)

Our evaluation of the association between teachers' display of analysis and their teaching practice found that teachers' display of analysis was only associated with change in teachers' adherence to the 4Rs curriculum. Teachers that displayed more analysis in their coaching conferences showed improvements in the fidelity with which they delivered 4Rs activities. These findings need to be interpreted with caution because the small sample size in this study may have limited its ability to identify significant associations. Still, the

findings from this study can be considered a starting point to improve our understanding of teachers' analysis of their practice as a facilitator of change in teachers' practice. It may be that teachers that engaged in more analysis were simply more engaged in the intervention and therefore more motivated to adhere to the 4Rs curriculum but that this engagement was not sufficient to promote changes in the more qualitative elements of their teaching practice.

This study delved on the role of teachers' display of analysis during the coaching conferences as a facilitator of change in teachers' practice. It is possible, however, that other elements of MTP are responsible for facilitating change in teachers' practice. MTP cycles also include asking teachers to observe their practice using video filmed in their classrooms, and written prompts provided by the coach, that allow teachers to focus on specific aspects of their behavior while they are observing their practice (Hamre, Downer et al., 2012; Mashburn, 2010; Pianta et al., 2008; 2014).

Although previous studies have found that increases in the number of MTP cycles to which a teacher is exposed to are associated with larger changes in teachers' practice (Pianta et al., 2008, 2014), these studies have not disentangled which one of the steps in the cycle or what conjunction of them is facilitating change in teachers' practice. This study focused on coaching conferences because this is a step that MTP shared with several other coaching models and that has garnered little attention from researchers (Denton & Hasbrouck, 2009; Hsieh et al., 2009; Reinke et al., 2012). However, recent research on teacher education and professional development highlights teachers' observation of their own practice as a process that may be facilitating change in teachers' practice. By having teachers observe their own practice, MTP provides them with the opportunity to assess what happens in the classroom in an objective, evidence-based manner that minimizes the

influence that teachers' emotional and cognitive processes at the moment may have in their recollection of the events. Research has found that individuals tend to overestimate the effectiveness of their performance when they make global self-assessments based on their recollection of events (Dunning, Heath & Suls, 2004; Eva & Regehr, 2011; Schumacher, Englander & Carracio, 2013). When teachers watch videos of their practice they display more reflective and specific analysis than when they base their analysis on their recollection of their practice (Osipova, Prichard, Boardman, Kiely & Carrol, 2011; Rosaen et al., 2008; Sewall, 2009). Thus, providing teachers with opportunities to observe their own practice should improve the accuracy of the teachers' assessment of the effectiveness of their practice, which would lead to a more refined framework of effective teaching practice that would guide teachers to improve their practice.

Finally, since the measure used to assess teachers' display of analysis of their practice was developed as part of this study and has not been previously validated, it is also possible that the measure used in this study is not measuring teachers' display of analysis accurately. In this case the lack of association between teachers' display of analysis and change in teachers' practice may be a result of methodological issues, instead of a reflection of the actual association between these two processes. The development of a new measure for teachers' display of analysis was driven by the lack of existing reliable measures for this construct (Mena Marcos et al., 2009). The measure, however, was developed using the features of analysis identified after a qualitative examination of teachers' expressions during the coaching conferences, which was guided by an established definition of analysis (Hamre, Downer et al., 2012) and thus should include all relevant features of this process. The use of this established definition of analysis also allowed us to ensure initial content validity (Clark & Watson, 1995). The resulting items were examined

to ensure that they were capturing variability between teachers and that coders were able to reliably use the measure (Johnson, Penny & Gordon, 2008; Kline, 2005). The associations (discussed below) between teachers' display of analysis and some of the hypothesized teacher and classroom characteristics also provide some evidence of the measure's validity. Still, further research is also needed to continue examining the measure's reliability, validity and sensitivity to change, key elements in the development of a useful measure for teachers' display of analysis (Jamil & Hamre, 2013). This measure could be improved by using it in larger MTP studies where the sample size would enable such examinations, as well as in other coaching interventions that share the inclusion in their theory of change of teachers' analysis as a facilitator of change in teachers' practice.

In summary, the present study provides some evidence of an association between teachers' display of analysis in coaching conferences and their changes in practice. However, the study's limitations regarding the sample size and the validity of the measure for teachers' display of analysis used call for caution when interpreting these findings. This association should continue to be examined in future studies in order to clarify the role that teachers' display of analysis plays in facilitating change in teachers' practice.

**Teacher and Classroom Characteristics and Teachers' Analysis**

Despite the lack of clarity around the association between teachers' display of analysis and their change in practice, this study did find consistent evidence of associations between teachers' display of analysis and teacher and classroom characteristics. However, the findings about the association between teacher and classroom characteristics and teachers' display of analysis during the coaching process were contrary to our initial hypotheses. These findings show that teachers who are teaching more challenging classrooms and that have fewer years of teaching experience showed higher levels of

analysis during the conferences. Initial hypotheses about teachers in more challenging classrooms displaying less analysis of their practice were based on a cognitive load model (Downer et al., 2012; Feldon, 2007) that states that teachers facing excessive demands experience an overload in their cognitive skills, limiting their ability to engage in cognitively demanding tasks such as analysis of practice. However, these findings may be better explained by looking at teachers' emotional experience of the classroom. Previous studies have found that teachers that report to be moderately stressed in their work are more engaged with professional development (Domitrovich, Gest, Gill, Jones & DeRousie, 2009; Li-Grining et al., 2010; Raver, Blair & Li-Grining, 2012; Wenz-Gross & Upshur, 2012). Highly-challenging classrooms place too many demands on teachers, exhausting their resources and causing stress (Friedman-Krauss, Raver, Neuspiel & Kinsel, 2014; O'Donnell, Lambert & McCarthy, 2008).

At the same time, teachers' low levels of experience can also be a source of stress (Li-Grining et al., 2010) because beginning teachers lack a framework for effective teaching practice that can help them manage the multiple demands of a classroom (Alger, 2006; Bernstein & Sparks-Langer, 1993; Bransford et al., 2005; Griffiths, 2000). Because analysis of their practice is one way in which teachers are expected to engage during the coaching conferences it is possible that teachers teaching in highly-challenging classrooms and with less teaching experience approach coaching as a mean to gain the skills required to handle the demands from their classroom and as a way to reduce the stress caused by the teaching experience, motivating them to analyze their practice. These findings could be used by coaching models to identify groups of teachers that require more support to analyze their practice, allowing them to develop strategies to support these teachers. Targeting

coaching's efforts towards groups of teachers that need more help could increase their positive impacts on teacher practice and students' learning and development.

**Conclusion**

The present study adds to the budding research on the *process* of coaching (McGroder et al., 2014; Sheridan et al., 2009) by examining how teachers displayed analysis of their practice during coaching conferences, and the associations between analysis and change in teachers' practice, and teacher and classroom characteristics. Overall, these findings highlight the importance of looking into the *process* of coaching and to examine our hypotheses regarding the mechanisms behind its effectiveness to ensure that coaching models are directing their efforts and resources in the right direction. Although the study provides a clear description of how teachers analyze their practice and identifies teacher and classroom characteristics associated with teachers' display of analysis of their practice, it also leaves open other questions on whether teachers' display of analysis can be changed through coaching and if these changes have positive impacts on teachers' practice. Providing a clear answer to these questions is particularly important since teacher educators consider analysis as a key process to facilitating change in teachers' practice, and analysis is included in several coaching models' theory of change. Answers to these questions can provide key information for program developers on whether targeting teachers' analysis in their designs is going to provide the desired return in change of teachers' practice. Research on the role of other processes, such as teachers' observation of their practice, as facilitators of change in teachers' practice would continue to increase our understanding of how coaching works, providing key information for the improvement of coaching models and professional development in general.

## References

Akbari, R. (2007). Reflections on reflection: A critical appraisal of reflective practices in L2 teacher education. *System, 35,* 192-207

Alger, C. (2006). "What went well, what didn't go so well": Growth of reflection on pre-service teachers. *Reflective Practice, 7,* 287-301

Allen, J., Gregory, A., Mikami, A., Lun, J., Hamre, B., & Pianta, R. (2013). Observations of effective teacher-student interactions in secondary school classrooms: Predicting student achievement with the Classroom Assessment Scoring System—Secondary. *School Psychology Review, 42,* 76-98

American Institutes for Research (2005). *Conceptual overview: Coaching in the professional development impact study.* Retrieved from http://albaniarsimin.wikispaces.com/file/view/Coaching+in+the+Professional+Development+Impact+Study+(Final,+Jan.+2005,+Updated).pdf

Baldanza, M., Jiménez Herrera, M., LoCasale-Crouch, J., & Cabell, S. Q. (2013). *Teacher reflection: Associations with change in teacher practice and children's engagement.* Poster presented at the 2013 Biennial Meeting, Society for Research in Child Development. Seattle, WA.

Belanger, P. (2011). *Theories in adult learning and education.* Farmington Hills, MI: Barbara Budrich Publishers.

Bernstein, A. & Sparks-Langer, G. M. (1993) A conceptual framework to guide the development of teacher reflection and decision making. *Journal of Teacher Education, 44,* 45-54

Bransford, J., Derry, S., Berliner, D., Hammerness, K. & Beckett, K. L. (2005) Theories of learning and their roles in teaching. In L. Darling-Hammond & J. Bransford (Eds.) *Preparing Teachers for a Changing World. What Teachers Should Learn and be Able to Do.* John Wiley & Sons: New Jersey

Cavanagh, M., & Prescott, A. (2010). The growth of reflective practice among three beginning secondary mathematics teachers. *Asia-Pacific Journal of Teacher Education, 38,* 147-159

Clark. L. A., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7,* 309-319

D'Abate, C. P., Eddy, E. R., & Tannenbaum, S. I. (2003). What's in a name? A literature-based approach to understanding mentoring, coaching, and other constructs that describe developmental interactions. *Human Resource Development Review, 2,* 360-384

Darling-Hammond, L. (1998). Teacher learning that supports student learning. *Educational Leadership, 55* (5), 6-11

Denton, C. A., Swanson, E. A., & Mathes, P. G. (2007). Assessment-based instructional coaching provided to reading intervention teachers. *Reading and Writing, 20,* 569-590

Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Towards better conceptualizations and measures. *Educational Researcher, 38,* 181-199

Domitrovich, C. E., Gest, S. D., Gill, S., Jones, D., & DeRousie, R. S. (2009). Individual factors associated with professional development training outcomes of the Head Start REDI program. *Early Education and Development, 20,* 402-430.

Downer, J. T., Jamil, F., Maier, M., & Pianta, R. C. (2012). Implications of information processing theory for professional development of early educators. In C. Howes, B. K. Hamre & R. C. Pianta (Eds.), *Effective early childhood professional development: Improving teacher practice and child outcomes.* New York: Brookes Publishing Co.

Downer, J. T., LoCasale-Crouch, J., Hamre, B., & Pianta, R. (2009). Teacher characteristics associated with responsiveness and exposure to consultation and online professional development resources. *Early Education and Development, 20,* 431-455

Downer, J. T., Pianta, R. C., Burchinal, M., Field, S., Hamre, B. K., LoCasale-Crouch, J., … Scott-Little, C. (2013). *Coaching and coursework focused on teacher-child interactions during language/literacy instruction: effects on teacher outcomes and children's classroom engagement.* Manuscript submitted for publication.

Downer, J. T., Pianta, R. C., Fan, X., Hamre, B. K., Mashburn, A., & Justice, L. (2011). Effects of web-mediated teacher professional development on the language and literacy skills of children enrolled in prekindergarten programs. *NHSA Dialog, 14,* 189-212. doi:10.1037/t08945-000

Dreyfus, H. L., & Dreyfus, S. E. (1986). *Mind over Machine: The Power of Human Intuition and Expertise in the Era of the Computer.* New York: The Free Press.

Dunning, D., Heath, C., & Suls, J. M. (2004). Flawed self-assessment. Implications for health, education, and the workplace. *Psychological Science in the Public Interest, 5,* 69-106

Ellison, J., & Hayes, C. (2009). Cognitive coaching. In J. Knight (Ed.) *Coaching: Approaches and Perspectives* (pp. 70-90) Thousand Oaks, CA: Corwin Press

Eva, K. W., & Regehr, G. (2011). Exploring the divergence between self-assessment and self-monitoring. *Advances in Health Science Education, 16,* 311-329

Feldon, D. F. (2007). Cognitive load and classroom teaching: The double-edged sword of automaticity. *Educational Psychologist, 42,* 123-137

Feningstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology, 43,* 522-527

Friedman-Krauss, A.H.**,** Raver, C.C., Neuspiel, J. M., & Kinsel, J. (In Press). Child behavior problems, and teacher executive function skills as predictors of teacher stress in Head Start. *Early Education and Development, 25,* 681-702

Gelfuso, A., & Dennis, D. V. (2014). Getting reflection off the page: The challenges of developing support structures for pre-service teacher reflection. *Teaching and Teacher Education, 38,* 1-11

Griffiths, V. (2000). The reflective dimension in teacher education. *International Journal of Educational Research, 33,* 539–555

Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching, 8,* 381-391

Hammerness, K., Darling-Hammond, L., Bransford, J., Berliner, D., Cochran-Smith, M., McDonald, M & Zeichner, K. (2005) How teachers learn and develop. In L. Darling-Hammond & J. Bransford (Eds.) *Preparing Teachers for a Changing World. What Teachers Should Learn and be Able to Do.* San Francisco, CA: John Wiley & Sons

Hamre, B. K., Downer, J. T., Jamil, F. M., & Pianta, R. C. (2012). Enhancing teachers' intentional use of effective interactions with children: Designing and testing professional development interventions. In R. C. Pianta, W. S. Barnett, L. M. Justice & S. M. Sheridan (Eds.) *Handbook of early childhood education.* New York: Guilford Press

Hamre, B. K., Pianta, R. C., Burchinal, M., Field, S., LoCasale-Crouch, J., Downer, J. T., … Scott-Little, C. (2012). Course on effective teacher-child interactions: Effects on teacher beliefs, knowledge, and observed practice. *American Educational Research Journal, 49,* 88-123

Han, S. S., & Weiss, B. (2005). Sustainability of teacher implementation of school-based mental health programs. *Journal of Abnormal Child Psychology, 33,* 665-679

Harford, J., & MacRuairc, G. (2008). Engaging student teachers in meaningful reflective practice. *Teaching and Teacher Education, 24,* 1884-1892

Hatton, N., & Smith, D. (1995). Reflection in teacher education: Towards definition and implementation. *Teaching and Teacher Education, 11,* 33-49

Heineke, S. F. (2013). Coaching discourse: Supporting teachers' professional learning. *The Elementary School Journal, 113,* 409-433

Hertzog, H. S., & O'Rode, N. (2011). Improving the quality of elementary mathematics student teaching: Using field support materials to develop reflective practice in student teachers. *Teacher Education Quarterly, 38* (3), 89-112

Hsieh, W., Hemmeter, M. L., McCollum, J. A., & Ostrosky, M. M. (2009). Using coaching to increase preschool teachers' use of emergent literacy teaching strategies. *Early Childhood Research Quarterly, 24,* 229-247

Husu, J., Toom, A., & Patrikainen, S. (2008). Guided reflection as a means to demonstrate and develop student teachers' reflective competencies. *Reflective Practice, 9,* 37-51

Ippolito, J. (2010). Three ways that literacy coaches balance responsive and directive relationships with teachers. *The Elementary School Journal, 111,* 164-190

Isner, T., Tout, K., Zaslow, M., Soli, M., Quinn, K., Rothenberg, L., & Burkhauser, M. (2011) *Coaching in early care and education programs and quality rating and improvement systems (QRIS): Identifying promising features.* Palm Beach, FL: Children's Services Council of Palm Beach County.

Jamil, F. M., & Hamre, B. K. (2013). *Teacher reflection in the context of an online professional development course: Applying principles of cognitive science to promote teacher learning*. Manuscript in preparation

Jamil, F. M., Sabol, T. J., Hamre, B. K., & Pianta, R. C. (2013). *Assessing teachers' skills in detecting and identifying effective interactions in the classroom: Theory and measurement.* Manuscript submitted for publication

Jiménez, M., Taylor, M., Hamre, B. K., & LoCasale-Crouch, J. (2014). *Variation in Coaches Implementation of a Coaching Intervention and its Association with Teacher Outcomes: Results from MyTeachingPartner.* Manuscript in preparation

Johnson, R. L., Penny, J. A., & Gordon, B. (2008). *Assessing Performance: Designing, Scoring and Validating Performance Tasks.* New York: The Guilford Press

Jones, S. M., Brown, J. L., Hoglund, W. L. G., & Aber, J. L. (2010). A school-randomized clinical trial of an integrated social-emotional learning and literacy intervention: Impacts after 1 school year. *Journal of Consulting and Clinical Psychology, 78,* 829-842

Joyce, B., & Showers, B. (1980). Improving inservice training: The messages of research. *Educational Leadership, 37,* 379–385.

Kline, T. J. B. (2005). *Psychological testing: A Practical Approach to Design and Evaluation.* Thousand Oaks, CA: Sage Publications

Kolb, D. A. (1984). *Experiential learning: experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall.

Korthagen, F. A. J., & Vasalos, A. (2009). *From reflection to presence and mindfulness: 30 years of developments concerning the concept of reflection in teacher education.* Paper presented at the European Association for research on Learning and Instruction (EARLI) conference, Amsterdam. Retrieved from http://www.kernreflectie.nl/Media/pdf/EARLI%20paper.pdf

Korthagen, F. A. J., & Wubbles, T. (1995). Characteristics of reflective practitioners: Towards an operationalization of the concept of reflection. *Teachers and Teaching: Theory and Practice 1,* 51–72.

Knight, J. (2009b). Instructional coaching. In J. Knight (Ed.) *Coaching: Approaches and perspectives* (pp. 29-55). Thousand Oaks, CA: Corwin Press

Li-Grining, C., Raver, C. C., Champion, K., Sardin, L., Metzger, M., & Jones, S. M. (2010). Understanding and improving classroom emotional climate and behavior management in the "real world": The role of Head Start teachers' psychosocial stressors. *Early Education and Development, 21,* 65-94

LoCasale-Crouch, J., DeCoster, J., Cabell, S. Q., Pianta, R. C., Hamre, B. K., Downer, J. T., … Roberts, A. (2013). *Unpacking intervention implementation: Teacher responsiveness as a mediator of intervention quality of delivery and change in teaching practice.* Manuscript in preparation

Mashburn, A. J., Downer , J. T., Hamre, B. K., Justice, L. M. & Pianta, R. C. (2010). Consultation for teachers and children's language and literacy development during pre-kindergarten. *Applied Developmental Science, 14,* 179-196

Maslach, C., Jackson, S.E. & Schwab, R.L. (1996). *Maslach Burnout Inventory—Educators Survey (MBI—ES).* In C. Maslach, S.E. Jackson, & M.P. Leiter, MBI Manual (3rd ed.) Palo Alto, CA: Consulting Psychologists Press.

McGroder, S. M., Howard, E. C., Fishman, M., Rankin, V. E., & Helsel, F. K. (2014). *Putting the Pieces Together: A Program Logic Model for Coaching in Head Start. From the Descriptive Study of the Head Start Early Learning Mentor Coach Initiative.* Washington, DC: U.S. Department of Health and Human Services, Administration for Children and Families, Office of Planning, Research and Evaluation.

Mena Marcos, J. J., Sánchez, E., & Tillema, H. (2009). Teacher reflection on action: what is said (in research) and what is done (in teaching). *Reflective Practice, 10,* 191-204

Merriam, S. B., Caffarella, R. S., & Baumgartner, L. M. (2007). *Learning in adulthood: A comprehensive guide.* San Francisco, CA: Jossey-Bass

Miller, K. F. (2011). Situation awareness in teaching: What educators can learn from video-based research in other fields. In M. G. Sherin, V. R. Jacobs, & R. A. Philipp (Eds.) *Mathematics teacher noticing: Seeing through teachers' eyes.* New York: Routledge

Moos, D. C., & Pitton, D. (2013). Student teacher challenges: Using the cognitive load theory as an explanatory lens. *Teaching Education.* Advance online publication. doi: 10.1080/10476210.2012.754869

Muthén, L. K., & Muthén, B. O. (2010). *Mplus User's Guide. Sixth Edition.* Los Angeles, CA: Muthén & Muthén

National Center for Education Statistics (2002). *Academic Rating Scale (ECLS-K 3rd and 5th grade).* Washington, DC: Author

National Council for Accreditation of Teacher Education (2006). *Professional Standards for the Accreditation of Schools, Colleges, and Departments of Education*. Retrieved from http://www.ncate.org/documents/standards/unit_stnds_2006.pdf

National Association for the Education of Young Children (NAEYC) & National Association of Child Care Resources and Referral Agencies (NACCRRA) (2011). *Early Childhood Education Professional Development: Training and Technical Assistance Glossary.* Retrieved from: http://www.naeyc.org/GlossaryTraining_TA.pdf

Neuberger, J. (2012). Benefits of a teacher and coach collaboration: A case study. *Journal of Mathematical Behavior, 31,* 290-311

O'Donnell, M., Lambert, R., & McCarthy, C. (2008). School poverty status, time of year, and elementary teachers' perceptions of stress. *Journal of Educational Research, 102,* 152-160.

Osipova, A., Prichard, B., Boardman, A. G., Kiely, M. T., & Carroll, P. E. (2011). Refocusing the lens: Enhancing elementary special education reading instruction through video self-reflection. *Learning Disabilities Research & Practice, 26,* 158-171

Pas, E. T., Bradshaw, C. P., & Cash, A. H. (2014). Coaching classrooms-based preventive interventions. In M. D. Weist, N. A. Lever, C. P. Bradshaw & J. S. Owens (Eds.), *Handbook of School Mental Health. Research, Training, Practice and Policy* (pp 255-267) New York: Springer

Phillips, M., & Roderick, T. (2007). *The 4Rs™ (Reading, Writing, Respect & Resolution). A Teaching Guide.* New York: Morningside Center for Teaching Social Responsibility

Pianta, R. C., DeCoster, J., Cabell, S. Q., Burchinal, M., Hamre, B. K., Downer, J., … Howes, C. (2014). Dose-response relations between preschool teachers' exposure to components of professional development and increases in quality of their interactions with children. *Early Childhood Research Quarterly.* Advance online publication doi: 10.1016/j.ecresq.2014.06.001

Pianta, R. C., Hamre, B. K., & Mintz, S. L. (2010). *Classroom Assessment Scoring System (CLASS), Upper Elementary Manual.* Baltimore, MD: Paul H. Brookes.

Pianta, R. C., Mashburn, A. J., Downer, J. T., Hamre, B. K. & Justice, L. (2008). Effects of web-mediated professional development resources on teacher-child interactions in pre-kindergarten classrooms. *Early Childhood Research Quarterly 23* 4, 431-4

Raver, C. C., Blair, C., & Li-Grining, C. (2012). Extending models of emotional self-regulation to classroom settings: Implications for professional development. In C. Howes, B. K. Hamre & R. C. Pianta (Eds.), *Effective early childhood professional development: Improving teacher practice and child outcomes.* New York: Brookes Publishing Co.

Raver, C. C., Jones, S. M., Li-Grining, C. P., Metzger, M., Champion, K. M. & Sardin, L. (2008). Improving preschool classroom processes: Preliminary findings from a randomized trial implemented in Head Start settings. *Early Childhood Research Quarterly, 23,* 10-26.

Reinke, W. M., Stormont, M., Webster-Stratton, C., Newcomer, L. L., & Herman, K. C. (2012). The Incredible Years Teacher Classroom Management program: Using coaching to support generalization to real-world classroom settings. *Psychology in the Schools, 49,* 416-428

Reynolds, C. R., & Kamphaus, R. W. (1998). *Behavioral Assessment for Children.* Circle Pines, MN: American Guidance Service Inc.

Rhodes, C., Stokes, M. & Hampton, G. (2004) *A Practical Guide to Mentoring, Coaching and Peer-networking. Teacher Professional Development in Schools and Colleges.* RoutledgeFalmer: London.

Romano, M. E. (2006). "Bumpy moments" in teaching: Reflections from practicing teachers. *Teaching and Teacher Education, 22,* 973-985

Rosaen, C. L., Lundeberg, M., Cooper, M., Fritzen, A., & Terpstra, M. (2008). Noticing noticing: How does investigation of video records change how teachers reflecto n their experiences. *Journal of Teacher Education, 59,* 347-360

Sailors, M., & Shanklin, N. L. (2010). Growing evidence to support coaching in literacy and mathematics. *The Elementary School Journal, 111,* 1-6

Schumacher, D. J., Englander, R., & Carracio, C. (2013). Developing the master learner: Applying learning theory to the learner, the teacher, and the learning environment. *Academic Medicine, 88,* 1635-1645

Sewall, M. (2009). Transforming supervision: Using video elicitation to support preservice teacher-directed reflective conversations. *Issues in Teacher Education, 18,* 11-30

Sheridan, S. M., Edwards, C. P., Marvin, C. A., & Knoche, L. L. (2009). Professional development in early childhood programs: Process issues and research needs. *Early Education and Development, 20,* 377-401

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15,* 4-14

Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory* (2nd ed.). Thousand Oaks, CA: SAGE.

Tsui, A. B. M. (2009). Distinctive qualities of expert teachers. *Teachers and Teaching, 12,* 421-439

Valli, L. (1992). *Reflective Teacher Educations: Cases and Critiques.* New York: State University of New York Press

Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum Inquiry, 6,* 205-228

Veenman, S., & Denessen, E. (2001). The coaching of teachers: Results of five training studies. *Educational Research and Evaluation, 7,* 385-417

Wenz-Gross, M., & Upshur, C. (2012). Implementing a primary social skills intervention in urban preschools: Factors associated with quality and fidelity. *Early Education and Development, 23,* 427-250

Williams, R., & Grudnoff, L. (2011). Making sense of reflection: A comparison of beginning and experienced teachers' perceptions of reflection for practice. *Reflective Practice, 12,* 281-291

Zaslow, M., Tout, K., Halle, T., Whittaker, J. V., Lavelle, B. & Child Trends (2010). *Toward the identification of features of effective professional development for early childhood educators.* Washington, DC: U.S. Department of Education. Office of Planning, Evaluation and Policy Development. Policy and Program Studies Service. Retrieved from: http://www2.ed.gov/rschstat/eval/professional-development/literature-review.pdf

Table 1. *Frequency of Teachers' Display of Analysis during Coaching Conferences*

| | Teachers' display of high-level analysis | | |
|---|---|---|---|
| | Never (%) | Occasionally (%) | Always (%) |
| Statement of the goals for practice | 6 (17%) | 20 (57%) | 9 (26%) |
| Awareness of the effect of what happens in the classroom on teachers' thoughts and feelings | 5 (14%) | 13 (37%) | 17 (49%) |
| Focus on the effects of their practice on students' learning and behavior | 5 (14%) | 25 (71%) | 5 (14%) |
| Assessment of the effectiveness of the strategies | 20 (57%) | 13 (37%) | 2 (6%) |
| Sharing ineffective practices | 26 (74%) | 9 (26%) | 0 |
| Self-directed analysis | 14 (40%) | 17 (49%) | 4 (11%) |

Table 2. *Results for Growth model for Teachers' Level of Analysis*

| | Estimate (SE) | P |
|---|---|---|
| Means | | |
| Intercept | 1.843 (.076) | .000 |
| Linear slope | -.035 (.046) | .447 |
| | | |
| Variances | | |
| Intercept | .084 (.069) | .222 |
| Linear slope | -.007 (.037) | .858 |
| | | |
| Model fit: | | |
| CFI | .895 | |
| TLI | .684 | |
| RMSEA | .184 | |

Table 3. *Descriptive Statistics for 4Rs Implementation and Teachers' Practice across the Coaching Process.*

| | Cycle 1 Mean (SD) | Cycle 2 Mean (SD) | Cycle 3 Mean (SD) | Cycle 4 Mean (SD) | Cycle 5 Mean (SD) | Cycle 6 Mean (SD) | Cycle 7 Mean (SD) | Cycle 8 Mean (SD) |
|---|---|---|---|---|---|---|---|---|
| Adherence | .76 (.132) | .76 (.191) | .75 (.165) | .81 (.125) | .75 (.211) | .70 (.186) | .65 (.186) | .61 (.185) |
| Quality | 3.19 (.447) | 3.13 (.552) | 3.19 (.587) | 3.08 (.500) | 3.18 (.578) | 3.06 (.485) | 3.11 (.541) | 3.01 (.414) |
| Emotional Support | 5.40 (.615) | 5.52 (.613) | 5.43 (.537) | 5.38 (.646) | 5.48 (.545) | 5.42 (.624) | 5.20 (.741) | 5.17 (.591) |
| Classroom Organization | 6.53 (.603) | 6.52 (.537) | 6.67 (.488) | 6.57 (.649) | 6.59 (.524) | 6.56 (.498) | 6.55 (.555) | 6.51 (.553) |
| Instructional Support | 4.22 (.556) | 4.48 (.611) | 4.50 (.515) | 4.50 (.686) | 4.60 (.557) | 4.65 (.596) | 4.59 (.625) | 4.35 (.582) |

Table 4. *Results for Unconditional Quadratic Growth Models for 4Rs Implementation and Teachers' Practice*

| | 4Rs Implementation | | Teacher Practice | | |
|---|---|---|---|---|---|
| | Adherence | Quality | Emotional Support | Classroom Organization | Instructional Support |
| | Estimate (SE) | Estimate (SE) | Estimate (SE) | Estimate (SE) | Estimate (SE) |
| Means | | | | | |
| Intercept | **.753 (.024)**$^{***}$ | **3.189 (.075)**$^{***}$ | **5.428 (.088)**$^{***}$ | **6.533 (.090)**$^{***}$ | **4.238 (.087)**$^{***}$ |
| Linear slope | .022 (.012) | -.023 (.049) | .045 (.043) | .044 (.036) | **.187 (.048)**$^{***}$ |
| Quadratic slope | **-.006 (.002)**$^{***}$ | .000 (.006) | **-.012 (.006)**$^{*}$ | -.007 (.006) | **-.023 (.007)**$^{***}$ |
| Variances | | | | | |
| Intercept | **.015 (.006)**$^{*}$ | .073 (.080) | .081 (.088) | **.207 (.081)**$^{*}$ | **.166 (.084)**$^{*}$ |
| Linear slope | .002 (.002) | .018 (.030) | -.012 (.020) | .012 (.013) | .035 (.024) |
| Quadratic slope | .000 (.000) | .000 (.000) | .000 (.000) | .001 (.000) | .001 (.000) |

$^{t}p \leq .1$ $^{*}p \leq .05$. $^{**}p \leq .01$ $^{***}p \leq .001$ .

Table 5. *Association between Teachers' Average Level of Analysis and Change in Emotional Support, Instructional Support and Adherence to the 4Rs curriculum.*

| | Emotional Support | | | Instructional Support | | | Adherence | | |
|---|---|---|---|---|---|---|---|---|---|
| | Intercept | Linear slope | Quadratic slope | Intercept | Linear slope | Quadratic slope | Intercept | Linear slope | Quadratic slope |
| Average analysis | -.122 (.241) | .015 (.115) | .008 (.016) | -.199 (.246) | .162 (.134) | -.027 (.019) | -.012 (.068) | .080 (.033)* | -.010 (.005)* |

* $p \leq .05$.

Table 6. *Association between Teachers' Average Level of Analysis and Average Classroom Organization and Quality of Implementation of 4Rs Curriculum.*

| | Average Classroom Organization | | Average Quality | |
|---|---|---|---|---|
| | B (SE) | p | B (SE) | p |
| Average analysis | -.070 (.188) | .711 | .082 (.119) | .494 |

Table 7. *Descriptive Statistics and Correlations*

| | Mean | SD | % missing | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|
| 1. Analysis | 1.802 | .366 | 0 | - | -.399* | -.042 | .206 | .325t |
| 2. Years of experience | 10.617 | 7.024 | 2.9 | | - | -.133 | -.177 | -.067 |
| 3. Knowledge of effective practice | 0 | .798 | 8.6 | | | - | .058 | .160 |
| 4. Emotional exhaustion | 2.295 | 1.303 | 0 | | | | - | .174 |
| 5. Classroom risk-index | 33.560 | 9.725 | 0 | | | | | - |

t p ≤ *.1* * p ≤ *.05*. ** p ≤ *.01* *** p ≤ *.001* .

Table 8. *Association between Teachers' Years of Experience, Knowledge of Effective Practice, Emotional Exhaustion and Classroom Risk-Index, and Teachers' Average Level of Analysis.*

| | Analysis<br>B (SE) |
|---|---|
| Teacher years of experience | -.381 (.142)** |
| Knowledge of effective practice | -.142 (.155) |
| Teacher emotional exhaustion | .095 (.150) |
| Classroom risk-index | .306 (.143)* |

* $p \leq .05$. ** $p \leq .01$.

## Appendix A

Teacher analysis items:

Does the teacher:

- Make explicit the thought processes behind the decisions made in the classroom?
- Show awareness of the effect of what happens in the classroom on their thoughts and feelings?
- Focus on the effects of their behavior on the students' learning and behavior?
- Assess the effectiveness of the strategies used comparing their goal with the actual effects?
- Share any ineffective practices they may have identified in their teaching practice?
- Answer the coach's questions in a reflective manner?

## Appendix B.

Items for the assessment of adherence and quality of implementation of 4Rs applied learning activities:

Adherence items:

- Does the lesson begin with a gathering?
- Is the gathering related to the lesson's theme?
- Is there an agenda visible?
- Does the lesson include opportunities for independent and/or supervised skill practice?
- Do the children have the chance to evaluate the day's lesson/activity?
- Does the lesson end with a closing activity?

Quality items:

- Would you say that the teacher varies the types of activities throughout the lesson?
- Would you say that the students were engaged in skill practice?
- Would you say that there was good, in-depth feedback given to students?
- Would you say that the teacher-student discussions were frequent and promoted student learning through opportunities for students to reflect on their own experiences and relate them to the theme of the lesson?
- Would you say that students are using higher order thinking?
- Would you say that the teacher tailors the lesson to be relevant to students' experiences?
- Would you say that the teacher strikes a balance between leading the lesson and providing opportunities for student input and/or leadership?
- Would you say that students have input in the development of their activities?