Understanding Early Childhood Teachers' Competence: Pedagogical Attention, Analysis

and Interpretation, and Decision-making Skills in the Classroom

A Dissertation

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Doctor of Philosophy

by

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ABSTRACT

This dissertation presents three independent studies that all focus on understanding early childhood educator's competence. The first study investigated toddler caregivers' ability to notice effective classroom interactions and indicators of toddler development. Results showed that caregiver noticing abilities are relatively low overall, with caregivers' ability to notice indicators of toddler development being even lower than their ability to notice effective caregiver-child interactions. There is also initial evidence to support the predictive value of the ability to notice effective caregiver-child interactions to caregivers' classroom practice. The second study investigated how early childhood teachers that changed their classroom practice in the context of intervention developed their noticing skills (i.e., attend, analyze, and respond to their teaching) over time through reflective assignments and conferences with a coach offered by an intervention. Results indicate that opportunities for teachers to reflect on their and with a coach enable them to improve their analytical skills over time. The third study further investigated the relationship between noticing skills, other teachers' characteristics (knowledge, emotions, motivation) and practice. Results indicated that teachers that watch somebody else's video showed higher levels of noticing skills compared to the ones who watched their own practice video. Holding a bachelor's degree was related to better noticing skills, and no evidence was found to support the relationship between noticing skills and practice. Collectively, these three studies add to a more comprehensive understanding of (1) early childhood teachers' competence; (2) how specific training/teacher professional development features matter to enhance teachers' skills; and (3) the relationship between teachers' cognitive and emotional processes and their practice in the classroom.

Dedication

I dedicate my dissertation to my family, my parents Magdalena Escudero and Claudio

Romo, and my siblings, Catalina Romo and Ignacio Romo. Thank you for always

believing in me and supporting me in everything, since I was a little girl. This

accomplishment would not have been possible without your love and support.

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To my friends in Chile: Thank you for having my back even when away! Love you all very much. To Javier: thank you all your support and love during the last phase of my dissertation journey. To my family: I love you and thank you for finishing up this journey with me.

TABLE OF CONTENTS

# LIST OF TABLES

LIST OF FIGURES/APPENDICES

Understanding Early Childhood Teachers' Competence: Pedagogical Attention, Analysis

and Interpretation, and Decision-making Skills in the Classroom

Rationale and Conceptual link

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The Three-Manuscript Dissertation: Overview

This dissertation proposal presents a line of research exploring early childhood educators' competence in the context of the classroom and professional development. This dissertation follows the requirements of the manuscript-style dissertation option, as defined in the Curry School of Education Ph.D. Dissertation Manual (2015). The manuscript-style dissertation calls for students to submit an introduction (linking document) describing the conceptual and theoretical linkages among all three manuscripts, two papers ready for submission, and a proposal for a third paper. In adherence to these guidelines, I am the first author of all three studies included in this dissertation. Study one is under review in the Journal of Teaching and Teacher Education. Study two is under review in the Journal of Early Childhood Education. In this proposal, I am presenting study three's research design and literature review and will be submitted for publication upon completion. All three studies are conceptually linked while providing unique contributions to the field. The remainder of this document discusses the rationale for the current line of research and the theoretical framework shared by the three studies. Following the linking document, I present the two complete manuscripts and the proposal for study three.

Understanding Early Childhood Teachers' Competence: Pedagogical Attention, Analysis

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Rationale and Conceptual link

**Introduction**

In this document, I present the conceptual link between the three studies of my

dissertation. To do this, I will first introduce the rationale for my three studies and the

overarching conceptual model used to draw upon for my three papers. Second, I will

introduce and describe the conceptualization of teaching as a complex task, and how

cognitive science and expertise literature can help the field to understand the processes

associated with this task. Third, I will detail each piece of the theoretical model, defining

the key constructs that I am using throughout the three studies, and describing the

relationship between them. Then, I will describe the two completed studies and how the

evidence they provide contributes to a better understanding of the model. Finally, I will

introduce what is still missing from the two previous studies and how the proposed third

study aims to fill some of those gaps.

**Overarching Conceptual Model**

Ample evidence points to the importance of effective classroom interactions to

support young children's development (e.g., Howes et al., 2008; Hamre & Pianta, 2005;

Mashburn et al., 2008; La Paro, Williamson, & Hatfield, 2014; Mortensen & Barnett,

2015). Despite this growing awareness, little research has identified what early childhood

teacher attributes contribute to the ability to engage in effective classroom interactions

(Early et al., 2007; LoCasale-Crouch et al., 2007; Pianta et al., 2005). More traditional

teacher characteristics, such as degree and qualifications, have been acknowledged as necessary but not sufficient to explain teacher performance (Castle et al., 2016; Early et al., 2007; LoCasale-Crouch et al., 2007; Pianta et al., 2005). Given this, a more comprehensive understanding of teacher competence might provide insights into the specific characteristics and skills that relate to a teacher's ability to engage in effective classroom interactions.

Blömeke and colleagues (2015) provide a conceptualization of teacher competence as a complex relationship between different aspects, as illustrated in Figure 1. This conceptualization draws upon situated (e.g., Lave & Wenger, 1991) and cognitive (e.g., Chi, 2011) perspectives of teaching and learning. In this model, teacher competence is understood as a continuum starting from cognitive and affective-motivational factors, named dispositions, that influence decision-making skills at the moment, which in turn, relate to enacted practice. Dispositions can be understood as what the teacher brings to the classroom and draws upon on to make decisions in the classroom: knowledge, affective aspects, beliefs, and past experiences, among others. In Blömeke and colleagues (2015) conceptualization, dispositions pass through the so-called "Noticing skills" (van Es & Sherin, 2015) which lead to performance. In the current dissertation, noticing skills, as explained further below, are defined as the cognitive processes of attention, analysis and interpretation, and decision-making (Moore-Russo & Wiley, 2014; van Es & Sherin, 2015). Enacted practice is understood from the theoretically and empirically supported Teacher Through Interactions Framework (TTFI; Hamre et al., 2013) which focuses on student-teacher interactions, organized in the domains of Emotional Support, Classroom Organization, and Instructional Support (Hamre, Pianta, Mashburn, & Downer, 2007).

For the current dissertation, I adhere to this model to explore the different paths while also adding new ones. For example, in Blömeke and colleagues (2015) original conceptualization, dispositions are not considered as influencing the enacted classroom practice directly. Also, the authors do not consider that enacted classroom practice and noticing skills are mutually linked, because it might be that, over time, teachers' experiences in the classroom reinforce or change existing filters and rules for processing information in ways that shape or constrain future behavior (Pianta et al., 2014). In the present work, I am also considering these relationships. Additionally, the current model and set of studies include the role of teacher professional development efforts to enhance both early childhood teachers' noticing skills and enacted practice in the classroom.

Figure 1. Conceptual Model of Teacher Competence
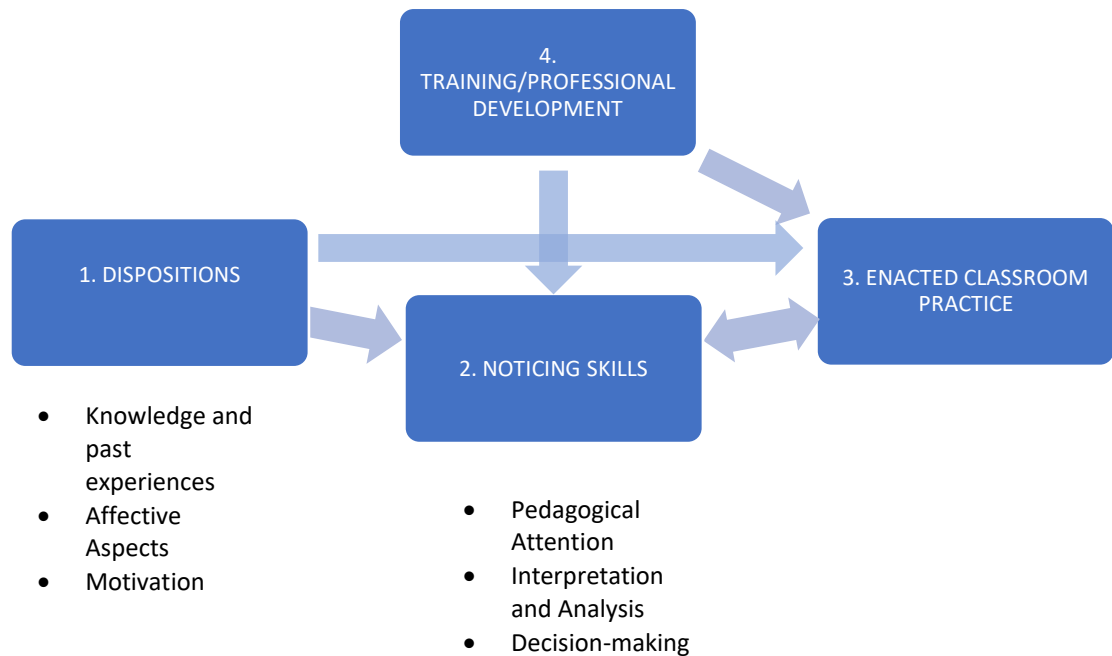


*Figure 1.* Conceptual Model of Teacher Competence. Adapted from "Beyond dichotomies: Viewing competence as a continuum" by Blömeke, S., Gustafsson, J.E., & Shavelson, R., 2015, *Zeitschrift fúr Psychologie*, *223*, 1, p. 3-13

**Understanding Teaching as a Complex Task**

Teaching is a professional activity situated in a complex context. Teachers act, moment-to-moment, under multidimensional demands in the classroom: an interplay between what children are doing and saying a set of diverse learning goals, and teachers' own beliefs, skills, and knowledge. The latter may be even more relevant in an early learning context because of the rapidly changing developmental levels of infants, toddlers, and preschoolers. For instance, think about a classroom composed of twelve 3 and 4-year old children, a lead educator, and one teacher aide. In a typical day, the teacher starts with "circle-time" to talk about attendance; these are the planned goals for this first part of the morning. However, suddenly, one child starts feeling sick, vomiting on the floor. Given this, the teacher aide needs to take him to the bathroom leaving the lead teacher alone. The situation changes unexpectedly, now there is a sick child, and the lead teacher does not have the help of her aide. When trying to talk about "who came to school," two boys start fighting. The teacher needs to change her attention to redirect their behavior. In the meantime, another girl starts asking the teacher about an unrelated topic and tries to reach for her.  In order to be responsive, the teacher sits the girl on her lap. Several minutes have passed already, and she needs to move quickly to "table work." Given the multiple aspects and actors involved in teaching, it is imperative to understand how and why teachers make the choices they make, as they teach, to best support young children's development (Schoenfeld, 2011). Thus, we need a theory as complex as the activity itself to better understand teaching.

The cognitive science literature (e.g., Chi & Glasser, 1998; Feldon, 2007), and specifically the adaptive expertise literature for naturalistic decision making (Klein,

2008), offers a series of lessons to understand teaching better. In order to make appropriate decisions under complex conditions, specific cognitive processes that rely on different mechanisms of learning and adaptation (Simon, 1979) are needed (Bogard, Lui, & Chiang, 2013). When the activity is complex, actors cannot rely exclusively on the routine aspects of practice given. They need to adaptively respond to the uncertain and constantly changing situations. Thus, the adaptive cognitive skills are critical to navigating the demands of an early childhood classroom successfully. Situation awareness (Endsley, 1995; Ericsson, Hoffman, Kozbelt, & Williams, 2018; Miller, 2011), defined as the one that enables a practitioner to continuously appraise a situation, attend to what is noteworthy moment-to-moment and ignore what is not, serves as one of these skills. Specifically, situation awareness comprises three key aspects a) perception of meaningful elements in an environment, b) comprehension of their meaning and c) projection of their status in the near future (Endsley, 1995; Miller, 2011). Experts in different fields are distinguished by their well-developed situation awareness that enables them to successfully navigate the specific demands of a task by reacting to what is important and ignoring what is not (Miller, 2011).

**Teacher's Competence: Noticing Skills and Enacted Practice**

In the educational field, the teacher noticing framework applies the principles of the situation awareness research, especially in the context of secondary education and in the subject area of mathematics. In the current work, I am applying the noticing skills framework to the early childhood learning context as the principal theoretical basis. As mentioned earlier, the skills that teachers need to comprehend and navigate the

complexities of an early childhood context might be better understood from a cognitive adaptation theory.

Noticing skills involve attending to what is noteworthy in the "classroom data," analyzing and interpreting that data, and deciding how to respond, or planning what one would do differently the next time in the classroom (Moore-Russo & Wiley, 2014; van Es, & Sherin; 2015). Expert teachers with developed noticing skills can assess the situation, quickly attend to what is a priority at the moment using their conceptual understanding to interpret that situation (Berliner, 2001; Sherin, Jacobs & Phillip, 2011; Stockero, Rupnow, & Pascoe, 2017). The connection between expert ability to enact a task and an expert ability to notice that task has been well established in sport research (Calvo-Merino, Glaser, Grezes, Passingham, & Haggard, 2004; Cañal-Bruland, Mooren, & Savelsbergh, 2013; Savelburgh, Williams, van der Kamp, & Ward, 2002). However, little empirical evidence is available in the field of education on how these skills are related to actual classroom practice (Gauding & Chalies, 2015). Most of these studies have inferred such relationship from "indirect" evidence (e.g., questionnaires, written commentaries) (König & Kramer, 2016; Santagata & Yeh, 2016) and not from "direct" evidence of teachers' enacted classroom practices. Thus, teachers' noticing skills show promise in helping explain teaching performance. However, more evidence linking these skills and enacted teaching practice is needed, particularly, in the Early Childhood field.

**Teacher Competence: Dispositions and Teacher's Noticing Skills and Enacted Practice**

Consideration must be given to other teachers' characteristics that might be influencing noticing skills and practice. As mentioned earlier, Blömeke and colleagues

(2015) understand dispositions as a "toolbox" that teachers utilize to make decisions in the classroom. The aspects that comprise dispositions are different in nature. Some of them are of cognitive nature, such as knowledge and beliefs, and others, of affective and motivational nature. In Blömeke and colleagues (2015) conceptualization, noticing skills mediate the effect of dispositions in enacted performance, as illustrated in Figure 1. For the current dissertation, we adhere to this claim, but also to the idea that dispositions might also influence performance directly.

Among the elements included in dispositions are knowledge and experience. From the literature on expertise (e.g. Ericsson & Charness, 1994), experience in teaching (Berliner, 1994; 2001) and the amount and depth of knowledge in a specific field (Ball & Cohen, 1999; Kersting, Givvin, Thompson, Santagata, & Stigler, 2012) might be essential in explaining a superior performance and decision-making in the classroom. As teachers gain experience in teaching, they tend to organize their accumulated knowledge and experience in coherent structures (curriculum scripts, short-cuts, schemas). These are retrieved from long-term memory, to notice and interpret cues from the classroom, especially when facing a novel situation in the classroom (Krauss et al. 2008; Pauli & Reusser, 2003; Putnam, 1987). In this sense, noticing skills have been identified as knowledge and experience-dependent (Jacobs et al., 2010).

Cognitive processes of attention, analysis, and decision-making are not only dependent on teachers' knowledge, but also on their past experiences (Yost, Sentner, & Forlenza-Bailey, 2000), and their beliefs (Bruckmaier, Krauss, Blum & Leiss, 2016; Llinares & Valls, 2009; Yadav & Koehler, 2007). Given that beliefs could act as a lens when interpreting experiences in the classroom (Ambrose, 2004; Yadav & Koehler,

2007), they might also play a role in noticing skills and enacting effective interactions. Theory and evidence suggest that special attention is needed to epistemological beliefs about teaching and learning given that fixed beliefs about the nature of knowledge, for example, work against the epistemology of reflection that stresses the attention to multiple point of views for the analysis of a given phenomenon (Bruckmaier et al., 2016; Yost, Senter, & Forlenza-Bailey, 2000).

Regarding affective aspects, the effects of stress in handicapping cognitive process of selection and planning are well-documented (Goleman, 2006). Burnout, emotional exhaustion and depersonalization due to prolonged exposure to high levels of work stress (Maslach, 1993; Schaufeli & Enzmann, 1998), are associated with poor performance in tasks of attention (Schmidt, Neubach & Heue, 2007; Van der Linden et al., 2005). As well, burnout and stress are related to other negative consequences, such as lower demonstrated quality and more conflictual relationship with students (Jennings & Greenberg, 2009; Yoon, 2002; Zinsser, Bailey, Curby, Denham, & Bassett, 2013). Therefore, an exploration of how these affective aspects influence both teachers' noticing skills and enacted practice in the classroom it is critical to understand teachers' competence and how to provide support that tackles these factors.

**How to Best Support Teachers' Competence: Relationship with Teacher Training and Professional Development**

Given the growing body of research that demonstrates daily interactions teachers have with young children are among the most important classroom-based elements that promote children's development and learning (e.g., Hamre & Pianta, 2005; Mashburn et al., 2008; Howes et al., 2008), more and more improvement efforts focus on how to

improve these classroom interactions and noticing skills. Robust research on teacher professional development offers key evidence of what approaches are the most effective to improve these specific skills and practice. However, less is known about how and what processes enable this improvement (Zaslow, 2014).

Research shows that watching videotaped classroom situations promote pre-service and in-service teachers' noticing skills about classroom events, becoming more adept at identifying relevant classroom features and providing more elaborated analyses of classrooms situations (Hamre et al., 2012; Pianta et al., 2008; Star & Strickland, 2008; Stockero 2008; van Es and Sherin 2002, 2015). However, evidence suggests that video-based noticing interventions might be improved by using a series of targeted scaffolds (Kaiser, Busse, Hoth, Konig, & Blomeke, 2015; Santagata & Angelici, 2010; Stockero, Rupnow, & Pascoe, 2017). For example, it might be helpful to include specific questions and prompts to elicit teachers' thought processes around the connection between teachers' action and students' learning and the integration of critical elements of teaching and learning (Pianta et al., 2008; Santagata, 2011; Stockero, Rupnow, & Pascoe, 2017).

Further, research increasingly supports the conclusion that a direct focus on teacher's practice is needed in order to improve the quality of their interactions with children (Zaslow, 2009; 2011), with approaches proven most effective typically providing classroom-based coaching of teachers (Bierman et al., 2008; Domitrovich et al., 2009; Egert et al., 2018; Isner et al., 2011; Markussen-Brown et al., 2017; Powell et al., 2010; Raver et al., 2008). Despite the robust evidence about the effectiveness of coaching/mentoring, less is known about how coaching or mentoring increases teachers' learning. One avenue to explore is that this approach offers teachers' the opportunity to

reflect with a partner through a dialogue. This may be a key mechanism for teachers' enhancement of their critical thinking and reasoning (Vrikki et al., 2017) and the promotion of greater learning, as evidenced by the advantage of working collaboratively with peers (Dillenbourg, Baker, Blaye, & O'Malley, 1995).

In sum, going back to the theoretical model, illustrated in Figure 1, this dissertation aims to understand better different aspects of teachers' competence, which are of different nature (cognitive, affective, and motivational) and the relationships between them. At the center of this dissertation are the cognitive noticing skills and how they are related both to dispositions and enacted practice. Finally, I also aim to understand in a fine-grain way, how different features of teacher professional development efforts can support the development of noticing skills and enacted practice.

**Overview of the two completed studies**

To examine the relationship between noticing skills and enacted practice and dispositions, in my first paper I investigated the unique contribution of a caregiver's ability to notice both teachers' effective behaviors and children's behaviors, to the quality of their enacted interactions with children. Specifically, I studied the relationship between caregivers' demographic characteristics (education and experience), beliefs (self-efficacy), knowledge about teacher-child interactions, and their ability to notice caregivers' effective behaviors and children's behavioral markers of their development. As well, we study how the ability to notice and the other characteristics are related to interaction quality, as measured by the Classroom Assessment Scoring System (CLASS) based in the TTIF. The ability to notice critical behaviors was measured using the Video Assessment of Interactions and Learning (VAIL) protocol (Hamre et al., 2012) that

assesses specifically the ability to correctly and accurately notice and label specific effective teacher-child interactions and children's behavioral markers of their development in a classroom video (Hamre et al., 2012). This assessment, thus, focuses mainly on the attention piece of noticing skills.

Findings indicated that a caregivers' ability to notice effective teachers' interactions and children's behavioral markers are limited, especially the latter. Second, demographic characteristics did not explain much about caregivers' ability to notice both effective teacher-children interactions and children's behavioral markers that denote their desired development. However, teachers' dispositions were related to this ability. Specifically, self-efficacy beliefs showed a negative and significant relationship to caregivers' ability to notice children's behavioral markers in a video. Further, a positive relationship between caregivers' ability to notice effective teacher interactions and their knowledge about effective teaching behaviors was found. This result is expected given that noticing skills are knowledge-dependent. Third, the ability to notice effective teacher-child interactions uniquely related to their ability to enact both effective socio-emotional and instructionally supportive behaviors. Lastly, teachers holding a Bachelors' degree provided higher quality interactions in the classroom. Overall, the results from this study provide initial evidence of the importance of both noticing skills and dispositions to understand the quality of enacted practice, and also the need to explore further other aspects of dispositions and a more refined and complex conceptualization of noticing skills.

In my second paper, I attempted to expand the conceptualization and measurement of noticing skills, by investigating the three aspects of this construct:

attention, analysis and interpretation, and decision-making. In this manuscript, I explored

the relationship between noticing skills and practice in the context of a professional

development initiative, the Effective Classroom Interactions (ECI) course. I described

qualitatively how the participants Pre-k teachers that changed their practice the most

developed their noticing skills through autonomous reflection using their videos, and

through conference dialogues between teacher and coach over time. In order to do this, I

coded and analyzed teachers' written answers in response to two reflective homework

about their teaching videos, characterizing the depth of their analysis about practice and

impact on students' learning, following the literature on productive reflection (Davis,

2006; Moore-Russo & Wilsey, 2014), teacher expertise (Berliner, 2001) and noticing

(van Es & Sherin, 2015). To investigate how the dialogues in the conference might have

served as supports for the development of the skills, I coded the coaches' and teachers'

cognitive engagement (as defined by Chi & Menekse, 2015) in the dialogue and the type

of questions, prompts, or statements coaches posed during the conferences. We also

coded when teachers convey desire, ability, reason, need, commitment, or taking steps to

change teaching practice, given that the own verbalization toward change is predictive of

change in behavior (White & Miller, 2007).

Overall, I found that teachers focused their attention to the relevant themes of the

intervention, enhanced their ability to analyze their teaching practice in more

sophisticated ways over time, and paid more attention to the relationship between

teaching and learning when reflecting autonomously. When reflecting with a coach, even

though overall the dialogues lacked interactivity (Chi &Meneseke, 2015), both coaches

and teachers engaged in more cumulative exchanges over time, building on each other's

ideas and constructing meaning together (Alexander, 2011; Chi & Menekse, 2015, Littleton & Mercer, 2013, Warwik et al., 2016.). This might have helped teachers also to reflect more effectively autonomously. Overall, the findings in manuscript 2 show that the opportunities to practice their noticing skills were crucial for teachers' development of those skills. Both opportunities to reflect on their own with specific scaffolds, as well as reflecting with others in the context of dialogue might have been vital for those teachers to change their enacted practice. These findings help the field to understand better the mechanisms that support the development of teachers' noticing skills as a critical contributor to their enacted practice in the classroom.

**Understanding Teachers' Pedagogical Attention, Interpretation, and Decision-making skills: Contributors and Association with Practice Effective Classroom Practice**

The previous studies in this dissertation provided information about early childhood teachers' and caregivers' noticing skills, how they are associated to teachers effective teaching, according to the TTIF (Hamre et al., 2013) and how improvement initiatives can support the development of these skills and interactions in the classroom. The third study will further explore these skills and relationships in a more comprehensive way. First, I will use the full conceptualization and quantitative measurement of noticing skills-- attention, interpretation and analysis, and decision-making. Second, I will explore early childhood teachers' dispositions more comprehensively, adding epistemological beliefs about teaching and learning, and affective and motivational aspects, such as burnout and stress, and readiness to change,

that I have not explored in the previous studies. Then I will explore their relationship with both noticing skills and enacted practice.

Overall, the three-manuscript dissertation will add to a more comprehensive understanding of early childhood teachers' competence and the relationships between cognitive and affective processes related to their enacted practice. Also, they provide insights for the measurement of teachers' noticing skills, and how teacher's training and teacher's professional development programs can support the enhancement of these skills and teachers' practice. From a practice perspective, these three studies offer insights into how to effectively design future professional development, what specific supports and task's features can be offered for early childhood teacher's improvement. This is particularly relevant as more and more children are in classroom settings at an early age, and, overall, little research is available to guide improvement efforts.

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Caregiver Ability to Notice and Enact Effective Interactions in Early Care Classrooms

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Abstract

The present study investigated toddler caregivers' ability to *notice* (i.e., detect and identify) effective classroom interactions and indicators of toddler development, including the degree to which caregivers' noticing abilities predict the quality of their own classroom interactions with toddlers. Sixty-one toddler caregivers completed a video-based noticing assessment prior to participating in a larger professional development study concerning effective caregiver-child interactions. Results indicate that caregiver noticing abilities are relatively low overall, with caregivers' ability to notice indicators of toddler development being even lower than their ability notice effective caregiver-child interactions. There is also initial evidence to support the predictive value of the ability to notice effective caregiver-child interactions to caregivers' ability to enact effective socio-emotional and instructionally supportive interactions in their own classrooms. Findings have implications for the utility of assessing and supporting caregiver noticing abilities to promote high-quality caregiver-child interactions in toddler classroom settings.


*Keywords*:  Teacher-child interactions; Early childhood education; Noticing skills; Toddler development; Video-based observation

**Caregiver Ability to Notice and Enact Effective Interactions in Early Care**

**Classroom Settings**

Abundant evidence points to the importance of effective classroom interactions between adults and children as a primary mechanism to support learning and development (LaParo, Williamson, & Hatfield, 2014; Mortensen & Barnett, 2015; Ruzek, Burchinal, Farkas, & Duncan, 2014). Given an increased emphasis on the value of measuring and enhancing teacher-child interactions over the past two decades (e.g., Early et al., 2007; Author, 2007; Pianta et al., 2005; Thomason & La Paro, 2009), the field would benefit from a deeper understanding of the specific knowledge, skills, experiences, and beliefs that support teachers' ability to engage in effective classroom interactions with children. There is promising evidence to suggest teachers' ability to *notice* (i.e., detect and identify) effective classroom interactions when observing other teachers and children is related to teachers' own interactions with children in preschool (preK; i.e., ages 3 to 5 years) to grade 12 (i.e., ages 17 to 18 years) settings (Author, 2012; Jamil, Sabol, Hamre, & Pianta, 2015; Pianta et al. 2014; van Es & Sherin, 2002). However, there is a lack of parallel research concerning the extent to which *toddler* (i.e., ages 1 to 3 years) *teachers and caregivers in classroom settings* (henceforth, caregivers) notice aspects of classroom interactions (including both caregiver and child behaviors) when observing other caregivers and young children, and whether the ability to notice these behaviors explains variability in the quality of their own interactions with children. Given that toddler caregivers face multiple daily demands, ranging from helping toddlers with basic care activities (e.g., eating; toileting) and ensuring their safety and comfort, to supporting the development of their cognitive and socio-emotional skills and knowledge

(Leana, Appelbaum, & Shevchuk, 2009; Sheridan et al., 2009), engaging in responsive caregiving requires complex cognitive skills (van Es & Sherin, 2002; Banhart & van Es, 2015) to notice and successfully interpret and respond to each demand (Downer, Jamil, Maier & Pianta, 2011)

       With some six million children under age three years in non-parental care in the United States (representing more than half of all infants and toddlers; Zero to Three, 2017), there is a pressing need for research to guide efforts to enhance caregiver-child interaction quality in these settings. The present research addresses this need by investigating the knowledge, skills, experiences, and beliefs that predict caregiver noticing abilities, and by determining the unique contribution of caregiver noticing abilities to the quality of their own classroom interactions with young children.

### Ability to Notice Effective Adult-Child Classroom Interactions

       The connection between teachers' ability to *notice* and *enact* effective classroom interactions is supported by theory and empirical evidence. Drawing from information processing theory (e.g., Moskowitz, 2005) teachers acquire and store information, knowledge, and experiences as schemas that shape how they process and retrieve incoming information to make decisions in the classroom. However, anyone who has observed an early care classroom, bustling with activity, would likely agree there is no shortage of information for caregivers to process and react to. At any one given time in the classroom, incoming information could be auditory (e.g., children crying, laughing, or squealing), visual (e.g., children climbing on furniture, pointing to something on a shelf, or pouting silently), or tactile (e.g., children tugging on the caregiver's clothing or snuggling in for a hug). Given that teachers receive multiple, sometimes simultaneous,

inputs from a variety of sources in the classroom, they must prioritize what to attend to and how to respond (van Es & Sherin, 2002). To do so requires that teachers make connections between specific classroom events and the broader principles they represent, using the classroom context to interpret individual situations - the *ability to notice* (van Es & Sherin, 2002, p. 574). Following from these principles, caregivers with a well-developed schema for effective interactions should exhibit greater skill in *noticing* effective interactions, and by extension, should *engage* in higher quality interactions with toddlers, as compared to caregivers with a less-developed schema for effective interactions.

Research with in-service preK teachers (e.g., Author, 2012) and preservice kindergarten (i.e., ages 5 to 6 years) through grade 12 teachers (e.g., Author, 2013) supports the use of video-based assessment to measure the ability to notice (i.e., detect and identify) effective teacher-child interactions and to predict teacher's own effective interactions within their classrooms (Hamre, Downer, Jamil, & Pianta, 2012; Pianta et al. 2014; Jamil et al., 2015). The Video Assessment of Interactions and Learning (VAIL; Author, 2012) is a standardized, direct measure of teachers' skills in detecting and identifying effective classroom interactions. Based on the Classroom Assessment Scoring System framework (CLASS; Pianta, LaParo, & Hamre, 2008), the VAIL was originally designed to assess the impact of a professional development intervention on effective teacher-child interactions among 440 in-service preK teachers (Author, 2012), and has since been further validated, to establish initial evidence about the measure's factor structure, internal consistency, and inter-rater reliability, as well as initial evidence

concerning the validity of the VAIL as a measure of teachers' noticing abilities and as a predictor of teacher-child interaction quality (Jamil et al., 2015).

**Extending Caregiver Noticing to Include Behavioral Markers of Development**

The toddler years, commonly defined as the period between about 15 to 36 months of age (e.g., Thomason & La Paro, 2009) are witness to rapidly changing, yet often subtle developmental behaviors. For example, with regard to social development, toddlers may variously indicate disinterest or displeasure in an experience by averting their eye gaze, throwing an object on the floor, or crying, and may indicate interest or pleasure through line of regard (eye gaze), pointing, or vocalizing. Arguably, some behavioral markers are salient and relatively easy to notice (e.g., crying, vocalizing), as indicated by distinctive brain response patterns in caregivers (Seifritz et al., 2003), whereas other developmental behavioral markers are subtle, and relatively more difficult to detect and identify (e.g., averting eye gaze, pointing). With regard to pointing, for example, the caregiver must recognize that the child's intentional gesture indicates a desire that the caregiver attend to something (to know something together) and recognize the child's wider social intention, or motive for directing the caregiver's attention there (Tomasello, Carpenter, & Liszkowski, 2007). The extent to which caregivers notice behavioral markers of toddler development, including subtle behavioral markers, may be critically important to shaping their interactions with children. For this reason, the present study extends prior research on the ability to notice effective classroom interactions with attention to an additional construct – caregiver ability to notice behavioral indicators of development.

**Knowledge, Skills, Experiences, and Beliefs Associated with Noticing and Enacting Effective Interactions**

Informed by prior research on teacher-child interaction quality, the present study considers additional specific factors and qualifications that may relate to caregiver's abilities to notice and enact effective interactions with young children.

In the United States, caregiver professional qualification requirements vary by state, and vary further according to the type of care (e.g., licensed home-based or center-based provider; federally-funded Head Start or Early Head Start provider; religious or faith-based provider). To illustrate, Head Start (which serves preschool-age children ages 3 to 5 years, living in poverty) required that by 2013, no less than fifty percent of all Head Start teachers, nationwide, have a Bachelor's degree in child development, early childhood education, or equivalent coursework, (https://eclkc.ohs.acf.hhs.gov/policy/45-cfr-chap-xiii/1302-91-staff-qualifications-competency-requirements). By comparison, for Early Head Start (which serves children from birth to age 3 years, living in poverty), teachers providing direct services to infants and toddlers must have a minimum of a Child Development Associate (CDA) or comparable credential or have received training or equivalent coursework in early childhood development with a focus on infant and toddler development (https://eclkc.ohs.acf.hhs.gov/publication/education-requirements-center-based-infant-toddler-teachers). In 2014-15, the percentage of Head Start teachers holding a Bachelor's degree or higher, nationwide, was 73%, whereas the percentage of Early Head Start teachers holding a Bachelor's degree or higher was 30% (Barnett & Friedman-Krauss, 2016).

Prior studies have produced inconsistent evidence concerning the predictive value of certain types of knowledge, skills, experiences and beliefs, as they relate to caregiver-child interaction quality. For example, evidence from Early Head Start caregivers indicates having a degree in Early Childhood Education (which is not a required qualification) is positively associated with providing effective caregiver-child interactions (Castle et al., 2016). Conversely, a study that examined data from seven major studies of early childhood education classroom quality reported largely null or contradictory linkages between caregiver training (i.e., degree and major) and effective caregiver-child interactions (Early et al., 2007). In a separate investigation, preK teachers with more years of education, but not more years of teaching experience, exhibited greater skill in detecting and identifying effective teacher-child interactions from video (Jamil et al., 2015). Such discrepant findings suggest the need to continue to examine caregiver education and experience, as well as a wider range of caregiver knowledge, skills, and beliefs to provide new insight into caregivers' ability to notice and enact effective classroom interactions.

Knowledge acquired during pre-service education programs and in-service professional development opportunities, too, is likely of relevant significance to the ability to notice and enact effective practices (König et al., 2014). Teacher expertise research suggests that two types of knowledge contribute to a teacher's classroom performance - declarative (knowing *what*) and procedural (knowing *how*) (Bromme, 2001; Fenstemacher, 1994). At any given moment, teachers may retrieve prior knowledge, organized in schemas, to both notice and act (Putnam, 1987). Thus, caregivers with a greater level knowledge about effective interactions and indicators of

child development should exhibit stronger noticing abilities. As well, caregivers with greater levels of knowledge should enact more effective interactions with young children, given the iterative relationship between knowledge and practice (Sheridan et al., 2009).

A growing body of literature suggests that teacher beliefs act as a lens for interpreting classroom experiences (Ambrose, 2004; Pajares, 1992; Yadav & Koehler, 2007), and as such, beliefs could play an important role in caregivers' ability to notice and enact effective interactions. In preK settings, associations between teachers' self-efficacy beliefs, instructional quality, and child outcomes are not entirely straightforward. For example, in one study (Guo, Piasta, Justice, & Kaderavek, 2010), preK teachers' self-efficacy was reported to be a positive predictor of children's vocabulary gains, but only in classrooms characterized by high levels of emotional support. Interpreted another way, the indirect association indicated preK children made smaller vocabulary gains within classrooms exhibiting lower levels of emotional support, even when their teachers reported high levels of self-efficacy. Another study involving early childhood special education teachers (Guo, Dynia, Pelatti, & Justice, 2014) revealed a different indirect association - lower levels of self-efficacy were associated with greater gains in children's language and literacy skills in the context of instructionally supportive classrooms. The authors suggested teachers with lower levels of self-efficacy might have been more motivated and open to incorporate recommended language and literacy instructional practices than teachers with higher levels of self-efficacy. As another example, within early education settings in Switzerland, researchers found self-efficacy to be a stronger predictor of caregivers' child-centered educational *practices* than their *attitudes* toward child-centeredness (Perren, Herrmann, Iljuschin, Frei, Körner, & Sticca, 2017). The

authors interpreted the findings to suggest self-efficacy beliefs may act as a guide for motivating concrete actions and behaviors with young children. Taken together, these findings reveal complex associations between teacher self-efficacy, effective interactions, and ultimately, child outcomes, and highlight the need for additional research to clarify linkages between self-efficacy and caregiver-child interactions.

## Aims of The Present Study

The present study aims to describe and predict caregivers' ability to notice effective caregiver-child interactions and behavioral markers of toddler development, within early care classrooms. Additionally, this study explores the predictive value of caregivers' noticing abilities to the quality of their own interactions with toddlers. These aims address a pressing need to better understand the knowledge, skills, experiences, and beliefs predictive of caregivers' interactions with toddlers. With a focus on an understudied group of early childhood professionals who play a key role in promoting young children's development, this research has important implications for pre-service and in-service professional development to improve the quality of adult-child classroom experiences. Specific research questions include the following: 1) How can we characterize caregiver ability to notice effective caregiver-child interactions and behavioral markers of toddler development?; 2) To what extent are caregiver knowledge, skills, experiences, and beliefs (including education, caregiving experience, self-efficacy, and knowledge of evidence-based effective caregiver-child interactions) related to caregiver ability to notice effective caregiver-child interactions and behavioral markers of development? and; 3) To what extent are caregiver noticing abilities uniquely related  to

the quality of their own interactions with toddlers?

## Methods

### Participants

Participants included 61 caregivers from private childcare programs who participated in a larger professional development study concerning caregivers' interactions with toddlers. All caregivers and classrooms enrolled in the study were located in a Mid-Atlantic state of the U.S. Although caregivers were randomly assigned to treatment conditions in the larger study, the present study included only baseline, pre-intervention data (i.e., prior to caregiver receipt of professional development).

**Caregiver characteristics.** All participants were female and served as the lead classroom caregiver. The largest percentage of caregivers were Black/African American (48.2%;) followed by White/Caucasian (39.3%), Asian (3.6%), multiracial (3.6%) and other (3.6%). With regard to ethnicity, 1.8% of teachers reported being Hispanic. The greatest proportion of caregivers had some college, but no degree (37.5%; $n = 21$), followed by caregivers with a two-year degree (e.g., A.A.; A.S.; 21.4%; $n = 12$), high school diploma (16.1%, $n = 9$) high school diploma plus technical training or certificate (12.5%, $n = 7$), and Bachelor's degree (12.5%, $n = 7$). Teaching experience ranged from 0 to 20 years, with an average of 7.3 years ($SD = 5.7$).

### Study Procedures

At the beginning of the study, caregivers completed a survey regarding their background, classroom characteristics, knowledge of effective teacher-child interactions, and self-efficacy beliefs. In addition, caregivers completed a video-based assessment of noticing abilities. Finally, data collectors filmed a typical classroom day, for about four

hours, and the resulting video footage was later coded using a standardized instrument measuring adult-child classroom interaction quality.

**Measures**

      **Caregiver demographics.** The caregiver and classroom demographic survey included items to pertaining to caregivers' years of experience and educational attainment, as well as information about caregivers' race/ethnicity and gender.

      **Caregiver Self-Efficacy Beliefs.** Caregivers' self-efficacy was measured using a 12-item questionnaire, the Ohio State Teacher Efficacy Scale – short form (OSTES; Tschannen-Moran & Hoy, 2001), that has been widely used and validated. Items included statements such as "How much can you do to control disruptive behavior in the classroom?", "To what extent can you craft good questions for children in your classroom? and "How much can you do to get children to believe they can do well on activities? Caregivers rated each item on a scale ranging from 1 ("no influence") to 9 ("a great deal of influence"). The total scale mean was calculated, with a possible range between 1 and 9 (Cronbach's alpha=.93 for the study sample).

      **Knowledge of Evidence-Based Caregiver-Child Interactions.** The Knowledge of Effective Teacher-Child Interactions measure (KETCI; Author, 2009) was used to assess caregivers' understanding of and knowledge about evidence-based interactions that promote positive development. Caregivers responded to 9 multiple-choice items pertaining to a classroom scenario, based on the CLASS-Toddler framework for effective caregiver-child interactions (CLASS-T; LaParo, Hamre, & Pianta, 2012). This measure has previously been used in a study of 440 early childhood teachers to test the effectiveness of a professional development course concerning effective teacher-child

interactions (Author, 2012), and a randomized controlled trial to test the effectiveness of two professional development interventions (Early, Maxwell, Ponder & Pan, 2017), and demonstrated sensitivity to intervention effects. The total scale mean percentage was calculated (Cronbach's alpha = .86 for the study sample).

**Ability to Notice Effective Caregiver-Child Interactions and Behavioral Markers of Development.** The Video Assessment of Interactions and Learning (VAIL; Author, 2012) was adapted for use in toddler classroom settings to measure caregivers' ability to notice effective caregiver-child interactions (Caregiver VAIL items), and behavioral markers of toddler development (Child VAIL items). To complete the VAIL, caregivers watched three pre-selected 2-minute video clips and identified five strategies and five specific examples, as follows: For two of the three videos, caregivers identified five indicators and specific examples of caregiver-child interactions that support toddlers' social, emotional, and self-regulatory development (Caregiver VAIL items). For the third video, caregivers identified five indicators, and specific examples of toddler development in the domains of social development and emotional development (Child VAIL items). For example, with regard to the Caregiver VAIL items, a caregiver might list the following indicator "Positive phrasing of desired behavior" and the following example of the indicator "The teacher made it clear in a positive what the children could do in each space: 'This is a sitting spot, if you want to stand up you can got to the jumping spot' ".Correspondingly, for the Child VAIL items, a caregiver might list the following indicator of toddler development "Seek secure adult base" and the following example of the indicator "Upset student (Andrew) goes to teacher for comfort. Andrew sits in teacher's lap when upset.".

A group of four coders scored caregiver responses according to four criteria: 1) *Strategy/Indictor*: Responses received a score of 1 if the caregiver identified strategies of effective interactions (for Caregiver VAIL items) or indicators of development (for Child VAIL items) accurately, according to a coding manual based on the CLASS-T framework (LaParo et al., 2012); 2) *Example*: Responses received a score of 1 if the caregiver provided a specific, detailed example that appeared in the video; 3) *Match*: Responses received a score of 1 if there was a match between the strategy (for Caregiver VAIL items) or indicator of development (for Child VAIL items) and the specific example; and 4) *Breadth*: Responses received a score reflecting the number of correct strategies (Caregiver VAIL items) or indicators of development (Child VAIL items) caregivers were able to identify. Possible scores could range from zero to 5. Before scoring, coders completed a comprehensive training protocol consisting of a one-half day review of the CLASS-T manual, followed by a half-day review of the VAIL coding manual, and 5 hours of practice coding short examples of caregiver responses.

All four coders scored all of the caregiver responses, and the inter-rater reliability score, as measured by an intraclass correlation coefficient (ICC), was .93. In addition to a total score, two subscales were calculated: 1) A *knowledge* score, which included the average of the strategy/indicator, match, and breadth scores; and 2) A *skills* score, which corresponded to the example score. The total score and each subscale had a maximum possible of 5. Table 1 presents examples of the VAIL coding scheme illustrating possible correct responses.

[Insert Table 1 about here.]

**Caregiver-Child Interaction Quality.** The Classroom Assessment Scoring

System Toddler version (CLASS-T; LaParo, Hamre, & Pianta, 2012) was used to measure the quality of caregiver-child interactions within participating classrooms. Videotaped classroom observations were filmed in the fall, prior to the start of the professional development intervention. The CLASS-T comprises two domains: Emotional and Behavioral Support and Engaged Support for Learning. The first domain includes five dimensions: Positive Climate, Negative Climate, Teacher Sensitivity, Regard for Child Perspectives, and Behavior Guidance. The second domain includes three dimensions: Facilitation of Learning and Development, Quality of Feedback, and Language Modeling. Each dimension receives a rating on a scale from 1 to 7, with a score of 1 reflecting low quality and 7 reflecting high quality. Ratings are averaged across three to four, 15-min observation cycles to create an average score for each dimension, and a composite score for each of the two domains. Nine coders completed a training and certification process for the CLASS-T over a period of two days and completed a reliability assessment (demonstrating an average agreement of $\geq$ 80% within one code of the master code) before performing coding for the study. To determine inter-rater reliability for the present study, 20% of the videos were double coded (ICC = .87). Descriptive statistics for scores on the caregiver for the OSTES self-efficacy measure, Knowledge about Teacher-Child Interactions measure, and CLASS–T domains are presented in Table 2.

[Insert Table 2 about here.]

## Results

**Ability to notice effective caregiver-child interactions and behavioral markers of development**

Descriptive findings concerning caregivers' ability to notice effective caregiver-child interactions (Caregiver VAIL items) and indicators of child development (Child VAIL items) are presented in Table 3. Table 4 presents correlations between the Caregiver and Child portions of the VAIL.

[Insert Table 3 about here.]

[Insert Table 4 about here.]

Given the possible maximum total score of 5, caregivers' abilities to notice effective caregiver-child interactions ($M = 1.06$; $SD = 0.95$) and indicators of toddler development ($M = 0.67$; $SD = 0.68$) are relatively low overall. Caregivers' abilities to identify effective caregiver-child interaction strategies ($M = 0.81$; $SD = 0.93$) and developmental indicators ($M = 0.38$; $SD = 0.68$), as reflected in the knowledge subscale, are also relatively low overall. The mean score for the Caregiver VAIL knowledge subscale was significantly higher than the mean score for the Child VAIL knowledge subscale, as measured by a paired sample t-test. ($p = .01$). This difference indicates participants in our sample demonstrated greater knowledge of effective caregiver-child interaction strategies than knowledge of behavioral markers of toddler development. Caregivers' ability to notice specific examples of effective interactions or indicators of development was measured by the skills subscale. As with the Caregiver VAIL and Child VAIL knowledge subscales, the Caregiver and Child VAIL skills subscales scores were relatively low, overall, given the maximum possible score of 5. Although the Caregiver VAIL skills subscale mean score ($M = 1.59$; $SD = 1.23$) was higher than that Child VAIL skills subscale mean score ($M = 1.46$; $SD = 1.17$), a paired samples t-test revealed the difference was not statistically significant ($p = .59$). However, when examining the mean

total scores for the Caregiver and Child VAIL items, caregivers in our sample

demonstrated better performance on the Caregiver VAIL items ($p = .02$).

**Predictors of caregiver noticing abilities**

Due to missing data in the variables of interest (i.e., VAIL = 16.1%; CLASS-T =

24.2%) Full Information Maximum Likelihood (FIML) was used to account for missing

data. Analyses were also conducted using Multiple Imputation methods. Both methods

resulted in similar patterns, and as such, we present the FIML models in Tables 5 and 6.

Specifically, Table 5 presents analyses examining the relations between caregiver

knowledge, skills, experiences, beliefs, and noticing abilities using multiple OLS

regression models. Predictors for the two VAIL scores (i.e., Caregiver VAIL; Child

VAIL) included education/training, years of experience, caregiver self-efficacy score, and

knowledge (KETCI) score. The first model predicting Caregiver VAIL items showed

predictive ability ($R^2 = 0.24$; $p = 0.02$) and only the KETCI knowledge score was

positively and significantly related to the ability to notice caregivers' effective

interactions ($\beta = .46$; $p < 0.001$). On the contrary, the second model predicting Child

VAIL items was not significant overall ($p < 0.05$). Interestingly, the self-efficacy score

was negatively related to caregivers' ability to notice indicators of child development ($\beta$

$= -.31$, $p = 0.04$), and holding a two-year degree was positively associated with

caregivers' ability to notice developmental indicators ($\beta = 0.05$, $p = 0.11$).

**Unique contribution of noticing abilities to caregiver-child interaction quality**

Finally, we explored the unique contribution of caregivers' noticing abilities to

the quality of their own interactions with toddlers, after controlling for other knowledge,

skills, experiences, and beliefs. We conducted two hierarchical regression models for

each CLASS-T domain (Emotional and Behavioral Support; Engaged Support for Learning). The first model included amount of caregiver experience and training, coded as dummy variables (Bachelor's degree, some college but no degree, high school diploma plus technical training or certificate, two-year degree (e.g., A.A.; A.S.) with high school diploma as the reference category. Additionally, we included caregivers' self-efficacy total score. Then, in the second model we added caregivers' noticing abilities as measured by the Caregiver VAIL items and Child VAIL items, separately.

Results are presented in Table 6. The first model, predicting the CLASS-T domain of Emotional and Behavioral Support as a function of caregiver experience, training, and self-efficacy, was not significant ($p = .14$). However, having a Bachelor's degree was positively associated with caregivers' observed emotional and behavioral support as measured by the CLASS-T ($\beta = 0.67$; $p = 0.04$). Adding the Child VAIL items as a predictor (in the second model) did not improve the model. However, the third model, which included the Caregiver VAIL items, was significant ($R^2 = 0.23$; $p = .05$) and was marginally related to caregivers observed emotional and behavioral support ($\beta = 0.22$; $p = 0.07$).

The second model predicting the CLASS T-domain of Engaged Support for Learning as a function of caregiver experience, training, and self-efficacy, was significant ($R^2 = 0.25$, $p = 0.03$). Furthermore, having a Bachelor's degree ($\beta = 0.75$; $p = 0.02$) was positively related to caregivers' observed interactions as measured by the CLASS-T Engaged Support for Learning domain, as was caregivers' years of experience ($\beta = 0.05$, $p < 0.01$). When the Child VAIL items were added (in the second model), the model continued to be significant ($R^2 = 0.24$, $p = 0.04$). Although the Caregiver VAIL items

were not significant predictors, years of experience ($\beta = 0.04$, $p = 0.02$) and having a

Bachelors' degree ($\beta = 0.75$; $p = 0.02$) were positively related to caregivers' observed

engaged support for learning. Similarly, in the third model, the Caregiver VAIL items

were positively related to caregivers' Engaged Support for Learning behaviors ($R^2 = 0.31$;

$p = 0.01$). In this model, years of experience ($\beta = 0.04$, $p = 0.03$) remained positively

related to Engaged Support for Learning, and having a Bachelors' degree ($\beta = 0.59$, $p =$

0.06), demonstrated a marginally significant association with caregivers' Engaged

Support for Learning. Finally, the ability to notice caregivers' effective interactions

(Caregiver VAIL items) was also marginally related to Engaged Support for Learning ($\beta$

$= 0.22$; $p = 0.05$).

     In sum, in examining the unique contribution of caregiver noticing abilities to the

quality of their own interactions with children, findings indicated the ability to notice

caregivers' effective interactions (Caregiver VAIL items) was marginally positively

related to both CLASS-T domains. By comparison, the ability to notice indicators of

toddler development (Child VAIL items) was not significantly related to either of the

CLASS-T domains.

<div align="center">

**Discussion**

</div>

     This study aimed to provide initial evidence concerning caregivers' ability to

notice effective caregiver-child interactions and indicators of toddler development, and to

examine the unique contribution of noticing abilities to the quality of caregiver-child

interactions. First, we found that caregivers' noticing abilities are limited, especially with

regard to the ability to notice toddlers' developmental indicators. Second, findings were

mixed concerning the predictive value of caregivers' knowledge, skills, experiences, and

beliefs to their noticing abilities. Despite this, we found that the ability to notice effective caregiver-child interactions uniquely related to caregivers' own observed effective interactions with children.

**Ability to Notice Effective Interactions is Stronger than Ability to Notice Child Development Indicators, But Both Abilities Are Low Overall**

The present study revealed that overall, caregivers' ability to notice both effective caregiver-child interactions and toddler developmental indicators is low. Given that the ability to detect and identify effective interactions using video observations is a predictor of the quality of caregivers' own interactions with young children, at least in classrooms serving older children (Jamil et al., 2015), practice in *noticing* could be a worthwhile focus for caregiver training and professional development. The present study also revealed that although low overall, caregivers' ability to notice effective caregiver-child interactions is stronger than their ability to identify indicators of development. These findings suggest the two abilities differ from one another and reflect different aspects of the complexity of early care classrooms. Given the rapid developmental changes toddlers experience (Bornstein et al., 2010; Howes & Hamilton, 1993), the ability to notice developmental indicators and specific behaviors may serve as key resource to navigate the demands of toddler classrooms. Given the importance of caregivers' knowledge of children's social, emotional, and cognitive domains (Leibbrand & Watson, 2010) for understanding the behaviors children exhibit, and responding accordingly, these results confirm the necessity of providing caregivers with greater training and professional development concerning indicators of toddler development.

**Mixed Findings Concerning Predictors of Noticing Abilities**

In exploring the other knowledge, skills, experiences, and beliefs related to noticing abilities, our results suggest that caregiver education and experience is a limited predictor of caregiver noticing abilities. Having a two-year degree was a significant predictor of caregivers' ability to notice indicators of toddler development, but not of their ability to notice effective caregiver-child interactions. Addressing the limitations of prior studies, we examined the predictive value of additional caregiver characteristics, such as knowledge about evidence-based caregiver-child interactions and caregiver self-efficacy. Only with regard to the Caregiver VAIL items (which measures caregivers' noticing abilities with regard to effective caregiver-child interactions) did we find a statistically significant association with the measure of caregiver knowledge about evidence-based teaching behaviors. This result is expected given that knowledge is a fundamental aspect of caregivers' ability to notice effective caregiver-child interactions as measured by the Caregiver VAIL items. However, no other characteristics were significantly associated with caregivers' abilities to notice effective interactions or indicators of development.

These findings suggest that other individual caregiver characteristics not measured in the present study –such as personality traits (Author, 2011) or previous experiences (Yost, Sentner, & Forlenza-Bailey, 2000) - might better help explain caregiver noticing abilities. Additionally, it is possible that classroom and child characteristics also play an important role in explaining caregiver noticing abilities. For instance, caregivers whose classrooms differ from one another in terms of child demographic composition or abilities, might use different filters to notice what is happening in the classroom (Ambrose, 2004; Yadav & Koehler, 2007). Thus, future

research should consider classroom-level predictors to further explore caregiver noticing abilities.

## Ability to Notice Effective Caregiver-Child Interactions Predicts Quality of Caregivers' Own Interactions

Our final aim examined the unique association between caregivers' noticing abilities and their ability to enact effective classroom interactions. Results provide initial evidence that caregivers' ability to notice effective caregiver-child interactions is related to their ability to enact both effective socio-emotional and instructionally supportive interactions. The latter is consistent with previous studies using the VAIL in preschool classrooms (Author, 2012; Jamil et al., 2015). This finding indicates caregivers who are able to observe, identify, and prioritize effective classroom behaviors (on video) are also more responsive to toddlers' emotional and academic needs. Overall, these results add to the existing knowledge base identifying noticing abilities as a key predictor of educators' own interactions with children.

The ability to notice indicators of toddler development, however, was not significantly related to the extent to which caregivers enacted effective interactions, in this study. This might be due to the fact that, overall, caregivers demonstrated very low levels of noticing developmental indicators. Thus, there may not have been enough variability in the extent to which caregivers noticed developmental indicators to detect an association with the quality of their classroom interactions. An additional explanation is that perhaps the measure, as designed, is too difficult for caregivers. Refining the measure to accurately capture variability in caregivers' noticing abilities could be an important avenue for future research.

Beyond caregivers noticing ability, we also detected a significant association between having a Bachelors' degree and providing higher quality interactions. This is consistent with some research indicating caregivers holding at least a Bachelor's degree exhibit higher levels of quality than classrooms whose caregivers do not hold at least a Bachelor's degree (e.g., Barros et al., 2018 for infant classrooms in Portugal; Slot, Leseman, Verhagen, & Mulder, 2015 for child care classrooms in the Netherlands serving children ages 2 to 3 years, but see Early et al., 2007). It is possible that the caregivers in the present study with at least a Bachelor's degree had gained a greater knowledge of effective caregiver-child interactions, which contributed to the ability to enact higher quality interactions in their own classrooms, as compared to their peers who did not hold at least a Bachelor's degree. Such a finding reinforces the importance of building a robust base of knowledge for early care professionals, in order for them to apply this knowledge to their practice.

**Limitations**

Several limitations of this study should be considered. First, this study is correlational in nature and so we cannot make causal claims about any of the associations detected. Second, our small sample size allowed only for exploratory analyses with a limited number of predictors, to provide initial evidence about the noticing abilities of an understudied population – toddler caregivers. Future research that relies on a larger sample size should include more complex statistical analyses, including predictor variables at different levels of analysis. In addition, we did not find a significant association between caregivers' ability to notice indicators of toddler development and their ability to enact effective interactions. However, it is possible that the lack of

variability in caregivers' ability to notice developmental indicators may be masking an association, if there is one. Finally, caregivers did not know the children in the videos used to measure their ability to notice indicators of child development. Thus, it may have been difficult for caregivers to notice developmental indicators in an unfamiliar group of children. Future research should identify whether the ability to notice indicators of toddler development is stronger when caregivers view videos of their own classroom and have an established relationship with the children.

**Conclusions**

The present study is the first to explore toddler caregiver's abilities to notice effective caregiver-child interactions and developmental indicators. In this understudied population, caregiver noticing abilities are low overall. Early care professional educators and professional development providers may wish to measure noticing abilities in pre-service and in-service education contexts, and provide appropriate supports to individuals whose noticing knowledge and skills are not well-developed. The present study also found that the ability to notice effective caregiver-child interactions appears to be distinct from the ability to notice indicators of toddler development. Thus, professional development providers should consider providing ample content and practice in both areas. Finally, there is initial evidence to support the predictive value of the ability to notice effective caregiver-child interactions to caregivers' ability to enact effective socio-emotional and instructionally supportive interactions in their own classrooms. This finding has implications for the utility of assessing and supporting caregiver noticing abilities to promote high-quality caregiver-child interactions in toddler classrooms.

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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Tables

Table 1. VAIL coding scheme examples illustrating correct responses.

|  | Strategy | Example |
|---|---|---|
| Caregiver VAIL items | Caregiver reinforces positive behavior | The teacher acknowledges that the children are on their "carpet squares" playing with balls and reinforces their behavior by saying "I like how you are sitting on your carpet square" |
|  | Caregiver follows children's leads | The boy in the blue vest points a picture in the book (a spider) and the teacher says: "yes, that is a spider" and starts signing a song about a spider |
| Child VAIL items | Relate to, trust, and become attached to consistent adults | Child in the red shirt laughs with the teacher when she tickles him with the puppet |
|  | Developing a sense of self and self-confidence | Children select the specific puppets they want to play with |

Table 2. Descriptive statistics for caregiver self-efficacy, knowledge, and CLASS-T
domain scores

|  | *M* (*SD*) | Total Possible Score |
| --- | --- | --- |
| OSTES (self-efficacy) | 7.57 (0.98) | 9 |
| Knowledge of effective teacher-child interactions | 0.80 (0.22) | 1 |
| CLASS-T: Emotional and Behavioral Support | 4.93 (0.67) | 7 |
| CLASS-T: Engaged Support for Learning | 2.50 (0.67) | 7 |

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Table 3. Descriptive statistics for VAIL scores.

| VAIL Type | Caregiver VAIL | | | Child VAIL | | |
|---|---|---|---|---|---|---|
| | Knowledge | Skills | Total | Knowledge | Skills | Total |
| Mean (*SD*) | 0.81 (0.93) | 1.59 (1.23) | 1.06 (0.95) | 0.38 (0.68) | 1.46 (1.17) | 0.67 (0.68) |
| Total Possible | 5 | 5 | 5 | 5 | 5 | 5 |

Table 4. Correlations between Caregiver and Child VAIL Knowledge Subscale, Skills Subscale, and Total VAIL scores.

| | Child Skill | Child Knowledge | Child Total | Caregiver Skill | Caregiver Know | Caregiver Total |
|---|---|---|---|---|---|---|
| Child Skill | | .33* | .66* | .49* | .22* | .36* |
| Child Knowledge | | | .919* | .27* | .33* | .35* |
| Child Total | | | | .41* | .34* | .41* |
| Caregiver Skill | | | | | .72* | .90* |
| Caregiver Knowledge | | | | | | .95* |
| Caregiver Total | | | | | | |

†*p*< .10. **p*< .05. ****p*< .001.

Table 5. Multiple Regressions analysis predicting noticing abilities

| Variable | Caregiver VAIL items | Child VAIL items |
|---|---|---|
| | $B$ | $B$ |
| Intercept | -2.16† | 2.03† |
| Years of Experience | -0.04 | 0.08 |
| Bachelor's degree | 0.14 | 0.04 |
| Some college, no degree | 0.18 | 0.14 |
| High school Technical degree | 0.16 | -0.06 |
| Two-year degree | 0.05 | 0.11* |
| OSTES (Self-efficacy) score | 0.07 | -0.31* |
| Knowledge of effective teacher-child interactions | 0.46*** | 0.02 |
| $R^2$ | 0.24* | 0.11 |

†$p< .10.$ *$p< .05.$ ***$p< .001.$

Table 6. Multiple regression analysis predicting CLASS-T domains

| | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|
| | EBS | ESL | EBS | ESL | EBS | ESL |
| Variable | *B* | *B* | *B* | *B* | *B* | *B* |
| Intercept | 4.63*** | 2.76*** | 4.91*** | 2.69*** | 4.27*** | 2.28*** |
| Years of Experience | 0.01 | 0.05* | 0.001 | 0.04* | 0.01 | 0.04* |
| Bachelor's degree | 0.67* | 0.75* | 0.68* | 0.75* | 0.51 | 0.59† |
| Some college, no degree | 0.27 | -0.04 | 0.30 | -0.04 | 0.17 | -0.14 |
| High school Technical degree | -0.08 | -0.33 | -.021 | -0.17 | -0.20 | -0.16 |
| Two-year degree | -0.14 | -0.01 | -0.11 | -0.02 | -0.14 | -0.01 |
| Self-efficacy score | 0.01 | -0.09 | -0.03 | -0.08 | 0.22 | -0.04 |
| Child VAIL items | | | -0.12 | 0.01 | | |
| Caregiver VAIL items | | | | | 0.22 † | 0.22† |
| $R^2$ | 0.15 | 0.25* | 0.18 | 0.24* | 0.23† | 0.31* |

*Note.* EBS = Emotional and Behavioral Support CLASS–T domain. ESL = Engaged Support for Learning CLASS–T domain; † *p*< .10.  **p*< .05. ***p*< .01. ****p*< .001.

Teachers' Noticing Skills in the Context of an Intervention: Supporting Teachers to

Effectively Reflect on Practice

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Abstract

Research findings: Given the importance of positive early classroom interactions for children's development and learning, more and more professional development programs focus on how to improve these interactions and the skills underlying them. Research on interventions has focused on the effectiveness of these interventions in changing teachers' classroom interactions; however, less has done to describe how this process of change occurs. The present study investigated how early childhood teachers that changed their classroom practice in the context of intervention developed their noticing skills (i.e., attend, analyze, and respond to their teaching) over time through reflective assignments and conferences with a coach offered by an intervention. Results indicate that opportunities for teachers to reflect on their own with specific scaffolds (questions and prompts) drew attention to the relevant themes in the context of the intervention, enable them to practice their analytic skills, and their ability to respond to their teaching. The opportunities for teachers to reflect with a coach showed the key importance of the type of exchanges between coaches and teacher in the conferences. Practice or policy: These findings are particularly relevant as more and more children are in classroom settings at an early age, and little research is available to guide improvement efforts. Thus, the current paper can serve as relevant information for the design of future professional development interventions that aim to improve early childhood teachers' skills and their children's development and learning.

Keywords: early childhood teachers; noticing skills; reflection; coaching; early intervention

**Introduction**

Studies consistently demonstrate that the daily interactions teachers have with young children are among the most important classroom-based elements that promote children's development and learning (e.g., Hamre & Pianta, 2005; Howes et al., 2008; Mashburn et al., 2008). Effective teachers engage in trusting and positive relationships with children, provide contingent responses to children's cues, clear and consistent behavioral expectations and time management, responsive feedback, as well as verbal engagement and cognitive stimulation intentionally directed to ensure children's learning (Hamre et al., 2013). Given the importance of these positive early experiences for children's development and learning, more and more improvement efforts focus on how to enhance these classroom experiences. Research increasingly supports the conclusion that a *direct focus on teacher's practice* is needed in order to improve the quality of their interactions with children (Zaslow, 2009; 2010), with approaches proven most effective typically providing some combination of curriculum and classroom-based coaching of teachers (Bierman et al., 2008; Domitrovich et al., 2009; Egert et al., 2018; Isner et al., 2011; Markussen-Brown et al., 2017;  Powell et al., 2010; Raver et al., 2008).

While this growing research base on interventions shows that teachers can improve their practice, it does little to illuminate *how* this improvement occurs. Effective teaching relies on a complex set of skills that enable teachers to manage the highly stimulating and dynamic classroom environment. Teachers need to continuously attend to classroom events and analyze what they observe to make informed decisions about what to change or maintain in the classroom (Moore-Russo & Wiley, 2014; Santagata & Angelici, 2010; van Es & Sherin, 2002; 2015). These skills named "Noticing skills" (van Es & Sherin, 2015), are critical to inform pedagogical decisions — in the moment and in

the future. Considering the latter, the working assumption is that Noticing skills, selective attention, the ability to analyze and interpret classroom situations, and respond to teaching, are crucial to act adaptively and effectively in these situations (Berliner, 1991, 2001; Kersting et al., 2012; Sherin & van Es, 2009). Thus, understanding how these skills might improve within the context of an effective professional development intervention is needed to better develop and refine future interventions.

Effective Classroom Interactions (ECI) is a professional development intervention for early childhood teachers that utilized an online platform to provide content and coaching on effective teacher-child interactions (LoCasale-Crouch, Hamre, & Neesen, 2013) and children's learning. In a randomized study of the intervention, teachers who received the content and coaching demonstrated improvement in their quality of teacher-child interactions and in their noticing skills, as a result of the intervention (LoCasale-Crouch, Hamre, & Neesen, 2013). The current study, then, aims to describe the process of *how* teachers that changed their practice acquired these set of skills. In order to do this, we qualitative and quantitative describe participating teachers' noticing skills as they developed through autonomous reflective practices and conference dialogues between each teacher and her coach offered by the intervention. By doing so, the field will be better able to understand the mechanisms that support the development of teachers' noticing skills as a critical contributor to their improved practice in the classroom.

**The Role of Reflection and Noticing Skills in Effective Teaching**

Reflection describes an active and deliberate act of inquiry into one's thoughts and actions (Dewey, 1933; Loughran, 1996). In this sense, reflection on [teaching] practice serves as a purposeful and systematic revisiting of the past often to consider

critical events (Moore-Russo & Wilsey, 2014; Schön, 1983). To engage in this systematic analysis, teachers' need skills that are conceptualized under the framework of *teacher noticing,* including attending to what is noteworthy in the classroom data, analyzing and interpreting that data, and deciding how to respond, or planning what one would you do differently the next time (Barnhart & van Es, 2015). Research on teacher noticing (Erickson, 2011), however, suggests that what teachers attend to and use as evidence from their experiences may not provide what they need to draw meaningful inferences about student learning. This is particularly true of novice teachers (Banhart & van Es, 2015). For example, studies have found that novice teachers may focus only on superficial features of classroom, such as students raising hands or following classroom routines, to deduce that students learned the lesson (Carter, Cushing, Sabers, Stein, & Berliner, 1988; Star, Lynch, & Perova, 2011; Star & Strickland, 2008). In addition, without support and appropriate framing, teachers' *analyses* tend to be judgmental and lack evidential support and coherence (Davis, 2006; Sandoval, Denerof, & Franke, 2002). This may result in an inadequate *response* to students' ideas and learning for the next time in the classroom because only teachers who systematically analyze teaching become more adept at responding to student ideas (Windschitl, Thompson, & Braaten, 2011). Thus, not every reflection on practice may result in a productive way of analyzing teaching and learning.

Drawing from the literature on expertise, expert teachers' when *analyzing* their teaching practice provide reasons for their decisions in the classroom, evidence for their claims, and alternatives for their teaching, questioning assumptions and identifying the results of their decisions, evaluating rather than just judging (Ball & Cohen, 1999; Davis,

2006; Moore-Russo & Wilsey, 2014; Santagata & Angelici, 2010). Moreover, expert teachers reflect by *attending* to classrooms events that they thought had an impact on the achievement of the lesson learning goals (Borko & Livingston, 1989). The presence of relationships of cause and effect between teaching decisions and students' learning is a characteristic of more sophisticated reflections (Barnhart & van Es, 2015), as well as a focus on students' behavior and thinking rather than only on what the teacher is doing. Expert teachers also pay attention to students' difficulties during instruction, reasoning about them and making decisions to respond to them (Berliner, 2001). Thus, merely *analyzing* teaching does not lead to improvement unless the product of the reflection includes a *response* to their teaching, including a decision about what should be maintained and what should be changed (Santagata & Angelici, 2011).

Noticing and reflection skills might serve as means to improve the quality of teaching. Prior research in noticing (Hamre et al., 2012; van Es & Sherin, 2002) and reflection provide evidence and a rationale that support this assumption. First, noticing and reflection can be seen as means for more *intentional* practice. Teachers cannot intentionally act on what they cannot notice and noticing and reflecting about practice informs future instructional decisions (Sherin, Jacobs, & Phillipp, 2001). Second, classrooms are complex settings and, therefore, teachers cannot respond to all that is happening in the classroom at the same time. Thus, they must prioritize what to attend to and how to respond (van es & Sherin, 2002). Experts in other fields consider specific situations and interpret them in terms of the concepts and principles that they represent, which are characteristics of high level analysis (Chi, Feltovich, & Glaser, 1981; Larkin & Simon, 1987). Lastly, evidence from teacher noticing research (Hamre et al., 2012; Jamil,

Sabol, Hamre, & Pianta, 2015; Kersting et al., 2010; van Es & Sherin, 2002;) also suggests a relation between noticing skills and effective teaching practice. For example, Hamre and colleagues (2012) used the Video Assessment of Interactions and Learning (VAIL) protocol, a measure that assesses a participant's ability to attend to effective teaching strategies and examples as specified within the Classroom Assessment Scoring System (CLASS; Hamre et al., 2012), to assess the impact of a course on effective teacher-child interactions among preschool teachers. Compared to teachers in a control condition, those exposed to the course demonstrated greater ability to identify multiple aspects of effective teacher-child interactions on a video and also demonstrated more effective emotional and instructional interactions in the classroom. A follow-up study (Pianta et al., 2014) investigated the bi-directional relationship between noticing skills, as measured by VAIL, and effective teacher-child interactions. Results showed that skills in identifying effective practice and enacted classroom behaviors were indeed mutually linked.

In sum, research has found teaching experts exhibit well-developed noticing skills, attention to what is relevant in the classroom, analysis of teaching practice and providing a response to it. Further, these skills are related to more *intentional* teaching practice and also to effective teaching practice in the classroom. Thus, improvement of these particular skills might serve as a mean to improve the quality of teaching.

**Key Approaches to Support the Improvement of Noticing and Reflection Skills**
       **Use of video and specific prompts: reflecting on your own.** Noticing skills are

malleable and subject to improvement. Given their relationship to better teaching

practice, these have been a focus of intervention. Research shows that, for example,

watching video-taped classroom situations promote pre-service and in-service teachers'

noticing skills about classroom events, becoming more adept to identify relevant

classroom features and providing more elaborated analyses of classrooms situations

(Hamre et al.,2012, Pianta et al., 2008; Star & Strickland, 2008; Stockero 2008; van Es

and Sherin 2002, 2015). However, without guidance and support, only exposing teachers

to videos of classrooms situations might not be sufficient, especially for more novice

teachers (Llinares & Valls 2009; Santagata, Zannoi, & Stigler, 2007; Santagata

&Angelici 2010; Star & Strickland 2008; van Es & Sherin 2002). Some of the noticing

interventions have used general prompts ("What did you notice?") to elicit and develop

teacher noticing skills (Sherin & van Es, 2005), however, evidence suggests that video-

based noticing interventions might be improved by using a series of targeted scaffolds

(Kaiser, Busse, Hoth, Konig, & Blömeke, 2015; Santagata & Angelici, 2010; Stockero,

Rupnow, & Pascoe, 2017). For example, including questions that prompt making

connections between teachers' actions and students' learning (Santagata, 2011; Pianta et

al., 2008) or integrating key elements of teaching and learning (Stockero, Rupnow, &

Pascoe, 2017) may be more useful.

**Dialogue in the context of coaching conferences: reflecting with a coach.** Despite robust evidence showing coaching/mentoring has a positive impact on teachers' practice (Egert et al., 2018; Isner et al., 2011; Markussen-Brown et al., 2017), less is known about how coaching or mentoring increases teachers' learning. Effective coaching/mentoring offers teachers' the opportunity to reflect with a partner about their own practice as well as receive individualized feedback through verbal interactions. The dialogue between teacher and a coach, then, may be the key mechanism for teachers' enhancement of their critical thinking and reasoning (Vrikki et al., 2017) and the promotion of greater learning, as evidenced by the advantage of working collaboratively with peers (Dillenbourg, Baker, Blaye, & O'Malley, 1995). However, a significant number of studies have also shown that collaborative learning in small groups (such as triads or dyads) does not necessarily promote greater learning (Barron, 2003). Thus, not all dialogues promote opportunities for teachers to develop greater noticing skills.

A useful framework for understanding the characteristics of a more productive dialogue is the professional dialogue framework. In this conception, dialogue represents an observable representation of thinking (Mercer, 2004; Warwik et al., 2016). In an ideal situation of a professional dialogue, language is used to make joint sense of an experience and create a new understanding which each individual could not have achieved alone (Chi & Menekse, 2015, Littleton & Mercer, 2013; Warwik et al., 2016). The characteristics of this type of dialogic process is a cumulatively building on each other's ideas, posing questions and constructing interpretations together (Alexander, 2011; Warwik et al., 2016). Key to achieving this aim is the type of questions, statements, or prompts that coaches pose during the conference that promotes teachers' engagement in

the dialogue and support the development of their analytical and planning skills. These include open-ended questions in dialogic exchanges back and forth (Rojas-Drummond, Littleton, Hernandez, & Zúniga, 2010; Vrikki et al., 2017), requesting teachers' opinion or clarifications (Warwik et al., 2016), and questions for deep explanatory reasoning, such as logical-reasoning, causal-reasoning, or goal-oriented questions (Graesser, Person, & Magliano, 1995).

Not only are the type of questions or prompts important to determine if a dialogue promotes learning, but also how each participant contributes to the dialogue matters. This is what Chi and Menekse (2015) denominate engagement activities in a dialogue. Building on the Interactive, Constructive, Active, and Passive modes of engagement (ICAP) framework (Chi, 2009; Chi & Wylie, 2014) their hypothesis is that the utterances by each partner within a dyad can be classified in different types of engagement that reflect the covert cognitive processes they are undertaking (Chi& Menekse, 2015; Chi & Wylie, 2014). These types of activities can be classified, and rank ordered by their benefit to learning, because they correspond to different cognitive processes related to how information is encoded and how knowledge changes as a result of this new encoded information (Chi & Menekse, 2015, p. 254). In a dialogue, a passive engagement is defined to be the case in which a partner listens and utters backchannel responses (e.g."uh hu", "okay", "right"); active engagement in which the partner describes what has been stated or repeats what was stated before, without adding any new idea to the dialogue; and constructive engagement, when a partner elaborates or builds on the other partner's idea (co-constructive engagement) or when builds upon his/her own idea, without considering the other partner's contribution (constructive-constructive). A dialogue that

presents more co-constructive utterances can be described as interactive, which is the

pattern that produces more learning, because it has the potential to create new knowledge

that neither partner could create alone (Chi & Menekse, 2015, p. 263).

Lastly, in order to promote ownership in change in practice, research has

increasingly shows that special attention is needed in evoking and strengthening one's

own verbalization toward change (White & Miller, 2009). This entails not commanding

or giving explicit direction for what to change or improve, but rather evoking one's own

ideas, acknowledging and extending one's own interpretations of their experiences. The

latter is hypothesized to increase personal responsibility as well as motivation for

sustained change (Miller & Rose, 2009). Thus, in order to promote sustained change in

behaviors, seems key that the dialogue between teacher and a coach in the conferences is

characterized by an evoking style of teachers' own ideas toward change rather than by

explicit directions offered by a coach.

**Effective Classroom Interactions (ECI): Reflecting on your own and with a coach**
The Effective Classroom Interactions (ECI) online course was designed to

improve teacher-child interactions. The content was based largely on the Teaching

through Interactions (TTI) framework, the domains of Emotional Support and Classroom

Organization specifically, which relate to engaging in positive communication, being

sensitive to children's needs, having regard for students, managing behavior, and

organizing the classroom (Hamre et al., 2013; Pianta, LaParo. & Hamre, 2008). All

treatment groups had access to the same core coursework, including three modules

consisting of 14 sessions. Each session, was composed of five to eight video-based

lessons and interactive activities, short quizzes, and end- of-session tests. In addition, six

lessons included homework assignments, where teachers were asked to videotape their

teaching practice, identify effective and less effective moments related to the particular dimensions of the TTI framework, reflect on how their teaching practice is influencing their students, how their practice has changed, and describe what they plan to do differently. The rationale of this approach was that increasing teachers' abilities to identify interactions and reflect on their own about their practice would have an impact on their ability to respond to their practice and enact more effective interactions.

In addition to the course material, teachers in the conference condition also had up to five one-on-one telephone conferences with their instructors. Conferences occurred biweekly, following completion of homework (*reflection on their own*) and were specifically designed to enhance teacher engagement and learning ---teachers understanding and knowledge of course material; enhancing teachers' skills in self-assessment and self-awareness of strengths and areas of challenge; and helping the teacher translate knowledge gained in the course sessions to their everyday practices with children. These conferences also allowed instructors to provide individualized feedback to teachers whose homework may demonstrate a lack of understanding about the practices being taught. In a randomized control trial with 89 teachers, those in the conference group made the most advantageous changes to their teaching practices (LoCasale-Crouch, Hamre, & Neesen, 2013).

**The Present Study**

Given the importance of positive early classroom interactions for children's development and learning, more and more professional development programs focus on how to improve these interactions and the skills underlying them. Research on interventions has focused mainly in proven that teachers can improve these classroom interactions with the right opportunities offered, however, less has done to describe how

this process of change occurs. In particular, we need a better understanding of how professional development's specific features support the enhancement of teachers' skills. In other words, what are the mechanisms behind these specific improvements efforts, analysis of practice using videos and coaching, that help to the process of change over time. By doing so, we will provide guidance for the design of future professional development interventions that aim to improve early childhood teachers' skills and their children's experiences in the classroom. The current study focuses on early childhood teachers in the context of the ECI professional development intervention to answer the following aims:

(1) Describe how early childhood teachers developed their noticing skills through autonomous reflective practices and conference dialogues between each teacher and a coach over time in the context of ECI.

(2) Describe the dialogic processes during coach-teacher conferences, over time, in terms of cognitive engagement, professional dialogue characteristics and evoking style toward change

## Methods

**Context**

The data we used to conduct our analysis comes from the effectiveness study of the online teacher professional development program "Effective Classroom Interactions (ECI-PK)" implemented in 2012-13. The ECI-PK course was designed to inform early childhood educators about social-emotional development in children and provide them with reflective techniques in order to implement intentional teaching practices (Hamre et al., 2012). The first module, sessions 1 and 2, was introductory and provided general information about why interactions are important, what would be covered in the course, and the TTI framework (Hamre et al., 2013). The second module, sessions 3-7, focused on children's social-emotional development and how to facilitate children's development through building positive relationships, providing individualized support, supporting children's independence, and using a targeted strategy known as "Banking Time" (Driscoll & Pianta, 2010). The third module, sessions 9-13, focused on children's self-regulatory development and how to support children's development through effectively managing behavior, using time effectively, and engaging children in learning.

The reflective process was intended to enhance their learning about effective classroom interactions through repeated evaluation of their teaching practice. Through this course, teachers were expected to learn about teacher-child interactions, enhance their ability to observe, analyze and respond to their teaching practice, and improve their teacher-child interactions based on the integration of course content, homework assignments, and coaching. Five times during each course teachers received 1-on-1 conferences with their coaches. These conferences follow completion of homework and were specifically designed to enhance teacher engagement and learning (Pianta et al.,

2008). The following table 1. shows a visual representation of the ECI intervention and key data sources for this study.

[Table 1 near here]

**Participants and Sampling Strategy**

As noted previously, teachers in the ECI-PK conference condition were the ones who on average improved their practice the most. Thus, we narrowed the focus of the current research study to examine teachers within this group (n=25). We further narrowed this group to include participants with a high degree of participation, enabling us to explore; and, 2) Participants in this condition completed a series of assignments that helped us to understand their noticing skills and reflective practices. Participants for the current study included 12 pre-kindergarten teachers who participated in the conference condition of the ECI-PK course, finished the course, and completed most of all the assignments. Teachers in this selected group completed, on average, 91% of the assignments (compared to a 35% average completion of the rest of the teachers in the conference condition). Teachers in this group were all female and the lead classroom teacher. The majority of the teachers were White (50%, n=6), followed by Latino teachers (41.7%, n=5). The greatest proportion of caregivers had bachelor's degree (33.3%, n=4), followed by those with some college, but not degree (25%, n=3), High school diploma (16.7%, n=2), Two-year degree (e.g., AA, AS) (16.7%, n=2) and master's degree (8.3%, n=1). Teaching experience ranged from 3 to 26 years, with an average of 12.8% years of experience (*SD*=6.4). Compared to the rest of the teachers in the conference condition, we did not find major differences in the variables above mentioned. However, the teachers not included in the current analysis were ethnically more diverse than the ones included.

The coaching team was composed of 3 coaches with extensive experience in the course content (teacher-child interactions and children's development) and coaching. All of them were female, with post-graduate studies in the area of education and psychology.

Besides conducting the conferences with teachers, the coaches also reviewed and scored teachers' assignments, and participated in the instruction of the course content.

**Materials Available for Reflection Analysis**

**Homework assignments - Written reflections on teachers' practice.** Teachers completed a written homework in conjunction with a filmed lesson at the end of each unit. The written homework was based on the reflection portion of the Intentional Teaching Framework and involved questions about planning, identifying, and reflecting on their interactions with students around the domain covered in the unit. Specifically, the teacher described the more effective and less effective moments selected, and then considered how the teaching in those moments impacted students. Next, the teacher made a plan for what could be done differently in the less effective moment and what changes she hoped to make in regard to each dimension. Finally, the teacher reflected on how engaging in the Intentional Teaching cycle around the particular domain changed her practice and how the changes in practice affected her students. We analyzed two homework assignments: mid-point homework, after they completed reviewing the domain of Emotional Support and the final homework, after reviewing Classroom Organization.

**Transcripts from conference sessions.** Teachers participated in conference sessions with a coach. These sessions were audio recorded, and we used the written transcripts to analyze the characteristics of the dialogues that supported teachers' noticing skills. We analyzed 4 conferences per teacher-instructor dyad, excluding the first conference because it was mostly focused on building a relationship between the coach and the teacher.

**Data Analysis Strategies**

We used conceptual coding (Coffey & Atkinson, 1996) as the major analysis strategy for this study. This strategy encompasses generating concepts from and with the data (Coffey & Atkinson, 1996, p. 26). Specifically, we used two strategies within the coding scheme:

**Open coding.** We looked for themes/concepts that *came from the data*, without imposing concepts driven by the theory. We used this strategy for coding only what teachers' pay attention to in their reflections ("attend" component in noticing skills). Two of the lead researchers read teachers' answers and assigned codes/themes that emerged from the data independently, considering the question, "What do teachers attend to in their written reflections in the homework assignments?" After this first pass, we discussed and compared what we found in the data and organized the codes in different categories within larger themes. Lastly, we re-coded the data independently, using the agreed coding scheme, and found consensus on any remaining discrepant codes. We usually agreed in most of the codes during the second phase of coding.

**Coding driven by theory.** We first developed a coding manual that was *theory driven,* in order to examine the data from a conceptual point of view. The main purpose of this second coding was *making sense* of the data using the concepts that guide our research questions. Two of the lead researchers, and two research assistants coded the data independently, using the coding schemes. All the data were double coded, with subsequent consensus conversations about discrepant findings, aiding the trustworthiness of our findings (Hill, Thompson, & Williams, 1997). Usually the coders were able to reach agreement but, if not, one of the principal researchers made the final decision. All coding was done using Dedoose. We developed two coding schemes:

1) Analysis of teaching practice and response to teaching for homework assignments.

Question 1 of the homework assignment asked teachers about how knowledge and practice in a specific dimension has changed their teaching practice, and in what ways this has impacted children's learning and development. This question prompts teachers to explain how their teaching has an impact on children's behavior, development, and so forth. The codes we used were designed to reflect the "depth" of the analysis about practice and impact on students' learning, following the literature on productive reflection (Davis, 2006; Moore-Russo & Wisley, 2014), teacher expertise (Berliner, 1994, 2001) and noticing (van Es & Sherin, 2015). The specific codes aimed to answer the following questions derived from the literature review: Do teachers describe what changed in their practice? Is there a connection between teaching and learning? Do teachers provide reasons for what they are identifying? Are they evaluating their practice? Five codes were used: i) Description of [teacher] practice (no explanation or link between teaching and learning; ii) Description of children behaviors' (no explanation or link between teaching and learning); iii) Evaluation of practice (with or without reasons/arguments for their appraisal); iv.) Explanation or causal link between teaching and learning (we also noted the sources of the reasons provided); and v) Future planning (or what they would do differently next time, also with a sub code for a causal link between teaching and learning, if present).

Question 2 of the homework assignment prompted teachers to *respond* to their current teaching, to think specifically about what they would do differently in order to

improve their teaching (and the impact on their students). We used codes to reflect the

complexity of their planning skills: i) the specificity of the alternatives for their teaching

practice, ii) the logical connection between teaching and learning in their plans; and iii)

the locus of control for the plan (teachers, students, others.). Table 2. presents definitions

and key words for each code (Appendix A. presents the same table with examples).

[Table 2 near here]

2) Analysis of dialogic processes in conferences between coach and teacher.

In order to investigate how the dialogues in the conferences might have served as

supports for the development of teachers' noticing skills, learning, and application of

knowledge of effective teacher-child interactions, we coded the coaches' and

teachers' cognitive engagement (as defined by Chi & Menekse, 2015) for every turn

in the dialogue, for the four conferences considered in the analysis. Table 3 presents

the description for each code (see Appendix A. for the table with examples)

[Table 3 near here]

We also coded the type of questions, prompts, or statements coaches posed during

conferences in order to characterize the specific supports for teachers' noticing skills,

learning, and application of knowledge of effective teacher-child interactions, and to see

how these were related to the modes of cognitive engagement. This also allowed us to see

when teachers were more prone to convey desire, ability, reason, need, commitment, or

taking steps to change their teaching practice. We coded two of the four conferences (the

first and third conference) illuminate these patterns. We only considered the dialogues that were about the teacher experiences in the classroom or analysis of their practice, excluding the pieces about technology issues the teachers might have had, checking in the completion of the assignments, among others. See table 4 for the codes and their definitions.

[Table 4 near here]

**Thematic analysis.** Throughout the coding process, the master coder created qualitative memos to capture notes on emerging themes; these served to guide later analyses. Considering the most important patterns we observed in the coding analysis and the memos, we analyzed the data holistically for each piece of data, homework and conferences, in order to organize the results and the most important assertions that synthesized the evidence into coherent explanations (Miles, Huberman, & Saldana, 2014.)

## Results

In what follow, we present the results for the study starting with the description of the frequency of occurrence of noticing skills—attention, analysis, and response, in the context of the homework assignment. Then, we describe the frequency of occurrence of the different modes of cognitive engagement and the types of questions/prompts/statements in the context of the conferences between coach and teacher. Finally, we present the thematic analysis organized in assertions that combine the coding analysis and the relationship between the different constructs. We also present excerpts from the homework assignments and conferences that exemplify the main ideas contained in each assertion.

**Noticing Skills in the Context of Reflection on your own and Reflection with a Coach**

To understand how teachers that changed their practice as a result of the intervention developed their noticing skills, we first looked at how teachers responded to the specific prompts of the homework assignment. Prompts asked teachers about how knowledge and practice in a specific domain changed their teaching practice, in what ways this impacted children's learning and development and what they would do differently in order to improve their teaching (and the impact on their students). We specifically considered what themes they attended to, or prioritized, when reflecting on their practice about Emotional Support and Classroom Organization (Moore-Russo & Wilsey, 2014). Table 5 shows how frequent each theme was, of all themes, present in each homework assignment. Teacher, Children, and Other codes represent the big domains, in which each of the codes belong (if teachers were teachers prioritizing teacher-related themes, children, or others). As observed, in both assignments, teacher-related themes occurred the most. A slight shift to children-related themes occurred in the second assignment. For the mid-point homework, about Emotional Support, the major attention was paid on the themes that corresponded to the domain (14.6% for awareness of children's needs, and 17.4% for regard for children's perspectives) and how the assignment generated an increase in self-awareness (12.3%) of teachers' own practice. For the final homework, about Classroom Organization, although some themes from Emotional Support were mentioned, teachers overall paid more attention to the themes that are part of this domain, such as routines (7.1%), proactivity (9.7%), setting expectations for children (8.4%) and children's engagement (9.1%).

[Table 5 near here]

Next, we examined teachers' analysis of the classrooms events, considering the inclusion of reasons for decisions, the logical connection between teaching and learning, evidence for claims, awareness of the results of decisions, and their evaluation (Ball & Cohen, 1999; Davis, 2006; Moore-Russo & Wilsey, 2014; Santagata & Angelici, 2010). Finally, we looked at how teachers responded to their teaching, identified difficulties during instruction, reasoned about them and made decisions about what should be maintained and what should be changed for next time in the classroom (Berliner, 2001; Santagata & Angelici, 2010). Table 6 shows the frequency of analysis codes expressed per assignment and across the two assignments. Specifically, the percentages represent, of all codes, how frequently each code was expressed per assignment and across both. Table 7 shows the frequency of respond codes expressed per assignment. The percentages represent, of all the codes for each category (locus of control, specificity, and connectedness) how frequently each code was expressed per assignment.

Across both assignments, description of teacher practice was the most frequent code (29%), followed by evaluation of practice (22%). However, the patterns per assignment were different. In the case of the mid-point homework (Emotional Support) the most common code was indeed description of teacher practice, however, in the final homework (Classroom Organization), causal link was the most prevalent, with a noticeably decreased prevalence of teacher practice compared to the first assignment. For both assignments, the locus of control was mainly with the teacher (79% for both homework), and two thirds of the action plans were specific. However, it is possible to

see an improvement in the final homework in an explicit connection between teaching and learning in the action plans, compared to the mid-point homework.

[Table 6 near here]

[Table 7 near here]

To better understand the supports from the intervention for teachers' developing of noticing skills, learning, and application of the knowledge of effective teacher-child interactions, we analyzed the conference dialogues between each teacher and her coach. Keep in mind that the principal focus of the conferences was to support teachers in the analysis of teacher-child interactions in the videos and responses to the assignments, specifically the homework assignment. Given this, we first coded coaches' and teachers' cognitive engagement (as defined by Chi & Menekse, 2015) for every turn in the dialogue, for each of the four conferences considered in the analysis. This assumes that dialogues that are more interactive, when partners in the dialogue elaborates or builds on the other partner's idea, would promote more learning and develop of the skills. Table 8 shows the frequency of modes of engagement expressed across the four conferences for coaches and teachers, separately. Specifically, the percentages represent, of all the modes of cognitive engagement, how frequently each of them was per conference and across the four conferences for coaches and for teachers. Overall, teacher-coach dialogues were characterized primarily by active modes of cognitive engagement (69% for both coaches and teachers). However, coaches engaged more in co-constructive modes of engagement (14.8%) compared to teachers (8.5%), whereas teachers engaged more in passive mode of engagement (19.5%) compared to coaches (12.5%). Interestingly, both teachers and

coaches engaged less in passive modes of engagement and more in co-constructive modes over time.

Then, for two of the four conferences (the first and third conference), we coded the type of questions, prompts, or statements coaches posed by the coaches during conferences to look for patterns of support (or not) of the development of teachers' noticing skills, learning, and application of knowledge of effective teacher-child interactions. For this layer of analysis, we only considered the turns of each partner that were thematically about the teacher experiences in the classroom or analysis of their practice, excluding the turns that covered other secondary aspects of the conference, such as helping with technology issues the teachers might have had, checking in the completion of the assignments, among others. Table 9 shows the frequency of each type of question, prompt, or statement for the first and third conference. The percentages represent, of all of the types of questions, statements, or prompts, how frequently each of the type was per conference and on average. As observed, closed-ended question was the most frequent type (26%), followed by coaches reflecting and extending what the teacher was saying (21%), and validating the teacher strengths, behaviors, ideas, or feelings (affirmations, 20.5%). The least frequent type was coaches posing questions for deep reasoning (3.5%), such as "how?" "Why?", "What if?".

[Table 8 near here]

[Table 9 near here]

**Assertions**

After examining coding patterns, reviewing themes and memos, we arrived at five assertions related to teachers' analysis of their own practice and the supports provided by the coaches when reflecting together with the teachers.

Assertion 1. Teachers attend to what they were asked to consider.

Within the mid-point homework (about Emotional Support), teachers' reflections clustered around awareness of self and others, responsive relationships and regard for child perspectives. It appears that course content inspired teachers to more seriously consider children's experience. Teachers began to emphasize children's perspectives, ideas, and opinions by, for example, "giving the children an opportunity to share, speak their voice, their mind" and "be[ing] present in... centers to hear and see how the children want to use the materials or what they are saying related to the theme". Teachers identified Emotional Supports as critical to their teaching practice, but had formerly neglected to fully consider the perspectives of children, a finding reinforced by research related to the CLASS measure, that "teachers are fairly positive in their interactions with students, and examples of teacher or student negativity are relatively rare… However, these interactions between teachers and students appear to be fairly impersonal, with very few instances in which individual students have positive, one-to-one interactions with their teachers (Pianta & Hamre, 2009, pp. 114-115)."

Within the final homework (Classroom Organization), to varying degrees, teachers reflected upon the connection between engaging teaching and using a variety of modalities and materials. For example, one teacher wrote in her plans for the future "I would like to have more thought-provoking centers and would like to have the children do more science activities". As well, they reflected on the relationship between

productivity, for example, the need of more efficient routines and opportunity that being proactive and anticipating behavior problems offer for this. For example, another teacher discussed the importance of having routines in place and the relationship with positive and proactive behavior management when writing about her future plans:

> I plan to have clear expectations for transitions as well as for new activities. I also plan to be consistent with routines. I plan to anticipate problem before they even begin and to redirect them if needed. I also plan to give attention to the positive and not just the negative"

In sum, teachers when asked, focused their attention to the relevant themes of each of the domains of the teacher-child interactions framework they were intended to reflect upon. Although a few teachers wrote about other themes, this was fairly infrequent. It is worth noticing that, often, the teachers utilized different words or terms for the concepts they were learning in the course but maintained the meaning accordingly to each domain.

Assertion 2. Teachers' ability to analyze their own practice improved over time, transitioning from describing their own teaching practice to making connections between their teaching practice and their students' learning.

On average, in the mid-point homework assignment about Emotional Support, teachers focused more on describing their own practice and how it changed, without linking these to their children's behavior or learning. This was expected given the prompt of the homework ("How has knowledge and practice in this dimension changed your teaching practice?"). However, the second piece of the prompt ("and in what ways has this impacted children's learning and development?") was intended to guide teachers to consider teaching and learning together, as more sophisticated analysis skills are

characterized by the presence of cause and effect relationships between teaching decisions and students' learning (Barnhart & van Es, 2015). The presence of this type of analysis (explanatory, causal links) was less prevalent. The following excerpts demonstrate this pattern. The excerpts demonstrate varying specificity in description of teacher practice, as Felicia is more specific in her description than teachers Shanika or Monica. Yet, all still involve only a description of the teachers' practice, without linking it to students' behaviors or learning. While some teachers did present some causal links between teaching and learning in their reflections, this happened infrequently.

> Teacher: "I have slowed down my process in the classroom this year and it feels right"
> Teacher: "I found that I have become more aware of the individual child and how they are feeling"
> Teacher: "I myself have been smiling, showing more emotions than ever before, hugging like never before and I spending so much time on my knees that I need new shoes and pants because I am wearing them out as I crawl and follow the children constantly!"

The second form of analysis frequently employed by teachers' in their homework assignment about Emotional Support was evaluation of practice; however, it was usually an appraisal of their practice (e.g. "I'm doing this better/worse") without providing reasons or evidence for these claims. Therefore, we consider these unsupported analyses as a general judgment, rather than evaluation (Ball & Cohen, 1999; Davis, 2006; Moore-Russo & Wilsey, 2014; Santagata & Angelici, 2010). For example, a teacher wrote, "'By videotaping myself and reviewing my videos I have notice that the little... I am doing is making a big difference," appraising her change in practice as making a 'big difference'

without specifying what has changed and how or why this has improved the classroom environment.

In contrast to mid-point homework about Emotional Support, teachers in the final homework of the intervention about Classroom Organization, on average, did not describe their practice separately from children's experiences. Rather, the most common pattern was a causal link between teacher practice and children's behaviors, followed by the code for description of children's behaviors. This might demonstrate a shift from analysis of practice in isolation to more comprehensive and in-depth analysis, which considers impact on students (Davis, 2006; van Es & Sherin, 2015) or at least focuses more on students than the teacher (Berliner, 2001). The following excerpts illustrate this phenomenon:

> Teacher: "The more I do to be prepared with a variety of activities for the kids helps them thrive, if my expectations are clear, then they know our routines and the transitions will be smoothly and quick"
> Teacher: "A lot of children are sitting down during circle time and when is time for a transition the follow it even they prepared their classmates to follow the routin[e] of the classroom"
> Teacher: "I notice the children were interacting more with me and their peers"

The previous excerpts suggest that when teachers were asked to analyze how the knowledge and practiced gained in the intervention impacted their practice in the domain of Classroom Organization, they were more adept to analyze the impact those changes had in their children's learning and behavior. In this last homework assignment, teachers were more prone to analyze their teaching and their students learning together, as coherent and indivisible unit, which is one of the main characteristics exhibited by expert teachers' reflections (Berliner, 2001; Davis, 2006). This improvement might be due to the

timing in the intervention and the additional opportunities to practice their noticing skills, on their own and with their coach, from the mid-point homework to the final one.

Assertion 3. From the beginning, teachers took ownership over the action plan for a next time in the classroom but improved in the frequency of logical connections between teaching and learning in the plans from one homework to another.

Responding to teaching, or identifying difficulties during instruction, reasoning about them, and making decisions on how to respond (Berliner, 2001) is critical to improvement. Without identifying what should be maintained and what should be changed, teacher reflection is unlikely to have an impact on both teacher practice and student learning (Santagata & Angelici, 2010). In this vein, the intervention prompted teachers to consider future teaching related to each dimension of interest, including Emotional Support and Classroom Organization. Overall, teachers identified themselves as the locus of control for future plans, assuming responsibility rather than placing it on students or other parties. This could be partially explained by the prompt, as it asked teachers to think specifically about their role as educators. Regarding plan specificity, responses ranged from involving highly-specific ideas to some being vague. The following excerpts reflect this variability. The first one is very general and just repeats a concept from the intervention (positive relationships) without specifying how that would present in the classroom. The second excerpt, however, presents very specific activities the teacher plans to implement to improve children's sharing and cooperating with verbal communication.

> Teacher: "My plan for Positive Climate is that we need to develop positive relationships with our student and be enthusiastic about learning, so children can communicate her/his interest to her/his teacher."

> Teacher: "I would really love to see the children stronger in sharing and cooperating with one another. My plan for this is to help them with their verbal communication and give them many opportunities to share/cooperate. Perhaps that may look like giving them partners to play with for the first ten minutes of class. Then switch it up with someone new the following week. or perhaps it will look like me being more blatant with my own words when sharing something with the children. "I would love to give you a turn on the swing...""

In addition, the presence of logical connections between teaching and learning varied in the responses from the mid-point homework to the final homework. In the mid-point homework teachers usually described plans by focusing only on their actions, without mentioning goals for children's behavior or potential student responses. Important to keep in mind is that the prompt did not specifically ask teachers to focus on the impact of their plan on students, however, the presence of this connection characterizes more sophisticated reflection (Moore-Russo & Wilsey, 2014; Santagata & Angelici, 2010), which was the case for the plans of action in the final homework. The excerpts below demonstrate the varying connectedness of the teacher responses from the mid- point homework to the final homework.

> Teacher (mid- point homework): "I am more aware of how my teaching is affecting the children and what they are getting from the instruction".
> Teacher (final-homework): "I am more proactive in the classroom and I am communicating and reinforcing behavioral expectations better, so that the children know what is expected of them".

> Teacher (mid- point homework): "'My teaching is getting stronger in that I am so aware of all the aspects that go into be an effective teacher"
> Teacher (final- homework): "If I prepare efficiently, I will have lessons that maximize the children's engagement and ability to learn. I will have prepared ways in which I can extend a child's learning in any given activity. The students will be engaged and enjoy the classroom experience".

The improvement in the explicit link between teaching and learning of the action plans from the mid-point to the final homework is coherent with the improvement in the sophistication in the analysis of teachers' practice, which was expressed in the presence of more causal links between teaching and learning. As mentioned earlier, this might be due the intervention's focus on the impact that teaching has in children's learning and development, enhancing teachers' self- awareness. The improvement in the analysis of teacher practice, then, might have also been transferred to teachers' ability to respond to their actions.

Assertion 4. Initial teacher-coach dialogues were characterized primarily by active modes of cognitive engagement, closed-ended questions, and affirmations and, over time, became more co-constructive.

As noted in the descriptives presented earlier, teacher-instructor dialogues were characterized primarily by active modes of cognitive engagement, with passive engagement and constructive engagement comprising the remaining third to half of dialogue to varying degrees. In addition, teachers tended to have a more passive role in the conversation, just agreeing with what the instructor had to say (i.e. "OK", right). This means that, in several parts of the conversation, the partner (the coach or the teacher) does not add any new ideas to the dialogue, just repeating what was said before or starting a new theme unrelated to the previous one. This often happened when coaches

and teachers were discussing "housekeeping" issues related to technology or the next activities in the course, or just "checking in", especially at the beginning of the intervention. The next excerpt illustrates this pattern, when teachers and coaches dialoguing around technology and the next assignments of the course:

> Coach: So, have you had a chance—remind me—with QuickTime Pro, do you have that now on your computer?
> Teacher: Yes
> Coach: Okay have you played around with it at all?
> Teacher: A little bit, a little bit. Because we have to edit—is that for the midterm, I'm thinking, that we have to edit?
> Coach: Right, so that's in—well, it's three weeks, really, but it's two sessions—
> Teacher: Yeah
> Coach: We give you two weeks for Session 6 because we have that editing thing going on which is obviously more work for people.
> Teacher: Yeah

These aspects are necessary and relevant in the building of the relationship between teacher, coach, and the intervention, however, it is important to keep in mind that the principal function of the conferences was to support teacher in the analysis of their practices and application of knowledge. However, even when teachers and coaches were exclusively discussing the experiences in the classroom and reflection on teacher practice, when engaged in an active mode of engagement, coaches were typically posing-closed ended questions or affirmations, and to a lesser degree, open-ended questions. Some of the closed-ended questions were posed to "gather" more information about the classroom or what the teacher was saying, which is necessary in many cases to understand the context of the teachers' classroom, as in the example below.

Coach: So, it is very interesting. So, it seems like the kids are wan—they don't want attention per se; they want C's attention. So what do you think is going on in your classroom that makes it so, that it's just they want to be with you, and not with maybe someone else?

Teacher: And the other ones are pretty, I mean, the other two are pretty good um, teachers. I just don't understand what could— (teacher laughs)

Coach: mmhmm So maybe there's something, well I can't say anything because I haven't seen your class, of course (yea) but there's something—maybe there's something there, and going back to the idea of positive climate, maybe there's something there that could be done to enhance and improve those relationships. Maybe, doesn't sound like you nee—you have that hard time with the relationships, but maybe we we—are they co-teachers or assistant teachers or are they the parents?

Teacher: Assistant, assistant

Overall, coaches engaged more in co-constructive modes of engagement compared to teachers, building on teachers' ideas when they were describing or analyzing their experiences in the classroom, what they answered in the homework assignment, etc. When engaged in this mode, coaches were usually reflecting on and extending what the teacher just said about their practice or situation in the classroom. Interestingly, for both teachers and instructors, the presence of co-constructive modes of engagement was higher in the last conferences. In this sense, the teachers were also constructing their reflection on practice along with what the teacher had to say. As suggested by the theory, when both partners in a dialogue are engaged in higher levels of cognitive engagement, as constructive, the learning is greater for both participants. The next excerpts illustrate the shift between a dyad, from a less co-constructive mode of engagement, where the instructor has major active role, to a more joint construction of meaning between coaches and teachers.

Conference 4

Coach: So, already, you have covered Positive Climate in Session 4 and then you also were just working on Teacher Sensitivity in Session 5, which, it looks like you finished as well. Um, and so I'm curious, just already with those two Dimensions that you've learned about, which one seems easier to you and which one seems more challenging?

Teacher: Um, I think the like—I got confused. Like it was—

Coach: Okay

Teacher: One of the questions, I got confused because it was talking about—one of the answers was either Positive Climate or Sensitivity.

Coach: Mm hmm

Teacher: And I thought that it was going to be Positive and then the right answer was Sensitivity.

I: Okay, so they're a little bit confusing—they're a little similar—

T: But I mean, I thought that I understood what it was, like Positive Climate and Sensitivity, but I guess I got confused.

I: Okay, well, you know what? And that's actually very common. That's not just you (chuckles). Um—

Teacher: Oh, okay! (chuckles)

Coach: So the real way to think about how they are different is that positive climate is really just about the—think of it like the connections, their relationships. So that's, you know, basically, do you have fun and do the kids have fun and do you guys seem to like each other? And simply stated, it's how connected are you, just, on an emotional level, in terms of enjoying the children and them enjoying you and enjoying the classroom environment. So that's the one where we look for laughter, smiling, that you seem to know about their lives, just this warmth. Warmth and connection. And then Sensitivity—they're both still related to emotional quality in the classroom, but Teacher Sensitivity is really looking at how—sorry, there's a very loud helicopter flying over my office—um, Teacher Sensitivity is looking at how well teachers know and respond the cues that the children give them and that's both academically and emotionally or socially.

Teacher: Oh, okay!

Conference 12

Coach: (…) So, have you continued banking time as well?

Teacher: Yes.

Coach: and is that still going so well?

Coach: Yes, and also, I have been trying to do banking time when I'm not busy. And I see that it's working. You can see that she's changing, she's not use to the big environment. During the day, she doesn't like to interrupt with the other children. She likes to be by herself, but in the afternoon when we have only four or five she goes and plays with them. So, I know it's the environment…

Coach: So, you were saying that you've been working well with another girl, and that she's more comfortable with small groups of kids basically?

Teacher: Yeah, yeah because in the morning she doesn't talk to them, she doesn't interact with the other children, she's just like, reading books, but um, and then she's just playing, or I mean, I'm sure you know, and that's just like how she talks.

Coach: Right, so that's the only time that she's really interacting with the other ones. Huh.

Teacher: Yeah, so there are things like, I've sat down with her and I've noticed that more of it is happening at her house it's just like, she's always asking me, "oh teacher, are you going to help me, do you like me?" I'm like, "yes, I like you", "Do you love me?" "Yes, I love you." I mean, she, she likes to hear that, we're always saying that to her.

Coach: Interesting. Oh that's, I'm glad, she sounds like a perfect child to be working with, it sounds like she definitely can use the extra attention and support. Have you noticed any change with her with the kids yet? Or maybe it's too early.

Teacher: Yeah, like today for example, she was able to pick, *cuz* normally with circle time, one of the other teachers is just reading a book to her because she doesn't, I mean she starts covering her ears, like while we're having the circle time, she doesn't like to be there with all of the children.  But today she sat down, and she was just listening to the book of the day with everybody and like we were all sitting down, and she was sitting down too. I was like oh, I mean I even took a picture of her.

Coach: Yeah, because it was so different.

Teacher: And then the first time that she did that, I was like to the teachers, did you notice that, that she came by herself and sat down for circle time.

> Coach: Yeah, oh good. So maybe, it sounds like she, now that she's feeling closer to you, that's helping her feel more safe over all, that it's probably something about the large groups that's overwhelming to her, that feels maybe a little bit scary or uncomfortable and the security that you're giving her through banking time is carrying over and allowing her to feel more secure in other parts of the day.
>
> Teacher: No, yes, it's helping, I mean it's helping her to, and it's helping me too so I can get to know her too, I mean I didn't know that, I knew that in the morning she doesn't get along with the other children, and that after the banking time, the social time that not every single day with her, twice a week, she's liking it and is more outgoing and everything and it's only because we have a little bit, I mean we have all of the other kids. I mean, it's working.

In sum, dialogues between coaches and teachers in the conferences were characterized by the active mode of engagement. or when partners in the conversation just describe what had been stated before without adding new ideas to the dialogue (Chi & Meneseke, 2015). This it is related to the number of closed-ended questions posed by the coaches or the "themes" of the dialogue, such house-keeping issues or technology challenges, which don't allow for more co-constructive patterns of dialogues. Although closed-ended questions are necessary to gather more information for better understanding, as well as it is to talk about housekeeping issues related to the intervention, more co-constructive patterns that are related to reflection and extension on what the partner in the dialogue says, is desirable to increase the learning (Chi & Meneseke, 2015) and the behavioral change (Miller & Rose, 2009). Patterns of co-constructive modes of engagement were more frequent in the last conferences, compared to the first two, both for coaches and teachers. This might have been due to "housekeeping issues" being less frequent at that point of the intervention, thus, the focus on practice was greater. As well, another possible explanation is that both coaches and

especially teachers, were more comfortable with the analysis of practice, given the several opportunities to "practice" these modes of thinking (Mercer, 2004; Warwik et al., 2016) in homework assignments and previous conferences.

Assertion 5. Teacher change talk happens usually after affirmations, and enablement questions (deep reasoning question).

Exclusively for the two conferences in which we analyzed the types of prompts, questions, or statements posed by the coach, and also when teachers conveyed desired, ability, or specific steps for change; we observed two patterns: first, teachers usually "talk about change" after the coach explicitly valued what the teachers were doing in the classroom, their strengths, or their effort, and, second, when coaches posed an enablement question, specifically a "how" question about what state or resources allow the teacher to perform an action or an event to occur. The next excerpts illustrate both patterns. In the first, the coach is *affirming* how good it is that the teacher is already noticing new behaviors in her tape considering how hard it is to develop self-awareness with everything that teachers have to deal with in the classroom. The teacher, after these statements, talks about how reflecting about her practice on video had help her to think about what she needs to change the next day. In the second excerpt, the coach asks the teacher to think about what/how they (lead and assistant teachers) could do to make something happen. This is a deep reasoning question that is repeated a second time by the coach, resulting in the teacher talking about specific changes she could make in order to improve the relationship with specific children.

> Coach: And I don't know that everyone—I mean, certainly, there are moments
> where teachers are able to sort of be reflective even during the day, but often we hear
> that's one of the hardest things for them to do and that it is, um, it's rather eye-

opening to watch the tape back because they didn't—they missed certain moments. But, um, and I think you're probably seeing some new things on the tape, but the fact that you're aware in those moments is a really good thing for you. It's going to help you be able to sort of correct, and also, more than correct—be aware of what's working, when it's working, so that you can do more of that.

Teacher: Right

Coach: And that's a—I think that's a real hard thing for teachers to develop and it's great if you're already feeling that awareness in the moment.

Teacher: Yeah, because like when circle time is over and stuff, I can—I can feel like, "Wow, that went really, really well!" or "That went really bad. I need to, you know, do something different than that the next day." But it seems like they're really— they're enjoying it.

Coach: what did you think, again, I think this is an exercise of brainstorming, what did you think you guys could do to have that happen? To kind of go back to what you learned about positive climate and, what do you think you could do to improve their relationships, their relationships, yes?

Teacher: So that they're not hiding—they're not calling just for me? (teacher laughs)

C: Exactly, so that it's—

Teacher: I think—I think they need—I think instead of calling me all the time for help, they know how, they're trained to deal with the situation. But I think, because, they're afraid that they're gonna get in trouble for the way they're talking to the kids. I don't know. I still need to know—we're still getting to know each other, us three, even though we've been working together for almost a month now. So I think, they're just scared that what I'm gonna say or, they're gonna get in trouble. I—I'm guessing that's what it is.

Coach: So, if you think that's what it is, what do you think you guys could do to kind of make them

Teacher: I mean I could sit down with them and—I could sit down with them during the kids nap time and then just ask them what they feel comfortable with or am I scar—am I intimidating them (teacher laughs).

As illustrated by the excerpts, teachers' verbalization toward change happens when a coach evokes and strengthens the desire to change (White & Miller, 2007) not when they provide direction about how to change. Through affirming teachers' strengths, coaches might be increasing their motivation and confidence, and might also be helping teachers think about what they are already doing well in their practice and can use in more challenging situations. When coaches pose more sophisticated questions for deep reasoning (Graesser, Person, & Magliano, 1995), they scaffold teachers' thinking about a situation (Mercer, 2004; Warwik et al., 2016), which might result in teachers coming up with their own solutions. Both strategies are aligned with more co-constructive patterns of learning through verbal communication in a dialogue (Chi & Menekse, 2015, Littleton & Mercer, 2013, Warwik et al., 2016).

## Discussion

The purpose of this study was to describe the process of *how* ECI participants who changed their teaching practice acquired noticing skills in the context of this intervention. We qualitatively described participating teachers' noticing skills as they developed through autonomous reflective practices and conference dialogues between each teacher and her coach. Overall, we observed that teachers focused their attention to the relevant themes of each of the domains of the teacher-child interactions framework, enhanced their ability to analyze their own teacher practice in more sophisticated ways over time, and paid more attention to the relationship between teaching and children's learning when asked to reflect autonomously. And, a pattern emerged in examining the conferences with coaches, noting that specific dialogue helped deepen teachers' skills,

which might have had an impact in their enactment of their practices. These points will be further elaborated on below.

**What you Draw Attention to Matters for Teachers' Skills Enhancement**

Noticing skills, given their relationship with enacted teaching practice (Hamre et al., 2012; Jamil, Sabol, Hamre, & Pianta, 2015; Kersting et al., 2010; van Es & Sherin, 2002) has been subject of improvement efforts. The ECI intervention took a targeted approach, following the recommendations from the literature that video-based noticing interventions might help teachers when using a series of targeted scaffolds (Kaiser, Busse, Hoth, Konig, & Blomeke, 2015; Santagata & Angelici, 2010; Stockero, Rupnow, & Pascoe, 2017). The reflection homework included specific prompts to draw teachers' attention to the relevant themes of the domains of the teacher-child interactions framework, how their teaching practice was impacted by the knowledge gained in the course, and most importantly how the eventual change in their own practice impacted children's learning. Teachers in the course focused their attention reflecting on themes they were intended to reflect upon. And, when asked to respond to their teaching (Santagata & Angelici, 2010) or planning for next time related to a specific dimension of the teacher-child interactions framework, teachers took ownership for the future plans rather than placing the responsibility on students or other parties. This could be partially explained by the prompts, as it asked teachers to think specifically about their role as educator in the classroom, as well as focus their attention in specific aspects of teaching. Thus, our results add to the research showing that the specificity of the prompt help focus a teacher's reflection on particular content (Kaiser, Busse, Hoth, Konig, & Blomeke, 2015; Santagata & Angelici, 2011; Stockero, Rupnow, & Pascoe, 2017).

**Analytical Skills can Change Over Time in the Context of Deliberate Reflective Practice**

Another key finding is that, over time, teachers improved their analytical skills and were more prone to establish causal links between their teaching behaviors and students' learning, as well as provide reasons and evidence for their claims, evaluating rather than just judging (Berliner, 2011; Ball & Cohen, 1999; Davis, 2006; Moore-Russo & Wilsey, 2014; Santagata & Angelici, 2010). These are characteristics exhibited by expert teachers' reflection (Berliner, 2001; Davis, 2006) which are result of deliberate opportunities to practice these skills as the research in expertise as demonstrate in different fields (Ericcson, 2006). The ECI course provided several of these opportunities for teachers to practice on their own (reflection homework) and with a partner (coach), which can begin to explain the analytical skills improvement. In addition, an explanation may be that it is easier for teachers to draw causal links between their organizational strategies and children's outcomes than with their emotional interactions. Early Childhood teachers are usually interested in having a classroom environment characterized by good behavior and little disruption, which enables them to implement the rest of the routines. Thus, the impact of these organizational aspects in children's behavior might has been perceived more tangible and clearer than the emotional ones. Nevertheless, the opportunities to practice these skills using different formats might have been key for the improvement in teachers' skills and enhanced self-awareness.

**Dialogues Between Coaches and Teachers Provide Opportunities for Teachers'**

**Enhancement of Their Thinking and Reasoning**

Lastly, as noted earlier, teachers in our study had the opportunity to reflect with a

coach in an individualized space. The *dialogue* between the teacher and coach was

hypothesized as being a key mechanism for teachers' enhancement of their critical

thinking and reasoning (Vrikki et al., 2017) if this exchange was characterized by being

productive and cognitively engaging (Chi & Menekse, 2015; Littleton & Mercer, 2013;

Warwik et al., 2016). Our results show that the dialogues between coaches and teachers

were characterized by the active mode of engagement, or when partners in the

conversation just describe what has been stated before without adding new ideas to the

dialogue (Chi & Meneseke, 2015), and by teachers having a more passive role in the

conversation compared to coaches. Thus, as suggested by the theory, there is room for

improvement of this space between coaches and teachers to fully take advantage of the

collaborative learning that this opportunity offers. Interestingly, both coaches and

teachers engaged in more cumulative exchanges, building on each other's ideas and

constructing meaning together (Alexander, 2011; Chi & Menekse, 2015, Littleton &

Mercer, 2013, Warwik et al., 2016) in the lasts two conferences. This enabled a space for

teachers to reflect more in depth about their own practice and verbalize their desire and

specific steps for change (White & Miller, 2007). This improvement in how interactive

the dialogue was between the two partners (Chi & Menekse, 2015) might have been due a

major thematic focus on practice, and less in "housekeeping issues" to resolve at that

point of the intervention. Additionally, the several opportunities to practice the noticing

skills throughout the intervention must have been key for these change in the dialogue

patterns, which are also aligned with the improvement in teachers' analytical skills when reflecting on their own.

**Limitations**

Several limitations of this study should be considered. First, it is not our aim to establish causation between teachers' noticing skills and the quality of teacher-child interactions, but rather to describe how teachers that changed their practice developed these skills using the supports of the intervention, and to consider the relationship between noticing skills, the ECI intervention, and teacher-child interactions. Second, as mentioned earlier, the teachers in this study were highly engaged in the intervention, completing most of the assignments that were part of the course. Thus, it is important to consider that the results presented in this study may not be applicable for teachers less engaged with an intervention. Moreover, we did not intend in this work to disentangle these different constructs, acknowledging that they might be confounded in the autonomous reflection and reflection with a coach. Third, because we did not analyze teachers' reflections in the other intervention conditions (reflective practice, course-only), we cannot answer with certainty how coaching facilitated the development of noticing skills compared to the teachers that did not have this support. Future research should address this comparison to understand better the valued added of coaching. Lastly, written reflections (reflective homework) may not be an accurate indicator of their noticing skills, given that their writing skills might be playing an important role. In order to address this, we also analyzed teachers' transcripts of the *dialogues* of the conferences between coach and teacher. However, we also acknowledge that both formats are not comparable because of the scaffolds and guidance provided by a coach in the

conferences. This is to say that the format of reflection might be an important factor to consider in future research.

## Conclusions

Despite these limitations, the findings show that supports provided by the intervention for teachers to practice their noticing skills were key for teachers' development of those skills. Opportunities for teachers to reflect on their own with specific scaffolds (questions and prompts) drew attention to teachers to the relevant themes in the context of the intervention, enable them to practice their analytic skills, as well as their ability to respond to their teaching, connecting in specific ways teacher practice and its impact in children's learning and development. The opportunities for teachers to reflect with a coach showed the key importance of the type of exchanges between coaches and teacher in the conferences.

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Table 1. ECI intervention time points and key data sources used in the present study

| Time in the intervention/Data Source | Conference (session 4) | Mid-Point Homework | Conference 2 (session 6) | Conference 3 (session 10) | Final Homework | Conference 4 (session 12) |
|---|---|---|---|---|---|---|
| Topic | Review of Positive Climate and Teacher Sensitivity Climate Banking time | Emotional Support | Review of Mid-Point Homework Follow up Banking time | Review of Behavior Management, Productivity | Classroom Organization | Review of Final Homework Wrap-Up intervention |

Table 2. Codes and definitions for the Analysis of teaching practice and response to teaching for homework assignments

| Code | Key words |
|---|---|
| Analyze | |
| Description of teacher practice (no explanation or link between teaching and learning | I'm doing more of this… I'm working on… I use more of… |
| Description of children's behaviors (no explanation or link between teaching and learning) | My children are doing this… My children are better at this… My children are more… |
| Evaluation of practice What needs to be changed or what has changed, but does not provide reasons for why What needs to be changed or what has changed, presenting reasons for why | I realized that I'm not doing… I should do more of… I've missed that opportunity I haven't been doing X, for next time I should try to... |
| Causal link Identify all or a subset of the causes of the impact in children | Because So Therefore Utterances formulated in the form of: When I do X, Y happens. |
| Future Planning Identify what they would do differently next time | I will do next time I want to focus on, that will make that. |
| Respond | |
| Specificity of ideas for the next time Specific Not Specific | how specific are the actions planned for a next time in the classroom? |

| Logical connection between teaching and learning<br>Connection<br>No connection | Explicit mention of how what I would do next time has an impact on children's learning |
|---|---|
| Locus of control | Who/what is responsible for the plan or outcome of the plan:<br>Teacher<br>Student<br>Other (e.g. staff, school administration, etc.) |

Table 3. Codes and definitions for modes of cognitive engagement

| Codes for modes of cognitive engagement | Definition |
|---|---|
| Passive | Being oriented toward and receiving information. When one of the partners only utters backchannel responses (e.g., "mmm", "uh-huh", etc.) or just agrees with a previous statement from the partner. |
| Active | The partner describes what has been stated or repeats what was stated by the other partner, without producing any additional idea/question/comment, etc. from what it's been already stated. Or just starts a new topic. |
| Constructive | |
| Co-constructive | when one partner elaborates on what his or her partner said |
| Constructive-constructive | when one partner elaborates on what he or she said previously |
| Interactive | When the dialogue is characterized by constructive modes of engagement |

Table 4. Codes and definitions for the type of questions/prompts/statements posed by a coach

| Type of questions/prompts/statements posed by a coach | Definition |
|---|---|
| Questions for deep reasoning (Graesser & Person, 1994) | Antecedent questions (why? How?) What caused a state or event? What logically explains or justifies a proposition? Consequence questions: (what if, what next?) What are the causal consequences of a state or event? What are the logical consequences of a proposition? Goal orientation (why) What are the goals or motives behind an agent's actions? Enablement (why? How?) What object, state, or resource, allows an agent to perform an action? What object, state, or resource, allows an agent to perform an action? Instrumental-procedural (how): what instrument or plan allows an agent to accomplish a goal? Expectational (why not?) Why did an expected state or event not occur? |
| Question for more information (prompting) (Alexander, 2011; Warwik et al., 2016). | Open-ended questions that elicit teachers to talk more about something or explain |
| Closed-ended questions | Closed-ended questions that are posed for gather specific information (facts); confirm understanding, among others. |

| Affirmations (Miller & Rose, 2009) | Statements that validates the teacher strengths, behaviors, ideas, or feeling (includes appreciation for teacher efforts) |
|---|---|
| Reflections: Re-phrasing and elaborating/extension (Miller & Rose, 2009; Alexander, 2011; Warwik et al., 2016). | Statements that re-phrased what the teachers just said, elaborating and extending the meaning based on the previous utterance of the partner. |
| Didactic explanations (Chi, 1996) | Mini-lectures about a topic; includes giving suggestions, commands regarding teacher practice. |
| Teachers' verbalization toward change (White & Miller, 2007) | Teachers verbalizations that convey desire, ability, reason, need, commitment, or taking steps to change their teaching practice |

Table 5. Frequency of each theme was (of all themes) present in each homework assignment.

| Codes | EMOTIONAL SUPPORT | | C. ORGANIZATION | |
|---|---|---|---|---|
| | N | % | N | % |
| Children (total) | 36 | 17.0 | 25 | 16 |
| Behavior/Self-regulation | 9 | 4.2 | 8 | 5.2 |
| Child Initiation | 6 | 2.8 | - | - |
| Communication, expression of needs and/or emotions | 11 | 5.2 | - | - |
| Relationships with peers | 10 | 4.7 | 3 | 1.9 |
| Children's engagement | - | - | 14 | 9.1 |
| Teacher (total) | 156 | 73.6 | 125 | 81.2 |
| Awareness | 31 | 14.6 | 1 | 0.6 |
| Flexibility/ Regard for Children's Perspective | 37 | 17.4 | 2 | 1.3 |
| Intervention as support | 9 | 4.2 | 9 | 5.8 |
| Positive relationships witch children | 21 | 9.9 | - | - |
| Responsiveness | 19 | 9.0 | 3 | 1.9 |
| Self-awareness | 26 | 12.3 | 10 | 6.5 |
| Set expectations for children | 7 | 3.3 | 13 | 8.4 |
| Teacher preparation | 6 | 2.8 | 12 | 7.8 |
| Engage with children - behavioral | - | - | 9 | 5.8 |
| Engage with children- cognitive | - | - | 10 | 6.5 |
| Proactivity | - | - | 15 | 9.7 |
| Productivity | - | - | 10 | 6.5 |
| Redirection of misbehavior | - | - | 6 | 3.9 |
| Routines | - | - | 11 | 7.1 |
| Set learning objectives | - | - | 3 | 1.9 |
| Variety of teaching modalities/materials | - | - | 11 | 7.1 |
| Others (total) | 20 | 9.4 | 4 | 2.6 |
| Classroom environment | 9 | 4.2 | 1 | 0.6 |
| Team work/colleagues | 11 | 5.2 | 3 | 1.9 |

Table 6. Frequency of "analysis" codes for mid-point homework and final homework

| Analysis Codes | Mid-point- Emotional Support | | Final- Classroom Organization | |
|---|---|---|---|---|
| | N | % | N | % |

| | | | | |
|---|---|---|---|---|
| **Description children's behaviors** | 6 | 14% | 7 | 20% |
| **Description Teacher Practice** | 18 | 42% | 5 | 14% |
| **Causal link** | 6 | 14% | 11 | 31% |
| **Evaluation of practice** | 11 | 26% | 9 | 26% |
| **Future planning** | 2 | 5% | 3 | 9% |
| **Total** | 43 | 100% | 35 | 100% |

Table 7. Frequency of "respond" codes for mid-point and final homework

| Codes | Mid-Point – Emotional Support | | Final- Classroom Organization | |
|---|---|---|---|---|
| | N | % | N | % |
| Locus of control | | | | |
| Teacher | 42 | 79.2 | 34 | 79.1 |
| Student | 6 | 11.3 | 5 | 11.6 |
| Other | 5 | 9.4 | 4 | 9.3 |
| Total | 53 | 100% | 43 | 100% |
| Specificity | | | | |
| Specific | 32 | 66.7 | 24 | 70.6 |
| Less specific | 13 | 27.1 | 10 | 29.4 |
| Total | 45 | 100% | 34 | 100% |
| Connection between teaching and learning | | | | |
| Logical Connection | 30 | 55.6 | 27 | 75 |
| No Logical Connection | 24 | 44.4 | 9 | 25 |
| Total | 54 | 100% | 36 | 100% |

Table 8. Frequency of coaches' and teachers' engagement mode per conference and total

| | First Conference | Second Conference | Third Conference | Fourth Conference | Total |
|---|---|---|---|---|---|
| Coach | | | | | |
| Active | 65% | 68% | 70% | 73% | 69.0% |
| Co-Constructive | 11% | 15% | 17% | 16% | 14.8% |
| Constructive-Constructive | 3% | 4% | 4% | 5% | 4.0% |
| Passive | 21% | 13% | 10% | 6% | 12.5% |
| Teacher | | | | | |
| Active | 62% | 75% | 68% | 72% | 69.3% |

| | | | | | |
|---|---|---|---|---|---|
| Co-Constructive | 6% | 7% | 9% | 12% | 8.5% |
| Constructive-Constructive | 1% | 2% | 2% | 2% | 1.8% |
| Passive | 31% | 16% | 17% | 14% | 19.5% |

Table 9.  Frequency of coaches' types of question, statements, or prompts in first conference and third conference

| Code | First Conference | Third Conference | Total |
|---|---|---|---|
| Affirmation | 22% | 19% | 20.5% |
| Closed-ended question | 25% | 27% | 26% |
| Didactic intervention | 10% | 16% | 13% |
| Prompt (open-ended) | 18% | 15% | 16.5% |
| Question for deep reasoning | 5% | 2% | 3.5% |
| Reflection/extension | 21% | 21% | 21% |

Appendix

Table 1. Codes, definitions, and examples for the analysis of teaching practice and response to teaching for homework assignments

| Code | Key words | Examples |
| --- | --- | --- |
| **Analyze** | | |
| **Description** of teacher practice (*no explanation or link between teaching and learning* | I'm doing more of this… I'm working on… I use more of… | I am working on using cues to help the children self-correct themselves instead of calling on them |
| **Description** of children's behaviors (*no explanation or link between teaching and learning)* | My children are doing this… My children are better at this… My children are more… | I think the children are doing much better at staying on task, attending at story time, listening and being thoughtful of others |
| **Evaluation** of practice What needs to be changed or what has changed, but does not provide *reasons* for why What needs to be changed or what has changed, presenting *reasons* for why | I realized that I'm not doing… I should do more of… I've missed that opportunity I haven't been doing X, for next time I should try to... | I felt that this is one of the worst teachings I have done.  I'm trying to have learning opportunities that I can build into our transitions, but I still need to work on transitions after free-play, when preparing for lunch and at the end of the day circle |
| **Causal** link Identify all or a subset of the causes of the impact in children | Because So Therefore Utterances formulated in the form of: When I do X, Y happens. | As a result of me being disengaged, the children were also disengaged and disinterested. When I am more prepared and let the children know what I expect, they seem to be listening and learning. |
| Future **Planning Identify what they would do differently next time** | I will do next time I want to focus on, that will make that. | I plan to tell the children why we are reading a specific story and also give them a purpose for listening.  After reading the story, I will focus on wrapping up the story and talking about why we read the story and what we found out. |
| **Respond** | | |
| **Specificity** of ideas for the next time - Specific - Not Specific | how specific are the actions planned for a next time in the classroom? | **Specific:** I am trying to make an effort to have better eye contact and get down on the same level as the children. I am 5'10" and can be like a giant to my little friends.  They love it when I crouch down, hold their hands and look them in the eye when they have something to say. **Not specific:** My plan for Positive Climate in my classroom is to keep doing what I am doing but have more support from the other staff in the room. I feel I do have a very good positive climate in my classroom most of the time. |

| Logical connection between teaching and learning<br>- Connection<br>- No connection | Explicit mention of **how what I would do next time has an impact on children's learning** | **Connection:** I'd like to build my relationship with Fernando, such that by keeping him busy with meaningful play and learning, he'd have less reason to behave inappropriately such as failing to keep gentle hands and feet to himself.<br>**No connection:** Trying to keep as much positive interaction and climate in my teaching and spending more time with my children in class. |
|---|---|---|
| **Locus of control** | **Who/what is responsible for the plan or outcome of the plan:**<br>- Teacher<br>- Student<br>- Other (e.g. staff, school administration, etc.) | **Teacher:** I plan to consistently reinforce clear expectations. I will be better about anticipating problem behaviors. I will give more attention to positive choices<br>**Student:** The children are also not as attentive, when they have to wait. Be more deliberate about handwashing when they enter the room. This is a routine, that some children ignore, but that is required<br>**Other:** My assistant and the other people that come in to help are constantly reviewing our behavior management plans and goals, specifically for one boy, but it includes everyone. |

Table 3. Codes, definitions and examples for modes of cognitive engagement

| Codes for cognitive engagement | Description | Examples |
|---|---|---|
| Passive | *being oriented toward* and *receiving* information<br>**when one of the partners only utters backchannel responses** (e.g., "mmm", "uh-huh", etc.) or **just agrees** with a previous statement from the partner. | C: Well that's a beginning. Even if you tried and it was just the two of you, it was still an interaction and it still needs to be built on.<br>T: Right **(Passive)** |
| Active | The partner describes what has been stated or repeats what was stated by the other partner, **without producing any additional ide**a/question/comment, etc. from what it's been already stated. Or just starts a new topic. | T: We have a boy that he hardly talks to me, that he is actually playing the game, he's making comments, he made me a tag, and he wishes me happy birthday, so we are like bonding with each other and then sometimes he comes in and whatever we are playing and then he asks, "can he play"? **(Active)**<br>C: Oh, that's wonderful. That's great. So, tell me about how positive climate is going? **(Active)** |
| Constructive | Characteristic descriptor of the *constructive* mode is *generative*. Generative behaviors should **contain new ideas that go beyond the information given** | |
| Co-constructive | when one partner **elaborates on what his or her partner said** | C: But kind of to go back to what you were saying about the difficulties of you seeing |

| | | |
|---|---|---|
| | | Regard – having Regard when you're working with your, some of your children because if you – kind of what I got from all of this was "if I let them do whatever they want they're going to just…" (**co-constructive**)<br>T: Right. And I tried to find things that they like to do because they need to have some kind of teachable moment with them, but at this point, especially with one of them, I'm having to really take him away of what he's doing and then letting him have what he wants as a reward. I think he has autism and he's just, he's not going to come out of that unless I force him out. It's kind of an unfortunate thing with those children that they would stand there all day. You let them. It's kind of a comforting thing for them. I am letting him do that, but it's not - he's got to do – (**co-constructive**) |
| Constructive-constructive | when one partner **elaborates on what he or she said previously** | C: yea I know that was great that he just given your behaviors and studying up that's small group and sharing the activity together and being close to one and another. Hmm, was able to open up this you know the start of this relationship between you and is that Marcos? Is that him?<br>T: yes.<br>C: yes. And so, again, the way you explain it the way you wrote your responses you really did a nice job, using what you learnt about positive climate and describing what you saw in the video. Hmm, you know about making children feel comfortable and talking to one another using each other's names and sharing and the cooperation. You really did a nice job of taking what you've learnt about positive climate and then watching yourself and writing about it that way. (constructive – constructive) |
| Interactive | When the dialogue is characterized by constructive modes of engagement | |

Table 4. Codes, definitions, and examples for the type of questions/prompts/statements posed by a coach

| Type of question/prompt/statement posed by a coach | Definition | Example |
|---|---|---|
| Questions for deep reasoning (Graesser & Person, 1994) | Antecedent questions (why? How?) What caused a state or event? What logically explains or justifies a proposition? Consequence questions: (what if, what next?) What are the causal consequences of a state or event? What are the logical consequences of a proposition Goal orientation (why) What are the goals or motives behind an agent's actions? Enablement (why? How?) What object, state, or resource, allows an agent to perform an action? What object, state, or resource, allows an agent to perform an action? Instrumental-procedural (how): what instrument or plan allows an agent to accomplish a goal? Expectational (why not?) Why did an expected state or event not occur? | So, why do you find it interesting? So, your goal is that your kids follow the instructions of your assistant teachers, is that it? |
| Question for more information (prompting) (Alexander, 2011; Warwik et al., 2016). | Open-ended questions that elicit teachers to talk more about something or explain | Tell me more about this Well what do you mean by saying it was easy? Tell me a bit more about what happened there" How do you think that's going on in your class at the time? |
| Closed- ended questions | Closed-ended questions that are posed for gather specific information (facts); confirm understanding, among others. | Have you been able to do banking time with him often? How many kids are in your classroom? Is she working with you now? |
| Affirmations (Miller & Rose, 2009) | Statements that validates the teacher strengths, behaviors, ideas, or feeling (includes | That's good and I have to tell you when I saw your response that you're speaking to them like you're having a conversation with friends, I did not attach your name to it, but I sent your comment to some of the |

| | appreciation for teacher efforts) | other people on our team. Because honestly, that's perfect. It's a huge goal for us for this project. And to hear that you're recognizing this shift in yourself and being able to connect with kids in a more personally way. That's just you're giving a gift to these students this year, V. And it's important that you recognize that they must probably really notice that change too and appreciate it too. |
|---|---|---|
| Reflections: Re-phrasing and elaborating/extension (Miller & Rose, 2009; Alexander, 2011; Warwik et al., 2016). | Statements that re-phrased what the teachers just said, elaborating and extending the meaning based on the previous utterance of the partner. | Okay, let's go step by step. Some of your children aren't following the instructions of some of your assistant teachers. So, it's an initial behavior management that we're talking about. |
| Didactic explanations (Chi, 1996) | Mini-lectures about a topic; includes giving suggestions, commands regarding teacher practice. | Yeah, it—that—that does get hard. I can—I can see that so—let's—let's step back a little bit, and let's think about positive climate in this classroom, because so—as you—as you read with—and uh—as you read and as you saw the instructor talk about positive climate, this is all about uh, the relationships in the class, in your classroom, and um, and I—I mention it because I think part of what you're doing, what you're beginning to do will—well with what you just told me about um, the issues that you're having in your classroom is building those relationships and kind of have uh, establishing the foundation so that—so that um, all of the kids kind of feel like the classroom is a nice warm environment and that they—they don't have to resort (interviewer coughs) sorry, they don't have to resort to (yeah) to this—let's call them 'extreme behaviors' because they're always um, sorry, always taken care of and they're gonna be—they're gonna feel like this is a caring environment. So that's why I'm kind of going back to—to positive climate. |
| Teachers' verbalization toward change (White & Miller, 2007) | Teachers verbalizations that convey desire, ability, reason, need, commitment, or taking steps to change their teaching practice | Yes, I think it will. We've been going through a lot of expectations of the classroom, like the classroom rules or how to use our walking feet inside the classroom and a lot of the things that I tell the children like they're understanding it if I make signs for them. They're more visible learners, it's been working like if we have the solution, we've been working with the solution box. The see the little kids are sharing them, they're going to share. If they don't see it, it's like how |

| | | people say it goes from one year up to the other. So I actually show them by seeing pictures. It's been working fine. It will be able to work out. |
| --- | --- | --- |

Study 3: Understanding Teachers' Pedagogical Attention, Interpretation, and Response to

Teaching Skills in Early Learning Contexts: Contributors and Association with Practice

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Abstract

Little is known about how early childhood teachers' make decisions in the classroom and what are teachers characteristics and skills that contribute to those decision and effective classroom interactions. The current study described early childhood teachers' noticing skills utilized when making decisions in the classrooms and how they varied depending on the type of video stimuli used for noticing skills measurement. Also, examined how teacher's emotions, such as burnout and stress; and cognitive aspects, such as knowledge and beliefs related to early childhood teachers' noticing skills. Finally, we explored the association between early childhood teachers' noticing skills and their enacted classroom practice. Results indicated that noticing skills varied according to the type of video stimuli (i.e., e. higher quality of noticing when teachers watched other's teachers' video than when watching their own practice). Only holding a bachelor's degree or more was uniquely and positively related to noticing skills. No evidence was found to support the relationship between noticing skills and enacted classroom practice.

**Understanding Teachers' Pedagogical Attention, Interpretation, and Response to Teaching Skills in Early Learning Contexts: Contributors and Association with Practice**

Teaching characterized by supportive, sensitive, and stimulating classroom interactions are a key lever for promoting young children's development (Hamre, Downer, Jamil, & Pianta, 2012; Hamre, 2014; Mashburn et al., 2008; Yoshikawa et al., 2013). Despite the increasing consensus regarding the importance of effective classroom interactions for children's development, less is known about the processes or underlying mechanisms involved in teachers' practice and change (Sheridan et al., 2009). Specifically, more about *how* early childhood teachers' make decisions in the classrooms that leads them to interact with children in a certain way in the classroom is needed (Schoenfeld, 2008).

While little is known, several studies and models point to lessons that can inform how early childhood teachers make decisions in the classroom (e.g. Blömeke, Gustafsson, & Shavelson, 2015; Borko, Roberts, & Shavelson, 2008; Jacobs, Lamb, Philipp, & Schappelle, 2011; Schoenfeld, 2008,). Blömeke, Gustafsson, and Shavelson (2015), for example, proposed a comprehensive understanding of teachers' classroom competence in math. In their conceptualization, competence is seen as a continuum starting from cognitive and affect-motivation aspects- named by the authors as *dispositions*- moving to noticing skills (van Es & Sherin, 2015), which are the cognitive skills used to make the moment-to-moment classroom decisions. These include attention, analysis and interpretation, and response to teaching (Moore-Russo & Wiley, 2014;

131

Banhart & van Es, 2015). These situation specific skills are hypothesized to lead to performance (i.e. enacted classroom practice).

Thus, in order to illuminate which early childhood teachers' characteristics and skills contribute to their ability to make decisions in the classrooms and engage in effective classroom interactions, utilizing a more comprehensive examination of early childhood teacher's competence components is needed (Blömeke, Gustafsson & Shavelson, 2015. The current study aims to address this gap by first describing early childhood teachers' noticing skills utilized when making decisions in the classrooms. Previous assessment of these skills has relied on the use of videos (Gauding & Chalies, 2015) to replicate "in-the-moment" classroom events with enough realism and complexity (Lemke, 2007; Roche & Gal-Petitfaux, 2014; Spiro, Collins, & Ramchandran, 2007). This study aims to build off this work by examining how noticing skills may vary when early childhood teachers reflect about their own practice versus when they reflect on someone else's practice. Further, this study will examine how teacher's emotions, such as burnout and stress; and cognitive aspects, such as knowledge and beliefs (Blömeke, Gustafsson, & Shavelson, 2015), relate to early childhood teachers' noticing skills. Finally, the association between early childhood teachers' noticing skills and their enacted classroom practice will be explored. This study has both theoretical and practice implications that will provide important information to better understand early childhood teachers' competence in the classroom, and the factors that may support or inhibit it.

**Understanding Teachers' Competence**

Blomeke and colleagues (2015) suggest that if we agree *competence* refers to real-world performance and that cognition, affect, and motivation are involved in that performance, these components should be studied as well as part of teachers' competence. Teachers' competence, then, involves complex intellectual characteristics along with affect and motivation that underlies observable performance. The authors propose competence in teaching is a process, a continuum with many steps in between, and that observable behavior is only one. To unpack this further, Blömeke and colleagues (2015) propose that this continuum starts with *dispositions*, which includes what the teacher brings to the classroom such as their prior knowledge, affective state, beliefs, and past experiences, and it ends with observable performance in the classroom. What connects the cognitive and affective-motivational aspects on the one hand and performance on the other hand, are hypothesized to be the processes of perception and interpretation of a specific situation event, together with decision making (Blömeke, Gustafsson & Shavelson, 2015; Shoenfeld, 2011). In different works, these processes of perception and interpretation have been conceptualized as Noticing Skills (van Es & Sherin, 2002; Banhart & van Es, 2015) or as Situation-specific Skills (Jacobs, Lamb, Philipp, & Schappelle, 2011), which play a critical role in the process of decision-making in the classroom. Thus, a closer look at the role these skills might play in the early childhood setting is needed.

**The Role of Attention, Interpretation and Decision-making Skills in Effective Practice**

Early childhood educators provide care and education for young children, helping them with basic needs like eating, toileting, and napping and ensuring their safety and

comfort, introduce them to academic domains, and support them in building of critical, life-long social and emotional skills (Leana, Appelbaum, & Shevchuk, 2009; Sheridan et al., 2009). Early childhood educators have to make decisions in dynamic and continually changing situations and discriminate among many competing stimuli to make effective decisions, choosing what to attend to, how to interpret the stimulus, and how to respond at any given moment (van Es & Sherin, 2002; Banhart & van Es, 2015). Thus, engaging in effective early childhood practice requires teachers to utilize complex cognitive skills to successfully attend to these multiple inter-connected components.

A useful lens for considering teachers' cognitive skills is the framework of Teacher Noticing (Erickson, 2011; van es & Sherin, 2002). The Teaching Noticing framework describes the different skills involved in reflecting about practice: attending to what is noteworthy in the classroom data, analyzing and interpreting that data, and deciding how to respond, and planning what to do differently the next time (Barnhart & van Es, 2015). These skills inform pedagogical decisions (Sherin, Jacobs, & Phillipp, 2001), both in the present and future, and promote teachers' continuous learning (Hiebert, Morris, Berk & Jansen, 2007).

Drawing from the cognitive expertise literature (e.g. Feldon, 2007; Chi, Feltovich & Glaser, 1981) the Teacher Noticing framework posits that expert teachers with developed noticing skills can assess the situation and quickly attend to what is a priority in the moment, using their conceptual understanding to interpret the situation (Berliner, 2001; Sherin, Jacobs & Phillip, 2011; Stockero, Rupnow, & Pascoe, 2017). Specifically, expert teachers attend to classroom events they think have an impact on the achievement of the lesson learning goals (Borko & Livingston, 1989; Barnhart & van Es, 2015), focus

on students' behavior and thinking rather than only on what the teacher is doing (Berliner, 2001; Wolff et al., 2016), systematically scan patterns of all students (Wolff et al., 2016) and identify situations that require intervention more quickly than novices (Berliner, 2011; Hogan, Rabinowitz, & Craven, 2003; Stigler & Miller, 2018; Sherin, Jacobs & Phillip, 2011; van de Bogert et al., 2014). When analyzing and interpreting classroom data, expert teachers offer reasons for their classroom decisions, provide evidence for their claims, question assumptions, identify results of their decisions (Hayden, Moore-Russo, & Marino, 2013) and evaluate (as opposed to judge) their decisions (Ball & Cohen, 1999; Davis, 2006; Moore-Russo & Wilsey, 2014; Santagata & Angelici, 2010). In addition, they make evidence-based claims about the causal relationship between teaching and student learning (Hiebert & Morris, 2012; Santagata, Zannoni, & Stigler, 2007). Lastly, expert teachers offer a forward-thinking response to their teaching, which includes a decision about what they should maintain and what they should change the next time (Kaiser, Busse, Hot, Konig, & Blomeke, 2015; Santagata & Angelici, 2010). Thus, given that noticing skills are exhibited by experts in the field, they show promise in helping understand how early childhood teachers make-decisions in the classroom and, therefore, are able to engage in effective classroom practice.

**Dispositions that Might Relate to Teachers' Attention, Analysis, and Response to Teaching Skills**

Following Blömeke and colleagues (2015) conceptualization of teacher's competence as a complex relationship between different aspects, a first component to examine is teachers' dispositions—affective, motivational, and cognitive processes that might underlie both teachers' noticing skills and enacted practice. In what follows are the

key teachers' dispositions and their association with noticing skills and enacted practice, according to the literature: motivational, cognitive, and emotional components.

**Motivational Components.** Readiness to change has been conceptualized as a person's internal and external resources that facilitate change (Peterson & Baker, 2011). Readiness to change and similar constructs, such as attitude towards change, have been widely studied in organizational psychology (e.g. Calabrese, 2002; Greenberg & Baron, 2000; Zimmerman, 2006) and in clinical and counseling literature (e.g. Biller, Arnstein, Caudill, Federman, & Guberman, 2000). The failure to recognize the need for change (Greenberg & Baron, 2000) is one of the greatest barriers for actual behavioral change. For example, one's previously unsuccessful efforts at change could lead to uncertainty as to whether new attempts should be pursued, or some established mental models can prevent individuals to recognize the need for new learning, resulting in unproductive ways to deal with change (Calabrese, 2002; Zimmerman, 2006). Moreover, readiness to change has been associated with intervention responsiveness (DiClemente, Schlundt, & Gemmell, 2004), for example, a study found that it could be used to correctly identify 65% of participants who dropped out of a clinical intervention (Biller, Arnstein, Caudill, Federman, & Guberman, 2000). Thus, readiness to change needs to be explored as it relates to early childhood teachers' affective and motivational resources, they can use to make sense of the classrooms events and engage with children.

**Cognitive Components: Knowledge and experience**. Experience in teaching is likely critical to become an expert in this field (Berliner, 2001) as it is knowledge to make decisions in the classroom (Shavelson, 2010; Shulman, 1987; Weinert, 2001). Previous knowledge and experiences in the classroom are organized in coherent

structures (curriculum scripts or schemas) teachers use, especially, when facing a novel

classroom situation (Krauss et al. 2008; Putnam 1987). Lessons from the expertise

research suggest that expert teachers draw upon on this rich network of schemas and

scripts stored in long-term memory to reconstruct and anticipate instructional events

(Gruber, Harteis, & Rehrl, 2006; Shavelson & Stern, 1981). As a result, they are able to

transform this knowledge to interpret and act adaptively on what is happening in the

classroom (Hackl, 2004). By contrast, novices, whose knowledge structures are in

construction, demonstrate less adaptive teaching style (Leinhardt & Greeno, 1986) and

less depth in the interpretation of classroom events (Berliner, 1992). Previous research

has investigated the role of knowledge in teacher's attention and interpretation skills. For

example, Konig and colleagues (2016) found that secondary math teachers' interpretation

skill correlated with their general pedagogical knowledge, but not with the attention

aspect. Further, in a study with early caregivers, Romo and colleagues (2018) found that

caregivers with a bachelor's degree were better at identifying effective caregiver-child

interactions. Thus, it is possible to suggest that noticing skills are knowledge and

experience-dependent, and it is relevant to continue exploring the relationship between

what teachers know and what they notice in the classroom.

**Cognitive Components: Beliefs**. The cognitive processes of selective attention,

analysis and decision-making are dependent on not only what teachers know, but also

what teachers believe (Bruckmaier, Krauss, Blum & Leiss, 2016; Llinares & Valls, 2010;

Yadav & Koehler, 2007). Beliefs could act as a lens when interpreting experiences in the

classroom (Ambrose, 2004; Yadav & Koeheler, 2007) and when making moment-to-

moment classroom decisions. For example, Yost, Senter, an Fortalenza-Bailey (2000)

studied the influence of teachers' beliefs about the role of the teacher and the nature of learning in reflection. They found that fixed beliefs often worked against the epistemology of reflection, which stresses multiple viewpoints (Yost, Senter, & Forlenza-Bailey, 2000). Bruckmaier and colleagues (2016) when studying secondary mathematics teachers' decision-making skills, found that constructivist beliefs predicted the level of competence. However, evidence suggests differences between teachers' characterizations of their epistemological beliefs and their practices exist. As an example, Schraw and Olafson (2003) found significant differences between what teachers say they believe and what teachers describe themselves as actually doing in the classroom. In this sense, beliefs alone cannot completely influence behavior. Nevertheless, the examination of the relationship between teachers' beliefs about the nature of learning seem to be critical to understand teaching competence.

**Emotional Components.** Consideration of emotional distress might be needed to understand selective attention and teaching practice. Work-related stress handicaps teachers' abilities to focus attention at will and plan and organize effectively (Goleman, 2006). Burnout, a series of symptoms that an individual may develop during prolonged exposure to high levels of work stress, such as emotional exhaustion and depersonalization (Maslach,1993; Schaufeli & Enzmann, 1998), might also play a role in teachers' cognitive skills and performance. Some evidence shows that burnout is associated with poor performance in tasks of attention and that burnout behavior tends to be guided by more automatic processes, leading to increased distraction (Van der Linden et al., 2005; Schmidt, Neubach & Heue, 2007). Given the circumstances under which early childhood teachers usually work, such as disruptive students, challenging working

conditions, or workplace disputes (Friedman-Krauss, Raver, Morris, & Jones, 2014), there's evidence to suggest that early childhood teachers might respond by reducing the energy they invest in their work, their identification with their work, and their efficacy in the task (Alarcon, 2011; Bettini et al., 2017). Thus, stress and burnout are likely to be a factor to consider when assessing early childhood teachers' competence in attentional, analytical, and decision-making skills, and their interactions with children (Jennings & Greenberg, 2009; Yoon, 2002; Zinsser, Bailey, Curby, Denham, & Bassett, 2013).

**Video analysis for the measurement of noticing skills: relationships between type of video and other teachers' characteristics**

Given that several assessments of teachers' pedagogical attention, analysis and interpretation, and response to teaching rely on the use of videos (Gauding & Chalies, 2015), a second aspect to consider is how noticing skills may vary depending on the type of video utilized in the assessment. Videos simulate classroom events without sacrificing authenticity and complexity (Lemke, 2007; Roche & Gal-Petitfaux, 2014; Spiro, Collins, & Ramchandran, 2007) and involve teachers actively in the perceptual processes (attention) as well as knowledge-based reasoning (Sherin, 2004; van Es & Sherin, 2008). Although there is a great amount of research with the use of video-based assessment and improvement efforts with teachers, only a few studies have focused on the differences between teachers' skills in response to videos of their own teaching or in response to videos of others' teaching (Gaudin & Chalies, 2015; Seidel et al., 2011). This is an important empirical question, given that when teachers engage in the reflection and analysis of teaching practice they activate not only cognitive processes, but also, emotional and motivational processes that can play a role in the levels of cognitive

competence when the video stimuli nature changes (Kleinknecht & Schneider, 2013;

Koehler, Yadav, Phillips, & Cavazos-Kottke, 2005; Seidel et al., 2011; Yadav et al.,

2011).

Watching one's own teaching might have positive effects on teachers' motivation

(Goldman, 2007; Lemke, 2007; Miller & Zhou, 2007; Spiro et al., 2007) and activate

prior knowledge and experience (Borko et al., 2008; Paul, Dawson, Lanphear, &

Cheema, 1998). When watching themselves, teachers may be better able to understand

the situation they are observing, given the knowledge and privileged information they

have about the class and individual, as well as their own teaching approaches and goals

(Kleinknecht & Schneider, 2013). Research has demonstrated that teachers find watching

their videos more useful than any other type of video, because teachers value seeing their

teaching from a distance and different angles, and notice things they would normally not

be able to notice while teaching (Zhang et al., 2011). However, the emotional

participation that is activated when watching ones' own teaching can be a double-edged

sword. The anxiety of watching one's own video (Calderhead, 1981) can activate self-

schemas and personal-related knowledge (Fiske, 1995) resulting in the activation of self-

defense mechanisms (Siedel et al., 2011), reducing the ability to process information and

to reflect critically (Krone, Hamborg, & Gediga, 2002; Siedel et al., 2011).

On the other hand, watching videos of others' teaching may allow for more

detached reflection (Kleinknecht & Schneider, 2013; Goldsmith & Seago, 2011) as fewer

situations should arise in which teachers activate self-related knowledge structures

(Fiske, 1995). Some evidence is available to suggest that teachers viewing videos of other

teachers are more deeply engaged in the analysis of problematic events (Kleinknecht &

Schneider, 2013). However, "emotionally activating" video excerpts, such as a critical classroom incident, might have adverse effects on critical reflection (Krone, Hamborg, & Gediga, 2002; Seago, 2004) even when it is someone else who is teaching. Additionally, others' teaching videos can present challenges due to the lack of context for the observer when analyzing, which can limit teachers' discussion and interpretation (Zhang et al., 2011). Thus, examining the differences of teachers' skills in attention, analysis and interpretation, and response to teaching, as they watch their own versus others' teaching could provide insightful in considering how best to assess and improve these critical skills in the future.

**The Association between Noticing Skills and Observed Classroom Practice**

The Teacher Noticing research assumes that selective attention and the ability to analyze and interpret classroom situations are likely to be prerequisites to act adaptively and effectively in these situations (Berliner, 1994, 2001; Kersting et al., 2012; Sherin & van Es, 2009). The connection between expert ability to do a task and an expert ability to notice that task has been well established in sports research (Calvo-Merino, Glaser, Grezes, Passingham, & Haggard, 2005; Cañal-Bruland, Mooren, & Savelsbergh, 2013; Savelburgh, Williams, van der Kamp, & Ward, 2002; Williams, Ward, Bell-Walker, & Ford, 2012). However, little empirical evidence is available in the field of education on how these skills are related to actual classroom practice (Gauding & Chalies, 2015). Most of these studies have inferred such relationships from "indirect" evidence (e.g., questionnaires, written commentaries; König & Kramer, 2016; Santagata & Yeh, 2016) and not from "direct" evidence of teachers' enacted classroom practices.

There is some empirical evidence, however, from intervention research that noticing skills transfer to actual teaching practices. For example, Santagata and Yeh (2014) examined the impact of a video and practice-based course pre-service teachers' mathematics analysis of their teaching and classroom practices, finding that participant teachers made student thinking more visible during instruction. Relatedly, Kiemer, Groschner, Pehmer, and Seidel (2015) examined the influence of a year-long video-based intervention in secondary science and mathematics teachers' classroom practice. Findings showed that participants engaged students more in discourse and scaffolded student learning with more concrete and learning-oriented feedback. In another study, Sun & van Es (2015) studied how secondary mathematics preservice teachers that participated in a video-based course enhanced their abilities of analysis and interpretation of teaching. The authors found that those who improved these abilities also enacted a more student-centered and responsive approach to instruction.

Important to note, few studies of these skills exist in the early learning settings. To our knowledge, only studies using the Video Assessment of Interactions and Learning (VAIL) protocol, that assesses a participant's ability to identify effective teaching strategies and examples as specified within the Classroom Assessment Scoring System (CLASS; Hamre et al., 2012) have studied these skills in early childhood settings. These studies, however, focus only on the attention aspect of noticing, as opposed to the analysis and decision-making aspects. Even with this narrower focus, results suggest that the ability to identify effective teaching strategies and behavioral examples in videos is associated with the quality of teacher practice in preschool and childcare settings (Hamre,

Downer, Jamil, & Pianta, 2012; Pianta et al. 2014; Jamil, Sabol, Hamre & Pianta, 2015; Wiens et al., 2013; Romo, LoCasale-Crouch, & Turnbull, under review).

**The Current Study**

Teachers' pedagogical attention, analysis and interpretation, and response to teaching skills show promise in helping understand early childhood teaching performance in a more comprehensive way. However, more evidence understanding and linking these skills and teaching performance is needed. The current study explores the links between early childhood teachers' noticing skills and teachers' dispositions. Specifically, the present study describes early childhood teachers' noticing skills, attention, analysis and interpretation, and response to practice, and whether these skills vary when examining one's own versus another teachers' practice. Further, this study will explore how early childhood teachers' affective, cognitive, and emotional components are related to classroom decision-making. Finally, the association between noticing skills and teaching practice in early childhood settings will be explored.

Study research questions are:

1. How can we characterize early childhood teachers' pedagogical attention, interpretation, and response to teaching skills (noticing skills)? Do they vary based on video stimuli?

2. How do teachers' noticing skills vary based on different teachers' dispositions?

3. What is the relationship between teachers' noticing skills and their interactions with children?

**Methods**

**Context: ECI Courses Overview**

Data used in this study comes from the effectiveness study of the online teacher professional development program "Effective Classroom Interactions (ECI-PK)" implemented in 2012-13. The ECI courses were offered to early childhood teachers in three geographically diverse locations across the country, during 2012. The Effective Classroom Interactions (ECI) online courses were designed to build teachers' content knowledge about effective teacher-child interactions and children's development; their ability to attend, analyze and make decisions about their own teaching practice, and their ability to enact those classrooms interactions. Since we will be using measurement at the before and the beginning of the intervention, it is expected that the course had minimal influence at this point.

Specifically, the homework assignments required teachers to reflect on their teaching practice or others' watching classroom videos. They had to select two moments, an effective moment and a less effective one, and reflect responding to a series of specific prompts: describe specific effective (or less effective) behaviors you (teacher) observed related to a specific dimension; and how those behaviors impacted children. For the less effective moment, teachers had to answer what they would plan to do differently for a next time in the classroom. This homework assignment was used to assessed teachers' pedagogical attention, analysis and interpretation, and decision-making skills, as described later.

**Participants**

The ECI courses were offered to early childhood teachers in three geographically diverse locations across the country. ECI course was offered in Spring of 2012 to a small group of teachers (first cohort), and during Fall 2012 to a larger group of teachers (second cohort). Teachers were recruited through local contacts and asked to participate in both courses as well as the research study. Recruited teachers were randomized into treatment and control conditions; the present study only considers participants in the treatment condition. A total of 26 comprised cohort 1 and 71 teachers comprised the cohort 2 sample.

Geographically, 34.4% of teachers in cohort 1 and 41% in cohort 2 were in suburban and rural locations throughout a Mideast state, 26.6% of teachers in cohort 1 and 29% in cohort 2, were located in a large Midwest city, and 27.6% of cohort 1 in a large city in a southeast coast state, and 29% of teachers in cohort 2, in a large city in a west coast state. Teachers represented a diverse sample in terms of their educational and racial or ethnic backgrounds; In cohort 1, 50% were white, and 59.2% in cohort 2. 33.3% and 26.8% were Hispanic, correspondently; and 12.5% and 7.0% were African-American. In both cohorts, less than 5% corresponded to Asian, multiethnic or another race or ethnicity. The majority of teachers (70. 8% in cohort 1 and 59.2% in cohort 2) held at least a bachelor's degree; 12.5% in cohort 1 and 15.5% in cohort 2 held an Associate's (AA) degree, and 16.7% in cohort one and 25.3% in cohort of 2 held less than an AA degree. Additional descriptives are presented in Table 1. Teachers in cohort 1 and 2 were fairly similar in demographic and training characteristics, with the exception that teachers in cohort 2 had more years of experience with children in Kindergarten age and are younger than teachers in cohort 1.

**Measures**

  **Demographics, training and experience.** Teachers completed a survey before

the intervention started. Along with demographics, teachers provided information about

their educational attainment levels, years of experience with children of different ages

and other measures as further described below.

  **Teachers' education and experience.** For the analytical models, we used as a

proxy of knowledge teachers' highest education attainment, transformed into a dummy

variable (1 is holding a bachelor's degree or more and 0 less than bachelor's). For

teachers' experience, we used the continuous variable of number of total years of

experience.

  **Teachers' pedagogical attention, analysis and interpretation, and response to**

**teaching skills.** To capture this construct, the research team created a scoring scheme

(Teacher Analysis of the Situation; TASC) that captures the quality of *noticing* skills:

attention, analysis and interpretation, and responding to teaching. Teachers in cohort 1

answered reflective questions on others' teaching practice videos. Teachers in cohort 2

answered reflective questions on a video of their own practice. In both cases, teachers had

to choose an "effective" and "less effective" moment in the videos, related to a dimension

of focus. Then, for both of them, they had to reflect on practice based on two specific

prompts: 1) Describe the effective/less effective teaching behaviors you observed during

one moment of the taping related to (dimension of focus) and 2) Describe specific ways

in which the effective/less effective teaching behaviors described above impacted the

children. After completing the first two prompts, teachers had to respond to a third

prompt intended to help them reflect about what they would do differently next time in

the classroom: 3) Describe specifically what you would do differently in your classroom related to the (dimension of focus). TASC generates a score for each skill (attention, analysis, and responding) using teachers' responses to the questions described above. We coded teachers' answers using a scale from 1 to 3, that represented low, medium, or high quality of the skill. Each score had a description of what was considered for each level of quality. Table 2 provides a summary of how each skill was coded: description of the skill, questions used to code each of them, example of an item and teachers' responses for each level scores. and an example of the description for each level scores. The complete coding scheme can be found in appendix A.

Table 2. Description of TASC coding scheme and examples from teachers' answers

| Skill | Description and examples of coding procedure | | |
|---|---|---|---|
| Attention | Description | What teachers are paying attention to when reflecting on practice. Teachers' answers that pay attention to connection between students' learning and teaching actions). | |
| | Question used to code | Describe the effective/*less* effective teaching behaviors… | |
| | Number of items | 2 | |
| | Min-max | 2-6 | |
| | Example of levels' scores | 1= Focus of the reflection **is mainly in the teacher** without linking to students' behaviors, observed learning, or students' learning goals | "I observed enthusiasm, respectful language, shared emotion, social conversation" |
| | | 2= Focus of the reflection is mainly in **the students'** behaviors/communication/etc. Or the attention is **divided between students and teacher** (50% each approximated) and the focus is not necessarily in the interactions between them. | "The teacher was enthusiastic and funny; the children were happy and laughing. They were all joining in a conversation about the puppets and story. The teacher had a calm voice and respectful language and children where engaged" |
| | | 3= Focus of the reflection is in **the interaction between teachers' actions and students' behaviors**, observed learning, or students' learning goals | "I show enthusiasm before beginning meeting asking the children if they are excited and sharing that I am so excited for the things we are going to talk about. I also notice that another" |

| | | | child is excited as she bounces up and down. I smile at the children and they smile back at me. I say nice things to the children and make sure they know that all their ideas are good ideas and we can learn more things about each of these before crossing out ideas that won't work for our first project. I use a warm clam voice. I am physically close to the children. |
|---|---|---|---|
| Analysis and Interpretation | Description | Teachers' answers that demonstrated complexity: they analyzed the classroom event from different points of view and in an integrated way. Offered reasons to explain teachers' actions, focusing in the impact in children's learning and development. | |
| | Questions used to code | Describe the effective/*less* teaching behaviors… <br> Describe specific ways in which the effective/*less* effective teaching behaviors described above impacted the children. | |
| | Number of items | 4 | |
| | Min-max | 4-12 | |
| | Example of levels' scores | 1= Teacher's answer does not present causal links between teaching and learning. Most answers are centered in the teacher's actions (or others) | One teacher was sitting with them during meal time. |
| | | 2=Both perspectives are presented (teacher and student), but the *causal link* is not clearly articulated. Or answer is centered just in students. | The children are sitting in close proximity to each other - but I am not very close to them. I am sitting in a low chair, but I am not very close to t them physically where I can reach them better for encouraging touches, etc. It may be making them not be able to see the pictures in the book as well. I am not close enough to effectively use physical affection as effectively. |
| | | 3=Teacher's answer presents clear *causal links* between teaching and learning in their practice | As a result of the positive connections that I have developed with the children in my classroom, the children are happy to be in school and are comfortable in sharing and discussing about their personal lives and also be more involved in their learning. There are still a few children who are a little reserved and shy to share information; |

| | | | |
|---|---|---|---|
| | | | however, with my continual support in their learning and the encouragement and positive reinforcement that I provide, these children will hopefully build their confidence to get more involved in their learning (…) |
| Response to teaching | Description | Teachers' answers that identify challenges in the classroom connected to learning goals or student's behavior. Present alternatives for a next time in the classroom clearly connected to potential impact on students' | |
| | Questions used to code | Describe specifically what you would do differently in your classroom related to the (dimension of focus). | |
| | Number of items | 1 | |
| | Min-max | 1-3 | |
| | Example of levels' scores | 1=Teacher does not offer alternatives, or they are too general | I truly would not do anything different. I encouraged him to join us-he didn't want us to be with him. I don't think I would force a child to participate in an activity he truly did not want to participate in |
| | | 2=Teacher provides alternatives with some degree of specificity, the connection with students' learning/behavior is not clear or specific. Or the alternatives are specific, but the connection with students' learning/behaviors is not clear. | The teacher who is walking around, should be sitting with the children. Meal time is a great time to share social stories and often a good time to refer children to one another for children needing assistance. |
| | | 3=Teacher provides specific steps for the plan, with a clear connection between teaching (specific steps) and learning (expected outcomes in children) | If this moment happened again, the teacher should sit at the tables WITH the children. This allows for physical and verbal closeness, which is essential to build relationships. Being in close proximity, especially during a meal allows a great opportunity for social conversations and shared emotion. I would encourage the teacher to engage in social conversations with the children while displaying enthusiasm and joy for being with the children. |

In summary, attention was comprised by two items, with a minimum of 2 and a

maximum of 6; Analysis and Interpretation, given the complexity of this construct, was

comprised by 4 items, with a minimum of 4 and maximum of 12; and responding, only comprised by one item, with a minimum of 1 and a maximum of 3. Finally, we calculated and overall score for TASC (see results section). Regarding the training, a team of 5 trained coders scored the written answers according to a rubric that described levels of competence for each skill. The coders were trained by the principal researcher for three hours which included: presentation and understanding of the coding scheme, illustrating examples for each score, and practice. Following this session, the team coded the same 20 teachers answers to established reliability, achieving on average Intraclass correlation of .91 Next, all teachers' answers were double coded, achieving an ICC of .70. To calculate the final scores, double codes were averaged between the coders. In terms of data time points, we coded the first homework about Positive Climate as baseline, expecting that the course had minimal influence at this point.

**Burnout.** Was assessed using the Maslach Burnout Inventory-Educators Survey (MBI- ES; Maslach, Jackson, & Leiter, 1996). The scale has 22-items in which teachers rate their feelings about their job, with three subscales: emotional exhaustion (i.e., "I feel emotionally drained from my work"), depersonalization (i.e., "I feel I treat some students as if they were impersonal objects"), and personal accomplishment (i.e., "I feel I'm positively influencing other people's lives through my work."). Teachers reported the frequency with which they related to a given statement using a 7-point scale where one represents "never," and 7 represents "every day." Several studies (e.g. Iwanicki & Schwab, 1981; Gold, 1984) support its validity, such as the three-factor structure and internal reliability. The scales demonstrated adequate internal consistency in the current study. However, personal accomplishment was not significantly correlated to emotional

exhaustion, excluding this from the model. Depersonalization and Emotional exhaustion

burn-out sub-scales were combined in just one, given they were moderately to highly

correlated ($r$=.41, $p$=.001)

**Beliefs about Teaching and Learning.** Was assessed using the Ideas about

children measure (Schaefer & Edgerton, 1985), containing 16 items on a 5-point scale.

Items measure the extent to which teachers believe learning should be child-focused (e.g.,

"Children learn best by doing things themselves rather than listening to others.") or not.

The measure showed good high internal consistency in the current study ($\alpha$ = .77) and has

shown construct validity in prior studies with significant correlations with a teacher's

emotional support and classroom practices (Driscoll & Pianta, 2010; Pianta et al., 2005)

**Readiness to change**. Was measured using a coding scheme developed for the

study of preschool teachers' responsiveness to the MyTeachingPartner Coaching

Intervention (Roberts et al., 2014). Teacher responses to an open-ended question in the

survey (What are your hopes and goals for the ECI course?) were coded. The readiness to

change coding scheme contains 6 items rated 1 (no evidence) to 3 (conclusive evidence)

assessing the extent to which teachers' responses demonstrated internal aspects

(communication of values, self-efficacy, specificity of goals, positive affect) and external

aspects (acknowledgment of external support) of readiness to change, as well as overall

motivation to change ($\alpha$ = .69). The measure successfully predicted teachers'

responsiveness to the intervention (Roberts et al., 2014).

**Quality of Teacher-Child Interactions Practice.** The Classroom Assessment

Scoring System Pre-K version (Pianta, Hamre, & LaParo, 2008) was used to measure the

quality of teacher-child interactions. The measure is divided into three domains:

Emotional Support, Classroom Organization, and Instructional Support. The first domain

includes the following four dimensions: Positive Climate, Negative Climate, Teacher

Sensitivity, and Regard for Child Perspectives. The second domain includes the

following three dimensions: Behavior Management, Productivity, and Instructional

Learning Formats. The last domain includes the following three dimensions: Concept

Development, Quality of Feedback, and Language Modeling. CLASS provides scores on

a rating scale from 1 to 7, with one being low and seven being high, for each dimension.

Multiple studies have demonstrated this measure's validity (e.g., Mashburn et al.,

2008). For the report of results, we used aggregate scores at the domain levels. Nine

coders completed a training and certification process for the CLASS- PK over a period of

two days and completed a reliability assessment (demonstrating an average agreement of

$\geq$ 80% within one code of the master code) before performing coding for the study. To

determine inter-rater reliability for the present study, 20% of the videos were double

coded (ICC = .87).

Descriptives for teachers' burnout, beliefs about teaching and learning, readiness to

change, and CLASS scores can be found in Table 3.

## Results

### How do early childhood teachers' pedagogical attention, interpretation, and response to teaching skills (noticing skills) are characterized? Do they vary based on video stimuli?

To answer research aim 1, teachers in cohort 1 and cohort 2 that completed the

first reflection assignment (n=69) were considered. Teachers that answered the reflection

assignment are demographically comparable with participant teachers in the course that

did not answer the first reflection assignment, with the exception of ethnicity. As well, they are also comparable in other variables of interest (see appendix B). Teachers answers to the reflection assignment were coded using the TASC coding scheme as described above. Due to the small sample and the exploratory nature of the study, a p value of .1 was considered to examine trends.

Evaluation of normality and possible data transformation were considered separately for each TASC skill (attention, analysis and interpretation, and responding) through histograms, and evaluation of skweness and kurtosis. Skewness and kurtosis values for the three dimensions were well within acceptable limits (between -1 and +1). To consider the use of just one score to represent *noticing*, first the correlations between the three skills: attention, analysis and interpretation, and responding were examined. For descriptive purposes, the statistics for each skill are presented separately below. Correlation analyses showed that the three skills are moderately to highly correlated (see table 4), suggesting the use of a single score to represent noticing ($\alpha$=.74).

Given that each skill is on a different scale, with a different minimum and maximum, they were re-scaled from 0 to 100 for interpretation purposes, with lower scores representing low development of the skills, and higher scores, a high development of these. Table 5 shows the descriptives for TASC scores (for each skill and for the total score) for each cohort. Overall, the three skills were very similar in their levels at the beginning of the intervention, with Analysis and Interpretation slightly higher than the other two. Also, the latter skill presents less variability compared to attention and respond. In sum, considering the total score, it is possible to say that at the beginning of the intervention, teachers presented a medium level of development of their noticing

skills (51.3% of 100% possible). When comparing the cohorts, teachers in cohort 1 showed higher levels of their noticing skills than teachers in cohort 2. As well, video stimuli seemed to matter. Utilizing an ANOVA analysis comparing the means for the total TASC score, teachers who watched other teachers' videos had statistically higher scores ($F= 8.65$; $p < .05$) than the ones who watched their own video in the reflection assignment at time one.

To further understand if the type of stimuli has a relationship with noticing skills, a two-way ANCOVA analysis was performed to assess the relationship between watching yourself versus watching others' and noticing skills, introducing additional key variables such as educational attainment groups and years of experience. The model compared teachers who watched themselves in video with the ones that watched other teachers' videos, and also teachers with a bachelor's degree or more and teachers with less than a bachelor's degree. We adjusted for total years of experience and readiness to change. Preliminary checks were conducted to ensure that there was no violation of the assumptions of normality, linearity, and homogeneity of error variances. After adjusting for total years of experience and readiness to change, there was a significant difference in mean noticing skills scores [$F(1,61)=6.55$, $p=.013$] between watching yourself versus watching others, and also Comparing the marginal means showed that teachers that watched other teachers video had higher scores in Noticing skills ($M=60.39$) than teachers' who watched themselves in video ($M=45.39$). Also, after adjusting for years of experience and readiness to change, there was a significant difference in mean noticing skills scores between the groups holding a bachelor degree or more, and those who do not [$F(1,61)=3.05$, $p=.08$], with estimated marginal means of 58.20 and 47.58, respectively

Both effect sizes, as reported by the Partial Eta Squared, were small. The interaction between video stimuli and educational attainment was not statistically significant [F (1,68) =.1,61, p=.980]. Table 6 and 7 shows the adjusted means and confidence intervals for both comparisons.

**How do teachers' noticing skills vary based on dispositions?**

To explore the relationship between noticing skills and teachers' dispositions, such as teachers' knowledge, experience, beliefs, and emotional factors, only teachers in cohort 2 are being used given that teachers in cohort 1 did not complete a survey with all of these variables of interest for the current study. The complete data set for this analysis comprised of teachers in cohort 2 who completed TASC and the survey (n=50). Table 8 presents all correlations between TASC total score and the variables of interests. As seen in the correlation table, TASC was positively correlated with having a bachelor's degree or more (*r*=.33, p<.01*)* and with readiness to change (*r*=.36, p<.05*)*. On the other hand, TASC was negatively correlated to teachers' adult centered beliefs about teaching and learning (*r*=-.32, p<.01) or in other words, teachers with higher developed noticing skills, tended to exhibit more child-centered beliefs than the ones with less developed noticing skills.

Table 9 presents results of a multiple OLS regression model examining the relation between noticing skills and teachers' cognitive dispositions --knowledge, experience, beliefs, and, teachers' emotional components, such as burnout and stress. To capture teachers' knowledge, holding a bachelor or higher degree was included. For experience, continuous variable of total years of experience considered, and for epistemological beliefs, the overall score for Beliefs about Teaching and Learning was

incorporated to the model. Finally, to account for emotional component, we used

depersonalization and emotional exhaustion burn-out sub-scales combined in one. The

model predicting noticing as measured by TASC total score showed predictive ability ($R^2$

= 0.2; $p$ = 0.07) and holding a bachelor's degree or more, in comparison to teachers with

less education, was positively and significantly related to noticing skills ($\beta$ =12.05; $p$

=0.08). The rest of the predictors were not associated to the ability to attend, analyze, and

respond to teaching (p> 0.1)

**What is the relationship between teachers' noticing skills in early learning contexts**

**and their interactions with children?**

The third aim was to determine the relationship between teachers' noticing skills

and their interactions with children. For this analysis, teachers in both cohorts that had

CLASS scores and TASC scores in time 1 (N=52) were included. In order to do this,

TASC overall scores were regressed on each teacher-child's interaction domain, as

measured by CLASS, controlling for cohort, knowledge (measured as highest educational

attainment), experience, and readiness to change. These are the variables we have for

both cohorts. Emotional variables, such as burnout and stress were available only for

cohort 2.

Table 10 shows the regression models for each teacher-child interactions domain,

Emotional Support, Classroom Organization, and Instructional Support. The first model

and last model, predicting the CLASS domain of Emotional Support and Instructional

Support, as a function of Noticing Skills, training, experience, and readiness to change

(controlling for cohort) were not significant ($p$ = .65 and $p$= .44). The second model

predicting the CLASS domain of Classroom Organization, however, was significant ($R^2$

= .26, $p$ = .01). Furthermore, higher levels of readiness to change ($\beta$ = .42; $p$ = .02) were positively related to teachers' observed interactions as measured by the CLASS domain of Classroom Organization.

## Discussion

This study aimed to described early childhood teachers' noticing skills and how these may vary when early childhood teachers reflect about their own practice versus when they reflect on someone else's practice; explore how teacher's dispositions (cognitive and emotional) relate to early childhood teachers' noticing skills; and explore the association between early childhood teachers' noticing skills and their enacted classroom practice. The results suggest three key findings. First, early childhood teachers in the study exhibited medium levels in their Noticing Skills and these seem to vary according the video stimuli. Second, having a bachelor's degree or more (as a proxy of knowledge) was the only factor that showed signal to be uniquely associated to Noticing Skills. However, noticing skills were individually positively correlated with having a bachelor's degree or more, readiness to change and child-centered beliefs. Finally, we did not find a significant relationship between Noticing Skills and any of the effective teacher-child interactions domains. Each will be further explored, along with the implications, below.

**Early Childhood Teachers Noticing Skills**

Overall, early childhood teachers in the study exhibited medium levels in their Noticing Skills. The three skills that comprise this construct, attention, analysis and interpretation, and response to teaching showed similar levels with analysis and

interpretation slightly higher than the other two. The three skills were moderately correlated, suggesting that they are capturing distinct skills, but they are enough correlated to be combined in one single score. This might suggest, at least theoretically speaking, that there is a mechanism, in this case *noticing* (Erickson, 2011; van es & Sherin, 2002; Banhart & van Es, 2015), that underlies the three of them. However, in this study we do not have evidence to suggest this empirically. Given that early childhood make decisions in the classroom under dynamic, challenging, and multidimensional demands, choosing what to attend, how to interpret stimulus, and how to respond to teaching (van Es & Sherin, 2002; Banhart & van Es, 2015) might be key to engage in effective interactions with children (Downer, Jamil, Maier & Pianta, 2011). Thus, providing space to practice these skills could be a critical focus for early childhood teachers training and professional development.

**Type of Video Stimuli Seems to Matter for the Quality of Noticing Skills**

The current study shows initial evidence that the video stimuli used in the assessment of these skills matter. Teachers who watched others had higher scores in noticing skills than the ones who watched their own videos. Watching your own teaching might enable teachers to understand better the situation they are observing (Kleinknecht & Schneider, 2013), however, the emotional participation that is activated when watching ones' own teaching can active self-defense mechanisms (Fiske, 1995), reducing the ability to process information and to reflect critically (Krone, Hamborg, & Gediga, 2002; Siedel et al., 2011). On the other hand, watching videos of other's teaching may allow for a more detached reflection (Kleinknecht & Schneider, 2013; Seago, 2004; Goldsmith & Seago, 2011), and enable a more deeply engaged in the analysis of problematic events

(Kleinknecht & Schneider, 2013). More answers are needed for this important empirical question. However, this study provides initial insights about when is better to use somebody else's videos, your own, or a combination of both, considering the assessment's goals or training/teacher professional development's goals.

**Dispositions related to Teachers' Attention, Analysis, and Response to Teaching Skills**

The second aim of this study was to investigate what teachers' dispositions, cognitive and emotional components, were related to noticing skills. When considering individual variables, Early Childhood teachers' that hold child-centered beliefs exhibited higher levels of attention, interpretation, and response to teaching than the ones with more teacher-centered beliefs. This was expected as suggested by the literature, because teachers prioritize events that are congruent with their orientation and core beliefs when teaching (Anderson & Smith, 1987; Schoenfeld, 2011). Moreover, this is aligned with studies that found more constructivist and less fixed beliefs works in favor of the epistemology of reflection, which stresses multiple viewpoints and critical thinking (Bruckmaier et al., 2016; Yost, Senter, & Forlenza-Bailey, 2000). Readiness to change was also positively related to noticing skills, suggesting that teachers with more internal resources (communication of values, self-efficacy, specificity of goals, and positive affect) and external resources (acknowledge external sources of support) that facilitate change (Peterson & Baker, 2011) exhibited higher skills involved in decision-making than the ones with less. This is aligned with what the literature suggests, that previous unsuccessful experiences could lead to less motivation to engage in new attempts to change. Similar to fixed epistemological beliefs, a failure to recognize personal resources,

internal and external, might act against the attentional skills needed to successfully navigate the classroom.

Knowledge measured as holding a bachelor's degree or more was also related to noticing skills. More interestingly, when adding all the variables listed before in one model, including emotional components (such as burnout), having a bachelor's degree or more was the only factor that remained significantly associated to noticing skills, as measured by TASC. This is similar to what have been found in a previous study with early caregivers (Romo, LoCasale-Crouch, & Turnbull, 2018; under review). This is expected given that, as suggested by the research, noticing skills are knowledge-dependent. Especially, when facing new situations in the classrooms, teachers use their accumulated knowledge to attend to specific aspects and interpret what is happening in a specific event (Krauss et al. 2008; Putnam 1987)

**No Evidence to Support the Association between Noticing Skills and Observed Classroom Practice**

Our last study aim was to explore the relationship between Noticing Skills and effective teacher-child interactions, as measured by CLASS. Surprisingly, we did not find a significant relationship between Noticing Skills and any of the effective teacher-child interactions domains. However, we did find a relationship between Classroom Organization and teachers' readiness to change. This construct combines aspects of teachers' self-efficacy, motivation, and acknowledgement of their internal and external resources (Peterson & Baker, 2011) that might facilitate change. Teachers with these characteristics might be more motivated and open to incorporate recommended practices than teachers less ready to change.

The few previous studies, using the Video Assessment of Interactions and Learning (VAIL) protocol, that assesses a participant's ability to identify effective teaching strategies and examples as specified within the Classroom Assessment Scoring System (CLASS; Hamre et al., 2012) found a relationship between this ability and teacher-child interactions (Hamre, Downer, Jamil, & Pianta, 2012; Pianta et al. 2014; Jamil, Sabol, Hamre & Pianta, 2015; Wiens et al., 2013; Romo, LoCasale-Crouch, & Turnbull, under review) which was not replicated in our study. A first consideration for this result is our power limitation to detect significant relationships given the small sample in the study. A second possible explanation is that TASC measures the three skills comprised in *noticing*, not only the aspect of attention as, for example, VAIL does. Additionally, VAIL and CLASS are both based in the Teaching Through Interactions framework, whereas TASC is not. Additionally, TASC is measuring mostly how well early-childhood teachers *explain t*heir behaviors, but not necessarily the *conceptual soundness* of those explanations. Adding this component to the measure may be a next step in the development of TASC, although this might imply considering a coding team with more expertise (or more training in the measure). Another possible hypothesis is that noticing skills might relate to enacted behavior in non-linear ways. For example, we know from the literature in sports (e.g. Williams, Ward, Bell-Walker, & Ford, 2012) that only *experts* in the field (e.g. they compete at international levels or at elite teams) exhibited these skills at high levels. It might be, then, that teachers' noticing skills relate to enacted performance at certain thresholds of quality.

**Limitations**

Several limitations of this study should be considered. First, our small sample size allowed only for exploratory analyses with a limited number of predictors, to provide initial evidence about noticing skills and relationship with enacted teaching, and other aspects of teachers' competence, such as knowledge, beliefs, emotions, among others. Future research that relies on a larger sample size should include more complex statistical analyses, incorporating variables at different levels of analysis. For example, we did not consider contextual aspects of the schools where teachers work or classroom composition, that can help understand better teachers' noticing skills and performance. Second, although we found a difference in the quality of noticing skills depending on the type of video stimuli the two group were not randomly assigned to each condition. Therefore, although we adjusted for some observable characteristics, there might be others non-observable characteristics that could be explaining the difference. Second, one of our findings suggest that holding a bachelors' degree or more is related to better noticing skills. This is in alignment with the research about the importance of knowledge for teachers' competence. However, this variable is only a *proxy* of knowledge and might be masking other effects we are not observing, such as the cultural capital needed to access and complete a university degree. Fourth, this is the first version of the TASC coding scheme and, thus, more development is needed. For example, as mentioned earlier, adding a conceptual soundness dimension of teachers' explanations might be necessary. Additionally, more research on what noticing skills look like in early childhood is needed. The development of TASC was a deductive exercise, based on the literature about noticing in other age levels and subject matter (specially, secondary and math). However, it is possible that there are aspects relevant for the Early Childhood

level we haven't considered in the quality of noticing. More inductive work might be necessary. Finally, written reflections we used as base for the TASC coding may not be an accurate indicator of their noticing skills, given that their writing skills, for example, the use of academic language (Luk, 2008), might be playing an important role. This is to say that the format of reflection, written or oral, might be an important factor to consider in future research.

**Next Steps for Future Work**

The findings and non-findings of the current dissertation provide lessons for future lines of research. First, continue working in the development of a measure for noticing skills in early learning contexts. Possibly, there might be aspects of noticing in early childhood contexts that are unique to this age level and context I did not consider in the development of the current version. More qualitative and inductive work might be necessary to identify those aspects, in addition to the elements we have already included. Additionally, I would like to study further the differences in noticing skills depending on the type of media and format of reflection. For example, randomly assign groups of teachers to different conditions – watching one's video and watching somebody else's, or/and written reflection and oral reflection. Second, continue researching the association between teachers' motivation and emotions with noticing skills. More research is needed to understand the intersections of cognition and affective factors. Finally, so far, my research has been focused on the teacher and how they observe and analyze their classroom, without including classroom compositions and characteristics, and other contextual factors that can be related to teachers' cognition. For example, teachers whose classrooms differ from one another in terms of child demographic composition or

abilities might apply a different lens when observing and analyzing their classroom. As well, different teachers' experiences in the past, including their own experiences as students, might help to understand teachers' differentiated schemas. The broader context, such as school leadership, support, working conditions, can help us explain teachers' emotional states and its interaction with teacher cognition, for example. In summary, expanding on the teachers' ecology is one of the lines of research I would like to pursue in order to understand better their competence in the classroom.

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Table 1. Descriptives statistics for additional demographics Cohort 1 and Cohort 2

|  | Cohort 1 | | Cohort 2 | |
| --- | --- | --- | --- | --- |
| Variables | *n* | *M (SD)* | *n* | *M (SD)* |
| Age | 24 | 40.54(11.44) | 65 | 36.82(11.10) |
| Years of experience total | 24 | 11.96 (8.10) | 71 | 11.10 (7.57) |
| Years of experience working with children prior kindergarten | 24 | 10.83 (7.13) | 71 | 8.86 (6.84) |
| Years of experience working with kindergarten students | 24 | .08 (.41) | 71 | .79 (1.96) |
| Years of experience working with children above kindergarten | 24 | 1.04 (3.25) | 71 | 1.35 (2.91) |

Table 3. Descriptives statistics for burnout, beliefs, readiness to change, and CLASS Cohort 1 and Cohort 2

|  | Cohort 1 | | Cohort 2 | |
| --- | --- | --- | --- | --- |
| Variables | *n* | *M (SD)* | *n* | *M (SD)* |
| Burnout Emotional Exhaustion | - | - | 64 | 2.16 (.70) |
| Burnout Depersonalization | - | - |  | 1.46 (.62) |
| Beliefs about Teaching and Learning | - | - | 70 | 2.20 (.58) |
| Readiness to Change | 24 | 1.58 (.29) | 61 | 1.58 (.33) |
| CLASS – E.S | 20 | 5.57 (.49) | 51 | 5.56 (.38) |
| CLASS – C. O | 20 | 5.61 (.46) | 51 | 5.23 (.42) |
| CLASS – I. S | 20 | 1.99 (.38) | 51 | 2.01 (.33) |

*Note.* ES = Emotional Support CLASS domain. CO = Classroom Organization CLASS domain; IS= Instructional Support CLASS domain

Table 4.  Correlations between Attention, Analysis and Interpretation, and Respond scores from TASC measure

|  | Attention | Analysis and Interpretation | Respond |
| --- | --- | --- | --- |
| Attention |  | .591** | .444** |
| Analysis and Interpretation |  |  | .696** |

†*p*< .10. *p< .05. ***p< .001.

Table 5. Descriptive Statistics for TASC scores both cohorts and separately

| | Cohort 1 (watch others) | Cohort 2 (watch yourself) | Total |
|---|---|---|---|
| | M (SD) | M (SD) | M (SD) |
| Attention | 59.52 (21.53) | 43.58 (27.60) | 47.97 (26.89) |
| Analysis and Interpretation | 62.83 (16.10) | 56.21 (18.37) | 58.03 (17.91) |
| Respond | 66.75 (31.53) | 40.67 (29.29) | 47.85 (31.92) |
| Total TASC score | 63.03 (19.17) | 46.82 (20.91) | 51.28 (21.58) |

Table 6. Adjusted means and confidence intervals for type of video stimuli comparison

| Type of video stimuli | Mean | CI 95% | |
|---|---|---|---|
| Watch others' videos | 60.39 | 50.33 | 70.45 |
| Watch your own video | 45.39 | 39.27 | 51.49 |

Covariates appearing in the model are evaluated at Years of experience =11.60 Readiness to change=1.58

Table 7. Adjusted means and confidence intervals for highest educational level comparison

| Highest educational level | Mean | CI 95% | |
|---|---|---|---|
| Less than Bachelor | 47.58 | 37.47 | 57.69 |
| Bachelor + | 59.00 | 51.75 | 64.64 |

Covariates appearing in the model are evaluated at Years of experience =11.60 Readiness to change=1.58

Table 8. Correlations between TASC total score and burnout scales, stress, educational attainment, years of experience, beliefs about teaching and learning, and readiness to change.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1)Beliefs | | .07 | .19 | -.36** | .15 | -.32* | -.33** | -.06 | -.32* | -.43** |
| 2)Burnout (EE) | | | .41** | -.22 | .86** | .04 | .06 | .34** | .02 | .17 |
| 3)Burnout (DP) | | | | -.34** | .82** | -.03 | .01 | .45** | -.10 | .00 |
| 4)Burnout (PA) | | | | | -.33** | .13 | .32** | -.08 | -.06 | -.03 |
| 5)Burnout (EE DP) | | | | | | .01 | .05 | .47** | -.05 | .11 |
| 6)Bachelor+ | | | | | | | .25* | -.19 | .33** | .29* |
| 7)Total Years of experience | | | | | | | | .16 | .14 | .30* |
| 8)Stress | | | | | | | | | -.11 | .05 |
| 9)TASC | | | | | | | | | | .36* |
| 10) Readiness to change | | | | | | | | | | |

†*p*< .10. *\*p*< .05. *\*\*\*p*< .001.

Table 9. Multiple Regression analysis predicting noticing score (TASC total score)

| Variable | TASC total score |
|---|---|
| | *B* |
| Intercept | 53.50* |
| Years of Experience Total | .599 |
| Bachelor's degree or more | 12.05† |
| Ideas about teaching and learning | -8.023 |
| Burnout (EE and DP) | -1.281 |
| $R^2$ | 0.20† |

†*p*< .10. *\*p*< .05. *\*\*\*p*< .001

Table 8. Multiple regression analysis predicting CLASS domains

| | ES | CO | IS |
|---|---|---|---|
| Variable | *B* | *B* | *B* |
| Intercept | 5.122 | 5.05*** | 1.74*** |
| Cohort 1 | .030 | -.420** | .061 |
| TASC score | -.002 | -.003 | .002 |
| Bachelor's degree + | .046 | -.033 | .151 |
| Total years of experience | - .008 | .002 | -.009 |
| Readiness to change | .267 | .48* | .079 |
| $R^2$ | .067 | .262* | .095 |

*Note.* ES = Emotional Support CLASS domain. CO = Classroom Organization CLASS domain; IS= Instructional Support CLASS domain † *p*< .10.  *p*< .05. **p*< .01. ***p*< .001

Appendix A

CODING SCHEME TASC ECI EVALUATION 2018

# I.    Video Observation Assignment

The pieces of data that you will be coding are teachers' written answers to some reflection questions about their practice, as it follows:

*Reflect on the first moment you selected from your overall classroom taping. Include the following information in your response below.*

## a.  Homework Questions

The specific questions are the following, each answer will serve to assign scores for *each* noticing skill: attention, analysis and interpretation, and respond:

1) Effective: What specific and observable behaviors did you see yourself saying and doing that demonstrate effective Positive Climate (PC) /Regard for Students Perspectives (RSP) /Instructional Learning Formats (ILF)? **Step4b_observe**
2) Impact effective: Describe how these behaviors impacted the children. **Step4b_impact**
3) Challenge: Describe the less effective teaching behaviors you observed during one moment of your taping related to PC/RSP/ILF. **Step4c_oberve**
4) Impact challenge.  Describe the specific ways in which your less effective teaching behaviors described impacted the children **Step4c_impact**
5) Describe specifically what you plan to do differently in your classroom related to PC/ RSP/ ILF **Step4c_different**

## II.    How to code

For each skill, the coding scheme describes the questions (from above) that you need to use to score that given skill. For each question that you will be coding there is a description of three scores: 0, 1, and 2. By reading teachers' answers, you will need to make a judgment of what score represents better the information, quality, and frequency that is encompassed in the teacher answer.

After scoring each skill, you will need to make a holistic appreciation (considering the previous scoring) of the quality of the skill according to three levels also described as follows.

**Note:** for those cases without an answer, use -99 for each column.

### 1.  ATTENTION

### 1.1.      Scores

| GUIDING QUESTIONS | 2/1/0 PER EACH QUESTION | Score |
|---|---|---|
|  | **Step4b_observe.** Describe the effective teaching behaviors you observed during one moment of your taping related to (dimension of focus): |  |
| What do the teachers attend to when observing their own practice?<br>-    When describing effective practice<br>-    When identifying or not, challenges in the classroom | 0- Focus of the reflection **is mainly in the teacher** without linking to students' behaviors, observed learning, or students' learning goals<br>1- Focus of the reflection is mainly in **the students'** behaviors/communication/etc. Or the attention is **divided between students and teacher** (50% each approximated) and the focus is not necessarily in the interactions between them.<br>2- Focus of the reflection is in **the relationship/interaction between teachers' actions and students' behaviors**, observed learning, or students' learning goals |  |

| | **Step4c_observe**<br>  0-   Teacher **does not** identify a challenge in the classroom (that leads them to plan something differently), or **it is too general** (it is not possible to distinguish where the focus of attention is at) Or the focus of the challenge **is only or mainly** in the **students' learning/behaviors or in others'** (e.g. Staff, school direction, etc.)<br>  1-   Teacher identifies a challenges or challenges in the classroom **only** or **mainly focusing in her/his practice**, and not linking this to the students' learning/behaviors.<br>  2-   Teacher **identifies a challenge or challenges in the classroom** connecting the impact that **this challenge (s) had in students' behaviors/learning** | |
|---|---|---|
| | **Total score** | |

**Examples:**

**1. Step4b_observe**

a.  Score 0:

I am sitting at the table with the children engaged in their activity with them.

Asking for children's opinion about rules
Allowing children to talk you could hear the background noisy

b.  Score 1:

Earlier in the taping, the children were not very interested in the book I was reading. When we started this particular activity, I "brought the children back". The children seemed comfortable holding hands and when Thomas hung back away from the group, I immediately responded and encouraged him to come hold my hand.

Teacher asked each child to share thier rule/comandment and asked them if they wanted/could draw a picture of it.  The teacher if the child would like her to show her how. She allows the children to chose what colors they want to use and allows the children to talk to one another and get their own markers.

The teacher is asking the children to think of a rule and draw it. They are all talking and sharing ideas. The teacher is also following the childrens lead by letting the boy just draw a person. She us supporting independence by allowing choices when she asks the children which rule they want. There is also freedom of movement. The children are leaning over to grab markers freely or ask for them.

c.  Score 2:

The teacher sits near the children: on the floor at their level, with them around her in a circle. She speaks with warmth and enthusiasm and often makes eye contact with the children as she converses with them. The teacher and children share frequent laughter and are engaged in common activity. There's some conversation that could be construed as social, and a child compliments the teacher on the mask she made:
child: "Who bought that mask?" teacher: "I made it this morning." child: "Aww. I like it."
and later, the teacher speaks through the puppet:
"How you doin' today? You havin' a good day? So, you excited about your trip?"
I observed no behavior problems during the activity; all children were engaged and enthusiastic, both listening and speaking.

I notice quickly that Sienna and Amelia are arguing over who will bring me the spaghetti. I anticipate the problem and attempt to redirect the children by suggesting that I move the cot out of the way and go to the table, so they can serve me lunch there. Sienna says, "I want the spaghetti." I provide assistance by explaining to Amelia that Sienna was trying to search for the spaghetti so that she could serve it to me. Amelia says, "Well I have it in my hand." I acknowledge their emotions by saying, "Oh that is tricky." I then offer a suggestion on how they could resolve their problem by saying, "Maybe you could both bring it together? Maybe Sienna could get the plate and you guys could put the spaghetti on." They try this suggestion with another child's support. I talk with other children as Sienna and Amelia continue to resolve their problem. Eventually, Sienna decides on the

green plate and Amelia sets the spaghetti on it. Sienna attempts to grab the plate back from Amelia as Kate says, "That plate's too small, Sienna." Throughout this clip, the children seek support and guidance, freely participate, and take risks.

The teacher asks, "Sophie, What is your rule?" -By asking her to share her ides she is promoting and incorporating the children's ideas. She is also encouraging the children to lead, by giving a rule that is important to each of them.
Ask the children to draw a picture of their rule. (Gives children responsibilites)

 The teacher allows child talk throughout the video (Child Focused)

2. **Step4c_observe**

a.  Score 0:

When it was time to clean up the children didn't want to so they kind of shut down and became withdrawn.

On one occasion i was distracted by some other children who were running in the classroom and had to tell them to use their "Walking feet".

b.  Score 1:

Lack of enthusiasm-- Although I show joy when students share their ideas and pictures, it is obvious that this is not an activity that I am particularly excited about.

During circle time we always have a hard time.

c.  Score 2:

When one of my girls was enthused to answer a question, I got on to her for it not being her turn to answer instead of harnessing her enthusiasm. Several moments throughout the table activity, I did not give eye contact with the children while they were talking to me and appeared disinterested.

After we moved to our center/small group activities, I was sitting with 4 children at one table. The activity was play dough with rollers, and with Mr. Potato head body parts. There were two verbal children and two non-verbal children in the group. I was totally engaged with the verbal students, while the non-verbal students struggled to get my attention. There was a lot of going back and forth of putting things in front of one non-verbal student as he demonstrated over and over that he was not interested. I was so focused on the conversation I was having with the verbal children that I did not tune in to the needs of those who could not tell me they were not interested.

While watching the small group activity, I heard children say, "Ms. Alford, help me" and I was involved with another child and didn't really acknowledge their need. I may not have even heard it until I watched the video. I also wish that I hadn't demonstrated the apple print and let the children just do it their way. But there was no indication that they were bothered by the way I did it.

## 1.2. Holistic Appreciation

| HOLISTIC APPRECIATION FOR THE SKILL | | | Level |
|---|---|---|---|
| **Low**<br>Center of the ATTENTION<br>Is mainly the teacher – this excludes events that they thought had an impact on the achievement of the learning goals, students' behavior and thinking. | **Mid**<br>**Anything in between** | **High**<br>Center of the ATTENTION is the relationship between teaching and learning (connection between students' learning goals, students' behaviors, teaching actions). | |

## 2. ANALYSIS AND INTERPRETATION

## 2.1. Scores

| GUIDING QUESTIONS | 2/1/0 PER EACH QUESTION | Score |
|---|---|---|
| What factors influenced the decision-making during the clip? In order to identify if they are analyzing from different points of view (for example: are they using cues or signals from what the children are doing for their interactions; considering their initial goals? etc.); the level of the analysis (just description, explanations, evaluation, etc.) | **Step4b_observe.** Describe the effective teaching behaviors you observed during one moment of your taping related to (dimension of focus): | |
| | 0- Answer does not even present a description (no answer), OR it is just a "judgement" of what happens, without providing reasons (or evidence) to justify the judgement<br>0- Answer presents a description with evidence from the classroom.<br>1- Teacher uses another level of analysis in the answer: evaluation with reasons, explanations, comparison, etc.<br><br>NOTE: Teacher can use description AND another level of analysis. Judgement does not count | |
| | **Step4c_observe** Describe the less effective teaching behaviors you observed during one moment of your taping related to (dimension of focus): | |
| | 1- Answer does not even present a description (no answer), OR it is just a "judgement" of what happens, without providing reasons (or evidence) to justify the judgement<br>2- Answer presents a description with evidence from the classroom.<br>3- Teacher uses another level of analysis in the answer: evaluation with reasons, explanations, comparison, etc.<br><br>NOTE: Teacher can use description AND another level of analysis. Judgment does not count | |
| | **Step4b_impact** Describe specific ways in which your effective teaching behaviors described above impacted the children. | |

| | |
|---|---|
| | 0- Teacher's answer does not present causal links between teaching and learning. Most answers are centered in the teacher's actions (or others)<br>1- Both perspectives are presented (teacher and student), but the *causal link* is not clearly articulated. Or answer is centered just in students.<br>2- Teacher's answer presents clear *causal links* between teaching and learning in their practice |
| | **Step4c_impact** Describe the specific ways in which your less effective teaching behaviors described impacted the children |
| | 0- Teacher's answer does not present causal links between teaching and learning. Most answers are centered in the teacher's actions (or others)<br>1- Both perspectives are presented (teacher and student), but the causal link is not clearly articulated. Or answer is centered just in students.<br>2- Teacher's answer presents clear *causal links* between teaching and learning in their practice |
| | **Total score** |

**Examples**

Levels of analysis examples:

| Levels of analysis | Key words | Examples |
|---|---|---|
| Description | I'm doing more of this…<br>I'm working on… | I see the teacher is sitting on the floor at the eye level of the children.  They are all smiling and |

| | | |
|---|---|---|
| | I use more of…<br>My children are doing this<br>My children are better at this<br>My children are more… | laughing as the teacher does a puppet show with them. The teacher is enthusiastic as the children react to the puppet scaring them. The teacher respectfully answers the children's question about who made the mask for the puppet. She shares with them how she made it that morning.<br><br>Teacher,wich is me,is close to the kids,interacting with them, smiling at them .Using a soft voice. |
| Explanation | This happened because…<br>Provides a WHY something happened or not.<br>Key words: because, this happens why, this might have happened because…, etc. | |
| Evaluation providing reasons | Appraisal of practice/event and providing reasons to explain<br>- I realized that I'm not doing…<br>- I should do more of…<br>- I've missed that opportunity<br>(followed by reasons to explain) | |
| Judgement | An appraisal of practice/event without justifying the appraisal | I felt that this is one of the worst teachings I have done |
| Comparison | Analyzing an event from different perspectives | The children simply sit and eat with minimal teacher-child exchange, and none with each other. The teachers lack of generating awareness of the potential for conversation at this important time may communicate disinterest to the children, and that mealtime is utilitarian rather than social. |

| Causal link between teaching and learning | - Because<br>- So<br>- Therefore<br>- Utterances formulated in the form of: When I do X, Y happens. | When I am more prepared and let the children know what I expect, they seem to be listening and learning |
|---|---|---|

1. **Step4b_observe**

Score 0


Score 1
The teacher is sitting down close with the children and is at their level.  She is participating in an activity with the children.  She is enthusiastic about the activity as you can tell by how she is talking loud and dynamically.  The teacher and the children are laughing together.  She is using a calm voice and uses appropriate eye contact when she is talking with the children.

The teacher was sitting close to children and very enthusiastic about the lesson. Children were sitting comfortably close to the teacher. Children were laughing and very attentive. There was back and forth exchanges about who bought the mask. Teacher answered and explained where the mask came from. Lots of laughter, listening, and engagement. Children were allowed to move. Observed respectful talk among students and teacher. Students joined in with and was a part of the teacher's lesson.

Score 2
I sat near the children as we all played a game in which the children tried to figure out which child was the class helper for the day. I spoke in a warm, calm voice. I also spoke with enthusiasm, as I felt excited about some modifications to the game I was introducing. **(DESCRIPTION)** I made eye contact with children as I spoke to them, used children's names, **and drew on my knowledge of the children's families ("The helper has two brothers.") (EXPLANATION/REASONS WHY)** the children and I shared laughter ("Is Piper a boy?") and the children participated enthusiastically in the game, offering guesses and answering questions freely. **There were no**

**behavior issues among the children (although several of them were quite wiggly, which is usual for those children).** (**EVALUATION**)I didn't notice any evidence of positive communication in this one-minute clip, but, in the few minutes just previous, **we'd decided that "The helper is really good at counting and numbers" wasn't a particularly helpful clue because several of the children who remained potential helpers were particularly strong in that area.**(**EVALUATION PROVIDING REASONS**)

**The teacher anticipates a problem in the block area and clearly states his expectations: "Now there's a lot of people that are going to work with motorcycles so we have to be friends and we have to [with child] share."( DESCRIPTION**) **The teacher signs the word "share" as he begins to say it, which serves to cue the children so that they say the word along with him; he can use the same sign later if a problem arises relating to the sharing of materials. (EXPLANATION why the teacher signed the word share)**The teacher states expectations, too, when he says, "Alright guys, tiptoe to your work time." He lowers his voice and uses his hands to help illustrate "tiptoe" as he says the word, and he follows the children closely (monitoring) as they leave circle to begin their work. **Finally, the teacher lets Anthony know that, since it's his first day, the teacher will "watch...to see where you go" ; without being intrusive, he clearly communicates that he's interested in Anthony's choices and is available as a resource (proactive**) (**EXPLANATION/why the teacher said that to Anthony**).

2. **Step4c_observe**

**SAME as above**

3. **Step4b_impact**

Score 0

The teaching behaviors impacted the children by firstly introducing them to their topic being scared in a really inventive fun way

Sitting down with them at the table and enjoying the activity with them.  Using their names to have them work with the group in turn they were talking and communicating with their friends by using their names and in a peaceful tone.

Score 1

The children appeared relaxed and excited: they laughed frequently, engaged enthusiastically in the activity, took turns listening and speaking. One child asked the teacher to "do it again!" and the teacher complied. One child complimented the teacher on the mask she'd made.

Children are laughing and smiling.  Children are showing interest in the activity.  children are cooperating by staying seated and participating.

The teacher is using an enthusiastic voice and props to keep the children engaged.She smiles at the children,uses eye contact,she listens to them.She repeats the activitie when they asked.She answers to their questions and she makes comments and asks questions related to the topic they will talk about on  that day.The children will be able to recall the experience of being scared ,but in a fun way.her approach of the subject is very effective in my opinion.

Score 2

The teacher is close to the children, smiling, laughing, and responding to the children.  In response, the children smile, laugh, and interact with the teacher and puppet.  Because the teacher is engaged and having fun, the children are also.

4. **Step4c_impact**

**SAME as above**

4.1.        Holistic Appreciation

| HOLISTIC APPRECIATION FOR THE SKILL | | | Level |
|---|---|---|---|
| **LOW** | **MID** | **HIGH** | |
| The analysis, if any, is simplistic, the "classroom event" is not analyzed from different points of view. Lack of | Anything in between | The analysis is complex given that the classroom event is analyzed from different points of view and in an integrated way. There are reasons offered | |

| integration of diverse elements (teaching, students, impact, etc.)<br>There are not reasons offered to explain the teachers' actions. | | for the teachers' actions focused in the impact in children's learning and development. | |
|---|---|---|---|

## 5. DECISION-MAKING

### 3.1 Scores

| GUIDING QUESTIONS | 2/1/0 PER EACH QUESTION | Score |
|---|---|---|
| What would you change or maintain next time in the classroom? | **Step4c_different. Describe specifically what you plan to do differently in your classroom related to the following dimensions**<br><br>0- Teacher' does not offer alternatives, or they are too general<br>1- Teacher provides alternatives with some degree of specificity, the connection with students' learning/behavior is not clear or specific. Or the alternatives are specific, but the connection with students' learning/behaviors is not clear.<br>2- Teacher provides specific steps for the plan, with a clear connection between teaching (specific steps) and learning (expected outcomes in children) | |

### 3.2 Holistic Appreciation

| HOLISTIC APPRECIATION FOR THE SKILL | | | Level |
|---|---|---|---|
| **Low**<br>Teachers do not identify challenges in the classroom and do not offered alternatives to their teaching | **MID** | **HIGH**<br>Teachers identify challenges in the classroom connected to their learning goals/student's behavior and learning. They identify specific alternatives to their teaching that are clearly connected to students' outcomes. | |

**Examples**

**Step4c_different**

Score 0

Trying to keep as much positive interaction and climate in my teaching, and spending more time with my children in class

Score 1

Management I intend to focus on two students in particular and help them redirect before their behavior gets inappropriate or unsafe for others.

Score 2

*I plan to acitively join children's activities and play along with high enthusiasm and interest in what they are doing. By encouraging other children to join along, the children will learn to problem-solve and draw from the knowledge and skills pool of his/her peers that may benefit the acitvity at hand. (**FIRST LOGICAL CONNECTION BETWEEN TEACHING AND LEARNING**) I'd like to build my relationship with Fernando, such that by keeping him busy with meaningful play and learning, he'd have less reason to behave inappropriately such as failing to keep gentle hands and feet to himself (**SECOND LOGICAL CONNECTION BETWEEN TEACHING AND LEARNING**). Another portion of my plan is setting high, positive expectations for the children which would motivate them to persist and build on skills/knowledge they have and go further. But most importantly, if I show more positive emotion that is visible to the kids, it would interest kids into more meaningful and rich play. (**THIRD LOGICAL CONNECTION BETWEEN TEACHING AND LEARNING**)*

Appendix B

Demographics and other variables of interest descriptives for teachers that completed the reflection assignment and those who did not

|  | Complete Assignment | | Did not complete Assignment | |
|---|---|---|---|---|
|  | N | *M (SD)* | N | *M (SD)* |
| White | 69 | .62 (.49) † | 26 | .4 (.50) |
| Age | 63 | 37.77 (10.62) | 26 | 38.00 (12.86) |
| Years of experience | 69 | 11.49 (7.60) | 26 | 10.85 (8.00) |
| Bachelor + | 69 | .64 (.48) | 26 | .58 (.50) |
| Readiness to change | 62 | 1.58 (.31) | 23 | 1.59 (.32) |
| Emotional Exhaustion | 43 | 2.07 (.84) | 21 | 2.35 (.69) |
| Depersonalization | 43 | 1.47 (.69) | 21 | 1.44 (.47) |
| Ideas about Children | 49 | 2.18 (.54) | 21 | 2.26 (.67) |

†*p< .10. *p< .05. ***p< .001*