January 2020

The Days Take Care Of Themselves: Early Head Start Teacher Interactions With Children In Association With Factors Affecting Environmental Quality

Britta Karin Shine
Wayne State University

THE DAYS TAKE CARE OF THEMSELVES: EARLY HEAD START TEACHER INTERACTIONS WITH CHILDREN IN ASSOCIATION WITH FACTORS AFFECTING ENVIRONMENTAL QUALITY

by

BRITTA K. SHINE

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2020

MAJOR: PSYCHOLOGY (Developmental)

Approved By:

Co-Advisor Date

Co-Advisor Date

DEDICATION

For the teachers, always.

And for my mother, who would have laughed if she heard I became a doctor.

ACKNOWLEDGMENTS

Nobody does this alone. To Dr. Ann M. Stacks, thank you for your clarity of thought, your astonishing mastery of time, and the wisdom that the best way to manage fear is to face it. I still owe you a cup of coffee. To Dr. Marjorie Beeghly, thank you for your contagious delight in babies and young children, and your unwavering belief in my ability to get the thing done. To Dr. Hilary Ratner, thank you for your candor, good humor, and the reminder to defend my position even when preaching to a choir. To Dr. Ty Partridge, thank you for the perspective, and the patience to scaffold several months of my learning multi-level statistical analyses. To Dr. Holly Brophy-Herb, a fellow master coder of the Q-CCIIT: Thank you for sharing the journey, and for demonstrating consistent warmth and optimism, even in the midst of an ice storm.

Special thanks to the Administration for Children and Families for making this study and my doctoral education possible via Grant 90YR0092 (PIs: Stacks, Vallotton, Muzik). From the Hearts and Minds on Babies Study, my special thanks to Becca Wheeler, Katie Asher Halquist, Shatisha Costner, Beverly Weathington, Jody Cook, Danielle Dalimonte-Merckling, Dr. Carla Barron, Dr. Fatimah Al-Ismail, Dr. Claire Vallotton, Dr. Maria Muzik, Dr. Kate Rosenblum, and especially our variegated flock of research assistants. Skyler, thanks for the window.

For their time and dedication to graduate-level education, I thank Alia Allen, Dr. Pat Siple, Dr. Lee Wurm, Dr. John Woodard (twice!), Dr. Toni Abbey, Dr. Boris Baltes, Dr. Joe Fitzgerald, Dr. Emily Grekin, Dr. Doug Barnett, and Dr. Carolyn Joy Dayton. For their enduring wisdom, thank you to Dr. Carol George, Dr. Linda Perez, and Dr. Maria St. John. Thanks to Dr. Julie Wargo Aikins and everyone at the Merrill Palmer Skillman Institute. To Dr. Corinne Rogers, thank you for listening, and for the handwritten lists. To my family and friends, far and wide, here and gone: Thank you isn't enough. And finally, to the employees (and the parking lot) of Starbucks at 12 Mile and Dartmouth, thank you for being there.

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CHAPTER 1: INTRODUCTION

Since the US Census Bureau began recording children's participation in non-maternal child care in 1985, families' use of child care centers has steadily risen, such that one-quarter of all children under five years now attend child care centers (Laughlin, 2013). The massive influx of young children into care during the past several decades is due to various factors, including welfare-to-work policies (Scarr, 1998) and increased re-entry by mothers into the workforce at large (Vandell, 2004). Unfortunately, the labor of caring for young children is afforded minimal social and economic status in the US, with early childhood education (ECE) teachers regarded as "babysitters" rather than educators (Schpancer, 2008). Although many members of the child care workforce are motivated by an ethic of service (Hall-Kenyon, Bullough, MacKay, & Marshall, 2014), love of children (Buettner, Jeon, Hur, & Garcia, 2016; Torquati, Raikes, Huddleston-Casas, 2007), or both, existing research has yet to fully capture the complexity of their inner lives, or the degree to which that influences the quality of their interactions with children and children's development. The purpose of this research is to examine in greater detail the primary task of infant-toddler teachers; in particular, their daily interactions with the children in their care, and the factors that contribute to teachers' abilities to provide consistent sensitive and responsive care throughout the day in support of children's social-emotional development.

Research is needed that draws together several strands of inquiry in the ECE field. At present, definitions of environmental quality may be insufficient to address specific concerns, especially in infant-toddler settings. Child care settings for the youngest children are qualitatively different even from those designed for their slightly older peers in preschool: Caregiving routines are more intensive and intimate, and the environment itself more closely resembles the family home. Further, infants and toddlers are oriented primarily towards their caregivers, rather than

other children, and look to teachers for cues about safety, and for help and comfort in moments of distress. Thus, it is likely that teachers' own well-being is of paramount importance to infants and toddlers, since they rely so totally on their teachers for support, comfort and co-regulation (Mortensen & Barnett, 2015). Existing theory suggests that both attachment (Pallini, Baiocco, Baumgartner, Bellucci, & Laghi, 2017) and emotion regulation (Jeon, Hur, & Buettner, 2016) may be important indicators of teacher well-being that are related to their ability to respond sensitively to children's needs and cues throughout the day; however, this has not been tested empirically. Finally, it is critical to understand and address the very real stress that ECE teachers face as a function of their jobs, which can complicate or exacerbate their ability to meet children's developmental needs. The current study proposes to examine caregiver-child interactions – the foundation of high-quality infant-toddler care – in conjunction with multiple teacher-level factors for a better understanding of teachers' differential abilities to provide consistent, sensitive responsiveness to children's signals. More specifically, this study is focused on whether teachers' provision of sensitive caregiving is consistent across the day at the individual, within-person level – that is, in dyadic interactions which comprise the majority of infant-toddler care.

Quality of the Caregiving Environment and Children's Social-Emotional Development

High-quality child care has been empirically associated with children's positive social and emotional outcomes. Specific associations have been demonstrated between high-quality environments and the emergence of children's self-regulation skills (Finch, Johnson, & Phillips, 2015). In their longitudinal study of child care, the NICHD Early Child Care Research Network (ECCRN; 1996, 2001, 2002a, 2002b) found evidence for increases in self-control, positive social behaviors, and skilled peer interactions in young children who experienced high-quality non-maternal care. The same study showed that higher-quality care in infancy and toddlerhood was

associated with reduced externalizing behavior as late as age 15 years (Vandell et al., 2010). However, the mechanisms by which "quality" is defined and measured rely heavily on specific aspects of the caregiving environment, and these measures can produce mixed results depending on context (Love et al., 2003). Thus, it is useful to review definitions and components of quality as they are understood in both research and practice: An explanation of how levels and features of environmental quality have been defined and measured will be given, and an argument for an additional dimension, specifically focused on the consistent quality of teacher-child interactions across the day, will be provided.

Quality in ECE classrooms has historically been broadly defined along two dimensions: Structural quality, which refers to regulatory aspects of the child care center or classroom, and process quality, which describes the daily workings of the caregiving environment. These dimensions relate in important ways. Research has demonstrated that aspects of structural quality predict levels of process quality (Gerber, Whitebook, & Weinstein, 2007; Phillipsen, Burchinal, Howes, & Cryer, 1997). Much of the policy change work and advocacy in ECE systems has sought to address structural features of care, based on the assumption that evidence-based alterations to those aspects of the environment will result in beneficial changes to process quality. A complicating addition to this model is the introduction of highly-simplified global ratings of quality, which collapse structural and process quality together into a single indicator.

Global Quality

The current trend in the ECE field, based on the dominant consumer model of child care and a strong push to enroll more families, is to assign global quality ratings to child care settings. One example of such an approach, the Quality Rating and Improvement System (QRIS), is utilized by 37 states to rank child care settings with one to five stars. The aim of doing so is to provide

families (i.e., consumers) with simplified information about the expectable level of quality at a given child care center. Unfortunately, as noted by Tarrant and Huerta (2015), the pace at which state-level QRIS have been implemented has been greater than the research on their feasibility or validity. The end result is a remarkable inconsistency across state QRIS instruments as to what constitutes high-quality care. In their review of multiple such systems, Kirby, Caronongan, Malone, and Boller (2015) found a wide range of benchmarks for quality, much of which could be attributed to local licensing standards. These dissimilarities were particularly evident at the lowest rating levels, although there was greater agreement across states about what constituted "high quality" care. Notably, none of the indicators of quality in QRIS included teacher-child interaction or elements of caregiver sensitivity and responsiveness.

The evidence available suggests that global measures of quality alone cannot predict positive or negative outcomes for children in any specific domain (Elicker & Thornburg, 2011; Hestenes, Cassidy, Hegde, & Lower, 2015). For an actual understanding of whether classrooms with global high ratings encourage positive social and emotional development, it is necessary to tease apart structural and process elements of those ratings and examine them separately, and at a more individualized level (Pianta, Downer, & Hamre, 2016; Slot, Leseman, Verhagen, & Mulder, 2015). Structural and process dimensions of the caregiving environment reflect an orthogonal approach to the conceptualization of quality, although they have demonstrated association with one another and with children's positive social-emotional outcomes.

Structural Quality

The most frequently cited components of structural quality are group size, child-to-caregiver ratio, and teacher educational attainment. Together, these characteristics form an "iron triangle" (Phillipsen et al., 1997), mainly used to predict process quality, with which they have

demonstrated consistent associations in research (Dowsett, Huston, Imes, & Gennetian, 2008; Gerber et al., 2007; Ghazvini & Mullis, 2002). These features of the caregiving environment are maintained by child care center administration, via hiring practices and adherence to licensing regulations. In the case of Early Head Start (EHS), a government-funded school-readiness program for infants and toddlers, group size and child-to-caregiver ratio are specified by program performance standards (Paulsell et al., 2002). A robust body of evidence has replicated the association of these variables with high-quality classroom experiences for children (Burchinal, Cryer, Clifford, & Howes, 2002; Saracho & Spodek, 2007; Thomason & La Paro, 2009).

The prevailing wisdom in ECE research and policy has been that classrooms with the appropriate ratio of children to well-educated teachers will provide the time and space necessary for supportive, nurturing interactions (Vandell, 2004). However, it is important to consider that mandated compliance with child-to-caregiver ratios, group size, and educational requirements for teachers do not guarantee a particular level of caregiving quality; such standards merely set the stage for it to occur. As noted by Layzer and Goodson (2007), the structural demands of regulatory bodies might make it easier to engage in one-to-one caregiving, but this assumption ignores the relative capacity of individual teachers on any given day.

Process Quality

Unlike structural quality, process quality is a dynamic and changeable property of the caregiving environment. The core element of process quality is teacher-child interaction, at both the dyadic and group level (Ahnert, Pinquart, & Lamb, 2006; Phillips et al., 2000; Pianta et al., 2016). The measurement challenges posed by this definition have been addressed in large part by combining interactions with structural elements into observational assessments such as the Infant-Toddler Environmental Rating Scale–Revised (ITERS-R; Harms, Cryer, & Clifford, 2006). This

instrument adds structural elements of the physical classroom to observable moments of child-caregiver interaction such as feeding routines, diaper changes, instructional support, and opportunities for cognitive stimulation.

As noted by Layzer & Goodson (2007), this association of process with structural features is easy to understand from a theoretical and pragmatic standpoint. A measure that sought to interrogate only the quality of interactions would be costly in terms of development, training, and implementation. However, the unfortunate end result is that many environmental rating scales devote limited attention to the actual, observable sensitivity and responsiveness shown by teachers during daily routines in the classroom. For example, in an infant-toddler environment, teachers' sensitivity to children's cues during transitions is critical to children's developing capacity for self-regulation (Ritchie & Howes, 2003). Indeed, teacher responsiveness that is contingent on signals from children, and that is consistent throughout the day, is what distinguishes high-quality infant-toddler care from the alternative (Pratt, Lipscomb, & McClelland, 2015). Despite this, the value assigned to this aspect of caregiving in many environmental rating scales is disproportionately small compared to its importance. Physical characteristics of the classroom (e.g., the number of books available to children, or teachers' adherence to handwashing routines) are afforded more statistical weight in total calculations of environmental quality. Nevertheless, it must be noted that studies using the ITERS-R have demonstrated significant associations between high-quality environments and fewer teacher-reported behavior problems, and children's positive social-emotional outcomes (see, e.g., NICHD-ECCRN, 2002). It is certainly possible that high ratings reflect a positive classroom climate; however, it begs the question of how those classrooms came to be that way. Infant-toddler environments that run smoothly and encourage children's development while ensuring their safety and comfort are not the result of some magical

happenstance. Rather, the teachers in those classrooms are working hard every day to provide emotional containment, mirroring, and support; a labor of love and dedication.

Teacher Well-Being Contributes to Process Quality

Previous research (see Ahnert et al., 2006; Layzer & Goodson, 2007; Slot et al., 2015) has suggested the need to disambiguate the specific effects of teacher sensitivity during dyadic or group-level interactions from other aspects of process quality. In addition, work that has focused specifically on the classroom social-emotional climate has identified the well-being of teachers as central to the maintenance of process quality: Teachers are not only a critical element of process quality, but active participants in children's development and growth (Davis, 2003; O'Connor, 2010). It is unsurprising, then, that newer models acknowledge teachers as differentially impacted by stressors, the environment, and internal factors unique to themselves.

While it was designed with preschool and school-age children in mind, the Prosocial Classroom framework conceived by Jennings and Greenberg (2009, see Figure 1) is salient to the ECE context for infants and toddlers. This model is founded on the construct of teacher social-emotional competence (SEC), the components of which are self-awareness, social awareness, responsible decision-making, self-management, and relationship management. These qualities are critical for teachers who must scaffold children's emerging social and emotional skills (Mortensen & Barnett, 2015). The Prosocial Classroom model emphasizes teachers' adaptability of affect and awareness of self and other, particularly in the face of children's high emotional demands. Importantly, teachers' baseline well-being is a primary component of their SEC.

In a similar vein, the Buffett Early Childhood Institute at the University of Nebraska offers a model of teacher well-being that is analogous to the associations demonstrated between structural and process quality in the classroom (see Figure 2). This model places teachers at the center of an

individually-focused framework in which external forces (e.g., job stress, economic hardship) impact personal states (e.g., emotional and physical health), which in turn produce alterations in relationships with children and those children's outcomes (Becker, Gallagher, & Whitaker, 2017). Like the Prosocial Classroom, this perspective emphasizes mindfulness techniques and other principles of self-awareness as the basis for intervention in building teachers' capacities to improve and sustain nurturing relationships with young children.

What the Prosocial Classroom and Buffett models share in common is an emphasis on teachers in general as meaningful participants and emotional actors in the caregiving environment: Their well-being and social-emotional competency is central to the overall quality of the classroom itself. This should be all the more true for ECE teachers, and most especially for those in infant-toddler contexts. Teachers for the youngest children are primarily focused on and occupied by interactions with the children in their care (Mortensen & Barnett, 2015). Unfortunately, a closer assessment of the variability and quality of within-person sensitivity and responsiveness in those interactions is largely absent from the literature.

Measuring Within-Person Variation in Interactional Quality

No established measures of infant-toddler classroom quality consider how teacher-child interactions change over the course of a day, or across different caregiving interaction types (i.e., feeding, circle time, small group activities). In addition, existing measures rely on summary or average scores, which may be too broadly defined to capture the variety of experiences infants and toddlers have throughout a single day in child care. Furthermore, the subscales of such measures that address sensitive and contingent responsiveness by caregivers rarely define and measure specific qualities of dyadic interaction, although such exchanges between teachers and

children are the primary driver of children's social-emotional development (Mortensen & Barnett, 2015).

For the purposes of the current study, interactional quality is conceptualized as an aspect of classroom quality that emphasizes in-the-moment sensitivity, empathic understanding, and consistency of teachers' responsiveness over the course of a single morning. This differs from the broader concept of process quality in its specific focus on caregivers' capacity for emotional availability and consistently sensitive behavior. While teacher-child interactions are the central aspect of environmental quality (in particular, process quality) as it is understood in research and practice, existing measures contain multiple items that are unrelated to those interactions. This approach is likely to obscure existing variability within and among child-caregiver relationships. A focus on the quality of interactions alone at the within-person level has the potential to reveal much about whether infants and toddlers are receiving truly sensitive and consistent care across the day. Caring for very young children is challenging work, and maintaining the same level of sensitivity to infants' and toddlers' cues throughout the day in the face of transitions, high emotional needs, and personal exhaustion requires a high level of skill.

Fleeson (2004) described the necessity of integrating the person-by-environment perspective with the observable variability in individual behavior by context. Whereas trait-based arguments are correct in their assertion that most people's behavior is fairly consistent over a longer period of time, situation-focused perspectives demonstrate that how an individual behaves is driven largely by the environment in which they find themselves. Thus, both perspectives are useful, but on differing levels of analysis. One might therefore expect a teacher to be generally perceived as calm and reassuring in the aggregate, while certain situations or interactions during

the course of the day present unique challenges to her caregiving behavioral system and disrupt the overall pattern of consistent responsiveness.

The preliminary basis for an interactions-focused approach to measuring environmental quality is limited but encouraging. In a study of the effectiveness of instructional interactions in various learning activities in a preschool setting, Cabell and colleagues (2013) demonstrated that teachers displayed differential levels of effectiveness depending on the type of activity. Le, Schaack, and Setodji (2015) examined "daily caregiving discontinuity" in which children and teachers were moved from classroom to classroom throughout the day, preventing the maintenance of consistent caregiving. When children or teachers moved more frequently, the quality of teacher-child relationships and children's subsequent social and emotional outcomes were lower.

Curby, Brock and Hamre (2013) conducted a study of emotional consistency in pre-kindergarten teachers using an adaptation of the CLASS-PreK observational measure (Pianta & Hamre, 2009) that allowed for the examination of variability during the day. Child measures the following year demonstrated significant associations with social outcomes, such that pre-kindergarten teachers' emotional consistency during the day was predictive of children's positive social outcomes, over and above levels of average emotional support. Each of these studies suggests that teachers' affective consistency across time may be an important avenue for research on environmental quality. In a subsequent review, Pianta, Downer, and Hamre (2016) argued that the best social-emotional outcomes for children in ECE settings derive from high-quality, consistent teacher-child interactions. These findings are encouraging; however, infant-toddler environments were not included in these analyses and the need for similar research is clear.

The gap in infant-toddler research on classroom quality spans the developmental period in which teachers' daily consistency and sensitivity are theoretically most important. Infants and

toddlers are engaged in building a relational understanding of the world, guided by their caregivers. Of interest to the current study are the as-yet-unexamined teacher- and environment-level characteristics that might be associated with the consistency (or inconsistency) of observable teacher responsiveness across the day within those vital early relationships. Young children are caregiver-oriented, rather than peer-oriented, and look to familiar adults for cues about safety and exploration in their widening worlds. Their emergent self-regulation, a central component of social and emotional learning, is able to develop over time via co-regulation by sensitive adults (Kurki, Järvenoja, Järvelä, & Mykkänen, 2016). Positive initial experiences of co-regulation, leading to self-regulation which facilitates social emotional learning, should form the backbone of infants' and toddlers' experiences in child care (Mortensen & Barnett, 2016). It is vital that such experiences be part of the expectable environment for children, and that their nonmaternal caregivers serve as reliable sources of consistent responsiveness throughout the day regardless of situational context inside or beyond the classroom.

To date, available measures of infant-toddler environmental quality have infrequently been measured in conjunction with variables that might influence teachers' capacity to provide sensitive, high-quality interactions that support children's development. Examples of such teacher-level factors include job-related stress – both at the individual level of perception and as a function of the working environment itself – and emotion regulation skills (Buettner et al., 2016; Jeon et al., 2016). It is also possible that teachers' internal representations of attachment and caregiving, informed by their own early experiences and borne out by a lifetime of close relationships, may impact their ability to be emotionally present in the moment, especially under emotional stress, and respond effectively and flexibly to the needs of infants and toddlers. Evidence from the parenting literature has amply demonstrated that attachment histories influence the quality of

family caregiving and children's social-emotional development (Belsky et al., 2006; Moreira et al., 2015; Spieker, Oxford, Fleming, & Lohr, 2018). Of all child care settings, an infant-toddler classroom – with its low group size, intimate caregiving routines, and extensive dyadic interactions – most closely resembles a family home (Gonzalez-Mena, 2009). Research is needed not only to observe the quality of those interactions in the moment, but to consider what else may be happening internally for teachers and how that contributes to their ability to be consistently sensitive and responsive to children across the day.

Teachers' Attachment Histories as a Foundation for Classroom Interactions

Attachment theory (Bowlby, 1969/1982) is predicated on the importance of early relationships to social and emotional functioning throughout the lifespan. Primary experiences with caregivers form the basis of internal working models, mental frameworks that scaffold an individual's understanding of what it means to be in relationship to others. The foundations of internal working models from childhood attachment experiences persist into adulthood (Dykas & Cassidy, 2011; Mikulincer, Shaver, & Pereg, 2003; Mikulincer & Shaver, 2019). Thus, it is reasonable to suppose that teachers' own attachment orientations and histories are salient to their work in an ECE classroom. Research has demonstrated that caregivers with secure attachments in adulthood are able to flexibly integrate their own and others' emotional states in the interest of self- and co-regulation (George & Solomon, 2008). When in relationships with secure caregivers, children's emotions are appropriately mirrored and contained. By contrast, responses from insecure caregivers either amplify or diminish children's emotional experiences, preventing children's return to physiological equilibrium and the deactivation of their attachment systems.

Over time, and via repeated interactions with the same caregivers, infants and toddlers internalize the models of emotional expression and social relationships that are demonstrated by

the significant adults in their lives. In the best circumstances, this results in the intergenerational transmission of secure attachment: Children come to view others as generally benevolent, and themselves as worthy of care and protection. This internalized secure base functions as a psychological touchstone in moments of stress or dysregulation (Waters, Rodrigues, & Ridgeway, 1998; Waters & Waters, 2006). However, evidence from family research has shown that the inverse is also true; insecure internal working models of attachment (and thus, the lack of an internalized secure base) may be transmitted from caregiver to child as well (Verhage et al., 2015).

Thus, from the perspective of attachment theory, ECE teachers' ability to consistently demonstrate sensitivity and responsiveness towards infants and toddlers may be founded on the nature of their own early experiences, which they mentally draw upon to inform their caregiving behavior. Bowlby (1980) first proposed and Solomon and George (1996) later elaborated on the caregiving behavioral system, which is activated in response to children's attachment behaviors. For infant-toddler teachers, responsible for multiple children throughout the day, the caregiving behavioral system may remain in near-continual activation, particularly if they lack the necessary co- and self-regulatory skills to bring both the children and themselves back to baseline.

Within-Person Variability in Caregiving Responsiveness as a Function of Attachment

Given that a core feature of secure attachment is consistent behavior by caregivers, it is worthwhile to consider the natural human limitations on such consistency, especially in the context of other stressors or individual variability in emotional responses and attachment. This concern has been amply covered in the maternal research, which may serve as a proxy literature for the context of infant-toddler caregiving. For example, Leerkes, Crockenberg, and Burrous (2004) examined maternal sensitivity to infant distress within a framework of maternal emotional competencies. Findings suggested that maternal sensitivity (i.e., a central mechanism of infant-

mother attachment) depended on a variety of maternal emotional competencies, analogous to some of the social-emotional competencies described by Jennings and Greenberg (2009) in their Prosocial Classroom model, including emotion recognition, emotion awareness of self and child, and emotion efficacy (i.e., self-management during emotional arousal), In later researcy, Leerkes, Parade, and Gudmundson (2011) more explicitly examined the role of maternal emotional reactions and children's attachment security. This study utilized emotion-eliciting tasks and the Strange Situation (Ainsworth, Blehar, Waters, & Wall, 1978) from the prenatal period through infancy. Results demonstrated that maternal anxiety in response to infant crying at all time points was associated with resistant attachment behaviors in infants in lab visits at 16 months, whereas consistent angry responses to infant crying was associated with avoidant behaviors by infants in the Strange Situation. These findings suggest that – consistent with attachment theory – caregiver responses to children's emotions have a real-time and cumulative impact on the quality of those developing relationships.

Lindheim, Bernard, and Dozier (2011) also examined the within-person variability of maternal sensitivity, but in the context of a high-risk, low-resource population. Attachment was assessed for this sample using both the Adult Attachment Interview (AAI) and the Maternal Behavior Q-Sort (MBQS). As noted by these authors, maternal sensitivity itself is both a *trait* – a static aspect of a mother's behavior – and a *state*, subject to change due to situational context. Thus, the authors' expectation was that, measured across a period of time, mothers with lower overall sensitivity would display greater within-person variability. Participant mothers and their infants were recorded ten times during one-hour visits to their homes. Results were consistent with hypotheses: Mothers whose own attachment security was assessed as nonautonomous – analogous to insecure – were lower overall in sensitivity and displayed greater within-person variability.

Given that EHS serves an overwhelmingly high-risk population and operates within a low-resource framework, these findings are applicable to both the families served and likely to the relationships that develop between infants, toddlers, and their teachers as well.

Attachment Theory in the Early Childhood Classroom

Early research on attachment theory's applications to the child care context established teachers as potential secondary attachment figures in children's lives, both in general application as well as in the context of maltreatment. A notable finding from a study by Goossens and Van IJzendoorn (1990) demonstrated that children formed relationships with their teachers unlike those with their parents or other children cared for by the same teacher. This result indicates that the formation of such relationships is a process unique to each teacher-child dyad, in which both members play an active part. Howes and Hamilton (1992a, 1992b) found a similar non-concordance of mother-child and teacher-child attachment relationships in a series of studies, and noted that if the quality of one depended upon the other (i.e., that the mother-child dyad set the stage for all subsequent relationships), a higher degree of correlation than is observed in practice would be expected across the board. Echoing this assertion were findings from a multiple-caregiver context (Israeli kibbutzim), in which Sagi and colleagues (1995) cited Sroufe's (1985) earlier theoretical assertion that rather than something intrinsic to the child alone, the caregiver's behavior is enormously impactful on the developing attachment relationship.

What remains absent from attachment research in ECE is a more comprehensive understanding of how caregivers manage to provide sensitive and responsive care in a group context, especially for infants and toddlers, who can present with multiple competing demands throughout the day. It is likely that teachers who provide the most sensitive care are those whose own internal working models of self and other are the most integrated and flexible (i.e., secure),

which in turn would permit them to remain consistent over the course of a typical day and across different types of interactions. From the foundation of an internalized secure base, such teachers would be able to regulate their own emotions, which in turn would allow them to support and scaffold children's social-emotional learning. Research is needed on the association of teachers' internalized models of caregiving and their social-emotional capacity in the classroom, which is tied directly to their strategies of emotion regulation. The intersection of theories of attachment and emotion regulation is perhaps most apparent in their mutual emphasis on the use of strategies for self-management.

Emotion Regulation, Caregiving Quality, and Children's Social-Emotional Outcomes

Emotion regulation broadly describes the processes by which individuals experience and manage the experience of emotion over time. Within its scope are the range of behaviors that caregivers, such as ECE teachers, model and scaffold for young children as they develop into social actors. A teacher's capacity for emotion regulation of self and others is crucial to the smooth operation of an infant-toddler classroom, and to the containment and mirroring of children's emotions that supports social-emotional development (Pianta et al., 2016). Emotion regulation is a function of many variables, including attachment orientation, which in adulthood is demonstrably related to a lifetime of learned strategies (Mikulincer & Shaver, 2019). Importantly, especially for the purposes of the current study, emotion regulation is highly dependent on context and requires adaptability and flexibility in the face of stress (Sheppes & Levin, 2013).

In an early paper on the theoretical convergence of attachment and emotion regulation, Cassidy (1994) described the emotion regulation strategies available to individuals as analogous to attachment behavioral strategies learned in infancy and toddlerhood during repeated interactions with important caregivers. Cassidy additionally postulated that the attachment relationship

between infants and their primary caregivers (often mothers) is likely shaped by the patterns of emotional communication preferred by those caregivers, which in turn leads to the intergenerational transmission of emotion regulation strategies. This has clear implications for infant toddler teachers as well, given that they spend so much time with children during the critical first three years of life. In addition, teachers' abilities to tolerate children's distress while regulating their own emotions will likely vary as a function of multiple individual factors.

Emotion Regulation Theory

The process model of emotion regulation defined by Gross (1998) describes a continual, dynamic person-environment exchange in which individuals select from a variety of available strategies to control sensory and other input and modify the expression of emotional states. This ongoing negotiation takes place at both conscious and non-conscious levels of awareness, and strategy selection is situation-dependent and person-specific. Those strategies that are utilized most often become habitual – part of an individual's overall pattern of emotion-related behavior.

The two regulatory strategies most often described in research are cognitive reappraisal and expressive suppression. Both occur at the lattermost stage of Gross's (1998) process model, when individuals are already in the midst of emotional experience and must choose how to proceed. Expressive suppression – the flattening of affect or use of false enthusiasm in response to negative input – is considered maladaptive in the long term (Gross & John, 2003). By contrast, cognitive re-appraisal, the mental re-framing of a negative stimulus that renders it neutral or positive, is generally regarded as an adaptive strategy (John & Gross, 2004). However, a strict adherence to either strategy could prove detrimental: Persuasive arguments have been made for the application of emotion regulation flexibility, or the ability to utilize a variety of strategies as the occasion demands (Sheppes & Levin, 2013).

Teacher Emotion Regulation and Classroom Quality

Teacher affective displays set the tone for a classroom's social and emotional climate, a primary indicator of process quality. In their model of the Prosocial Classroom (see Figure 1), Jennings and Greenberg (2009) incorporated the teacher as an emotional actor, whose affective state and well-being have a reciprocal influence on the overall quality of the environment, including teacher-student relationships and student outcomes. This recognition of teachers' internal states represented a theoretical divergence from previous perspectives on classroom management, which stressed the importance of curriculum design, teaching skills, and other logistical tasks. This reframing was based on research evidence that teacher social and emotional competence is beneficial to the classroom climate (see, e.g., Birch & Ladd, 1998; Rimm-Kaufman et al., 2002). While teacher emotion regulation has not often been explicitly examined as a predictor of classroom quality, Jennings and Greenberg (2009) argued that teacher SEC (of which emotion regulation is a significant part) is associated with healthy teacher-child relationships, a healthy classroom climate, and in turn, children's positive social, emotional, and academic outcomes.

The application of within-person variability to teacher emotions and classroom behavior has been infrequently studied to date, and mostly in populations serving much older children (see Becker et al., 2015; Tadić, Bakker, & Oerlemans, 2013). As an example of such efforts, Frenzel, Becker-Kurz, Pekrun, and Goetz (2015) looked at both the person and context specificity of three separate teacher emotions (enjoyment, anger, and anxiety) and their variability according to other factors. Consistent with the authors' expectations, teacher emotion varied significantly, both within-person across the day, and by subject taught (i.e., math, science, language). In a follow-up study, teachers of specific subject matter showed significant differences in emotion when

instructing different groups of students, suggesting that the within-person variability was also related to the quality of teacher-child relationships and interactions.However, as noted by Mortensen and Barnett (2015) in their review of the available literature, an examination of teacher emotion and emotion regulation in ECE environments are generally conspicuous by their absence. Those authors point to the analogous relationship between family systems and infant-toddler classrooms as a possible starting point for future research aims. For example, Rutherford, Wallace, Laurent, and Mayes (2015) describe emotion regulation in parenthood as a foundational component of the sensitivity and responsiveness seen in parent-child relationships, and symptoms of stress and depressions as hindrances to their consistent provision. In a more direct correlation, Edwards et al. (2018) found that maternal strategies of expressive suppression were associated with higher levels of infant negative affect. Given the similarities between infant-toddler child care and the home environment, additional research is needed to examine the potential for comparable associations in ECE settings serving infants and toddlers.

Emotion Regulation and Early Childhood Teacher Responsiveness

Although much of children's learning occurs within the context of child-caregiver relationships, rather than independently or with peers as older children might do, the emotional experiences of ECE teachers have to date been under-studied (Jeon et al., 2016; Hamre & Pianta, 2004). Furthermore, the early childhood research that does exist is limited to preschool and kindergarten children and is focused primarily (if understandably) on the intersection of emotion and language. It is notable that findings suggest that teachers' use of emotion-minimizing language (e.g., "You're okay.") negatively impacts children's social-emotional competence, and that classroom chaos impedes teachers' abilities to respond to challenging behaviors through their broadly defined emotion regulation strategies (Jeon et al., 2016). However, empirical work in this

area has yet to describe what those strategies are, or analyze their association with other teacher-level or environmental factors. In addition, little if any research has addressed the infant-toddler environment as a unique developmental context. This is salient because for infants and toddlers, the long project of learning to self-regulate is guided entirely by their caregivers (Mortensen & Barnett, 2015). The process begins through co-regulation of emotion and affect, when children learn about display rules and other minutiae that will guide their growth into fully social individuals (Denham, Bassett, & Zinsser, 2012). As a way to contain children's emotions and support the development of emotion knowledge, caregivers must name and describe children's emotions (Jennings & Greenberg, 2009). However, when they fail to do so – whether as a function of their own non-awareness or in an effort to dissuade such expressions – there are negative consequences for children's social-emotional development (Denham, Bassett, & Miller, 2017).

The few studies available offer promising directions for further research. King and La Paro (2018) conducted a study of teachers' emotion-minimizing language in toddler classrooms. The use of emotion-minimizing language is a regulatory strategy by the adult caregiver to put psychological distance between herself and the child, while simultaneously discouraging the child's expression of emotion. It is most often used with respect to children's strong negative emotions, such as anger or sadness. King and La Paro (2018) found that teachers' emotion-minimizing language was negatively related to children's emerging social-emotional competence. Because a positive classroom climate encourages emotional expression, the practice of emotion-minimizing language by teachers may be construed as detrimental to young children's positive emotional development. The results of this study demonstrate the indirect connection between teachers' efforts to regulate their own emotions and the possible effects on children's social-emotional outcomes – and, by extension, the process quality of the classroom environment.

In a series of studies, Buettner and colleagues (2016) assessed psychological load and coping ability as an indicator of social-emotional capacity in teachers, and the impact of those factors on teacher reactions to children's negative emotions. Results of the first study suggested that ECE teachers with a high psychological load used more punitive reactions and emotion minimizing in response to children's challenging behaviors. Teachers who utilized positive coping strategies, including a cognitive reappraisal strategy of emotion regulation, were more likely to encourage children's emotional expression and react positively to children. In a related study on classroom chaos, the level of chaos was negatively associated with teacher emotion regulation and teachers' positive responses to children's challenging behaviors. Teachers who reported more chaos in their classrooms used more emotional suppression as a regulatory strategy, which in turn was associated with non-supportive responses to children's emotions (Jeon et al., 2016). The constructs of psychological load and coping ability proposed by Buettner and colleagues are easily understood within the framework of the Prosocial Classroom (Jennings and Greenberg, 2009), which incorporates aspects of teacher social-emotional competence – and therefore, emotion regulation strategies and overall functioning – into the quality of the environment.

Despite the strong theoretical basis for the study of ECE teacher emotion regulation, only recently have researchers begun to look at this construct in earnest. The few studies that exist are limited by the absence of an observational measure of teacher-child interactions. Although the maternal literature has demonstrated the importance of sensitive interactions and well-regulated caregivers by using observational ratings of the environment (see Ainsworth, 1967; Laranjo, Bernier, & Meins, 2008; Mirabile, 2014; NICHD-ECCRN, 1999, 2004), this particular approach is largely absent from the ECE literature. Especially in light of the demonstrated connections among maternal sensitivity, children's secure attachment, and positive social-emotional outcomes,

research is needed that maps these constructs onto infant-toddler childcare. Research has demonstrated that mothers' distress tolerance is higher when their parenting-related reflective functioning is higher; that is, when they are able to think coherently about their own and their children's emotions at once, even under stress (Rutherford et al., 2013; 2015). This skill is critical for child care teachers, who must balance the needs of multiple young children with their own in order to maintain a positive classroom climate.

More targeted research is needed that includes an assessment of environmental quality at the level of child-caregiver interactions, where social and emotional learning take place. In addition, such research must incorporate evidence of factors that demonstrably impact teachers' abilities to regulate their own emotions while responding contingently to children's emotional needs and remaining consistently available throughout the day. While teachers' attachment histories may be associated with their baseline ability to provide responsive care, there are other concurrent factors at work, such as contextual stressors in the environment, that should also be taken into consideration. As demonstrated amply in the parenting literature, stressors can impact the quality of caregiving, and by extension the outcomes possible for children.

Early Childhood Educator Job Stress

Psychological load, a part of everyday work experience, impacts teachers' ability to cope and their emotional responses to children. The demand-control model of stress proposed by Karasek and Theorell (1990) integrates individuals' appraisals of their autonomous decision-making ability (job control) and available intrinsic and extrinsic supports (job resources) in contrast to the requirements of the working role (job demands). Within this framework, the relative balance of these constructs as a function of person-environment interactions over time produce levels of stress unique to the individual. On a daily basis, teachers experience the regular stressors

associated with caring for multiple children while meeting programmatic requirements, such as paperwork and other center policies (Whitebook, 2002, 2018). However, it is important to acknowledge that more proximal and personal stressors also weigh heavily on them (Curbow et al., 2000). Taken together, these multiple levels of stress (personal and environmental) constitute the weight of imposed demands and lack of autonomous control that can lead to burnout, and which will ultimately impact classroom quality and children's social-emotional outcomes.

Impact of Teacher Stress on Quality Caregiving

The flexible management of stressors, both in the moment and over time, is a critically important skill for teachers in ECE. Similar to the adaptive regulation of emotional states, the capacity to remain calm in the face of challenging circumstances is the hallmark of skilled ECE caregiver. Fluid management of multiple demands while continuing to provide sensitive responses to young children's cues is one thing that may distinguish truly high-quality interactions from "good enough" child care. It is important to note, especially in the case of infants and toddlers, that the driving force behind high-quality care is sensitivity on the part of the adult. As such, understanding the mechanisms by which teachers handle their stress, and how that stress impacts children via the classroom climate, is an important research endeavor.

Teachers experience a wide variety of stressors, even beyond the expected challenges of caring for young children, that have the potential to impact the consistency and sensitivity of the care they provide. Studies of the ECE profession demonstrate that teachers in early childhood are paid far less than their counterparts in elementary education; sometimes, below a self-sufficiency wage (Rhodes & Huston, 2012; Whitebook & Sakai, 2003; Whitebook, McLean, Austin, & Edwards, 2018). Partially as a result of this issue, turnover in the workforce is high, with one-third to one-half of teachers leaving their jobs each year (Whitebook & Sakai, 2003; Wells, 2015).

Because so many teachers change jobs, those vital caregiver-child relationships are sometimes interrupted midway. In the absence of sustained, supportive interactions with trusted adults, children's social and emotional development – and the quality of their care – is compromised (Ghazvini & Mullis, 2002; Howes, Phillips, & Whitebook, 1992). Recruitment and retention of qualified teachers are two of the greatest obstacles facing the ECE field (Rhodes & Huston, 2012; Whitebook & Sakai, 2003).

Wagner and French (2010) examined ECE teachers' job satisfaction and found that teachers' motivation to remain in the ECE field was associated with perceived positive support from administrators and fellow teachers. In the absence of explicit support from supervisors, teacher workplace satisfaction was lower. The same was true for teachers who perceived lower levels of autonomy in their classroom-related decision-making. Wells (2015) echoed these findings in a study of Head Start teachers during their first year with that program: Those who remained in their positions had better relationships with supervisors, and those who quit within the year were more likely to do so because of a lack of institutional and collegial support. These results suggest that there may be additional causes to the crisis of teacher turnover beyond the concerns captured by structural problems such as long working hours and low wages. Nevertheless, it must be said that teacher turnover has real effects for young children, including increases in children's disruptive and externalizing behaviors (Pilarz & Hill, 2014), lower social and emotional skills (Bratsch-Hines et al., 2015; Howes & Hamilton, 1993), and decreased school readiness and caregiver attachment (Tran & Winsler, 2011).

Several studies have examined the impact of teacher stress on classroom quality through the lens of the demand-control model of stress. Li Grining et al. (2010) described how the interaction of job demands with job control may impact teachers' feelings of self-efficacy in their

study of teachers' management of classroom emotional climate. In that study, researchers examined various psychosocial stressors experienced by teachers in both an experimental intervention and a control group. Teachers in the experimental group were given the opportunity to use stress-reduction techniques and utilize mental health consultation services with the aim of improving the emotional climate of their Head Start classrooms. In line with hypotheses and previous research, teachers with the highest levels of personal and work stressors had classrooms with the lowest-quality behavioral management techniques. However, it was also the case that teachers with the highest levels of stress sought out the most help from the intervention offered. Li Grining and colleagues (2010) suggested that professional development opportunities such as theirs, based on a collaborative model and aimed at improving the daily classroom climate, might help to sustain the engagement of stressed teachers in early childhood settings.

In the Pennsylvania Head Start Staff Wellness Study, also based on the demand-control model, Whitaker et al. (2015) examined teachers' self-reported levels of job stress, the quality of their relationships with children, and other variables including symptoms of depression. Results demonstrated a clear association between higher stress and greater levels of relationship conflict. The clear limitations of this study are the cross-sectional nature of the data, the reliance on self-report measures, and the absence of an observational measure of classroom quality.

However, these findings do mirror previous and subsequent results in similar populations. Denham et al. (2017) similarly identified significant associations between preschool teachers' perceptions of job control and job resources and their positive emotional expressions and contingent responsiveness to children. By contrast, teachers in that study who felt a diminished sense of control or higher demands associated with their working roles demonstrated more negative emotions with children. However, this study also relied entirely on teacher self-report. In

addition, as with other studies cited here, the population of children were in preschool or kindergarten. While their results are important and signify an important contribution to ECE research in general, the caregiving environment is not the same. Infants and toddlers require closer, more specialized care than children in preschool, and for that reason are more vulnerable to change, negative affect, and chaos (Hestenes et al., 2007).

In spite of its focus on an older age group, the available research on teacher stress has established that children do reap gains from teachers' emotion regulation and lower levels of stress, because those factors are associated with classroom quality and positive teacher-child relationships. Teachers' perceptions of their relationships with children also have differential associations with their own self-reported stress, which has been shown to vary as a function of factors such as teacher-child ethnic match (Denham et al., 2017; Saft & Pianta, 2001; Thijs & Eilbracht, 2012), children's hyperactivity (Thijs & Koomen, 2009), and teacher educational attainment (Castle et al., 2016). This point is critical, as it reinforces that relationships in early childhood classrooms are dynamic and bidirectional; teachers and children influence and impact one another as equal partners in their relationships.

The quality of children's early relationships deserves the best possible foundation. In addition to being the mechanisms behind process quality, those relationships are a robust predictor of children's later academic success. Mantzicopoulos (2005) found that kindergarten classroom emotional climate and student-teacher conflict were associated with teacher stress as well as children's negative perceptions of their teachers. Teachers' stress related to their work assignment was the most significant contributor to classroom emotional climate and student-teacher relationships above and beyond other established predictors of teacher-child conflict. In a similar vein, Pakarinen et al. (2010) found that kindergarten teachers' low levels of self-reported stress in

combination with classroom organization predicted children's increased learning motivation and greater phonological awareness. On the other hand, children in the same study (but different classrooms) with lower learning motivation, and subsequent lower phonological awareness, had teachers with significantly higher self-reported stress. Pakarinen et al. (2010) suggested that one indication of these findings is that teachers' own well-being should be taken into account, especially in cases of emotional exhaustion or burnout, given the indirect effect of teacher stress on children's learning motivation.

In a recent study that focused on the subjective experiences of teachers in child care settings, Carson et al. (2017) used an ecological momentary assessment (EMA) technique to examine ECE teachers' subjective experiences throughout the day. This form of self-report allows for the analysis of within-person variability across a short time period; in this case, with respect to larger concerns such as burnout, a psychological syndrome of workplace stress characterized by emotional exhaustion and subsequent dysfunction in interpersonal relationships. In addition to demonstrating significant associations between experienced stress and burnout, results from this study confirmed that ECE teachers' affective experiences in the classroom had immediate, in-the-moment effects. This suggests that a more microscopic level of analysis (i.e., at the daily level) is worthwhile, especially in the context of early childhood, where children's emotional needs are greater, and relationships with teachers more significant, than in elementary school and beyond.

At present, a gap exists in the literature for the intersection of within-person interaction quality, consistent availability, and teacher emotion regulation not only in ECE generally, but in infant-toddler classrooms, the context in which those variables should be of greatest importance. While conclusions may be drawn about the relationship between teacher stress and classroom quality for preschoolers and kindergarteners, the social-emotional climate of an infant-toddler

classroom is qualitatively different. The theoretical models of teacher well-being proposed by Jennings and Greenberg (2009; see Figure 1) and the Buffett Institute (Gallagher, 2017; see Figure 2) emphasize teachers' emotional health as a vital component of the life of the classroom. Research is needed that can compare teachers' reports of their emotional experiences, including their attempts to remain regulated under conditions of stress, in the highly specific context of infant-toddler care.

Given the analogous relationship between those environments and the family home, and the high level of communication required with children's families, it is also useful to examine teachers' own mental frameworks of attachment. These mental models structure their caregiving behavior and may inform their beliefs and strategies of what constitutes appropriate and sensitive care. Research is also necessary that focuses specifically on the quality of caregiver-child interaction above and beyond structural aspects of the environment. Questions remain about the extent to which the care provided is consistently sensitive, or whether it may be highly variable throughout the day. A comparison of such findings with other teacher-level and environmental factors would greatly broaden the picture of interactional quality in infant-toddler group care.

The Current Study

The purpose of the current study is to examine a specific sub-process of environmental quality – interactional quality – by observing infant-toddler teacher sensitivity and responsiveness across the day, to determine whether patterns exist in the provision of sensitivity, and if other teacher-level and environmental factors are associated with observable sensitivity. A related goal of this research is to illuminate individual differences in teachers' emotion regulation, attachment, and perceived job stress in relation to observed levels of the consistency of their interactional quality in the care of infants and toddlers.

This study addresses existing gaps in the research in several ways. To date, the literature on teachers of older children has made very clear the impact of teachers' perceived job stress on their relationships with children (Abidin & Kmetz, 1997; Mantzicopoulos, 2005). However, research on teacher stress in ECE more generally has focused on structural problems (e.g., wages, class size, voluminous paperwork), rather than the emotional content of their work, which is the driver of process quality. Further, this work has yet to be conducted to any extent in infant-toddler settings, where teachers' internal states are arguably most influential on the children in their care. Teachers' emotion regulation strategies also inform their caregiving behavior in the classroom. Unfortunately, very little research is available that elucidates teachers' emotional experiences or their strategies of emotion regulation. Rather, the focus has primarily been on the psychological consequences of teachers' affective displays for children, rather than the internal experiences of teachers themselves. Children's social and emotional development occurs through a dynamic process of relationships with their important caregivers, whose own well-being is the foundation of their ability to provide that care. Research truly dedicated to positive outcomes for infants and toddlers in child care should begin with their caregivers' affective experiences, as it often does in the maternal literature. Finally, existing research measures of environmental quality cannot accurately capture those moment-by-moment interactions that constitute social-emotional development for infants and toddlers; a micro-time-series analysis such as proposed here will provide a different approach to viewing caregiving sensitivity. Connections may then be drawn between patterns of responsiveness and other aspects of teachers' capacity for caregiving, including attachment, emotion dysregulation, and aspects of perceived job stress at the personal and environmental level.

Aim 1: Variability in Individual Scores Across the Morning

To assess whether significant variability exists among and within teachers on four separate indicators of contingent responsiveness and sensitivity to infants' and toddlers' cues across the morning in a group child care setting.

Aim 2: Identification of Typologies of Interactional Quality

To determine whether the observed variability among and within teachers can be grouped into typologies of interaction quality; potential examples include increasing over time, consistent, or unstable.

Aim 3: Association of Typologies of Interactional Quality with Teacher-Level Factors

To examine the differences in teacher-level factors such as attachment, emotion regulation and job stress among the different typologies of interaction quality.

Aim 4: Prediction of Typologies of Interactional Quality from Organizational Stress

To broaden the scope of the previous aim by investigating the differences in aspects of job stress at the agency and center levels, and whether those differences have an effect on teachers' assignment to typologies of interaction quality.

CHAPTER 2: METHODS

Sample Characteristics and Recruitment

Participants

The sample for the current study are taken from the baseline wave of data collected in both the open trial and RCT phases of a larger study, Hearts and Minds on Babies (HMB), that sought to develop and test an integrated parent and teacher intervention to support interaction quality via improved reflective functioning and mindfulness and reduced stress. All participants were teachers or assistant teachers employed by Early Head Start (EHS), a federal program for low-income families and their young children birth to age three. EHS provides comprehensive child development and family support services, including home visiting services, high quality center-based child care, nutrition, health and behavioral health services to young children and their families. In total, nine community agencies operating EHS programs across six counties in Michigan participated in the HMB project.

Recruitment

Participants were recruited and consented at the EHS programs where they worked, either individually or during a group meeting scheduled for that purpose. Informed consent was obtained for all participants.

Data Collection

Multiple types of data collection were used for this study. At the baseline assessment period, teachers were filmed during interactions with children for two hours at the start of the school day to assess classroom quality. Teachers were also interviewed individually to assess attachment and reflective functioning, and they completed a battery of online self-report surveys on demographics, adverse experiences, stress, depression, beliefs about caregiving, relationships

with children and families, and children's behavior. Teachers were compensated for their time spent in research outside of work hours.

Ethics

All data were collected by graduate and undergraduate research assistants who were first required to complete training in the ethical conduct of research. Research assistants who conducted data collection at EHS sites were additionally required to test negative for TB and be cleared by the Michigan Department of Human Services child abuse registry. The study was approved by the Wayne State University Institutional Review Board and the Michigan State University Human Subjects Review Board.

Measures

Classroom Interaction Quality

The social-emotional responsiveness subscale of the Quality of Caregiver-Child Interaction for Infants and Toddlers (Q-CCIIT; Atkins-Burnett et al., 2015a), is used to assess interactional quality. The Q-CCIIT is a comprehensive observational measure designed specifically for environments serving children birth to three years of age. It contains five subscales: Support for Social-Emotional Development, Support for Cognitive Development, Support for Language Development, Across the Visit, and Areas of Concern. In addition to those domains, the Q-CCIIT requires the coder to indicate the types of interaction observed, the complexity and type of talk used by caregivers, the concepts presented by caregivers, and any unusual events during the observation period.

For the sake of practicality, in the current study, teachers were filmed in their classrooms, and videos were then edited by trained research assistants to approximately one hour in length to include the required six coding cycles of approximately ten minutes each. Videos were coded by

three researchers who were trained by Mathematica and earned reliability of 80% across all domains on gold-standard videos. In analyses proposed here, only the Support for Social-Emotional Development subscale was used. Scores from each of the six cycles were reframed as a micro-time-series to model interactional typologies. This Q-CCIIT subscale contains four items, each of which is rated on a 7-point scale with comprehensive descriptive anchors. As a general rule, a cycle score of 5 to 7 for any Q-CCIIT item is considered above the threshold of responsiveness and sensitivity, with a score of 7 being the absolute best (but still attainable) example of teacher-child interactions possible. A score of 4, at the midpoint of the scale, indicates that a teacher has provided adequate-to-good care on average during that 10-minute cycle for the children in her classroom. A rating of 3 is the floor of what may be considered acceptable care; children in classrooms where teachers receive many 3s are in no danger, but neither are they receiving the attention and care that would best support their development. Scores of 2 or 1 demonstrate diminished (or absent) overall responses of any kind to children's cues, or perfunctory, unengaged caregiving within a given domain.

The first item on the social-emotional subscale of the Q-CCIIT is Responding Contingently to Social Cues. This item refers to children's non-distress signals (verbal and non-verbal) that include requests for direct attention, moments of joint attention, vocalization or initiation of conversation, aspects of play, and cues of interest or disengagement. On the range from 1-7, a score of 1 indicates no response to children's non-distressed social cues and 7 indicates that caregivers were consistently able to individualize responses to children, flexibly respond to multiple social bids at once, and interact using a variety of modalities including physical touch, verbal interaction, and facial expressions.

The second item on the subscale (Responding to Emotional Cues) is closely related but differs in subtle ways. For this domain of social-emotional development, caregivers are assessed on their ability to discern and display awareness of infants' and toddlers' emotional states. In addition, their responses are scored according to the degree of empathy shown, and the extent to which their actions support the development of emerging self-regulation skills as appropriate. Scores of 1 for this domain indicate a limited awareness of (or in some cases, a deliberate attempt to ignore) children's emotional states, while a 7 reflects caregivers' consistent, empathic responses to children's positive and negative emotional expressions, while scaffolding children's development of emotion regulation strategies.

The third item, Building a Positive Relationship, refers more broadly to caregivers' abilities to maintain an attitude of warmth and general positive regard towards all children in the group. While individual relationships are critically important, it is the nature of child care that teachers must maintain an awareness and sensitivity towards all children in the environment (Ahnert et al., 2006). Scores range from a low of 1, for teachers who provide only routine care and maintain impersonal relationships with the multiple infants and toddlers in their classrooms, to a high of 7 for those who actively engage each child on an individual basis even during group activities, using a flexible range of strategies including positive physical touch.

The fourth and final item on the social-emotional subscale is Supporting Peer Interaction and Play. As infants and toddlers learn to be social actors, they require the continual assistance of adults to support their entry into and efforts to engage the social world. While the youngest children are generally more caregiver-oriented, it is through the assistance of their teachers that they come to recognize and negotiate with the presence and goals of their peers. This, too, requires sensitivity and attentive responsiveness for appropriate scaffolding of social-emotional development. Scores

on this item range from a low of 1 for the absence of any support for peer interaction, to a high of 7 for caregivers who encourage peer awareness and interaction through a variety of age-appropriate strategies (e.g., placing non-mobile infants in sight of one another, choosing toys that are easily exchanged or require two young toddlers for use).

Demographics

As part of an online battery of self-report surveys, study participants completed a demographic questionnaire. Items on this questionnaire addressed personal characteristics such as sex, age, and race/ethnicity. Additional items asked about teachers' educational attainment and work experience in EHS and other child care settings. For descriptive statistics of participant demographic variables for this study, see Table 1.

Attachment

The Secure Base Scripts narrative assessment (SBS; Waters, Rodrigues, & Ridgeway, 1998) is a semi-structured interview in which participants are asked to make up six different stories using lists of provided prompt words. Two stories feature a mother and child, two are about adult romantic partners, and two are neutral stories. The purpose of the instrument is to assess for the presence of an internalized secure base, based on the content and quality of the stories told by the interviewee. The stories individuals tell are theorized to relate to their internal working models of attachment and their relative experiences of the availability of help when it is needed. In the parenting literature, the SBS has been used to demonstrate that mothers' secure base scriptedness is related to their reflective functioning (Huth-Bocks, Muzik, Beeghly, Earls, & Stacks, 2014) and children's attachment behavior (Borelli, Burkhart, Rasmussen, Brody, & Sbarra, 2017; Huth-Bocks et al., 2014). In the present study, all teachers were administered the SBS narrative assessment in the initial wave of data collection. Each story prompt was coded by researcher who

was trained by Harriett Waters and earned reliability on a gold-standard set of scripts. Scores from the mother-child and adult partner stories are averaged separately to reflect secure base scriptedness in each domain, and the two scores may again be averaged to reach a summary score of secure base scriptedness.

Emotion Dysregulation

The Teacher Care Patterns Questionnaire (TCPQ; Shine, 2016) is a 25-item self-report measure that describes ECE teachers' emotional experiences in relationships with the young children in their care. Items on the TCPQ are combined to create a summary score by reverse-coding the Integration subscale (n = 6 items, range of possible scores 6-30; Cronbach's α = .71 for this study) and collapsing the other items into a single dimension, Emotion Dysregulation (n = 19 items, score range 19-95; Cronbach's α = .85). Each item is rated on a 5-point scale from "strongly disagree" (1) to "strongly agree" (5). The Integration subscale, consistent with Gross's (1998) process model, reflects a flexibility of emotion regulation, as well as the ability to cognitively appraise and address challenging situations as they arise: A sample item from this subscale is "The children deserve my love and attention, especially when they are not feeling well." By contrast, the Emotion Dysregulation domain describes adherence to one or more maladaptive strategies in such situations: A sample item from this subscale is "Sometimes being a teacher seems like a battle and if the children won't cooperate, one of us must give in."

Aspects of Job Stress

The Child Care Worker Job Stress Inventory (JSI; Curbow, Spratt, Ungaretti, McDonnell, & Breckler, 2000) is a 54-item self-report measure designed specifically for ECE teachers that contains the subscales Job Demands, Job Control, and Job Resources. This measure is based on Karasek and Theorell's (1990) demand-control model of workplace stress. Job demands (n = 20

items, range of possible scores: 20-100, Cronbach's α = .78 for this study) include items related to the physical, mental, and emotional requirements of work in ECE; an example item is "Children have behavior problems that are hard to deal with." Job control (n = 17 items, score range: 17-85, Cronbach's α = .76) items reflect the extent to which respondents feel a sense of autonomy in their work; a sample item is "I have control over when daily activities take place." Job resources (n = 17 items, score range: 17-85, Cronbach's α = .88) refers to the intrinsic social support and self-efficacy teachers report in their working lives; an example item from this subscale is "I feel the love of the children for me." Subscales are scored separately but are all rated on a 5-point Likert scale.

Statistical Plan

Data Screening

Data screening followed a standard procedure to eliminate errors and outliers in a dataset (Tabachnick & Fidell, 2018). The first step was to run basic frequencies and descriptive analyses on all subscales, and inspect histograms for normality. The initial sample for this study included all participants from the pre-test wave of data collection of the larger HMB project (N = 127). Missing data was evaluated by running an MVA; the total amount was less than 5%, and values were replaced using listwise deletion. Next, to test the homogeneity of variance, scatterplots of independent variables (the SBS, TCPQ, and JSI) were made to allow a quick visual inspection. Univariate outliers are detectable via creation of z-scores of each subscale; after calculating these, it was possible to check their respective skewness and kurtosis, and evaluate the Mahalnobis distances. Two participants' scores exceeded the Mahalnobis distance on the SBS and job demands subscale of the JSI, respectively; they were excluded from analyses. Individual items were then

evaluated to check whether minimum and maximum values, as well as means and standard deviations, were within expected limits.

For various reasons, the number of participants at pre-test with Q-CCIIT videos – and, therefore, interaction data – was smaller than the total pre-test sample (N = 103). In addition to traditional data screening, these videos were then cross-checked against exclusion criteria, and six were eliminated. Two videos were recorded on a day when only one child was present with two teachers: These were discarded due to the fact that Q-CCIIT scoring for social-emotional items heavily emphasizes teachers' group-level sensitivity and capacity for supporting peer-to-peer interaction. Four videos were recorded at times of day that were inconsistent with the rest of the sample – one in the afternoon, and three over the course of two days, including periods of time in the afternoon. The final sample for the study (N = 97) represents participants with videos that were all filmed in a single session in the morning, at approximately the same time of day.

Power Analysis

To conduct power analysis for these data, it was necessary to calculate the root mean square error of approximation (RMSEA) using an online calculator (Preacher & Hoffman, 2006). Computation of power in a repeated-measures design such as this required that the initial sample size (final N = 97) be multiplied by the number of observations per individual (e.g., 6 cycles) to calculate the number of cells for analysis (N = 582). Degrees of freedom in this case were the number of within-person measurements multiplied by variances, divided by two (df = 21). Alpha was set at a conventional level (p = .05). This resulted in an estimated power of 0.99 for the research aims of this study, confirming that research aims and hypotheses were sufficiently powered using this sample size.

Planned Hypothesis Testing

After data screening, sample size finalization, power analysis, and preliminary analyses, the following aims and hypotheses were planned as described below.

Aim 1: Variability in Individual Scores Across the Morning. To assess whether significant variability exists among and within teachers on four separate indicators of contingent responsiveness and sensitivity to infants' and toddlers' cues across the morning in a group child care setting.

Hypothesis 1. It was hypothesized that significant variability existed among and within teachers on each of the items in the Support for Social-Emotional Development subscale. To test this initial hypothesis – and to establish a precedent for all planned analyses in this study – SPSS Version 26 was used to calculate descriptive statistics for Q-CCIIT item scores, and profile plots were compiled for each of the items on the subscale across the six cycles in the Q-CCIIT videos. Then, using an unconditional growth model in MPlus Version 8.4 (Muthén & Muthén, 2017), it was possible to determine via measurement of variance at intercept (I), slope (S) and quadratic slope (Q) whether significant variability was present for each social-emotional Q-CCIIT item.

Aim 2: Identification of Typologies of Interactional Quality. To determine whether the observed variability among and within teachers could be grouped into typologies of interaction quality; potential examples include increasing over time, consistent, or unstable.

Hypothesis 2. It was hypothesized that individuals' variability in interactional quality could be grouped by the patterns of their behavior over time. To evaluate this hypothesis, a latent class analysis (LCA) using MPlus Version 8.4 was applied to the observational data on teacher-child interaction. Nylund-Gibson and Choi (2018) have described this statistical technique as a "person-centered" rather than variable-centered approach to data. For studies such as this one, in which the

theoretical and practical goals include support for an under-served workforce, LCA is a useful framework; not only for identifying large groups, but for extracting smaller classes whose observed behavior puts them at the fringes of the study sample. There is no established lower bound for sample size in LCA with regard to analytical accuracy.

The LCA conducted for the current study were exploratory by nature; for that reason each social-emotional item on the Q-CCIIT was tested using two-, three-, and four-class models in order to discern the best solution possible. To evaluate model fit, several indices were used to make the final judgment between solutions of comparable parametric quality. Entropy is an index of the accuracy of model classification. An entropy value is considered acceptable if it is greater than 0.80 (Wang et al., 2017). The sample size-adjusted Bayesian information criterion (SABIC) serves as the superior model selection criterion when a sample is small, as was the case for these data (Wu, 2009). An information criterion such as the SABIC accounts for both the fit and complexity of a model; a lower value implies the better trade-off between these components (Chen et al., 2017). A model's SABIC is based on that same solution's loglikelihood value; a better model fit is designated by a greater loglikelihood. Finally, classification probabilities for each group represent the percent chance that class assignments would be accurate at the population level, and serve as an additional marker of goodness-of-fit for the data at hand.

Aim 3: Association of Typologies of Interactional Quality with Teacher-Level Factors. To examine the differences in teacher-level factors such as attachment, emotion regulation and job stress among the different typologies of interaction quality.

Hypothesis 3.1. It was hypothesized that interaction quality was associated with teachers' attachment orientations such that teachers' attachment security would demonstrate a positive

association with higher and consistent levels of observed interactional quality. Secure base scriptedness was evaluated as a continuous, rather than categorical, variable.

Hypothesis 3.2. It was hypothesized that teachers' self-reported emotion dysregulation while teaching would demonstrate a negative association with higher and consistent levels of observed interactional quality.

Hypothesis 3.3. It was hypothesized that teachers' self-reported job demands would be negatively associated with higher and consistent levels of observed interactional quality, while job control and job resources would show positive associations with higher and consistent levels of interactional quality.

Aim 4: Prediction of Typologies of Interactional Quality from Organizational Stress. To broaden the scope of the previous aim by investigating the differences in aspects of job stress at the agency and center levels, and whether those differences have an effect on teachers' assignment to typologies of interaction quality. This goal of this analysis was to use a multi-level modeling approach – specifically, a hierarchical linear model – to examine whether any of the variance on measures of job stress - was attributable to either individual child care centers or their operating agencies.

Hypothesis 4. It was hypothesized that aspects of job stress operating at the child care center and agency levels would differentially affect the quality of the caregiving environment via their impact on teachers' assignments to typologies of interaction quality.

CHAPTER 3: RESULTS

Preliminary Analyses

Prior to hypothesis testing, participant demographic variables were run as bivariate correlations with all study measures to check for the presence of covariates. A full list of demographic variables and associations with the Q-CCIIT, SBS, TCPQ, and JSI are in Table 2. Significant associations were found between the TCPQ and both participant age and length of work experience in ECE, such that older and more experienced teachers reported lower levels of emotion dysregulation at work. A similar finding emerged for the JSI, such that older and more experienced EHS teachers reported lower stress related to job demands. Lastly, teachers with higher levels of education reported significantly lower perceived levels of job control. Bivariate correlations were calculated between all study measures; descriptive statistics and associations among all study measures may be seen in Table 3. Correlation values for the four Q-CCIIT items on both Tables 2 and 3 represent calculations using participant mean scores across the observation period, which is the standard scoring procedure for the measure.

Results of Hypothesis Testing

Aim 1: Variability in Individual Scores Across the Morning

Results from descriptive analyses demonstrated that while means for the total sample (N = 97) were similar across cycles on each domain of social-emotional responsiveness, standard deviations and variances indicated a wider dispersion of scores. This contrast indicated the likely presence of underlying differences not conveyed through use of the sample means. To further confirm variability in teachers' responsiveness and interactions across the morning, profile plots were created for each participant's item score at each of the six cycles. A visual inspection of these

graphs (see Figures 3-6) also revealed participants' individual differences on the Q-CCIIT's social-emotional subscale.

To test the statistical significance of the observed variance, an unconditional growth model was run in MPlus Version 8.4 to calculate variance within the total sample for each social-emotional Q-CCIIT item. Sample variance ranged from 0.38 ($p < .01$) for supporting peer interaction and play to 0.82 ($p < 0.01$) for responding to emotional cues; for a complete list of descriptive statistics and calculated within-item variance for Hypothesis 1, see Table 4. With the support of both statistical evidence of significant variance at the individual level, and the striking visual representation of the graphed data, Hypothesis 1 was supported.

Aim 2: Identification of Typologies of Interaction Quality

When analyzed as micro-time-series using latent class analysis (LCA), teachers' scores by cycle produced coherent and statistically sound 2- and 3-class models for the social-emotional items on the Q-CCIIT. While there was variance at the individual level, results from the LCA show consistency across most of the classes for most teachers, which does not fit with study hypotheses, which postulated the existence of increasing, consistent, and unsteady classes. Hypothesis 2 was partially supported; In every domain, the largest class demonstrated consistency of scores in the adequate-to-good range, while smaller groups showed consistent, increasing, or declining scores in the higher and lower ranges of the scale. However, no classes in any social-emotional domain demonstrated instability across the morning as a defining characteristic. A description of the model testing process for each item follows. For a complete list of LCA model testing results, including descriptive indices of model fit and the intercept (I), slope (S) and quadratic slope (Q) for each class, see Tables 5-8.

Responding Contingently to Social Cues. After testing two, three, and four-class models, quantitative markers as well as a visual examination of the graphed data indicated that a 2-class model was the best fit for teachers' scores on responding contingently to children's social cues across the morning. An initial inspection of all output revealed that the 4-class model contained an empty class, a sign that such an approach was likely over-extractive (Nylund-Gibson & Choi, 2018). In addition, the populated groups rendered for the 4-class model were nearly identical to those produced by the 3-class model, as were the loglikelihood and entropy values. Further, the 4-class model's sample-adjusted Bayesian information criterion (SABIC) value was greater, which suggested that it was not the most parsimonious solution. For all these reasons, the 4-class model was discarded as a poor fit.

A subsequent examination of the 2- and 3-class models revealed that their goodness-of-fit indices and information criteria were not substantially different from one another. The entropy value of the 3-class solution was slightly higher, and the SABIC and loglikelihood values were both an improvement over the 2-class alternative (see Table 5). However, in this case, such differences did not indicate that the 3-class model solution was meaningfully better. In order to establish strong evidence for any given solution over another, a difference of 10 or more should be observed between SABIC values (Nylund-Gibson & Choi, 2018). In addition to these minor distinctions between the two models, the additional group produced by the 3-class solution was very small (n = 6), and its classification probability was quite low (0.67), especially compared to the Moderate Consistent (n = 82) and High Consistent (n = 15) groups in the 2-class solution, whose probabilities were excellent (0.98 and 0.91; respectively). Therefore, in the interest of accurate representation of actual typologies of teacher-child interactional quality in this sample, the 2-class model was selected (see Figure 7). This solution is partially consistent with hypotheses,

although an "unstable" class could not be reliably established for this domain. For comparison purposes, the profile plot for the 3-class model may be seen in the Appendix.

Responding to Emotional Cues. After testing models with two, three and four classes, a 3-class model emerged as the best fit for teachers' scores across the morning on responding to children's emotional cues (see Table 6; Figure 8). This was due in no small part to the fact that both alternative models had to be discarded. The 2-class model's entropy value was unsatisfactory, an initial indication that the groups identified by this extraction were not distinct. Although the 4-class solution's entropy was quite good, that analysis produced two classes with zero cases. As with responding contingently to social cues, this implies the opposite problem – that a proposed model suffers from over-classification at the expense of both theoretical meaning and practical utility.

In comparison with the discarded models, the 3-class solution nevertheless performed well: It demonstrated a larger loglikelihood value (-706.67) and a lower SABIC (1445.94) than both the 2-class and 4-class models, indicating optimum goodness-of-fit to these data. The 3-class model's entropy value was good (0.87), and substantially greater than the 2-class model. Further, this value was identical to the entropy for the 4-class solution, indicating (correctly, in this case) that the forced addition of another class was unlikely to clarify any understanding of the data. Classification probabilities were also good-to-excellent for the 3-class model, and a marked improvement on a 2-class approach: Class 1 (0.94, Moderate Consistent, n = 58), class 2 (0.83, High Consistent, n = 15) and class 3 (0.94, High Declining, n = 24). Based on these indices and a visual inspection of the profile plot, the 3-class approach was selected as the most practical model of teacher-child interaction typologies for responding to children's emotional cues. With respect to study hypotheses, these findings are consistent with the prediction that there would be classes

with consistent and increasing trajectories across the morning. Contrary to expectations, a third group demonstrated a clear negative slope and none of the classes were irregular such that they could be described as "unstable."

Building a Positive Relationship. Similar to analyses of the previous time series, the 2-class model's entropy value (0.67) for building a positive relationship proved less than satisfactory, so that model was discarded. The 4-class model rendered by MPlus produced a group with zero cases, so it was also discarded. However – as before – the choice of a 3-class solution was justified for these data (see Table 7) based on research on fit indices in latent class analysis (see Chen et al., 2017; Nylund, Asparouhov, & Muthén, 2007; Wu, 2009). The 3-class model's entropy value was good (0.87) and also a marked improvement on the 2-class alternative. The 3-class model for teacher scores on building a positive relationship additionally had the lowest SABIC (1225.52) and greatest loglikelihood (-596.46). Further, class probabilities for this model were acceptable to excellent: Class 1 (0.97, High Consistent, n = 82), class 2 (0.81, Very High Consistent, n = 11), class 3 (0.91, Moderate Declining, n = 4). A visual inspection of the profile plot (see Figure 9) clearly demonstrates the differences among these three classes, despite the third group's small size. In terms of Hypothesis 2 and the expected trajectories for classes, the two high-level groups observed here are in accordance with predictions, but neither increasing nor unstable classes were detected in analysis. As with responding to emotional cues, building a positive relationship also showed an unexpected but statistically coherent class with a clear negative trajectory across the morning.

Supporting Peer Interaction and Play. The choice of a latent class model for teachers' scores across the morning on supporting peer interaction and play presented a unique challenge. This Q-CCIIT domain's use in a time-series analysis is problematic from an analytical standpoint,

because of the multiple situations in which cycles may be marked 'Not Applicable' (e.g., when the class is engaged in circle time, during diaper changes or bottle-feeding, or when the teacher is sharing a book with the group). Thus, scores across the morning more frequently resulted in incomplete and interrupted time series (i.e., fewer than six sequential scores) than did the other items, for which scores are nearly always required regardless of teacher-child interaction type. With the goal of retaining the largest sample size possible, participants with fewer than five sequential cycles scored for supporting peer interaction and play were held out, leaving a total sample of $N = 89$ for these analyses. As with the previous social-emotional items, models with two, three, and four classes were analyzed using MPlus. In the 4-class model, one class had zero cases, so it was discarded. The 2-class and 3-class solutions were then examined for relative goodness-of-fit (see Table 8).

On most indices, the 3-class model appeared to be a better choice: Its entropy value was higher, its SABIC was lower, and its loglikelihood greater than those for the 2-class solution. However, the third class contained only three individuals, with a probability value in the acceptable but lower range (0.83), suggesting that the issue with classification for this social-emotional domain of the Q-CCIIT was partly due to the presence of extreme outliers, in an area that already posed a challenge to this statistical approach to the data. The three participants grouped into their own class had scores on peer interaction and play that were truly unusual. Rather than retain a such a tiny group for analysis – which would have limited practical and theoretical utility – the 2-class model was selected instead. In contrast to the overall patterns observed on other social-emotional items, this model included Low Consistent ($n = 77$) and Low Increasing ($n = 12$) profiles of interactional quality (see Figure 10). While both a consistent and an increasing profile were represented in this social-emotional domain, as with other Q-CCIIT items, no evidence emerged

for an unstable class with respect to supporting peer interaction and play. For comparison purposes, the profile plot for the 3-class model may be seen in the Appendix.

Aim 3: Association of Typologies of Interaction Quality with Teacher-Level Factors

One-way omnibus ANOVAs were conducted to examine for mean differences among latent classes on each teacher-level variable. For purposes of post-hoc testing in 3-class models, the Games-Howell test was utilized, as this nonparametric alternative does not assume equal sample sizes between groups. Practical differences in mean scores between classes for all domains were calculated using Hedge's *g*, an adjusted effect size that is best for small (< 20) and unequal sample sizes. Medium effect sizes (a threshold of $g_{Hedges} = 0.50$) or better are reported here, as are significant ($p < 0.05$) results of ANOVA tests and Games-Howell post-hoc analysis, where applicable.

Hypothesis 3.1 – Attachment. Descriptive statistics for scores on the Secure Base Scripts (SBS) task and effect sizes for differences between classes may be seen in Table 9. It was hypothesized that secure base scriptedness would differ among the classes on each Q-CCIIT item measuring social-emotional responsiveness, such that teachers in latent classes characterized by higher responsiveness and more consistent interaction would have the highest SBS scores. Results are presented below by Q-CCIIT item and are consistent with the study hypotheses.

Responding contingently to social cues. Results of an ANOVA indicated that there was a significant difference in SBS scores between classes, $F(1,91) = 3.845$, $p = 0.05$. Teachers in the High Consistent class scored higher on the SBS task ($M = 4.31$) than those in the Moderate Consistent group ($M = 3.88$), a difference that represents a medium effect ($g_{Hedges} = 0.55$).

Responding to emotional cues. The ANOVA for responding to emotional cues also demonstrated significant differences, $F(2,90) = 3.715$, $p = 0.03$. Post-hoc tests revealed significant

differences in SBS scores between the High Consistent class for that domain (M = 4.39) and the High Declining class (M = 3.69, p = .05), which represents a large effect (g_{Hedges} = 0.94). In addition, while mean SBS scores did not statistically differ between the Moderate Consistent (M = 3.93) and High Consistent (M = 4.39) classes, a medium effect was found (g_{Hedges} = 0.58).

Building a positive relationship. SBS scores did not significantly differ among the 3 classes of building a positive relationship. $F(2,90) = 1.767$, p = 0.18. However, the Very High Consistent class had higher scores (M = 4.36) than both the High Consistent (M = 3.90, g_{Hedges} = 0.58) and Moderate Declining (M = 3.75, g_{Hedges} = 0.65) classes; these differences represent medium effects.

Supporting peer interaction and play. The ANOVA for supporting peer interaction and play demonstrated trending significance, $F(1,83) = 2.728$, p = 0.10. Teachers in the Low Increasing class scored higher on the SBS task (M = 4.31) than those in the Low Consistent group (M = 3.93), a difference that represents a medium effect (g_{Hedges} = 0.52).

Hypothesis 3.2 – Emotion Dysregulation. Descriptive statistics for the Teacher Care Patterns Questionnaire and effect sizes for differences between classes are presented in Table 10. On the whole, teachers in this sample reported moderate levels of emotional dysregulation while working in EHS classrooms. The overall mean score (M = 58.43) was not significantly higher or lower than the mean for any individual latent class across social-emotional domains on the Q-CCIIT measure. Contrary to expectations, no significant associations or substantial effect size differences emerged from multivariate testing.

Hypothesis 3.3 – Aspects of Perceived Job Stress. Results of multivariate ANOVA testing across the subscales of the JSI were statistically nonsignificant, with job demands showing the least variability among classes across social-emotional domains. In general, effects for class

differences were also low to medium in size, and several were in directions contrary to hypothesized associations.

Job demands. Descriptive statistics for job demands and effect sizes for differences among latent classes on the social-emotional items of the Q-CCIIT are presented in Table 11.

Responding contingently to social cues. The ANOVA for job demands by latent class on responding to social cues was nonsignificant, and effect sizes were in the low range.

Responding to emotional cues. The ANOVA for job demands by latent class on responding to emotional cues was nonsignificant, and effect sizes were in the low range.

Building a positive relationship. The ANOVA for job demands by latent class on building a positive relationship revealed no significant differences. However, the Games-Howell post hoc test showed that the Very High Consistent class had significantly higher scores (M = 62.00) than the Moderate Declining class (M = 56.67), a result which represents a medium effect (g_{Hedges} = 0.51) and is in the opposite direction to hypothesized associations.

Supporting peer interaction and play. The ANOVA for job demands by latent class on responding to emotional cues was nonsignificant, and effect sizes were in the low range.

Job Control. Descriptive statistics for job control and effect sizes for differences between classes on the social-emotional items of the Q-CCIIT are presented in Table 12.

Responding contingently to social cues. The ANOVA for job control by latent class on building a positive relationship was nonsignificant, and effect sizes were in the low range.

Responding to emotional cues. The ANOVA for mean differences on job control by class on responding to emotional cues was nonsignificant, but individual comparisons between group means demonstrated a significant difference between the Moderate Consistent (M = 40.93) and

High Consistent (M = 45.67, g_{Hedges} = 0.60, p = 0.05) classes. A similar effect size was observed for the mean difference between High Consistent and High Declining (M = 41.33, g_{Hedges} = 0.62).

Building a positive relationship. The ANOVA for job control by class on building a positive relationship was nonsignificant. A medium effect was nevertheless found during post-hoc analysis between the High Consistent (M = 41.38) group, whose scores were lowest, and the Moderate Declining group (M = 45.67, g_{Hedges} = 0.52), who reported the highest level of job control. This finding is contrary to hypothesized associations.

Scaffolding peer interaction and play. The ANOVA for job control by latent class on supporting peer interaction and play was nonsignificant. However, a medium effect was found for the difference between classes such that the Low Increasing class (M = 45.73) reported higher job control than those classified as Low Consistent (M = 41.35, g_{Hedges} = 0.55).

Job Resources. Descriptive statistics for job resources and effect sizes for differences among latent classes on the social-emotional items of the Q-CCIIT are presented in Table 13.

Responding contingently to social cues. The ANOVA for job resources by class on responding to social cues was nonsignificant, and the effect size for mean differences between groups was in the low range.

Responding to emotional cues. The ANOVA for job resources by class on responding to emotional cues was nonsignificant, and effect sizes were in the low range.

Building a positive relationship. The ANOVA for job resources by latent class on building a positive relationship was nonsignificant, and effect sizes were in the low range.

Scaffolding peer interaction and play. The ANOVA for job resources by latent class on supporting peer interaction and play found a trending result, $F(1,82) = 2.691$, p = 0.10. The Low

Increasing group (M = 75.82) reported higher job resources than teachers in the Low Consistent group (M = 71.73), a difference which reflects an effect of medium size (g_{Hedges} = 0.53).

Aim 4: Prediction of Typologies of Interactional Quality from Organizational Stress

Teachers in this study were employed by nine different community agencies; across these agencies, they worked in 34 child care centers. Many participating centers employed only a handful of teachers from the overall sample, and so the planned approach to this research aim (a hierarchical linear model) had to be re-evaluated. It was not possible to employ a truly nested design with these data, in which all participants would be included at level one, their centers at level two, and agencies at level 3. Individual cell sizes in such an analysis would have been too small and unequal for results to have practical meaning (Cohen, 1998; Maas & Hox, 2005).

Instead, a linear mixed model analysis was applied to the same variables. This alternative multilevel technique maintains the intent of the stated research aim, but has fewer constraints on sample size and assumptions of independence and homogeneity of variance (Field, 2013). The goal of the re-framed analysis was the same: To examine whether levels of perceived job stress at the agency or center level demonstrated significant associations with teachers' latent class assignments on the social-emotional domains of the Q-CCIIT. In the interest of streamlining analyses in SPSS Version 26, only agencies and centers that employed at least 5% of the study sample (n = 5 or more teachers) were utilized for this approach to the hypothesis. A breakdown of both the total sample by agency and the number of teachers at centers included in these specific analyses is in Table 14.

Job demands. Results of a test for the effect of agency on job demands were nonsignificant, and no significant effects were observed for the prediction of latent class by job demands in any social-emotional domain. Similarly, no significant effects were found for job

demands by center, nor did job demands at the center level predict latent class assignment on Q-CCIIT social-emotional domains.

Job control. A test for the effect of agency on perceived job control showed trending significance, $F(5,31) = 2.279$, η_p^2 .27, $p = .07$. However, no significant effects were observed for the prediction of latent class by agency-level job control in any of the social-emotional domains. A trending result was also observed for the effect of job control by center, $F(2,41) = 2.767$, $\eta_p^{2\,=}$ .12, $p = .08$, but job control at the center level did not significantly predict teachers' latent class assignments among the social-emotional domains.

Job resources. Results of a test for the effect of agency on job resources were nonsignificant, and no associations were observed for latent class in any social-emotional domain. Likewise, no significant effects were found for job resources by center, or for the prediction of latent class membership by center-level job resources.

CHAPTER FOUR: DISCUSSION

The purpose of this study was to approach assessment of the social-emotional climate in infant-toddler classrooms in a new way: From the perspective of interactional quality, a developmentally critical sub-category of process quality (Goble et al., 2019). To do so, an established observational measure (the Q-CCIIT) was reframed as a micro-time-series analysis, in order to identify latent typologies of teacher behavior in a sample of Early Head Start (EHS) programs. As a population, the families and children served by EHS are by definition "at-risk," which makes assessments of the care they receive critical in terms of children's future outcomes. At the same time, EHS teachers themselves face unique –often stressful – circumstances as a function of the context in which they work, and it is worthwhile to consider their experiences as well. Thus, a further aim of this study was to draw connections between interaction typologies and teacher-level factors such as attachment, emotion dysregulation, and job stress.

Findings demonstrated that there was significant variability between teachers' caregiving behavior across the morning. Subsequent analyses revealed that teachers could be grouped into latent classes that reflected the quality of their interactions with infants and toddler across the days; however, contrary to what was hypothesized, classes appeared mostly stable across the day, with little variability. Evidence was found for classes of interaction quality that were consistent across the morning, increasing, and decreasing, but no classes emerged that were sufficiently erratic to be considered "unstable" from an analytical standpoint. In addition, consistent with study hypotheses, the effects of attachment security on latent class assignment within each social-emotional domain of the Q-CCIIT were mostly in the moderate to large range, with the highest security scores found in teachers who demonstrated the greatest and most consistent sensitivity and responsiveness towards children, compared to those whose sensitivity declined across the

morning, or who scored lower overall in responsive interaction. With regard to teachers' self-reported emotion dysregulation and job stress, however, study hypotheses were not supported and in some cases, results were in opposite directions. Finally, neither agency- nor center-level job stress were found to be significant predictors of latent class membership. The practical and theoretical implications of these findings, as well as potential future directions for applied research, are described below.

Describing the Variability of EHS Teacher Contingent Responsiveness

The first aim of this study was to demonstrate that significant differences in four domains of social-emotional responsiveness existed within individual teachers over the course of typical mornings in child care. This aim also proposed that if such variability was present, it could justify using observational cycles in a micro-time-series analysis. In addition to support for the first research aim, the positive findings for Aim 1 also serve as the basis for all subsequent analyses discussed here.

To regard a sample of EHS teachers as a cohesive whole may have utility in some contexts, such as in large-scale research focused on program assessment and other structural concerns (see, e.g., NICHD-ECCRN, 1996, 2002a, 2002b; Peisner-Feinberg & Burchinal, 1997; Vogel et al., 2015a, 2015b). As a sub-category of process quality, the assessment of interactional quality – the sensitivity and responsiveness by teachers in interactions with children over the morning – shows promise as a framework for research in professional development and intervention (Goble et al., 2019; Pianta et al., 2016). The true variance of scores demonstrated here within the four Q-CCIIT items (see Table 4; Figures 3-6) reveals not only the diversity of EHS teacher behavior across the morning, but the possible utility of conducting analyses at this scale. These results add to the available and increasing evidence that any conceptualization of "quality" in infant-toddler

environments should be primarily focused on daily interactions between teachers and children (Atkins-Burnett et al., 2015a, 2015b; Goble et al., 2019; Pianta, Hamre, & Nguyen, 2020), rather than focusing so strongly on structural elements of the environment

Interactional Quality and Teacher-Level Factors in Early Head Start

The major aims of this study are connected, and together build upon the foundation of the first hypothesis. The shared goals of the second and third hypotheses were not only to derive latent classes of teacher responsiveness from within the larger sample, but to find associations with other forms of teacher-level data (via interview and self-report) that would help to anchor those observations in context. While more work remains to be done to understand how these identified classes impact children's outcomes, it is nevertheless important to understand teacher characteristics that are associated with consistent high-quality interactions in the social-emotional domains of the Q-CCIIT measure. National data from the EHS Family and Child Experiences Study (Baby FACES; see Vogel et al., 2015a, 2015b) suggest that when children experience consistent and supportive interactions with teachers, the effects of prior caregiving instability are somewhat mitigated (Choi, Horm, Jeon, & Ryu, 2019). Due to their disproportionate exposure to cumulative risk, including the general instability conferred by poverty, it is likely that children in EHS need more than adequate-to-good care to foster the social-emotional skills that will provide them a foundation for school readiness (Love et al., 2005; Roy & Raver, 2014).

Interpretation of results from this study's major aims relies simultaneously on the structure of the measure from which the latent classes were derived (the Q-CCIIT) and the early childhood development literature. The available – if limited – evidence on teacher-child interactions in ECE is generally focused on preschool and prekindergarten settings. Findings suggest that the associations between children's social-emotional outcomes and classroom quality can differ as an

effect of geographic location (i.e., urban vs. rural settings; Schmitt et al., 2018), teacher-child ethnic match or mis-match (Graves & Howes, 2011), or the type of program itself – i.e., federally subsidized care through the Office of Head Start compared with university-sponsored laboratory preschools (Garner, Mahatmya, Moses, & Bolt, 2014).

While these findings are interesting – and point to structural concerns or other variables beyond individuals' control – none of them address the central question of what inner processes drive teacher behavior, which in turn produce the social-emotional responsiveness that is critical to classroom quality. As noted by Pianta and colleagues (2016) in their review of gaps in the literature on environmental quality, improvement of the structural elements of the caregiving environment do not automatically translate to better outcomes for children. Instead, it is high-quality interactions between children and their teachers – and their consistency over time – that has persistently demonstrated positive effects. For example, in a study that utilized the CLASS observational assessment, preschool classroom climate was determined to have improved – as were social-emotional and school readiness outcomes for children – following an intervention based on principles of infant mental health and building relationships, rather than structural changes to the classroom or program design (Heller et al., 2012).

The few studies that targeted infant and toddler settings have also borne out the assertion that relationships are central to children's best outcomes, especially in the context of risk (see Choi et al., 2019; Landry et al., 2014; La Paro et al., 2014). These results are consistent with developmental systems theory (Overton, 2013), which places children – especially in the first three years – within a nested series of interconnected relationships. Further research is needed that targets environmental quality in infant-toddler environments in particular, given the special needs of that population. In EHS, it is a fundamental element of program design that children should

remain with the same teachers for several years. This intentional reflection of the family system is based on research, and intended to support children's optimal development across multiple domains (Fenichel & Mann, 2001; Love et al., 2005). Where evidence for the relevance of specific topics with respect to an EHS context is older or limited (e.g., in the case of attachment theory) it is helpful to reference the parenting literature, which provides an analogous framework to rely upon when necessary.

Typologies of Interactional Quality in an Early Head Start Context

Descriptive analyses of latent class profiles revealed that the majority of teachers in this study exhibited caregiving that was relatively consistent and moderately responsive; what might be termed "good-enough" teaching, to paraphrase Winnicott (1953). These findings are consistent with those from the Baby FACES Study (see Vogel et al., 2015a, 2015b), a large-scale assessment of EHS program performance and outcomes. In that study, the CLASS-T (La Paro, Hamre, & Pianta, 2012) observational instrument was used to measure classroom quality, including the quality of teacher-child interactions. The CLASS-T is comparable to the Q-CCIIT insofar as it also utilizes observation cycles, the scores for which are averaged for a cumulative indicator of quality in each domain. Results of the Baby FACES study indicated that EHS teachers scored in the middle range across domains of teacher-child interaction (3-5.3 on a scale of 7) at both the 2-year and 3-year follow-up (Vogel et al., 2015a, 2015b).

In the current study, across the social-emotional areas of the Q-CCIIT, the majority of participants were assigned to groups that demonstrated almost no variability across the morning. This consistency with regard to children's cues was remarkable in contrast to some of the smaller latent classes derived through model testing (see Figures 7-10) and contrary to the proposed potential for an "unstable" group with relatively inconsistent scores across the morning. Findings

for each area of social-emotional responsiveness are discussed here with respect to Q-CCIIT scoring and empirical research, and in the caregiving context of EHS.

Responding Contingently to Social Cues. An important distinction about the first social-emotional Q-CCIIT item is that scoring is not reliant wholly upon whether and how caregivers respond to children, but also the frequency with which they initiate social interactions. Further, scores are higher for teachers who accurately interpret children's nonverbal cues (e.g., head-turning, a shift in body language) as either engagement or disengagement. The general threshold of contingent responsiveness for items on the Q-CCIIT – a score of five or better – is crossed with respect to responding contingently to social cues when caregivers respond quickly, initiate and individualize some of the social interactions they have with children, and also use a variety of strategies (not just verbal) to interact.

The vast majority of EHS teachers in this study (n = 82, 84.5%) fit a profile best described as Moderate Consistent in their responses to children's social cues across the morning. On average, these participants scored about a four on the seven-point rating scale at every observation time point, a rating that is considered adequate-to-good care. However, an exceptional minority of the sample (High Consistent) scored within the 5-7 range, a distinction that literally and figuratively elevates them above the rest of the sample (see Figure 7). In terms of perceptible differences and children's outcomes, the contrast between these two classes on responding contingently to children's social cues reflects a real – if not drastic – difference in interactional quality.

Taken in light of the fact that the study sample is composed entirely of children and teachers in EHS, the implications of this finding have potentially greater consequences. As part of the Cost, Quality and Outcomes Study (CQO) that followed children who had participated in community child care, Peisner-Feinberg and colleagues (2001) found lasting beneficial outcomes for high-

quality teacher-child relationships from the preschool period as late as age 8 for children's academic and social-emotional development. In that study, positive child care effects were even stronger when children came from families with identified risk factors such as poverty and lower maternal education. This finding is consistent with other studies that focused specifically on the buffering effect child care can have against external risk factors (see, e.g., Mortensen & Barnett, 2016; NICHD ECCRN, 1997). As with the Baby FACES Study, the CQO found a general result of moderately good care in child care centers in a national sample. In a recent study of secondary data from Baby FACES, Choi et al. (2019) demonstrated that the combination of caregiving stability plus high levels of emotional support from teachers were a crucial combination of factors for EHS children's developing social competency and emotion regulation.

Responding to Emotional Cues. The differences between the first two social-emotional items of the Q-CCIIT are subtle but important. While teachers' responsiveness to social cues refers to their support for the development of children's communication strategies and the nuances of dyadic interchange, responding to emotional cues adds a dimension of empathic understanding to the scoring rubric. At the bottom of the scale, a score of 1 indicates a lack of awareness – or refusal to acknowledge – that children are experiencing perceptible emotional states. By contrast, teachers who score a 7 on this item are consistent in their responses to children's emotional expressions; support the development of self-regulation as appropriate in context; and are able not only to respond to events as they happen, but accurately predict how children might react.

Although the largest group in this domain (Moderate Consistent, $n = 58$) scored only in the adequate range for responsiveness to children's emotional cues, the utter invariance of their behavior across the morning does convey a predictability that the other groups did not possess. The other latent classes of teacher score profiles (High Consistent and High Declining) began the

morning at a similar level of interactional quality (mean scores for cycle 1: 4.73, 4.79; respectively). However, the trajectories of their caregiving behavior diverged immediately thereafter in opposite directions, such that the High Consistent and High Declining groups ended the observation period in meaningfully distinct regions of the scale (for cycle 6: 5.73, 3.25; see also Figure 8). According to the scoring metric of the Q-CCIIT instrument, these differences indicate that the High Consistent group had settled into a general pattern of active engagement with children's interests and intentional co-regulation of infants' and toddlers' emotions. By contrast, the High Declining group's score dipped almost to the lower threshold of what might be considered acceptable care, in which teachers display a only basic emotional awareness and occasionally respond to children's positive or negative emotional displays.

Teacher emotional responsiveness to infants and toddlers in EHS is worth a consideration from the perspective offered by research in infant mental health. Findings from the maternal literature demonstrate that mothers' internal experiences (e.g., depression, anxiety) can negatively impact their capacity to exhibit sensitive responsiveness to children's emotional cues (Leerkes, 2011; Leiferman et al., 2005). The quality of parent-child interactions over time can shift as a function of toddlers' developing emotion regulation strategies, which emerge in response to the quality of their mothers' affective expressions (Premo & Kiel, 2017). For decades, both research and public policy have rightly advocated for maternal mental health support, especially in the context of risk.

Caregiver emotional responsiveness has wide-ranging implications for children's well-being and development throughout the infancy and toddler period (Lorber, 2012; Martorell & Bugental, 2006). Not only the quality, but the consistency of caregiver response to children's emotional cues sets the tone for present and future interactions (Brooker & Poulin-Dubois, 2013).

In high-risk, low-resource populations such as those served by EHS, caregiver depression is a common risk factor when children are young, and rates are higher than in the general population (Chazan-Cohen, Stark, Mann, & Fitzgerald, 2007). Depression and other mental health challenges pose risks to children's social-emotional development and to the quality of the relationships they form with their caregivers.

From a policy and professional development standpoint, these findings in family research should raise concern for infant-toddler caregivers – and indeed, all teachers in early childhood – whose mental health needs may be going unmet. In recent years, a small but important body of research has emerged on mental health concerns for early childhood teachers (Hamre & Pianta, 2004; Jeon et al., 2014; Kwon et al., 2019). While a more holistic approach, strengths-based approach to early childhood teacher well-being (see Hall-Kenyon et al., 2014; Jennings, 2015) might prove most useful, this research is nonetheless an encouraging sign. If EHS teachers are well, the care, sensitivity and responsiveness they provide to the vulnerable children in their care will be of the best possible quality.

Building a Positive Relationship. The nature of infant-toddler care requires that teachers form dyadic bonds with individual children, while also maintaining a general positive regard for the whole group as they develop together over the days, months, and sometimes years together. Scores on the Q-CCIIT for building a positive relationship reflect teachers' capacities to sensitively monitor cues from and respond flexibly to the whole group – and individual children within it – using a variety of strategies, including but not limited to physical closeness, verbal exchanges, and emotional mirroring.

Most teachers in this study were in the High Consistent group (n = 82) for building a positive relationship. Nearly the whole sample's greater average responsiveness (when compared

with the previous two Q-CCIIT items) was reflected in the overall mean scores for each cycle in this domain, which were very close to a 5 on the 7-point scale (range: 4.78 – 4.99, see Table 4). On the whole, this result is encouraging: Positive relationships between children and their caregivers are the most critical element of high-quality early childhood education (Chu, 2016). With respect to the scoring metric of the Q-CCIIT, however, a closer look at the distinction between the latent classes reveals much about the variability of caregiving and the likely differences in children's experiences by typologies of interaction quality.

At the top of the scale, scores of 6 or 7 are given when teachers' caregiving already involves multiple strategies for interpersonal connection (e.g., eye contact, warm tone of voice, listening to children), and they engage in positive touch (i.e., holding and rocking, hugging, patting). The distinction being made here is that the use of either multiple communication strategies or positive touch alone are insufficient; each requires the other for meaningful teacher-child relationships. Teachers in the Very High Consistent group (n = 11) distinguished themselves by the exceptional responsiveness they demonstrated towards the children in their classrooms. The critical difference between this group's caregiving (i.e., mean scores above a 6 for most cycles) and the majority of the sample includes their use of positive touch in addition to other responsive relationship-building strategies. To that point, the optimal development of infants and toddlers – more than for any other period of childhood development – relies on sensory input from and co-regulation by caregivers (Feldman, Singer, & Zagoory, 2010; Fogel, 2016).

This developmental fact is especially salient in light of the scores received by the small – but statistically coherent – Moderate Declining group (n = 4, see Table 7, see also Figure 9). Those few teachers began the morning just inside the adequate-to-good range (for cycle 1, M = 4.00), but gradually decreased in responsiveness to a mean score in the very low range (for cycle 6,

M = 2.25). Children in EHS face a unique constellation of risk, especially as a consequence of factors related to poverty (Roy & Raver, 2014). From the perspective of research in developmental psychology and infant mental health, the best possible care for at-risk children anywhere includes the consistent provision of positive touch from all caregivers, including those in federal family service programs like EHS.

Supporting Peer Interaction and Play. As noted by the Q-CCIIT instrument (Atkins-Burnett et al., 2015a), a wide variety of strategies are possible – even in the birth-to-three age range – for supporting peer interaction and play. Teachers who receive higher scores in this area utilize multiple strategies; adjust or individualize based on children's needs and developmental level; and over time, scaffold children's gradual entry into more sophisticated forms of peer-to-peer play. One of the most surprising findings in this study was the almost universally low scores across the morning on this domain of social-emotional development (see Figure 10).

A score in the 2 to 3 range on the Q-CCIIT is truly low; to receive a 3, a teacher merely has to "[support] peer interaction with multiple children at least occasionally". The overall sample mean score (*M* = 2.23) and per-cycle means (see Table 4 and Figure 10) were a full two points below any of the other social-emotional items. For the majority Low Consistent (*n* = 77) group, the threshold for a score of 3 – the conceptual floor of adequate care on the Q-CCIIT – was not reached by the group mean at any point. The Low Increasing group (*n* = 12) managed to break through into the adequate range between 3 and 4 for much of the observation period, but even with this marginal improvement, the overall scores for this sample on supporting peer interaction and play were very low. The presence of several outlier individuals revealed during model testing (see Results, also Appendix) indicated that high scores in this domain are well within the realm of possibility. Questions remain about what prevented the majority of this sample of EHS teachers

from scoring well – or even in the adequate-to-good range, as they had for the other social-emotional items – on supporting peer interaction and play.

In light of these disparate results, it is worth noting that multiple contextual factors exist that influence teachers' abilities to establish and maintain the kind of classroom environment that fosters optimal social-emotional development (Howes et al., 1992; Mortensen & Barnett, 2015). As noted by Hooper and Hallam (2017), the social-emotional climate – and thus, the interactional quality – of the classroom environment increases when children are more engaged, including with one another. When teachers intentionally structure activities to support peer-to-peer interaction, children are more likely to remain engaged for longer periods of time. On the other hand, when teachers struggle to maintain control of the classroom, or the environment is otherwise chaotic and fraught with continual transitions, children's engagement – and therefore the interactional quality – suffers as a result (Jeon et al., 2016; Kurki et al., 2016; Le et al., 2015).

EHS is designed to serve as a bridge to the Head Start program, a primary goal of which is preparation for entry into kindergarten using a school readiness curriculum (Zigler & Muenchow, 1992). Many of the foundational skills needed for kindergarten and beyond – such as the capacity to interact and play well with peers – are developed during children's first three years. Without proper support and scaffolding for these skills, EHS children may enter Head Start (and possibly kindergarten) without the gains these programs are designed to afford them. The low scores for this study sample on supporting peer interaction and play suggest this domain of social-emotional development as a clear area of concentration for future efforts at professional development.

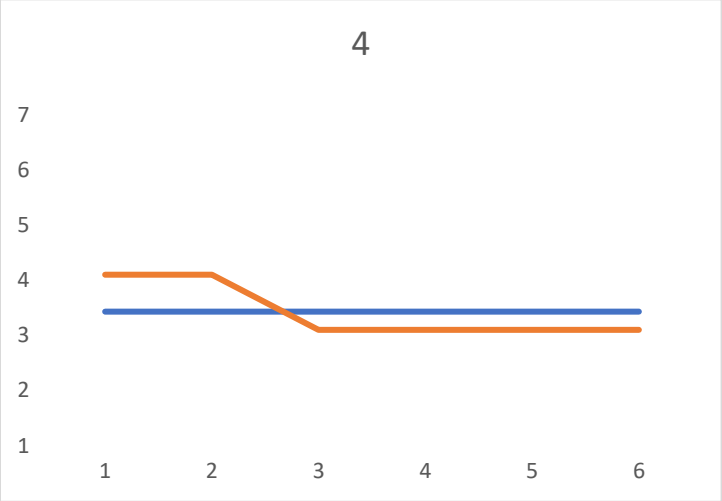
A Deeper Understanding of Within-Teacher Stability and Instability Within Classes. In the initial research aims for this study, it was proposed that some teachers (based on the author's experience of coding videos) might have a pattern of responsiveness in some or several domains

of social-emotional responsiveness that could be characterized as "unstable" – however, the latent class analysis (LCA) performed did not reveal such a trajectory for any group, in fact, the LCA suggests that most teachers belonged to a class that was stable across the morning. At the level of sub-sample means, the largest groups were consistent with the flatness of the lines displayed in their profile plots (see Figures 7-10).

However, a closer examination of the largest classes for each social-emotional domain revealed underlying variability within each. To understand the composition of these classes more completely, the variance within each of those groups was re-checked using the same unconditional growth model approach applied in Aim 1. Results may be seen in Table 15, which displays the variance of the intercept, slope, and quadratic slope of the majority groups for each Q-CCIIT item. As can be seen from this table, the non-significant slope variance suggests that within-teacher differences did not vary for the Moderate Consistent class in responding to emotional cues, the High Consistent class for building a positive relationship, or the Low Consistent class for supporting peer interaction and play. However, among the Moderate Consistent class in responding contingently to social cues, the slope variance was significant [var(slope) = .03, $p < .001$]. This suggests that latent class analysis (LCA) may not capture the total scope of within-teacher variability within groups. It is therefore likely that the traditional scoring methodology – using cycle mean scores – is an adequate measurement of the general quality of interactions in infant-toddler care.

It is also possible that LCA may have artificially obscured within-person variability due to the minimization of variance. To better understand within-teacher variation across the morning, a deeper examination of teachers in the largest class of each domain was conducted. Each teacher's scores across the morning were plotted, as was the average score (see Appendix B). This level of

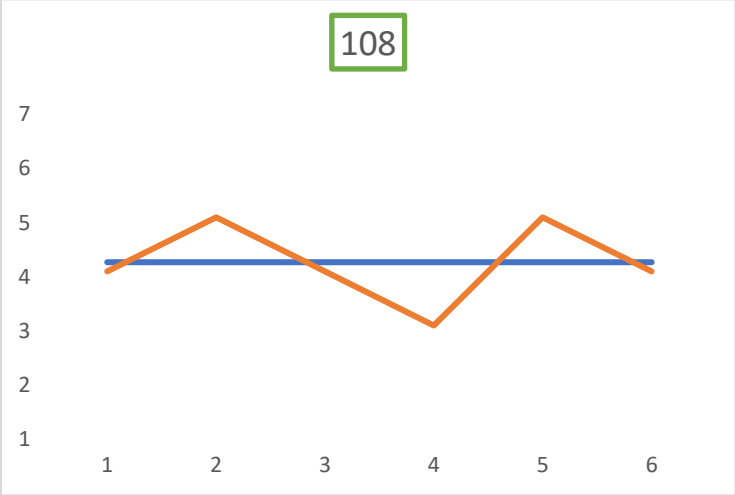
analysis revealed that profile plots within groups generally reflected the consistency described by the group nomenclature (moderate consistent, high consistent, and low consistent). The parameters for a judgment of "consistency" in caregiving across the morning are guided here by the language in the anchors of the Q-CCIIT measure itself (Atkins-Burnett et al., 2015a, 2015b). When participant scores were within one scale step of the subsequent and previous scores, in addition to remaining within the ranges of low, moderate, and high responsiveness, their behavior was regarded as consistent. For example, participant 4's scores for responding contingently to social cues (Q-CCIIT item A1) is reproduced here; the x-axis represents time points, and the y-axis the scoring scale.



This participant's individual mean score (the blue line) is 3.33, and her scores for each of the cycles was a series coded as 4-4-3-3-3-3. Because scores of 3 and 4 are in the adequate-to-good range, and because her behavior neither dipped below the floor of acceptable care (less than 3) nor crossed the threshold of responsiveness as defined by the Q-CCIIT measure (5 or above), this participant is solidly within the moderate consistent class.

However, this level of data analysis did reveal a minority of individuals within each class whose caregiving could be characterized as "unstable" or inconsistent across the morning. To

make this judgment, participant behavior was marked as such (with a green box over the ID in Appendix B) when scores differed by at least two scale points from one time point to the next. An example of this phenomenon from a different participant on responding contingently to social-emotional cues is displayed here.



This participant's mean score is 4.17, and her time-point series is 4-5-4-3-5-4. What is notable about the profile plot displayed here is that although her average score is better than the previous example, her behavior is less consistent across the morning. Further, the quality of her interactions with the children in her care ranges from acceptable (3) to responsive (5), likely depending on contextual factors previously discussed, and elaborated on further in this discussion.

Of the 82 participants in the moderate consistent group for responding contingently to social cues, 12 teachers (14.6%) were similarly variable in their behavior, but were not identified as distinct by latent class analysis. The same was true in the other social-emotional domains: Using the same criteria, an examination for relatively "unstable" behavior found 14 (24.1%) of teachers in the moderate consistent class for responding to emotional cues, 7 (8.5%) of teachers in the high consistent class for building a positive relationship, and 20 (25.9%) of teachers in the low consistent class for supporting peer interaction and play. The within-person variability of scores

identified for these individuals suggests that as-yet unidentified factors impact their ability to maintain the kind of steady responsiveness towards infants and children that was observed in the majority of individuals within these classes.

Given the natural constraints of latent class analysis, especially with a small sample such as this one, it is possible that the methodology of this study contributed to the absence of any findings for the hypothesized existence of "unstable" or inconsistent caregiving patterns at the within-person level. It is the purpose of LCA to find the best fit possible, sometimes at the expense of descriptive accuracy. It is also possible that the intra- and inter-individual variability that remained within the largest classes even after latent class analysis (LCA) is an indication that this is not the best approach to these data. Follow-up analyses using this dataset – again, given its size – might be better served through an approach such as a Q-Sort (i.e., as in related maternal research such as Lindheim et al., 2011). However, results from LCA in the current study from hypothesis testing using teacher-level factors nevertheless revealed differences of interest, which are discussed next.

Teacher-Level Factors in an Early Head Start Context

The third aim of this study was to determine whether teacher-level factors (attachment, emotion dysregulation and job stress) were different among the latent classes identified in Aim 2. Significant results were found only for the Secure Base Scripts task. However, examination of effect sizes revealed additional contrasts between identified latent classes of interactional quality.

Attachment Theory. Family attachment research has for decades demonstrated the importance of early relationships to lifespan development (Ainsworth, 1967; Bowlby, 1973; George, Kaplan, & Main, 1985; Hazan & Shaver, 1994; Mikulincer et al., 2003; Verhage et al., 2016). Likewise, research that has bridged the gap between attachment in family systems to

attachment in a broader context has been fairly consistent on a few points: First, that attachment relationships are possible with non-family caregivers, and in fact such connections are common throughout the world (Howes & Hamilton, 1992a; Pallini et al., 2017; Sagi et al., 1995; Van IJzendoorn & Sagi-Schwarz, 2008). Second, that that children's attachments to their non-maternal caregivers form independently of other important relationships (Goossens & Van IJzendoorn, 1990; Howes & Hamilton, 1992b).

In light of the ample evidence for the lifelong and cross-contextual salience of the attachment behavioral system, an examination of its representational correlate – the caregiving behavioral system – is also warranted. In the research literature, which is primarily focused on mother-child relationships, mothers who possess secure adult attachments are most able to sustain balanced internal representations of themselves and their children (Solomon & George, 1996; George & Solomon, 2008). As a positive consequence of their internal stability, secure mothers are able to respond flexibly to children's attachment-related cues (Bost et al., 2006; Tini et al., 2003). At the representational level, a secure attachment orientation is reflected in an internalized secure base. Because secure mothers' own needs for reassurance and comfort are rarely activated – in which case they would compete for mental and emotional resources – it is easier for them to provide help to distressed or dysregulated children (George & Solomon, 2008).

As a logical extension of this, teachers' capacity to maintain a caregiving environment characterized by affective warmth and contingent responsiveness is likely related to their own internalized secure bases, which – like anyone – they can call upon when necessary. The most essential component of high-quality care is caregiver sensitivity. Research on constructs of attachment theory in early childhood settings has pointed to the difference between dyadic-level and group-level sensitivity (Ahnert et al., 2006; Verschueren & Koomen, 2012). Truly sensitive

ECE teachers are able to exhibit both, as required throughout the day depending on context. Results from the current study suggest that the ability to do so flexibly and responsively – as assessed by the Q-CCIIT social-emotional subscale – may derive in part from teachers' secure attachment orientations.

Typologies of interaction quality and teacher attachment security. The SBS task is designed to elucidate narratives containing attachment themes; these include separation, reunion, loss, and supportive interchange between members of a dyad (Waters et al., 1998). These analyses represent the assessment of attachment in individuals (ECE teachers) and a setting (infant-toddler classrooms) to whom those constructs are rarely applied. In this sample, just under half of the teachers (n = 47, 48.3%) scored in the "secure" range on the SBS, which may also account for the average scores in the moderate-to-high range. However, there was a small minority of teachers (n = 6, 6.4%) whose SBS scores indicated the absence of an internalized secure base, and the remaining 44 (45.3%) demonstrated only "marginal security" in their interviews (for cut points, see Huth-Bocks et al., 2014). Such teachers may need more support to provide high-quality social-emotional environments to young children, that are associated with social-emotional competence, especially for at-risk children.

Overall, the latent classes with either the highest consistent scores or scores that increased over the morning on each of the four Q-CCIIT items also scored highest on secure base scriptedness. This finding represents an interesting elaboration upon preliminary analyses in this study using the whole sample's (N = 97) SBS scores in correlation with their average scores across the social-emotional Q-CCIIT items (see Table 3).

When separated by latent class on domains of social-emotional responsiveness, scores on the SBS showed greater differentiation, with additional significant findings and effect sizes in the

medium to large range (see Table 9). These results illustrate the potential utility of typologies of interaction quality in analyses of teacher sensitivity and responsiveness, and also emphasize the potential effects teachers' attachment orientations may have on the nature of their interactions with young children. In addition, the consistency of association between high SBS scores and high responsiveness observed in this study link teachers' internal representations of themselves in relation to others (assessed via clinical interview) to their observable caregiving behavior.

Between the identified groups on responding contingently to social cues, the High Consistent teachers had greater attachment security than the majority of teachers. Although both groups demonstrated mean scores on the SBS task that were above the cut point for security, the differences in their behavior were clear during observation, and reflected in their latent class profiles (see Figure 7). In this case, the caregiving context must be taken into account: EHS children's disproportionate exposure to cumulative risk factors over the early childhood period places them at a disadvantage when compared to the general population of infants and toddlers (Love et al., 2005; Roy & Raver, 2014). Increased contingent responsiveness to children's social cues may make a significant difference to EHS children's social development, and teachers' attachment security may explain some of the exceptional responsiveness displayed by the teachers in the High Consistent class. It may also be a partial explanation for the different scores across the morning between latent classes of teachers in the domain of supporting peer interaction and play.

However, the more perceptible – and likely more salient – differences were in the domain of responding to children's emotional cues. Among those classes, both the Moderate Consistent and High Consistent groups scored in the secure range, but the High Declining class had an SBS mean score in the marginal range, indicating that the narratives they told during the interview task were event-focused, rather than relationship-focused (Huth-Bocks et al., 2014; Waters et al.,

1998). Moreover, the difference between the High Consistent and High Declining classes was statistically significant (see Table 9) and their profiles were visibly different (see Figure 8). The same principle applies to SBS scores by latent class assignment for building a positive relationship. This domain of social-emotional development is also linked to attachment, which is based on the persistent relevance of early relationships throughout the lifespan. Both the High Consistent and Very High Consistent classes scored in the secure range, while the small Moderate Declining class demonstrated marginal attachment security. According to attachment theory, the capacity to build and maintain warm, positive relationships derives from an internalized secure base (Bowlby, 1988). When that security is tenuous or somewhat lacking, relationship-building becomes a more challenging process. Children in EHS, more so than their peers in the general population of infants and toddlers, require teachers who approach caregiving work with a fundamental capacity for nurturing and supportive relationships.

Attachment and the Prosocial Classroom Model. The Prosocial Classroom model proposed by Jennings & Greenberg (2009; see Figure 1) offers an established framework through which the importance of ECE teachers' attachment security to a positive classroom climate may be understood. This model is founded on the principle of teacher social-emotional competence, a construct that incorporates teachers' skills and talents, as well as the impact of their personal well-being on their ability to do their jobs well. Teacher well-being in this sense is understood to include not only mastery and enjoyment of work-related challenges, but also the absence of untenable emotional stress – or the risk of burnout.

Because the nature of teaching and caregiving work provides limited-to-no opportunities for removing oneself from the environment (the classroom) in moments of high stress, teachers must usually rely on internal resources to cope. From an attachment theory perspective, this

resource – on which individuals habitually depend during moments of stress and dysregulation – is the internalized secure base (Bowlby, 1969/1982, 1988). This study's differential results for sensitivity and responsiveness by latent class indicate the presence of additional underlying mechanisms that contribute to distinct patterns of observed behavior. The significant findings for the SBS interview task suggest the possibility that such mechanisms may be related to foundational processes of attachment, which – although based in childhood experiences – continue to operate throughout the lifespan (Cassidy, 1994; Mikulincer et al. 2003).

Flexible management of stress, and the capacity to cope with challenges as they arise, are central to the construct of well-being described in the Prosocial Classroom model. Although that framework was designed with older children in mind, there are aspects of student-teacher relationships that are cross-contextual (Pianta et al., 2016). Furthermore, in infant-toddler settings, teacher-child relationships are critical for children's basic development as social and emotional actors, laying the foundation of their subsequent academic and personal achievement in school and beyond. A version of the Prosocial Classroom model which includes teacher attachment security could potentially offer a new perspective on positive classroom climate in infant-toddler settings, and an avenue for further research on early childhood teacher well-being.

Emotion Dysregulation. It was hypothesized that teachers with higher emotion dysregulation would demonstrate the lowest quality and least consistent interactions with children. This hypothesis was not supported. There are several possible explanations: First, the temporal and psychological gap between initial emotional awareness and subsequent behavior described by Gross's (1998) theoretical process model of emotion regulation. This dynamic person-environment model posits that individuals engage in internal processes on a continuous basis in response to every emotional experience. Thus, while straightforward emotional awareness

operates at multiple levels of consciousness, more complex strategies of self-regulation (i.e., cognitive reappraisal, expressive suppression) intervene to modify observable behavior. It is also important to note that although the labor of infant-toddler teachers in many ways resembles parenting, their work is overlaid with professional expectations and explicit codes of conduct. As part of establishing and enforcing program quality, EHS maintains stringent standards for classroom practices, based on research evidence (Paulsell et al., 2002). Teachers' behavior is therefore moderated as well by the context in which they perform their caregiving roles.

Regardless of behavioral constraints, another consideration for this sample of EHS teachers is the very moderate level of emotion dysregulation reported by the sample as a whole. As noted, the possible range of scores on the TCPQ is 25-125, and the overall mean was under the midpoint (M = 58.43) for the total scale. This result suggests the optimistic possibility that only ECE teachers who are extremely dysregulated by their work would reveal as much through their caregiving, while those experiencing a (more typical) level of dysregulation are able to exercise self-control through as-yet unobserved strategies of emotion regulation.

The choices individuals make between available self-regulatory strategies vary, both as a function of personal factors, and according to context (Gross & John, 2004; John & Gross, 2003). What matters most for adaptive functioning is flexibility of emotion regulation, or the ability to appraise situations and choose the appropriate action for a given context (Sheppes & Levin, 2013). This flexibility of response is the common thread between adaptive emotion regulation and adult attachment security (Mikulincer & Shaver, 2019). The absence of significant associations between teachers' endorsement of strong negative emotion and their responsiveness to infants and toddlers may indicate that they utilize successful coping strategies. At least in terms of children's experiences, and the overall quality of the classroom climate, the teachers in this sample were able

to manage negative emotions in ways that did not interfere with their ability to provide adequate-to-good care. This is where the TCPQ's utility in this study falls short: As a measure, it is designed only for the self-report of strong emotional experiences while teaching in ECE. Results cannot offer insight into how teachers interpret, manage, and cope with those feelings.

The ability to report insight into emotional experience is important, as it points to teachers' differential levels of mindful awareness (Becker et al., 2017). It is possible that when teachers engage in higher-order forms of cognition such as mindful attention, their ability to provide sensitive care improves; similar findings have been reported in maternal research (Laranjo et al., 2008). Additionally, the lack of association between self-reported emotion dysregulation and observed behavior may be moderated by teachers' attachment, which for this sample showed medium-to-large effects with respect to responsiveness on all four social-emotional domains of the Q-CCIIT. The vast majority of this sample (n = 91, 93.8%) scored within at least the range of marginal, "event-focused" security on the SBS task, suggesting relatively positive internalized representations of self and others.

It is possible that teachers' secure attachment acts as a protective factor during moments of dysregulated emotion in their work with infants and toddlers. However, additional research is needed to test these proposed associations. Future empirical work on ECE teacher emotion regulation and social-emotional responsiveness to children's cues should also make an effort to include an assessment of the coping strategies and skills this workforce uses, and what barriers they face to self-care while at work.

Aspects of Job Stress. A voluminous quantity of research has established teacher stress as a contributing factor to the overall social-emotional climate of the classroom at all grade levels. However, comparatively less effort has been devoted to research on teacher stress in ECE, and

very little at all to the stress faced by infant-toddler teachers. A notable exception to this is the model of early childhood teacher well-being used by the Buffett Early Childhood Institute (Gallagher, 2017; see Figure 2). This model proposes that stressors of various kinds operate within and through teachers to impact the quality of their relationships with children, and by extension, children's social-emotional outcomes. In addition, constructs of mindfulness – applied via targeted intervention and professional development – are theorized to moderate the negative effects of the various stressors acting upon and within teachers.

Large-scale studies of teacher stress in EHS's sibling program, Head Start, have relied on self-report data alone to measure the degree to which teachers experience job stress (see the Pennsylvania Head Start Staff Wellness Study; Becker et al., 2017; Whitaker et al., 2013, 2015). This approach is pragmatic when the goal is to understand a population's general experiences. In the current study, however – and the larger intervention study from which its data is derived – the aim was to understand teachers' self-reported job stress in the context of their daily lives in the classroom, to the purpose of informing future professional development and applied research.

The use of an observational measure in tandem with self-report of job stress has demonstrated findings of interest elsewhere. In studies using the CLASS (Pianta et al., 2008) and CLASS-T (Thomason & La Paro, 2009), perhaps the most comparable measures to the Q-CCIIT, Head Start teachers who experienced more personal and professional stressors engaged in lower-quality interactions with the children in their care (Li Grining et al., 2010). In the general population, negative outcomes were found for preschool children's learning motivation on the CLASS when teachers' workplace well-being was compromised by stress (Pakarinen et al., 2010). In one of the few studies of this kind in infant-toddler settings, Castle et al. (2016) found that

teachers' years of experience and "progressive beliefs" about child development mediated the effects of personal psychosocial risk on their interactions with infants and toddlers.

In this study, although results of significance and effect size testing were largely nonsignificant across latent classes, responses by class to the three JSI subscales nevertheless demonstrated interesting patterns. In addition, using the theoretical framework of dimensions of environmental quality in ECE, each subscale of the JSI may be construed to represent a different dimension of quality (i.e., structural, process, and interactional; respectively). Viewed through this lens, results from this study parallel existing research findings on the classroom experiences of teachers and children.

Job demands. Topics addressed by the first subscale of the JSI include the hours teachers work, the pay they receive, professional expectations for their behavior, and reactions to external problems faced by the children and families they serve. Job demands may therefore be viewed as a reflection of stressors associated with structural features of child care work. Results on this subscale are likely to vary as a function of the population teachers work with, the staffing and instrumental resources available to them, and program or policy guidelines.

The general absence of notable differences across Q-CCIIT items and classes on the job demands subscale suggests that EHS teachers in this sample held common perceptions of the requirements of their work. Similar unity of work-related perceptions has been in large data sets on Head Start teachers (Zinsser, Christensen, & Torres, 2016). In this sample as well, given that all participants were employed by community agencies that held contracts with the Office of Head Start, the uniformity of their responses is somewhat unsurprising. EHS program performance guidelines are set at the federal level and enforced by local licensing agencies to ensure structural standards are met (Paulsell et al., 2002; Zigler & Muenchow, 1992).

The only effect size of note between classes on job demands was in the domain of building a positive relationship (see Table 11), such that the Moderate Declining group reported lower job demands than Very High Consistent teachers, a finding contrary to hypothesized expectations. However, research has demonstrated that low scores on job demands can indicate lower levels of work-related motivation, especially taken in context with other variables (Curbow et al., 2000; Li Grining et al., 2010). Seen in this light, the mean score for job demands by the Moderate Declining group becomes more consistent with other information available about this very small (n = 4) but statistically coherent group of teachers. For example, across the social-emotional domains, these four teachers were assigned to the same combination of latent classes, all of which represented the lowest quality of teacher-child interaction for their respective Q-CCIIT items. Furthermore, this class also received the lowest score for their social-emotional domain on the SBS task, and were one of two latent classes overall to receive mean scores in the "marginal" range for attachment security (see Table 9). In consideration of these multiple forms of data, it is possible that the four Moderate Declining participants' responses to the JSI – which also included a strong assertion of control over the environment and avowed enjoyment of the work – were the effect of a competing motivation to meet social and professional standards that did not match observable reality.

Although the job demands subscale of the JSI was significantly correlated in preliminary analyses with emotion dysregulation as measured by the TCPQ (see Table 3), results suggest that unknown factors may have moderated the effect of job demands on teachers' caregiving behavior. Theory and research have demonstrated that adaptive strategies of emotion regulation are related to past experiences of supportive and nurturing attachment relationships (Cassidy, 1994; Mikulincer & Shaver, 2019). Thus, teachers' strategies of emotion regulation, or their capacities

for mindful awareness, may have moderated the effects of job demands on Q-CCIIT observational findings.

Existing research on job stress in ECE, and Head Start and EHS in particular, has focused primarily on describing the origin, nature, and differential impact of stressors teachers face. There is general agreement across studies that child care is demanding work, compensated at an abysmally low rate (Whitebook, 2001). Nevertheless, teachers continue to do the work for a multitude of reasons including emotional commitment to children and families, and a belief in themselves as agents of positive change (Hall-Kenyon et al., 2014; Jennings, 2015). The results of this study further confirm what is already known about the demands of the profession. Future research should address stressors in an applied manner, with the aim of improving early childhood teacher well-being throughout the field, and in federal programs for at-risk families in particular.

Job control. As with any challenging occupation, it is critical that EHS teachers feel a sense of self-efficacy in their daily work, which is measured by the job control subscale. This subscale indicates teachers' beliefs in their own freedom to make autonomous decisions about daily events in their classrooms. Teachers' control over the dynamic properties of the classroom environment includes the order of daily events, persuading children to comply with routines, and making room for their own self-care in the midst of caring for others. By exercising their autonomy over what happens in the classroom, teachers can create perceptible shifts in process quality; their ability to do so relies on felt self-efficacy which derives from the autonomy afforded by the work environment.

Differences between latent classes on the job control subscale were most pronounced in the social-emotional domain of responding to children's emotional cues (see Table 12). This result indicates that teachers' sense of their own autonomy and self-efficacy is most variable with regard

to aspects of caregiving that require empathic awareness, acceptance of children's emotional displays, and the provision of co-regulation to infants and toddlers who have not yet developed the capacity to regulate their own affective arousal. In some ways, this particular finding crystallizes a central challenge of infant-toddler child care: Even at a 1:4 ratio, the number of signals and cues a single teacher must respond to and manage from the children in her care can be overwhelming. Research has demonstrated that this is all the more true during complex group interactions, such as whole-group transitions or mealtime (Hooper & Hallam, 2017).

In latent classes for responding to emotional cues, teachers who endorsed the highest levels of autonomy and self-efficacy were those in the High Consistent group, whose Q-CCIIT scores reflect their capacity to maintain high levels of interactional quality throughout the morning. Notably, this group of teachers also received the highest mean score of any latent class on the SBS interview task (see Table 9). In a recent study, Roubinov et al. (2017) demonstrated the importance of goodness-of-fit between teacher and child temperament to the success of such relationships, and indeed to the overall social-emotional climate of the classroom. This situation is another in which teachers who are exceptionally responsive and sensitive, as demonstrated by their attachment security, can provide a necessary dimension of care, especially in the context of risk. Children in EHS, more so than their peers in the general population, reap gains from the buffering effects of responsive, sensitive non-maternal care (Zinsser et al. 2016).

Beyond the clear benefits to children, improvements to teachers' felt autonomy and self-efficacy can contribute to the quality of the classroom social-emotional climate (DeMauro & Jennings, 2016). The JSI and self-report instruments like it are measures of perceived (i.e., subjective) job stress. Results are therefore illustrative not only of individual differences, but – to a degree – also reflect commonly-held ideas about work environments when answers are

consistent across co-workers. Sharing the details of job stress with others in a work environment can be a positive form of coping (Hochschild, 2012; Karasek & Theorell, 1990). Thus, although the apparently more-responsive teachers in this sample reported lower levels of control over daily life in the classroom, this may simply reflect accurate (and shared) perceptions of their work: Child care is a challenging job, especially at the infant-toddler level.

Future work on ECE teacher autonomy and self-efficacy should continue the work already begun on the relevance of teacher emotional states and the potential benefits of mindfulness techniques (see, e.g., Elreda et al., 2019; DeMauro & Jennings, 2016; Jennings et al., 2013). The cited work in populations of teachers of older children show promising results for the development and maintenance of professional development programs that encourage teacher well-being. An application of these constructs to the early childhood context – and especially EHS – is long overdue.

Job resources. A final – but critical – dimension of job stress is the presence (or absence) of job resources, or the felt support from co-workers and children's families, and genuine enjoyment of relationships with the children themselves. The elements of this subscale on the JSI are analogous to aspects of interactional quality, the sub-category of process quality that is the focus of this study. Items on this subscale are characterized by positive impressions of the workplace gained via close relationships, including teachers' sense of children's love and affection for them; their belief that families see and appreciate their hard work; and knowledge that their efforts are making a difference in children's lives. As with job control, there is an element of self-efficacy to these themes, but a distinction can be made. Whereas the job control subscale describes teachers' instrumental ability to get things done and move the day forward, job resources are an

outgrowth of relationships, built on a solid base of repeated, positive interactions with children and families.

Dynamic and relational variables, including supervisor job satisfaction – more so than structural elements of program design – also predicted the level of emotional support EHS teachers felt in the Baby FACES study (Zinsser & Curby, 2014). This finding speaks to the importance of parallel process to the best outcomes for everyone within a system such as EHS: When center directors are satisfied with their own work, that self-efficacy works through their relationships with teachers to support the development of at-risk infants and toddlers. These results are supported by other studies of teachers' felt emotional support in ECE settings (see, e.g., McGinty, Justice, & Rimm-Kaufman, 2008; Zinsser et al., 2016), although additional work is needed with respect to infant-toddler settings in particular.

In this study, groups with consistent and higher scores across the morning with respect to social-emotional responsiveness on the Q-CCIIT also reported greater job resources and more secure attachment. Due to the fact that an internalized secure base reflects a belief in the reliability of trusted others, the parallel results with self-reported job resources were consistent with expectations. Further, they demonstrate the real need for EHS teachers – and indeed, everyone – to feel a sense of social and emotional support in their chosen work.

The sole effect of notable size for this subscale was in the domain of supporting peer interaction and play, such that teachers whose engagement with children (and scaffolding of peer interactions) improved over the morning scored higher than the vast majority of the sample. This finding demonstrates the important associations between intrinsic social support and teachers' subsequent capacities to create pathways for appropriate social-emotional development for infants and toddlers in their care. Again, this parallel process reflects the nested character of relational

systems in early childhood (O'Connor, 2010; Overton, 2013). When teachers feel confident and secure in their work, they are able to extend that support to children, and scaffold their optimal development. In EHS, a fundamental goal of the program is to prepare infants and toddlers for entry into the wider world of preschool and beyond. To do so effectively, teachers must be provided with the intrinsic and extrinsic resources they deserve for their vital work.

Prediction of Typologies of Interactional Quality from Organizational Stress

The final aim of this study represented an elaboration on the scope of the associations between job stress and interactional quality, analyzed at the center and agency level. The purpose of this hypothesis was to examine whether teacher membership in identified classes of interactional typology in domains of social-emotional responsiveness on the Q-CCIIT could be predicted by the general level of stress at either the centers where they worked or the community agencies operating those centers. The research on organizational climate in ECE applies to this hypothesis as well: teachers' experiences as workers, in addition to their roles as caregivers to infants and children, impact their experiences of stress.

McGinty et al. (2008) noted the discrepancy in available research on the quality of "school community" for ECE programs when compared to K12 schools in their study of factors contributing to teachers' endorsement of a positive organizational climate. The related research in grade school has demonstrated the importance of positive organizational climate to teachers' enjoyment of and intention to remain in their jobs. Results from that study demonstrated that teachers in ECE programs serving at-risk populations positively rated their workplaces when the overall size was small and when they had concurrent positive personal attitudes towards teaching. Such positive attitudes have been shown to derive from the support they receive in a collegial

environment, via relationships with other teachers, opportunities for professional growth, and the provision of personal autonomy in the classroom (Dennis & O'Connor, 2013).

In this study's sample of EHS teachers, neither agency- nor center-level job stress predicted class membership for teacher responsiveness across social-emotional domains. At a basic analytical level, this may be an artifact of measurement. As noted in the discussion of differential effects of subscales by latent class, the JSI is a very specific self-report of job stress; many of the items relate to factors beyond the control of teachers, or sometimes even the centers and agencies that employ them. Many aspects of stress experienced by teachers are independent of center and agency effects; for example, the disproportionate stress that EHS families face as a consequence of poverty and other risk factors (Landry et al., 2014; Roy & Raver, 2014).

While it is true that EHS serves a primarily low-income population, this correlation is not a causative factor for teacher stress. Rather, the available research continues to demonstrate that teacher stress is demonstrably related to variables intrinsic to teachers themselves (Denham et al., 2017; Jennings & Greenberg, 2009). In addition, teachers across ECE settings are underpaid and lacking in resources (Whitebook, 2001), but this is a function of program budget constraints and early childhood education policy, and does not necessarily reflect the organizational climate of centers where they work. For these reasons, the subscales of the JSI may have limited utility as general indicators of the stressfulness of a particular workplace. The more likely explanation for null findings in this case – and the one supported by results of the previous three aims – is the clear presence and impact of individual differences on interactional quality. The variability among and within teachers, amply demonstrated throughout this study by their observed caregiving behavior, reflect teachers' unique experiences and expressions of caregiving work.

Research and Policy Implications

The results of this study demonstrate that for the most part, teachers in EHS provide consistent, reliable caregiving at a level that would be acceptable-to-good for the general population of infants and toddlers. However, children in EHS are by definition a "special-needs" group. They are designated as such by any number of indicators, but most common among them is qualification for care through meeting a low-income requirement (Chazan-Cohen et al., 2007). Families and children who live at or below the federal poverty line require a higher level of caregiving and responsiveness from child care than their peers in better circumstances, given their disproportionate exposure to other risk factors and the potential for cumulative risk over time (Landry et al., 2014; Roy & Raver, 2014). Thus, when it comes to responsive teaching, what counts as *good* in regular circumstances is simply not good enough in EHS.

This study's analysis of Q-CCIIT social-emotional responsiveness by EHS teachers indicates the need for targeted professional development, especially in the area of supporting peer interaction and play. Results of latent class analysis (LCA) further suggest that such targeting is possible when conducted at the appropriate scale. Further, the significant findings of these analyses suggest that concepts of attachment theory are a fruitful avenue for applied research in ECE, a topic that has not received substantial attention in a number of years (for a foundational paper, see Howes & Hamilton, 1992b), and rarely if ever from the perspective of teacher attachment and the salience of the caregiving behavioral system (Bowlby, 1980; George & Solomon, 2008) in infant-toddler contexts.

Strengths and Limitations

This study has some findings of real interest, derived through an analytical approach not tried before. At the outset, this study took a mixed-methods approach to understanding patterns of

behavior, utilizing participant self-report, clinical interviews, and coded observations to form a cohesive picture of caregiving in EHS. Results demonstrate that reframing a comprehensive observational measure as a micro-time-series may prove useful for a number of purposes, including professional development and coaching in ECE, as well as applied research on highly-specific contextual questions about child development in non-maternal care. Furthermore, the finding that secure base scriptedness most significantly predicted interactional quality suggests that teachers' own attachment security is an underlying mechanism for their caregiving behavior.

At the same time, there are some clear limitations to this study. The relatively small sample size for latent class analysis impacts the generalizability of findings, and resulted in some very small class sizes within the social-emotional domains of the Q-CCIIT. The use of videotaping rather than live coding meant that it was not possible to capture all aspects of the classroom environment, since the camera provides only a single perspective. Further, due to coding constraints, the fourth item, supporting peer interaction and play, may not be well-suited to time-series analysis. The sample was also naturally limited by geographic constraints to counties in the state of Michigan. It is also important to interpret these results in the context of the larger intervention study from which these (pre-test) data are taken, as teachers who volunteered to take part in the Hearts and Minds on Babies Study (HMB) may not be representative of all teachers across the participating community agencies. Teachers declined to enroll in the study for a variety of reasons: Some did not want to be videotaped interacting with children, some had demands on their own time outside of work that prevented their participation in the intervention, and others were very new to the profession and were still learning the EHS system. In sum, these analyses are exploratory, representing a new approach to an established measure (the Q-CCIIT), and results should be taken in that light. Replication of these findings, or similar results using a larger sample,

are needed to establish the utility of LCA in observational assessment of teachers' responsiveness and sensitivity to children's cues.

Future Directions

The results and implications of the current study provide several avenues for future research and policy work. All data for these analyses came from pre-test data of teachers enrolled as participants in the open-trial or RCT phases of HMB. The clearest next step with these data is additional latent class analysis on the same sample's Q-CCIIT scores at post-test and follow-up. Observable shifts in group membership and alteration in the position, slope, or curvature of derived profiles are part of the purpose of that statistical technique (Tabachnick & Fidell, 2018). These potential differences (or stability) over time could illustrate the impact of many other variables on teacher social-emotional responsiveness. With respect to data analysis, this approach to observational assessment can make teacher-child interactions plain at a level that resembles the real-time experiences of young children. It is not yet clear what types of training and professional development are most effective at improving teachers' abilities to read and respond to infants' and toddlers' social-emotional cues, build relationships with individual children (as well as the whole group) and support their exchanges with peers. Teacher-child relationships develop via a unique interactional process between infants, toddlers and their caregivers, as is consistent with a dynamic systems approach to lifespan development (Overton, 2013).

The results of this study also show promise for further analysis into the impact of teacher attachment security on observable caregiving behavior. In this study, self-reported emotion dysregulation and job stress did not manifest in teachers' caregiving, which is a testament to their professionalism. However, this does not diminish the fact that teachers do experience strong negative emotions at work, a finding which is significantly correlated with their self-reported job

stress (see Table 3) – and there is no permanent element of EHS program design that addresses their well-being. Jennings and Greenberg (2009) note that school systems in general assume that teachers with high social-emotional competence already have the personal resources they need to sustain themselves. This is rarely if ever the case: People thrive within supportive, consistent relationships, not when left to fend for themselves. If the broad goal of Early Head Start is to achieve the best outcomes for infants and toddlers, we must also care for their teachers.

Table 1

Descriptive Statistics for Demographic Variables[a]

	M	*SD*
Age		
Range = 21-66 years	35.59	11.18
Years of ECE Experience		
Range = 0.25-35 years	9.39	8.16
	N	*%*
Sex		
Female	96	99
Race		
Black/African American	41	42.3
White	47	48.6
Native American/Alaska Native	2	2.1
Mixed Race	7	7.2
Ethnicity		
Hispanic/Latina	4	4.1
Education		
High School	6	6.2
Some College	18	18.6
Associate's Degree	23	23.7
Bachelor's Degree	40	41.2
Master's or Professional Degree	8	8.2

[a]Means, standard deviations, and percentages represent the final study sample (N = 97).

Table 2

Bivariate Correlations Among Key Study Variables and Demographic Data

	Age	Education	Years of Experience in ECE
Q-CCIIT[a] Items			
Responding Contingently to Social Cues	0.09	0.16	0.11
Responding to Emotional Cues	0.07	0.08	0.12
Building a Positive Relationship	0.11	0.13	0.05
Supporting Peer Interaction and Play	0.12	0.09	0.08
Attachment			
Secure Base Scripts	-0.01	0.18	0.10
Emotion Dysregulation			
Teacher Care Patterns Questionnaire	-0.31**	-0.11	-0.26*
Job Stress			
Child Care Worker Job Stress Inventory			
JSI - Job Demands	-0.40**	0.14	-0.34**
JSI - Job Control	-0.04	-0.22*	-0.08
JSI - Job Resources	0.15	0.02	0.09

[a]Quality of Caregiver-Child Interactions for Infants and Toddlers (Atkins-Burnett et al., 2015a).

**$p < .01$, $p < .05$.

Table 3

Descriptive Statistics and Bivariate Correlations Between Key Study Variables

	M	*SD*	*Min.*	*Max.*	2	3	4	5	6	7	8	9
Q-CCIIT[a] Items												
1. Responding Contingently to Social Cues *Score range 0-7*	4.58	0.86	2.67	6.83	0.90**	0.82**	0.66**	0.24*	-0.02	0.01	0.08	-0.03
2. Responding to Emotional Cues *Score range 0-7*	4.39	0.94	2.00	6.67		0.87**	0.60**	0.18	0.01	-0.05	0.18	-0.02
3. Building a Positive Relationship *Score range 0-7*	4.91	0.74	2.50	6.50			0.57**	0.21*	-0.06	-0.06	0.10	0.03
4. Supporting Peer Interaction and Play *Score range 0-7*	2.23	0.74	1.00	5.40				0.20	-0.13	0.01	0.14	0.04
Attachment												
5. Secure Base Scripts *Score range 0-7*	3.97	0.80	2	6					-0.02	0.01	0.07	0.07
Emotion Dysregulation												
6. Teacher Care Patterns Questionnaire *Score range 25-120*	58.43	10.44	35	90						0.38**	-0.26*	-0.22*
Job Stress												
7. JSI[b] - Job Demands *Score range 20-100*	60.54	9.43	45	91							-0.40**	-0.29**
8. JSI - Job Control *Score range 17-85*	41.81	9.04	24	60								0.48**
9. JSI - Job Resources *Score range 17-85*	71.72	8.11	50	85								

[a]Quality of Caregiver-Child Interactions for Infants and Toddlers (Atkins-Burnett et al., 2015a). [b]Child Care Worker Job Stress Inventory (Curbow et al., 2000).
**$p < .01$, *$p < .05$.

Table 4

Descriptive Statistics for the Full Sample at Each Cycle, Q-CCIIT Items A1-A4.

A1. Responding Contingently to Social Cues	*N*	*M*	*SD*	*Variance*
Cycle 1	95	4.62	1.01	1.03
Cycle 2	97	4.58	0.96	0.91
Cycle 3	96	4.54	1.02	1.03
Cycle 4	96	4.51	1.17	1.37
Cycle 5	97	4.57	1.02	1.04
Cycle 6	95	4.45	0.95	0.91
Total Sample Variance	Intercept = 0.73**			
	Slope = 0.04**			
	Quadratic Slope = 0.01**			
A2. Responding to Emotional Cues	*N*	*M*	*SD*	*Variance*
Cycle 1	97	4.48	1.08	1.17
Cycle 2	97	4.51	1.14	1.29
Cycle 3	97	4.33	1.13	1.27
Cycle 4	96	4.29	1.27	1.62
Cycle 5	97	4.39	1.05	1.10
Cycle 6	97	4.23	1.10	1.20
Total Sample Variance	Intercept = 0.82**			
	Slope = 0.02*			
	Quadratic Slope = 0			
A3. Building a Positive Relationship	*N*	*M*	*SD*	*Variance*
Cycle 1	97	4.99	0.85	0.72
Cycle 2	97	4.96	0.90	0.81
Cycle 3	97	4.90	0.91	0.82
Cycle 4	96	4.78	0.93	0.87
Cycle 5	97	4.90	0.91	0.82
Cycle 6	96	4.79	1.00	1.01
Total Sample Variance	Intercept = 0.52**			
	Slope = 0.02**			
	Quadratic Slope = 0			
A4. Supporting Peer Interaction and Play	*N*	*M*	*SD*	*Variance*
Cycle 1	87	2.00	0.70	0.49
Cycle 2	93	2.16	0.85	0.72
Cycle 3	95	2.23	0.99	0.99
Cycle 4	96	2.13	0.99	0.97
Cycle 5	95	2.37	1.08	1.17
Cycle 6	93	2.14	1.04	1.08
Total Sample Variance	Intercept = 0.38**			
	Slope = 0.02**			
	Quadratic Slope = 0			

**$p < 0.01$, *$p < 0.05$.

Table 5

Results of Latent Class Analysis Model Testing, Responding Contingently to Social Cues

Model	Goodness-of-fit			Probabilities			
	Loglikelihood	*SABIC*[a]	*Entropy*	*Class 1*	*Class 2*	*Class 3*	*Class 4*
2-class	-631.28	1289.48	0.88	0.98 (*N* = 82) I = 4.32** S = 0.01 Q = 0	0.91 (*N* = 15) I = 5.93** S = -0.21** Q = -0.01	--	--
3-class	-628.11	1288.80	0.86	0.98 (*N* = 76) I = 4.30** S = 0.01 Q = -0.02	0.94 (*N* = 15) I = 5.93** S = -0.21** Q = 0	0.67 (*N* = 6) I = 4.50** S = -0.02 Q = 0.15*	--
4-class	-628.11	1294.47	0.89	0.98 (*N* = 76) I = 4.30** S = 0.01 Q = -0.02	0.66 (*N* = 6) I = 4.50** S = -0.02 Q = 0.15*	*N* = 0	0.94 (*N* = 15) I = 5.93** S = -0.21** Q = 0

[a]Sample-adjusted Bayesian information criterion.

**$p < .01$, *$p < 0.05$.

Table 6

Results of Latent Class Analysis Model Testing, Responding to Emotional Cues

Model	Goodness-of-fit			Probabilities			
	Loglikelihood	*SABIC*[a]	*Entropy*	*Class 1*	*Class 2*	*Class 3*	*Class 4*
2-class	-711.27	1446.63	0.77	0.97 (*N* = 85) I = 4.37** S = 0 Q = 0	0.73 (*N* = 12) I = 4.38** S = -0.41** Q = 0.06		
3-class	-706.67	1445.94	0.82	0.94 (*N* = 59) I = 4.36** S = 0.01 Q = -0.02	0.83 (*N* = 15) I = 5.34** S = 0.21** Q = -0.05	0.94 (*N* = 23) I = 3.92** S = -0.36** Q = 0.06**	
4-class	-710.27	1458.80	0.87	*N* = 0	0.94 (*N* = 75) I = 4.50** S = 0.04 Q = -0.02	*N* = 0	0.83 (*N* = 22) I = 4.08** S = -0.35** Q = 0.06*

[a]Sample-adjusted Bayesian information criterion.

***p* < .01, **p* < 0.05.

Table 7

Results of Latent Class Analysis Model Testing, Building a Positive Relationship

Model	Goodness-of-fit			Probabilities			
	Loglikelihood	*SABIC*[a]	*Entropy*	*Class 1*	*Class 2*	*Class 3*	*Class 4*
2-class	-600.78	1225.65	0.66	0.97 (*N* = 87) I = 4.90** S = 0 Q = 0	0.50 (*N* = 10) I = 4.75** S = -0.31* Q = 0.07		--
3-class	-596.46	1225.52	0.87	0.97 (*N* = 82) I = 4.86** S = -0.02 Q = 0	0.81 (*N* = 11) I = 5.91** S = -0.11 Q = 0.06	0.91 (*N* = 4) I = 3.03** S = -0.28 Q = -0.03	--
4-class	-594.29	1226.84	0.87	0.96 (*N* = 72) I = 4.92** S = -0.08** Q = -0.01	0.84 (*N* = 23) I = 4.97** S = 0.11** Q = 0.05	*N* = 0	0.89 (*N* = 2) I = 3.38** S = -0.57** Q = 0.07

[a]Sample-adjusted Bayesian information criterion.

**$p < .01$, *$p < 0.05$.

Table 8

Results of Latent Class Analysis Model Testing, Supporting Peer Interaction and Play

Model	Goodness-of-fit			Probabilities			
	Loglikelihood	*SABIC*[a]	*Entropy*	*Class 1*	*Class 2*	*Class 3*	*Class 4*
2-class	-618.56	1259.60	0.86	0.98 (*N* = 77)	0.83 (*N* = 11)		
				I = 1.99**	I = 3.20**		
				S = 0	S = 0.36**		
				Q = 0	Q = -0.13		
3-class	-609.52	1249.45	0.93	0.97 (*N* = 60)	0.93 (*N* = 26)	0.99 (*N* = 3)	
				I = 1.93**	I = 2.61**	I = 4.76**	
				S = -0.06*	S = 0.25**	S = 0.66**	
				Q = 0	Q = -0.04	Q = -0.21**	
4-class	-613.37	1262.43	0.94	0.99 (*N* = 78)	0.84 (*N* = 7)	0.86 (*N* = 3)	0.99 (*N* = 1)
				I = 2.05*	I = 3.20*	I = 2.14*	I = 5.20*
				S = 0.02	S = 0.50*	S = -0.45*	S = 0.20*
				Q = 0	Q = -0.18*	Q = 0.23*	Q = 0

Note. Sample size for analyses constrained to participants with at least 5 consecutive scored cycles (*n* = 89).

[a]Sample-adjusted Bayesian information criterion.

***p* < .01, **p* < 0.05.

Table 9

Differences by Class in Mean Scores on Attachment

	SBS[a]			Effect Size Differences	
	N	*M*	*SD*	*Class 2*	*Class 3*
A1. Responding contingently to social cues					
1. Moderate Consistent	78	3.88	0.76	0.55	
2. High Consistent	15	4.31	0.86		
A2. Responding to emotional cues					
1. Moderate Consistent	56	3.94	0.78	0.58	0.32
2. High Consistent	15	4.39	0.83		0.94*
3. High Declining	22	3.69	0.68		
A3. Building a positive relationship					
1. High Consistent	79	3.90	0.75	0.58	0.20
2. Very High Consistent	11	4.36	1.01		0.65
3. Moderate Declining	3	3.75	0.43		
A4. Supporting peer interaction and play					
1. Low Consistent	73	3.93	0.74	0.52	
2. Low Increasing	12	4.31	0.67		

[a]Secure Base Scripts (Waters, Rodrigues, & Ridgeway, 1998).

*$p < 0.05$.

Table 10

Differences by Class in Mean Scores on Emotion Dysregulation

	TCPQ[a]			Effect Size Differences	
	N	*M*	*SD*	*Class 2*	*Class 3*
A1. Responding contingently to social cues					
1. Moderate Consistent	79	57.90	10.39	0.32	
2. High Consistent	15	61.20	10.61		
A2. Responding to emotional cues					
1. High Consistent	57	57.05	10.24	0.33	0.32
2. Very High Consistent	15	60.47	10.20		0.004
3. Moderate Declining	22	60.43	10.97		
A3. Building a positive relationship					
1. High Steady	80	57.93	10.17	0.34	0.24
2. Very High Consistent	11	61.55	13.21		0.10
3. Moderate Declining	3	60.33	6.43		
A4. Supporting peer interaction and play					
1. Low Consistent	75	58.47	10.17	0.10	
2. Low Increasing	11	57.45	10.72		

[a]Teacher Care Patterns Questionnaire (Shine, 2016).

Table 11

Differences by Class in Mean Scores on Job Demands

	JSI[a] Demands			Effect Size Differences	
	N	*M*	*SD*	*Class 2*	*Class 3*
A1. Responding contingently to social cues					
1. Moderate Consistent	76	60.54	9.26	0.10	
2. High Consistent	15	61.53	10.56		
A2. Responding to emotional cues					
1. Moderate Consistent	53	60.77	9.65	0.06	0.06
2. High Consistent	15	60.20	9.14		0.002
3. High Declining	23	60.22	9.48		
A3. Building a positive relationship					
1. High Consistent	77	60.48	9.33	0.16	0.41
2. Very High Consistent	11	62.00	11.48		0.51
3. Moderate Declining	3	56.67	0.58		
A4. Supporting peer interaction and play					
1. Low Consistent	73	60.52	9.37	0.21	
2. Low Increasing	11	58.55	8.35		

[a]Child Care Worker Job Stress Inventory (Curbow et al., 2000).

Table 12

Differences by Class in Mean Scores on Job Control

	JSI[a] Control			Effect Size Differences	
	N	*M*	*SD*	*Class 2*	*Class 3*
A1. Responding contingently to social cues					
1. Moderate Consistent	76	42.29	8.20	0.40	
2. High Consistent	14	39.21	5.83		
A2. Responding to emotional cues					
1. Moderate Consistent	55	40.93	8.28	0.60	0.05
2. High Consistent	15	45.67	6.10		0.62
3. High Declining	20	41.33	7.68		
A3. Building a positive relationship					
1. High Consistent	79	41.38	8.37	0.29	0.52
2. Very High Consistent	11	43.73	4.84		0.43
3. Moderate Declining	3	45.67	2.08		
A4. Supporting peer interaction and play					
1. Low Consistent	71	41.35	7.80	0.55	
2. Low Increasing	11	45.73	8.57		

[a]Child Care Worker Job Stress Inventory (Curbow et al., 2000).

Table 13

Differences by Class in Mean Scores on Job Resources

	JSI[a] Resources			Effect Size Differences	
	N	*M*	*SD*	*Class 2*	*Class 3*
A1. Responding contingently to social cues					
1. Moderate Consistent	71	72.32	7.93	0.47	
2. High Consistent	21	68.60	8.21		
A2. Responding to emotional cues					
1. Moderate Consistent	55	72.26	8.77	0.08	0.31
2. High Consistent	15	72.93	6.29		0.48
3. High Declining	22	69.65	7.15		
A3. Building a positive relationship					
1. High Consistent	78	71.96	8.08	0.28	0.13
2. Very High Consistent	11	69.64	8.93		0.41
3. Moderate Declining	3	73.00	2.00		
A4. Supporting peer interaction and play					
1. Low Consistent	73	71.73	7.75	0.53	
2. Low Increasing	11	75.82	7.47		

[a]Child Care Worker Job Stress Inventory (Curbow et al., 2000).

*$p < 0.05$.

Table 14

Sample Distribution of EHS Teachers for Mixed Model Analysis by Community Agency and Center[a]

Agencies			Centers		
	N	***%***		***N***	***%***
Agency A	22	21.4	Center 2	7	7.4
Agency B	14	13.6	Center 11	7	7.4
			Center 12	7	7.4
Agency C	9	8.7	Center 15	7	7.4
Agency D	19	18.4	Center 19	5	5.3
			Center 21	6	6.4
Agency E	17	16.5	Center 23	9	9.6
Agency F	6	5.8	Center 27	6	6.4
Agency G	2	1.9			
Agency H	10	9.7	Sub-Sample n = 54		52.4%
Agency I	3	2.9			
Total Sample N = 103[b]					

[a]A total of thirty-four child care centers participated in this study. Centers excluded from mixed model analysis (n = 26) in Aim 4 employed fewer than 5 participants each. [b]Initial sample of videos, prior to data screening and the application of exclusion criteria.

Table 15

Descriptive Statistics and Variance for Majority Classes, Q-CCIIT Items A1-A4

A1. Responding Contingently to Social Cues	*M*	*Range*	*SD*	*Variance*
Cycle 1	4.29	3-6	.68	.46
Cycle 2	4.29	3-5	.66	.43
Cycle 3	4.30	2-7	.86	.74
Cycle 4	4.32	3-7	.99	.97
Cycle 5	4.37	3-7	.92	.85
Cycle 6	4.31	2-7	.89	.79
Moderate Consistent Class (n = 82)		Variance of Intercept = .39**		
		Variance of Slope = .03**		
		Variance of Quadratic Slope = 0		
A2. Responding to Emotional Cues	*M*	*Range*	*SD*	*Variance*
Cycle 1	4.29	2-7	1.11	1.23
Cycle 2	4.33	1-7	1.05	1.10
Cycle 3	4.40	3-7	.97	.95
Cycle 4	4.28	2-7	1.15	1.33
Cycle 5	4.41	3-6	.90	.81
Cycle 6	4.24	3-6	.76	.57
Moderate Consistent Class (n = 58)		Variance of Intercept = .76**		
		Variance of Slope = -.01		
		Variance of Quadratic Slope = 0		
A3. Building a Positive Relationship	*M*	*Range*	*SD*	*Variance*
Cycle 1	4.85	3-6	.67	.45
Cycle 2	4.87	4-7	.66	.44
Cycle 3	4.84	4-6	.68	.46
Cycle 4	4.72	3-6	.75	.56
Cycle 5	4.84	4-7	.78	.60
Cycle 6	4.73	3-6	.74	.54
High Consistent Class (n = 82)		Variance of Intercept = .26**		
		Variance of Slope = .01		
		Variance of Quadratic Slope = 0		
A4. Supporting Peer Interaction and Play	*M*	*Range*	*SD*	*Variance*
Cycle 1	2.03	1-4	.70	.49
Cycle 2	2.01	1-4	.75	.57
Cycle 3	1.97	1-4	.71	.50
Cycle 4	1.91	1-3	.71	.51
Cycle 5	2.09	1-4	.81	.66
Cycle 6	1.95	1-4	.80	.65
Low Consistent Class (n = 77)		Variance of Intercept = .10*		
		Variance of Slope = .01		
		Variance of Quadratic Slope = 0		

**$p < .01$, *$p < 0.05$.

Figure 1
The Prosocial Classroom Model (Jennings & Greenberg, 2009)

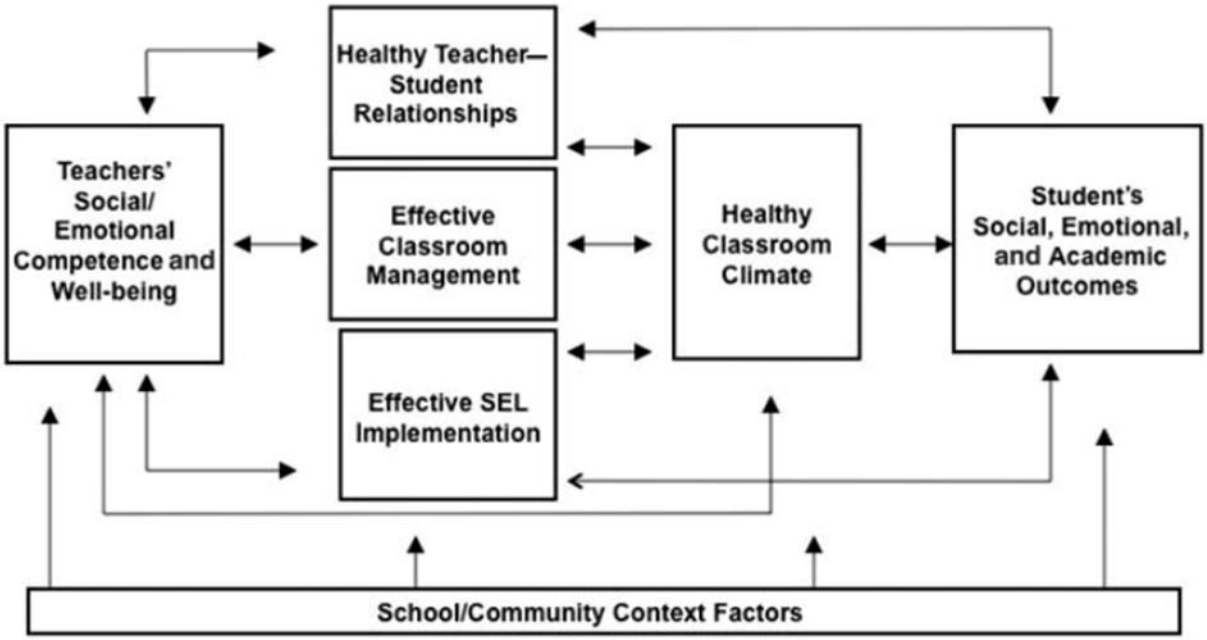


Figure 2
The Buffett Early Childhood Institute Model (Gallagher, 2017)

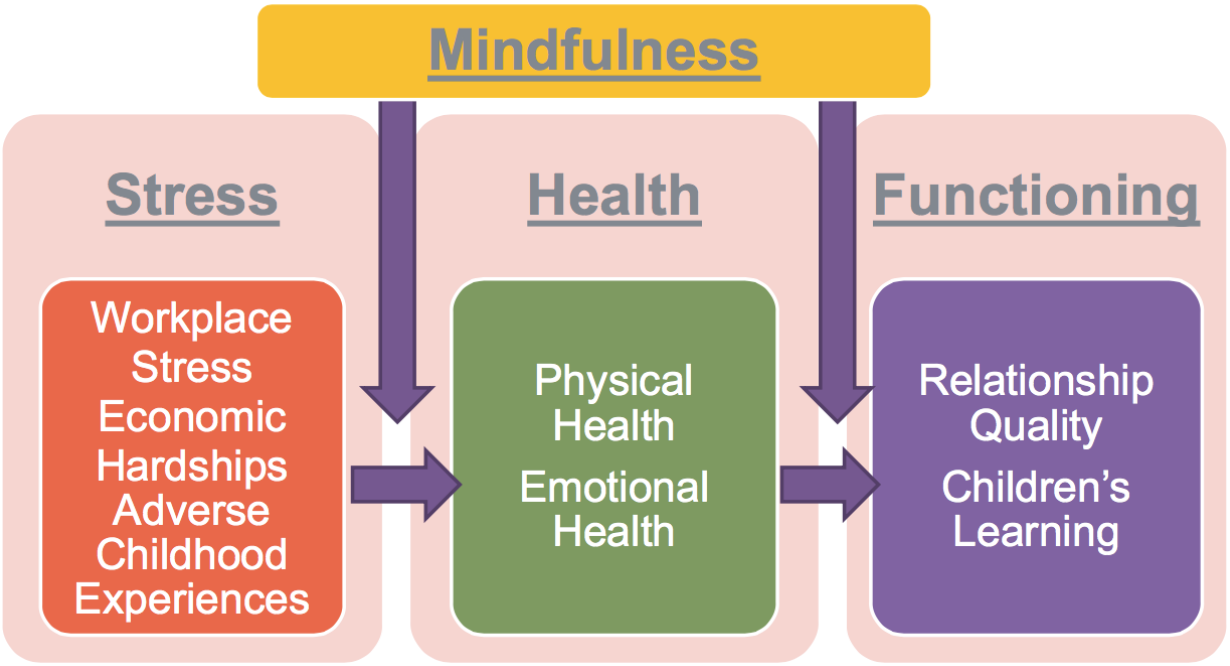


Figure 3

Scores for the Total Sample (N = 97) on Responding Contingently to Social Cues

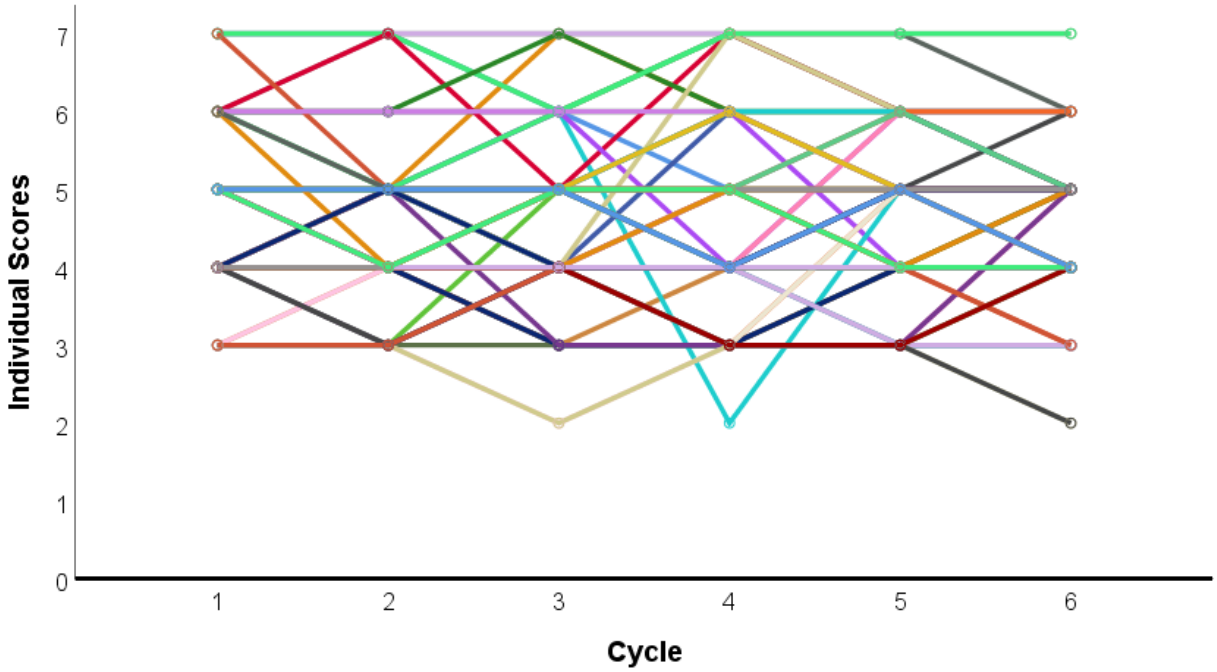


Figure 4

Scores for the Total Sample (N = 97) on Responding to Emotional Cues

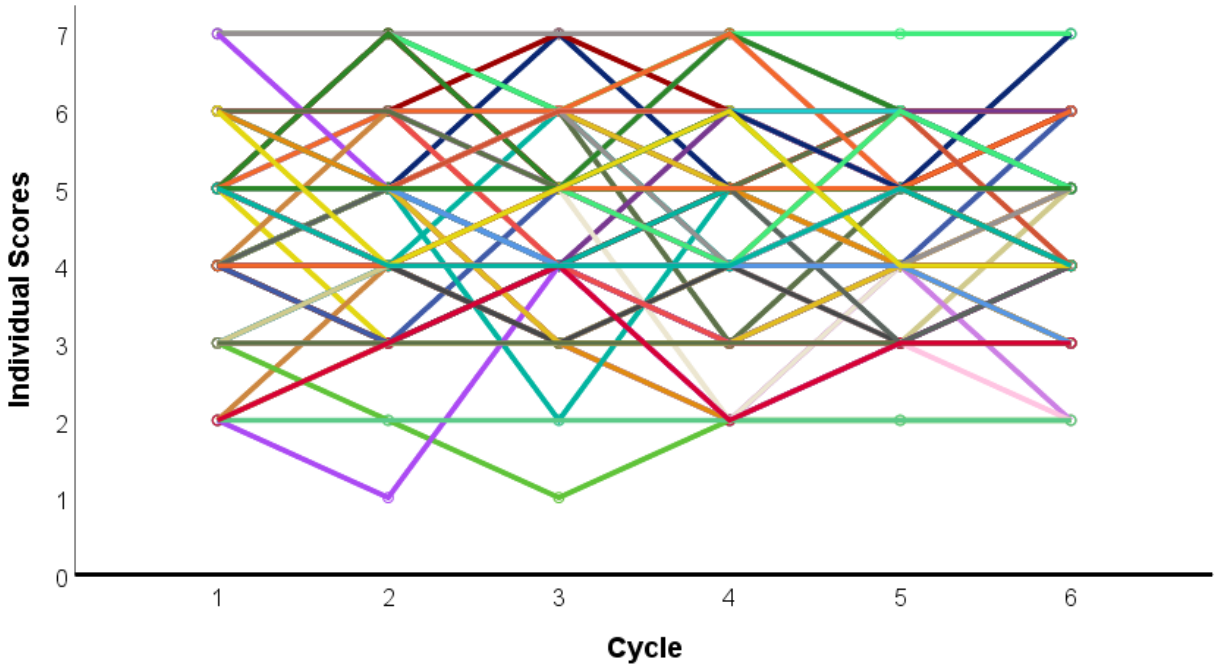


Figure 5
Scores for the Total Sample (N = 97) on Building a Positive Relationship

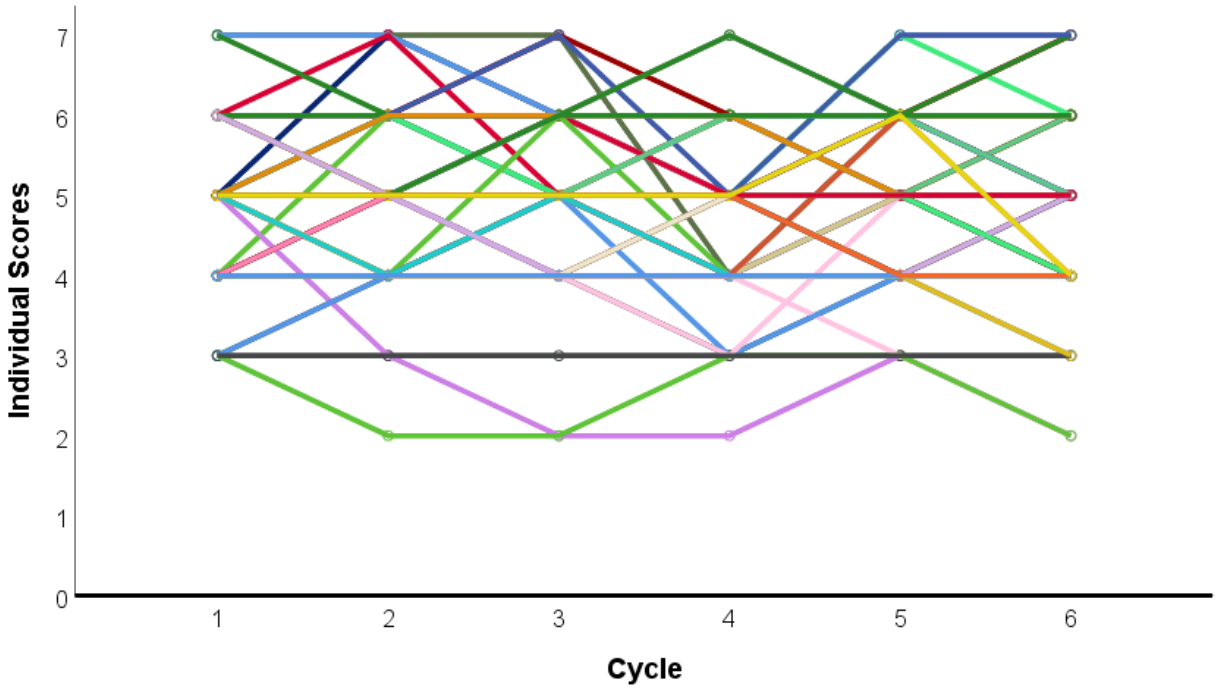


Figure 6

Scores for the Total Sample (N = 97) on Supporting Peer Interaction and Play

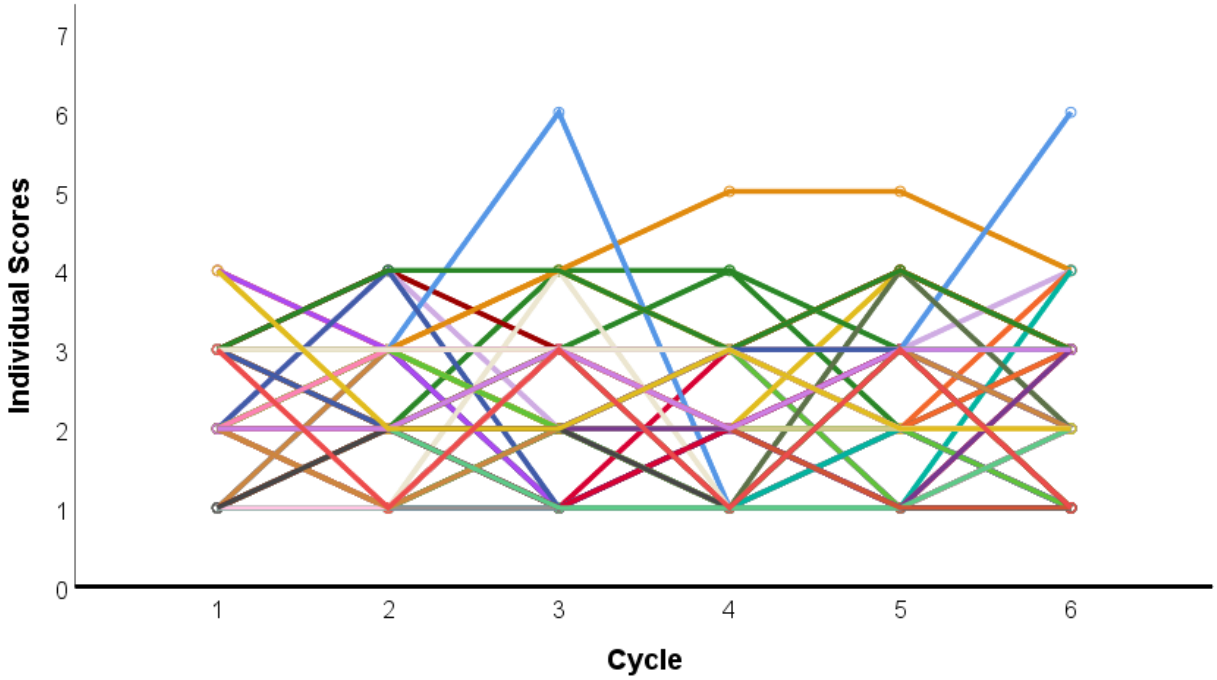


Figure 7

Two-Class Model for Responding Contingently to Social Cues

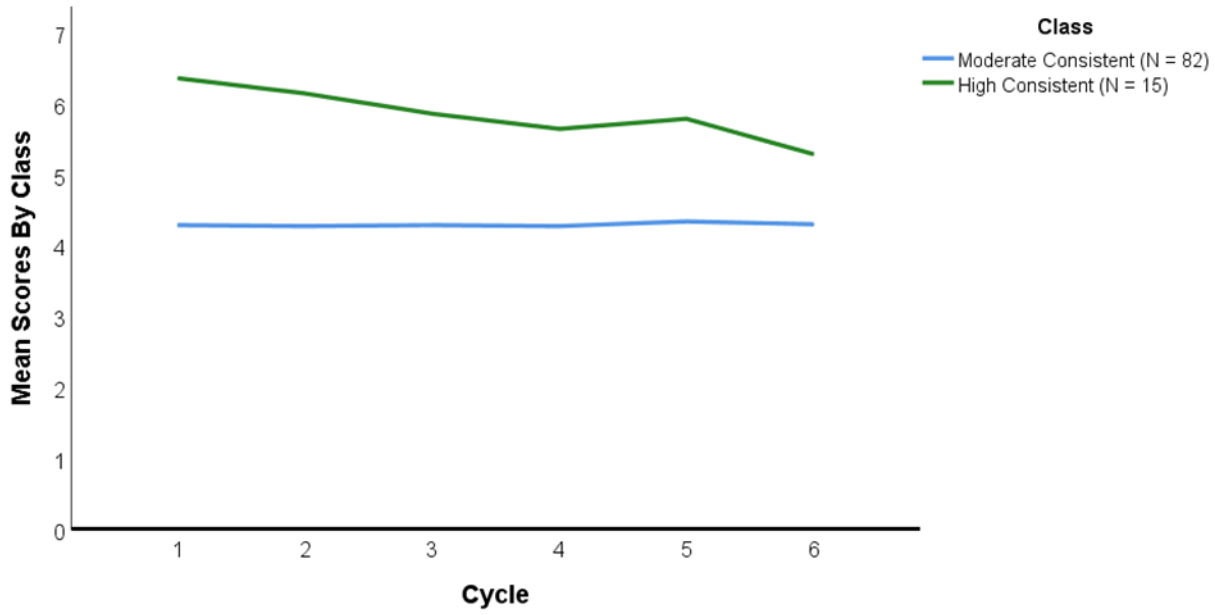


Figure 8

Three-Class Model for Responding to Emotional Cues

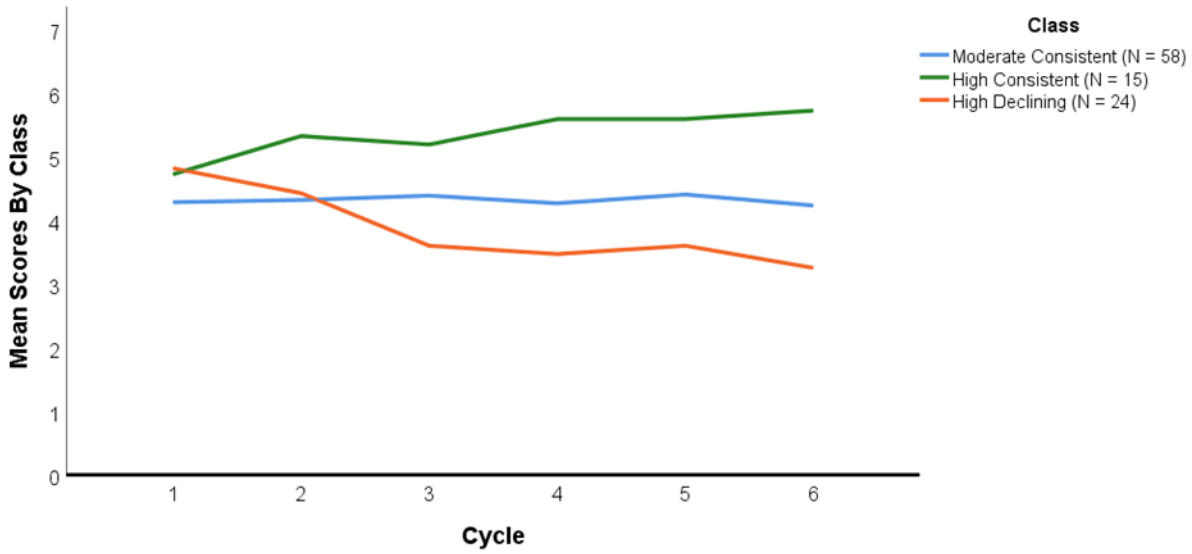


Figure 9

Three-Class Model for Building a Positive Relationship

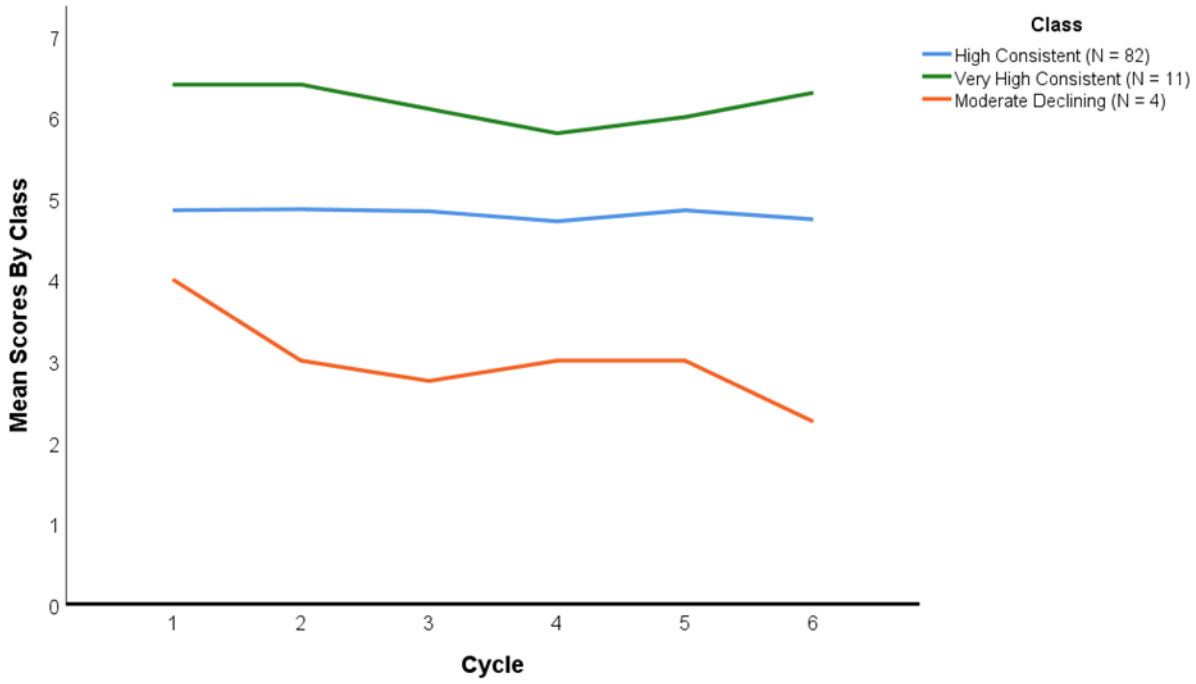
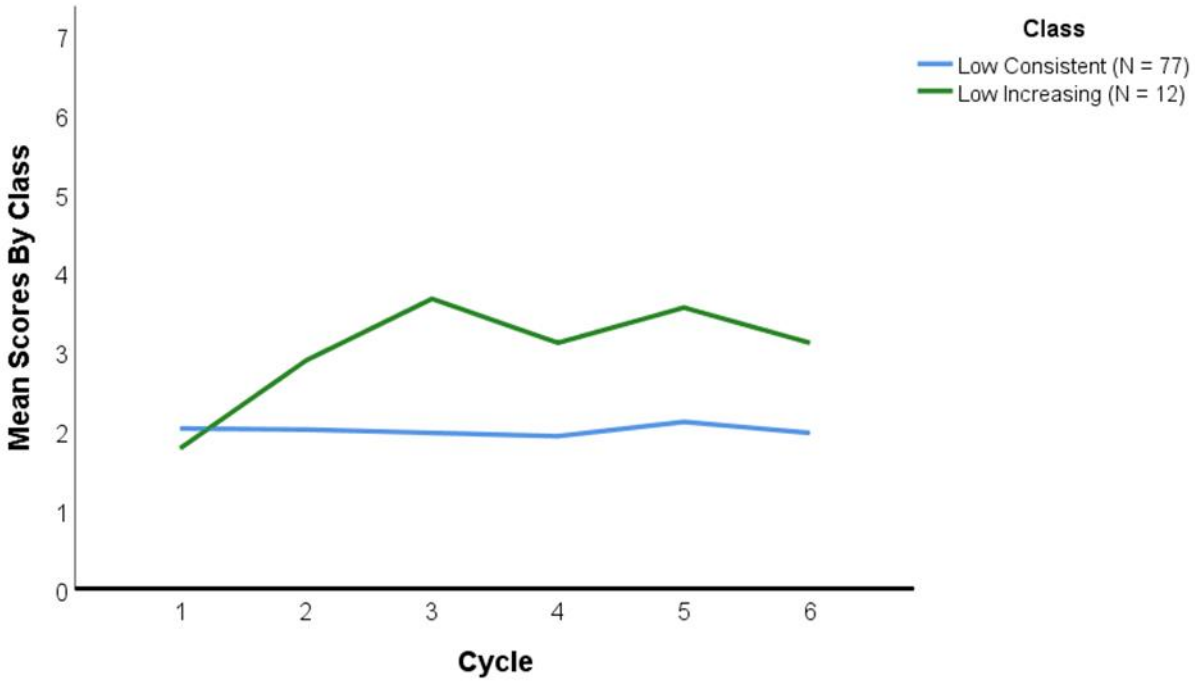


Figure 10

Two-Class Model for Supporting Peer Interaction and Play



APPENDIX A
LATENT CLASS PROFILE PLOTS FOR ALTERNATE 3-CLASS MODEL SOLUTIONS

Figure 11
Three-Class Alternate Model for Responding Contingently to Social Cues

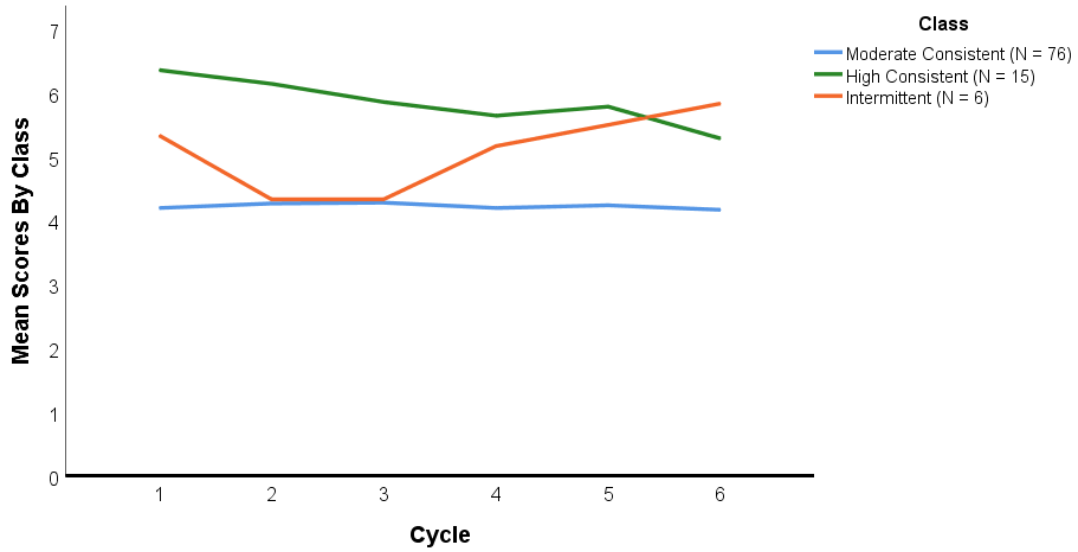
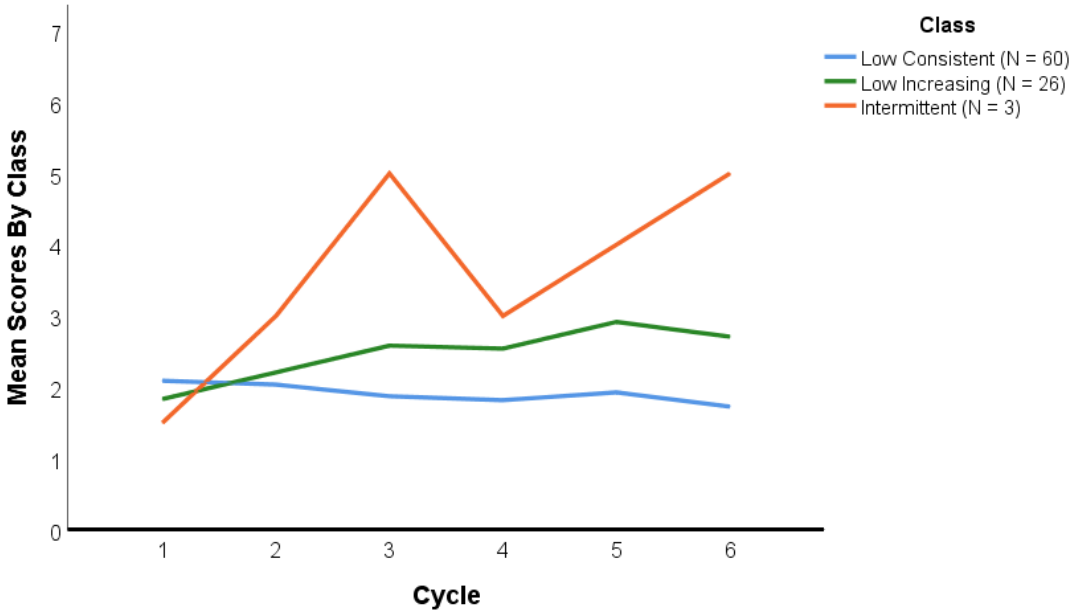


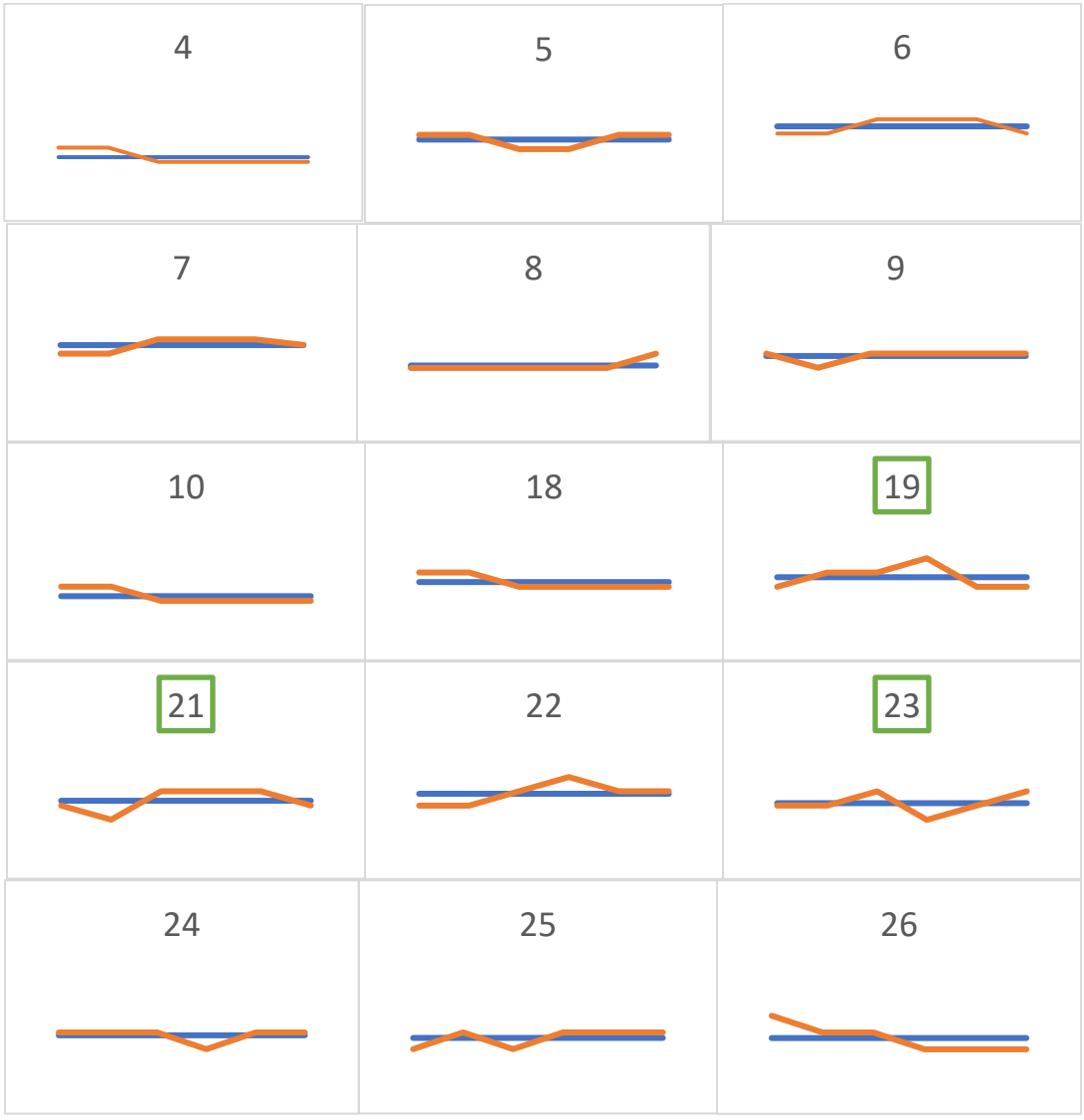
Figure 12
Three-Class Alternate Model for Supporting Peer Interaction and Play



APPENDIX B
INDIVIDUAL PROFILE PLOTS FOR PARTICIPANTS ASSIGNED TO MAJORITY CLASSES

Graphs in this Appendix represent scores across the morning (orange) plotted against the mean score for each individual (blue). Where no blue line appears, a participant received the same score for each cycle. Participant study IDs appear at the top of each graph; green boxes appear around those whose scores varied by at least two scale steps from any one time point to the next during the observation period.

Figure 13
Individual Profile Plots, Responding Contingently to Social Cues, Moderate Consistent Group (n = 82)



27 	28	29 
30 	31 	33 
34 	36 	37 
38 	48 	49 
53 	55 	57 
58 	59 	61 
62 	63 	65 

67 	69 	70 
73 	74 	75 
79 	80 	81 
82 	83 	84
85 	86 	87 
88 	89 	90
91 	92 	93 

94 	95 	96 
97 	98 	99 
100 	101 	102 
104 	107 	108 
109 	111 	115 
116 	117 	118
119 	120 	122 

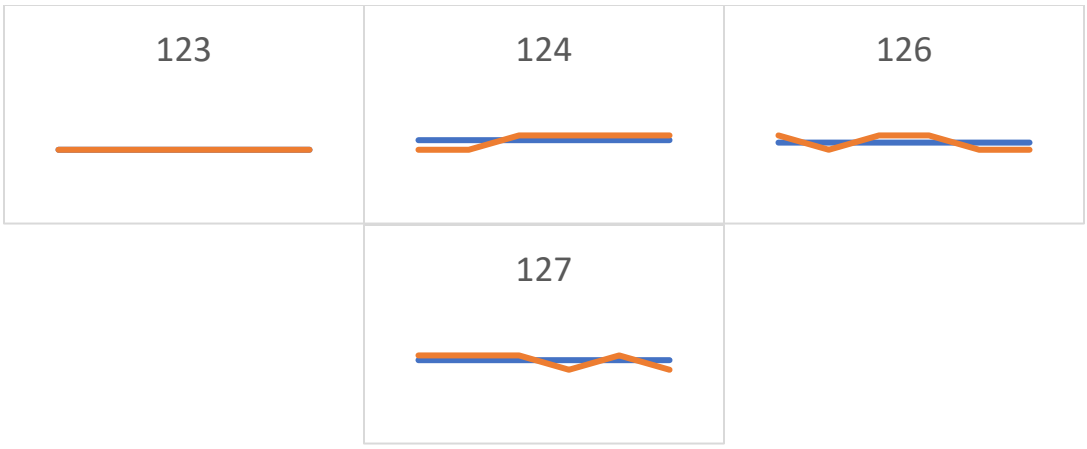
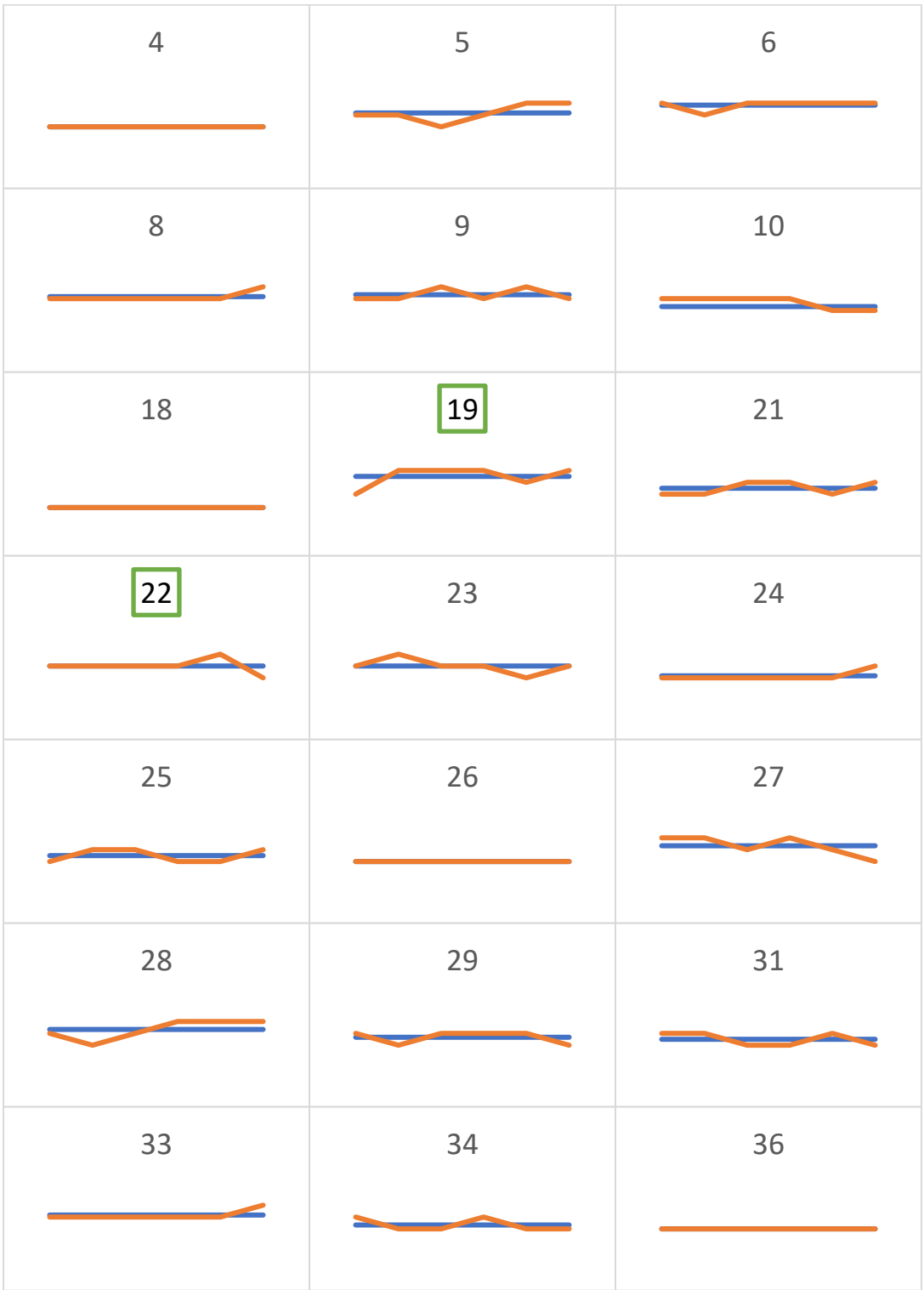


Figure 14
Individual Profile Plots, Responding to Emotional Cues, Moderate Consistent Group (n = 58)

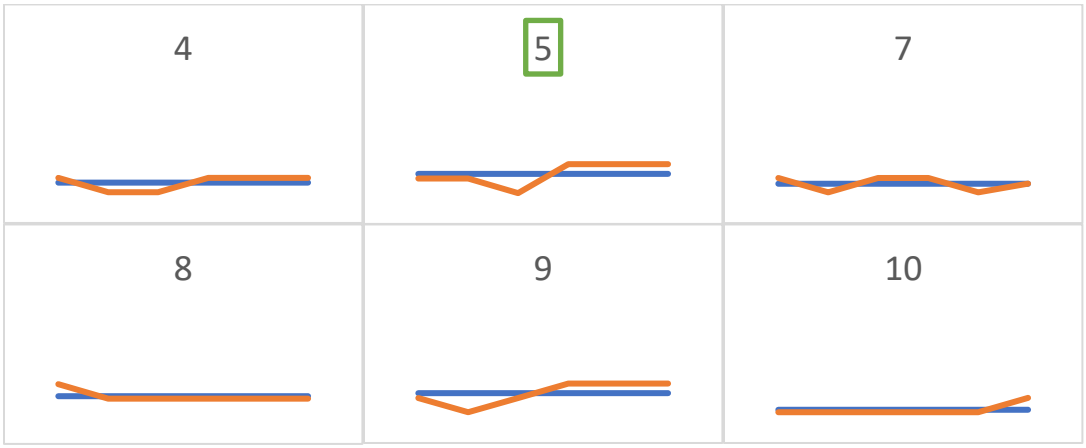
Figure 15

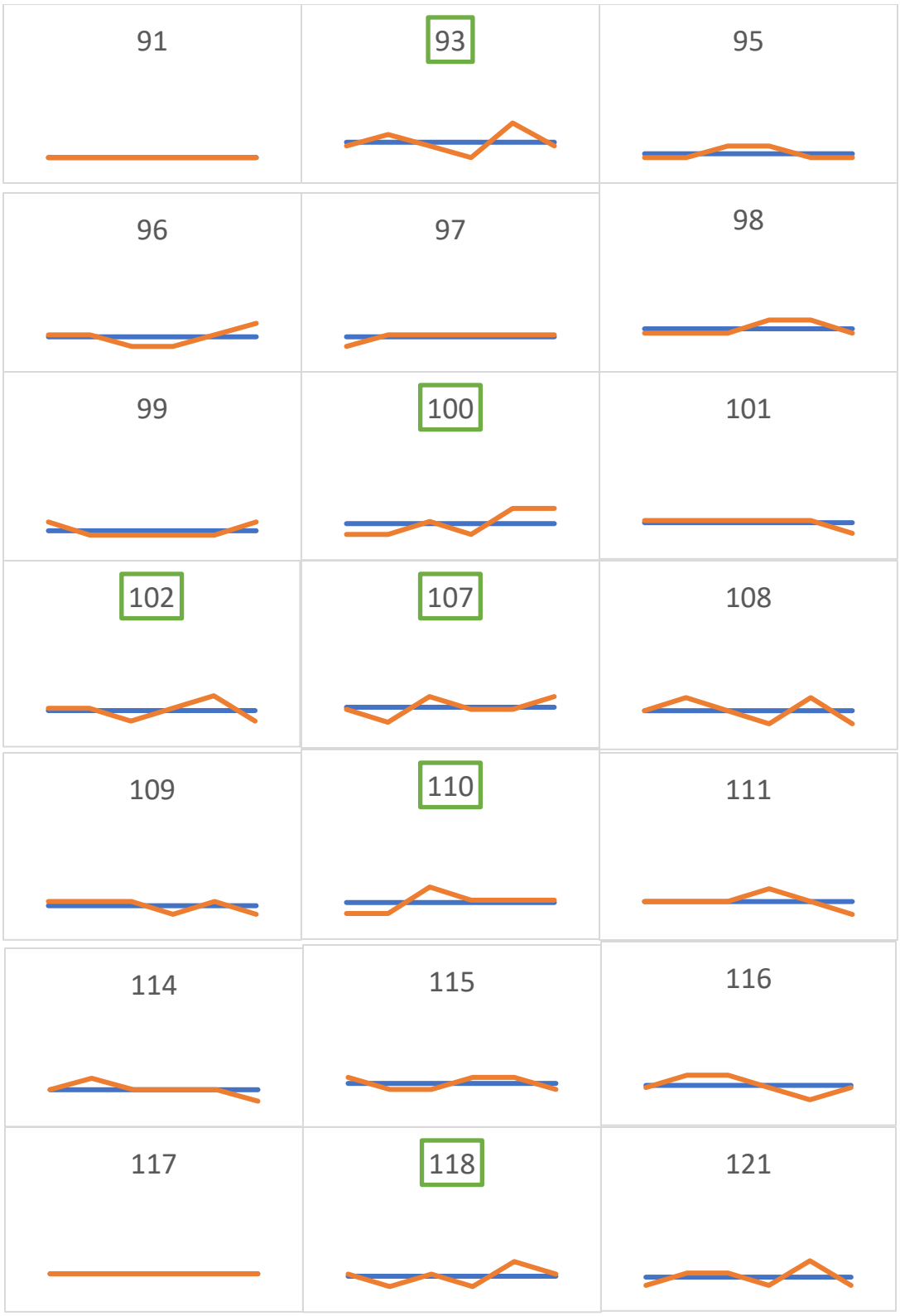
Individual Profile Plots, Building a Positive Relationship, High Consistent Group (n = 82)

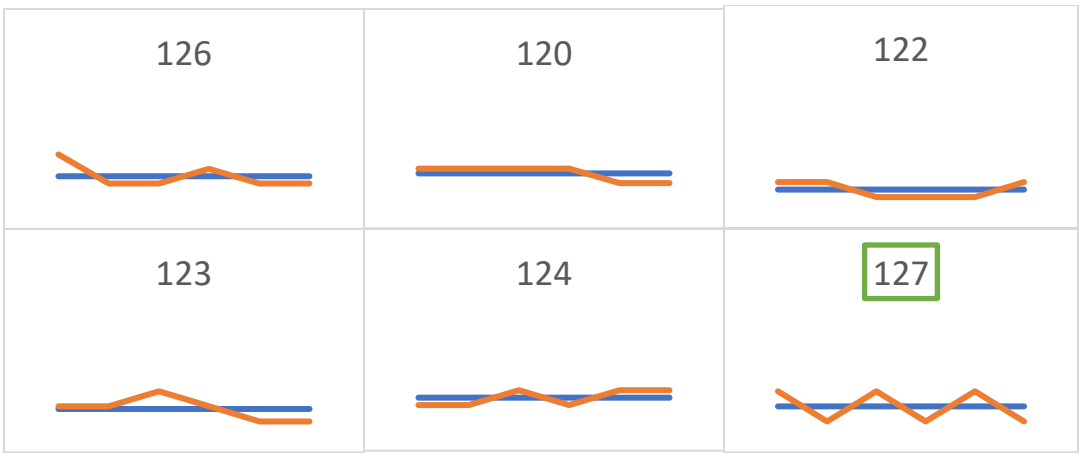


37 	38 	40 
43 	48 	49 
54 	58 	59 
61 	63 	65 
67 	69	70 
71 	72 	73 
74 	75 	79 
80 	81 	82 

Figure 16
Individual Profile Plots, Supporting Peer Interaction and Play, Low Consistent Group (n = 77)







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ABSTRACT

THE DAYS TAKE CARE OF THEMSELVES: EARLY HEAD START TEACHER INTERACTIONS WITH CHILDREN IN ASSOCIATION WITH FACTORS AFFECTING ENVIRONMENTAL QUALITY

by

BRITTA K. SHINE

May 2020

Advisors: Dr. Ann M. Stacks and Dr. Marjorie Beeghly

Major: Psychology (Developmental)

Degree: Doctor of Philosophy

The purpose of this study was to propose a new framework for the assessment of environmental quality in infant-toddler classrooms in Early Head Start (EHS), in which sequential observational scores across the morning on the Quality of Caregiver-Child Interactions for Infants and Toddlers (Q-CCIIT; Atkins-Burnett et al., 2015) were re-framed as a micro-time-series. The purpose of these analyses was to assess within-person differences across a typical morning in EHS in teacher responsiveness and sensitivity to children's social and emotional cues, their capacity for building relationships with children, and their support for children's peer interaction and play. During hypothesis testing, interaction typologies emerged for teacher behavior in each of the social-emotional domains, the models for which demonstrated statistical coherence and important between-class differences with regard to the quality of care provided. When typologies of interaction quality were analyzed in association with teacher-level variables, attachment showed significant associations with observed caregiving behavior, such that secure teachers provided care that was more sensitive and responsive. Other teacher-level variables (emotion dysregulation and job stress), while correlated with one another, showed no association with latent class assignment.

A final analysis examined whether average job stress at child care centers or operating community agencies predicted teacher behavior, but found no significant results. Implications for policy and professional development are discussed, as well as potential avenues for further applied research on teacher well-being in early childhood education in general, and EHS in particular.

AUTOBIOGRAPHICAL STATEMENT

Britta K. Shine graduated from Smith College with a Bachelor of Arts in Women's Studies in 2004. Before returning to school, she worked for one year at a non-public school for children with autism as a one-to-one aide and program art teacher, and then for five years as an early childhood educator for children in infant through pre-kindergarten classrooms in a large child care center. In August 2013, she became a student in the Master's program in Infant Mental Health at Mills College in Oakland, CA. While enrolled in that program, she worked as a clinical intern with a mental health consultant for Head Start, and developed the Teacher Care Patterns Questionnaire as part of her thesis research. In August 2016, she became a student in Developmental Science with a Dual Title Degree in Infant Mental Health at Wayne State University. Her doctoral education and research were generously funded by ACF Grant 90YR0092 (PIs: Stacks, Vallotton, Muzik).