# The Moderating Effect of Teachers’ Work-Related Stressors: Evidence From a Randomized Field Experiment in Head Start Classrooms

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The Moderating Effect of Teachers’ Work-Related Stressors:
Evidence from a Randomized Field Experiment in Head Start Classrooms

Qualifying Paper
Submitted by:
Bonnie B. Mackintosh

November 17, 2015
Abstract

Stress among early childhood professionals has been well-documented. Previous studies have shown that teacher-perceived stress is negatively associated with job satisfaction (Kontos, 1993) while high rates of turnover and demanding workloads exacerbate working conditions in early childhood programs (Cassidy, Lower, Kintner-Duffy, Hegde & Shim, 2011). Likewise, a teacher’s confidence in his/her ability to effectively manage classroom behavior plays an important role in her teaching responsibilities and classroom interactions (Alkon, Ramler & MacLennan, 2003). Given the increased focus on early childhood, many interventions have been implemented to improve child-level outcomes. Recently, studies suggest that there are many potential moderators of these intervention treatment effects (e.g., dosage, fidelity). This study investigates the moderating effect of baseline job-related stressors (i.e., Job Demands and Confidence in Managing Children’s Behavior) on the Emotional Climate of the classroom in the cluster-randomized Chicago School Readiness Project (CSRP). CSRP was a multi-component intervention designed to foster children’s self-regulation by developing more positive and close teacher-child interactions. Overall, 78 teachers in 35 classrooms at 18 Head Start sites were analyzed in the study. Adjusting for baseline depressive symptoms and classroom quality, findings suggest that interventions implemented with strong theories of change and comprehensive services help to make them robust to variation in treatment effects for some baseline participant characteristics (i.e., job demands). There is suggestive evidence that other baseline teacher characteristics (i.e., confidence managing children’s behavior) may play a moderating role in interventions, which may be an important line of inquiry for future studies.
Introduction

The Chicago School Readiness Project (CSRP; Raver, Jones, Li-Grining, Metzger, Smallwood & Sardin, 2008) was an evaluation of a multi-component intervention designed to foster children’s self-regulation by developing more positive and close teacher-child interactions. To do this, CSRP provided teachers in the intervention group with training in the use of strategies in effective classroom management and with consultation by mental health professionals to support them to effectively implement the strategies in their classrooms as well as to better manage their own work-related stress (Raver et al., 2008). In one of the initial impact report from the CSRP evaluation, Raver and colleagues (2008) examined the individual CLASS dimensions that comprise Emotional Climate (Positive Climate, Negative Climate, Teacher Sensitivity, and Behavior Management) and found significant treatment effects on Positive Climate, Teacher Sensitivity and Negative Climate with marginally significant effects (p<0.10) on Behavior Management by March of the Head Start year. To date, there have been a number of publications, including a few from this project, describing teachers’ roles in program implementation (e.g., dosage, Zhai, Raver, Jones, Li-Grining, Pressler, Gao, 2010; fidelity, Domitrovich, Gest, Jones, Gill, Sanford, 2010) which suggest that variation in implementation may be related to heterogeneous impacts on child-level outcomes. However, few studies have investigated the role of teachers’ work-related stressors in explaining variation in treatment impacts on classroom-level outcomes, a gap this paper aims to address. Given the relatively limited research in this area, the results from this study can provide important insights into teacher characteristics that may maximize or impede the success of early childhood interventions.
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In this paper, I will provide an overview of the previous literature regarding the role of classroom quality in promoting positive outcomes for children in early child care and educational settings, the prominence of job-related stress in early childhood professionals’ daily roles and responsibilities, and the role of—and need for—effective behavior management strategies when working with young children, particularly in these group settings. I will also provide a brief summary of studies that have investigated heterogeneity in treatment effects to provide context for this paper. Next, I will describe the data and methods used in this study. Then, the results will be presented and discussed. Finally, limitations of the current analysis as well as implications for policy and practice will be discussed.

Background

The Role of Quality in Early Childhood Care and Educational Settings in Promoting Child Outcomes

Early childhood care and educational programs, many of which are designed as compensatory, vary greatly in ways that can be quite different from universal K-12 programs. Organizations, such as the National Association for the Education of Young Children (NAEYC) have, for many years, advocated important program features designed to promote children’s development across domains (i.e., physical, cognitive, and social emotional development). Program quality is often described using either structural features of quality (e.g., teacher degree/qualifications, child-teacher ratios) that have been well established as important indicators of high quality early childhood programs as well as more process-oriented features of quality (e.g., the nature of teacher-
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child interactions) (Phillipsen, Burchinal, Howes & Cryer, 1997). While the former has long been considered important, research is increasingly focusing on this latter type, which may be particularly important for promoting positive child outcomes associated with school readiness. For example, a comprehensive analysis of state-funded PreK programs in 11 states that served predominantly low-income children revealed that certain aspects of classroom quality were particularly important for promoting academic and social emotional outcomes during the preschool year (Howes, Burchinal, Pianta, Bryant, Early, Clifford & Barbarin, 2008; Mashburn, Pianta, Hamre, Downer, Barbarin, Bryant, Burchinal & Early, 2008). In addition to the gains in academic outcomes that one might expect, teacher-reported ratings of the quality of their relationships with the children (i.e., more supportive teacher-child relationships) were associated with larger gains in children’s social skills (e.g., child participates, completes work) and larger decreases in problem behaviors (e.g., being disruptive in class, difficulty following directions) (Howes et al., 2008). Such findings suggest that certain types of classroom quality and interactions may play a particular role in promoting optimal outcomes for children in early care and educational settings.

Increasingly, there is evidence to suggest that there may be thresholds of quality for early childhood care and educational programs—minimum levels of quality that are necessary to promote these positive outcomes. Dearing, McCartney and Taylor (2009), for example, found that for children in non-maternal care between the ages of 6-54 months, higher quality child care, defined by above average scores on indicators of ________________

1 Scores on all of the classroom and instructional quality assessments (i.e., ECERS, CLASS Emotional Climate, CLASS Instructional Climate) were low to moderate overall and only 8% of the classrooms in this sample were rated as being in the range of good to excellent (i.e., scores of 5-7 on ECECRS-R).
developmentally stimulating and supportive child care, significantly moderated the relationship between several risk factors (e.g., low maternal age, low maternal education, low income) and child outcomes, specifically math, letter-word identification and applied problems. These improved academic outcomes extended into middle childhood (i.e., 3rd and 5th grade) with the largest effects for the lowest income children.

Recent evidence also suggests that the quality of early care and educational experiences can either exacerbate or compensate for children’s home experiences. Consistent with past findings, a recent analysis of the data from the National Institute of Child Health and Human Development Early Child Care Research Network (NICHD SECCYD) showed that children with home environments characterized by low parental sensitivity and limited stimulation had, on average, lower levels of self-regulation (i.e., mother-reported internalizing and externalizing behaviors, more disruptive behaviors and fewer prosocial behaviors). Children who were in both home and child care environments characterized by low sensitivity and stimulation faced a “double jeopardy” (Watamura, Phillips, Morrissey, McCartney & Bub, 2011, p. 52) because these children were reported to have more behavior problems than children in the mid-level parenting and child-care quality (as reported by both mothers and child care providers). However, when children from similarly low-sensitivity home environments were in high-quality child care (characterized by, among other things, higher provider educational levels, sensitivity, appropriate materials), mother-reported social emotional outcomes were similar to those reported for children in mid-level parenting and child-care quality (Watamura et al., 2011), suggesting that high-quality early childhood experiences may help to compensate for home environments that do not provide such types of interactions.
and can help to promote social emotional outcomes that are more typical of the average child. Taken together, these findings illustrate the critical role that positive teacher-child interactions and teacher sensitivity, in particular in early care and educational settings, could have for young children’s development.

**Job-Related Stress**

Despite the critical role that early childhood educators play in promoting positive child outcomes, stress among early childhood professionals has been well-documented. For example, previous studies have shown that teacher stress is negatively associated with job satisfaction (Kontos, 1993). In addition, early care and education providers (for children birth-5 years) are poorly compensated, making a national average of $19,980 per year or $9.61/hour (U.S. Bureau of Labor Statistics, 2012). Such low wages have been associated with high rates of job turnover (Whitebook & Sakai, 2003; Cleveland & Hyatt, 2002) and lower quality early childhood programs (Phillips, Mekos, Scarr, McCartney & Abbott–Shim, 2000). High turnover can result in greater burdens for those educators who remain on site, increasing their stress and job demands.

Both high rates of turnover and demanding workloads (e.g., insufficient planning time, challenges in effective classroom behavior management) have been reported as stressors that exacerbate poor working conditions in early childhood programs (Cassidy, Lower, Kintner-Duffy, Hegde & Shim, 2011). Moreover, teachers’ reported job-related stress has been associated with the ways in which they manage children’s behavior. Specifically, in one recent study of state-funded PreK programs, 14.3% of teachers who reported high levels of job stress also reported expelling a preschool child in the previous year, compared to only 4.9% of those reporting low levels of job stress (Gilliam, 2008).
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In fact, PreK teachers expel preschoolers at a rate that is more than three times higher than the national rate of expulsion for K-12 students, with higher rates of expulsion for African-American children and for boys (Gilliam, 2005). Taken together, these findings suggest that teacher stress may not only play a role in children’s behavior, but importantly, likely also influences whether and how teachers incorporate effective strategies in classroom behavior management.

Effectively Managing Children’s Behavior

A teacher’s ability to effectively manage children’s behavior is a critical component of classroom quality in early childhood programs. Caregivers’ responses to problematic child behaviors are influenced by many factors. For example, Scott-Little and Holloway (1992) found that childcare providers’ perceptions about children’s misbehavior (e.g., whether viewed as a stable characteristic of the child or determined by contextual factors within classrooms) influence how they respond. Moreover, when a teacher lacks confidence in her ability to perform such an essential component of early childhood care and education, the interactions between teachers and children may be compromised. Subsequent research has focused on the influence of efforts to support teachers to develop these skills and to shift their belief systems about children’s behavior. In one observational study, teachers in child care centers reported higher self-efficacy in managing children’s behavior following mental health consultation. In addition, there were positive changes in center quality, including reports of increased teacher confidence in their ability to effectively manage children’s difficult and challenging behaviors (Alkon, Ramler & MacLennan, 2003).
Previous Findings of the Role of Teachers in Heterogeneity of Treatment Effects

Recent research suggests that work environments shape teacher experiences in important ways, either supporting or constraining teachers’ ability to teach effectively, particularly in schools that serve predominantly low income and minority students (Kraft, Papay, Charner-Laird, Moore Johnson, Ng & Reinhorn, 2012). In addition, there is evidence to suggest that individual participant level factors, including professional (e.g., previous training, education level) and psychological (e.g., stress, depressive symptoms) characteristics play an important role in the quality of intervention implementation (Domitrovich, Bradshaw, Poduska, Hoagwood, Buckley, Olin, Romanelli, Leaf, Greenberg, & Ialongo, 2008). A recent meta-analysis of more than 500 studies revealed four specific individual level characteristics most highly associated with implementation of prevention and intervention programs in school and/or community-based organizations; among these was participants’ confidence. Specifically, participants with higher confidence were more likely to successfully complete the intervention (i.e., with higher rates of fidelity and dosage; Durlak & DuPre, 2008). Such findings provide additional rationale for investigating the potential moderating effect of teachers’ confidence in managing children’s behavior on intervention impacts, given that this is such a central component of their job and an important element of effective implementation of the CSRP intervention.

Previous studies have shown mixed results about the role of teachers’ self-perceptions on classroom outcomes. In one recent analysis (Brown, Jones, LaRusso & Aber, 2010), 3rd grade teachers’ self-reported emotional abilities (e.g., ability to identify
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one’s own/others’ emotions) were positively related to two sub-dimensions of instructional quality on the CLASS (classroom instructional support and classroom organization) suggesting that teachers’ self-reported traits and perceptions may play a key role in creating classrooms associated with positive outcomes for children. Importantly, however, that same study showed no effects of these self-perceptions on dimensions of emotional quality in these elementary classrooms and did not play a moderating role in the impact of the intervention on children’s outcomes (Brown et al., 2010), leaving open questions about the role of these baseline teacher characteristics in classroom-level outcomes.

A previous investigation into the ways in which variation in the CSRP treatment impacted participants differently provided an important foundation for the current study. Randomized control trials, such as CSRP, typically use intent-to-treat (ITT) estimates, to describe average treatment effects based upon assignment to a particular condition (without taking into account actual participation). Zhai and colleagues (2010), however, found that variation in the amount and rate of participation in program components led to different child-level outcomes than these initial intent-to-treat (ITT) estimates indicating that dosage was key to the effectiveness of the intervention. Specifically, that study found that high rates of participation in the mental health and other intervention services were associated greater improvements in children’s social emotional skills and behavior (e.g., more positive emotion, higher attention, lower rates of externalizing behaviors) while for teachers with low participation there were no statistically significant effects on children’s social emotional skills and/or behavior (Zhai et al., 2010). These findings indicate that the average treatment estimates masked the true nature of the effectiveness of the
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intervention (i.e., for whom the intervention was truly effective and under which conditions).

Taken together, these previous studies provided rationale for investigating the potential moderating effect of baseline characteristics of the participating teachers that could also lead to varying CSRP treatment effects. Specifically, I hypothesized that the impact of the CSRP intervention on early childhood classroom quality could be either enhanced or impeded by baseline levels of teacher work-related stressors (i.e., job demands and lack of confidence in managing children’s behavior). On the one hand, it is possible that teachers’ perceived job demands and/or lack of confidence in behavior management may lead to more responsive, committed participation in the intervention by teachers eagerly seeking more effective strategies for working with young children. Indeed, a previous analysis of CSRP indicated that teachers who reported considerable lack of confidence in managing classroom behavior (at the 75th percentile or higher, indicating low levels of confidence) actually attended, on average, more of the behavior management trainings (Li-Grining, Raver, Champion, Sardin, Metzger & Jones, 2010). Therefore, it is possible that teachers with low confidence may actively engage in the intervention, and therefore may benefit more from it, leading to more positive teacher-child interactions and higher classroom quality. On the other hand, teachers who initially lack confidence or who experience job demand-related stress may be overwhelmed such that they are unable to fully benefit from the intervention even if they attend intervention program activities. In this case, the intervention may be less effective for these teachers and teacher-child interactions may continue to be strained—or may become even more strained—following the intervention, with negative impacts on classroom climate.
Research Questions

In this study, I examine the moderating role of teacher characteristics on the impact of the CSRP intervention on classroom outcomes. The following specific question guided this work:

Do teacher-reported work-related stressors (i.e., Job Demands and Confidence in Managing Children’s Behavior) moderate the effects of the CSRP intervention on classroom quality, as indicated by the Emotional Climate of the classroom?

In addressing these key interactions of interest, I will also investigate and present the main effects of the CSRP treatment, and of Job Demands and Confidence (respectively), on Emotional Climate of the classroom in spring of the Head Start year.

Method

Participants

The evaluation of the CSRP was site-randomized with 9 Head Start sites randomized to the intervention condition (18 classrooms) and 9 to the control condition (17 classrooms). The 18 sites were embedded in the Chicago Public School system and were spread across seven high poverty neighborhoods. Over the course of the evaluation, 602 children and 94 teachers across two cohorts participated (the two cohorts are combined for the purposes of this study as they have been in prior reports from the project, e.g., Raver et al., 2008, 2009 etc.). Sites were matched into pairs (on several teacher, child and site characteristics; see Raver et al., 2008 for details) before randomizing. Within each site there were two participating classrooms, and each classroom had two teachers (see Appendix A, Figure 1).

Several (N=15) teachers were missing at least some data for one or more baseline
characteristics, including key predictors, and were excluded from the analysis (see Appendix B for more detail). There were no missing values for Emotional Climate of the classroom at either baseline (September) or May. Teachers were deleted if they were missing data for any of the relevant variables (i.e., listwise deletion was used in cases of missingness), as sensitivity analyses indicated that such missingness did not substantively change any of the findings presented here (presented more fully in the Results section).

Overall, of the 90 teachers with complete demographic data, CSRP teachers were, on average, 40 years old and almost all (96%) were female (see Table 1). Most (71%) of the teachers were African-American, 21% were Hispanic, and 9% were non-Hispanic white. Approximately 27% of the teachers had bachelor’s degrees or higher and 30% of teachers had three years or less of preschool teaching experience. The analytic sample in this study comprises of 82 participants; in the final fitted models, the analytic sample is further reduced to 78 participants due to additional missing data.

**Intervention Components**

The CSRP intervention included four components: teacher training in effective behavior management strategies, mental health consultation to classrooms, stress-reduction workshops (provided by mental health professionals), and one-on-one mental health consultation services for individual children. The descriptions provided here are largely based upon the published reports of Zhai and colleagues (2011).

**Teacher Trainings.** In the fall and winter of the Head Start year, teachers were eligible to participate in workshop-style training sessions facilitated by a licensed clinical social worker and an experienced trainer. The training sessions, adapted from the evidence-based Incredible Years Teacher Training Program (Webster-Stratton, Reid, &
Hammond, 2004) were designed to help teachers learn and apply behavior management strategies in the classroom (i.e., to reduce children’s challenging behaviors). Trainings were held on five Saturdays (from October to January) and incentives were provided to encourage participation in the training sessions; participating teachers were paid $15 per hour and provided with lunch and on-site child care.

**Mental Health Consultation.** Mental health services were provided by consultants (MHCs) who were clinically trained with master’s degrees in social work and had experience working in early childhood settings with low-income families. During the initial 10 weeks of the Head Start year, MHCs conducted weekly classroom visits to provide coaching and support for teachers in the implementation of specific behavior management strategies. During classroom visits, MHCs also provided consultation about stress management to help teachers manage work-related stress. In their role as coaches, MHCs observed, assessed, and, when warranted, questioned teachers’ routines and stress-reduction strategies (e.g., locus of control, relaxation techniques, and cognitive-behavioral skills) (Bond & Bruce, 2000; Daniels & Guppy, 1994; van der Klink, Blonk, Schene, & van Dijk, 2001). In some cases, strategies included encouraging teachers to leave the classroom during their allotted breaks, changing classroom routines that made them feel particularly overwhelmed, and helping teachers problem-solve issues related to the school or families. MHCs also participated in the teacher training sessions (described above).

**Stress-Reduction Workshops.** During the second ten weeks of the Head Start year, MHCs held one-day stress-reduction workshops for the two classrooms in their respective Head Start sites. The workshops provided an overview of typical sources of
stress among preschool teachers as well as manageable ways to reduce stress (using the evidence-based stress-reduction strategies described above). During these sessions, teachers discussed potential solutions and coping strategies that could be implemented in their daily routines. Teachers were also encouraged to consider self-care (e.g., establishing routines related to eating, sleeping) and ways to potentially improve in these areas as well.

**One-on-One Mental Health Consultation Services for Individual Children.** During the final ten weeks of the intervention, children in the treatment group who had been identified by teachers and MHCs as having emotional and behavioral problems during the first six months of the school year received individual mental health consultation services. MHCs provided direct and targeted intervention services to these children based on the evidence-based Positive Behavioral Support (PBS) approach (Sugai, Horner, Dunlap, Hieneman, Lewis & Nelson, 2000).

Given the anticipated critique that the mental health consultant could simply be an “additional pair of hands” in an early childhood classroom, control group classrooms were provided with a teacher’s aide; thus the child-adult ratios were the same in all classrooms, and the causal impact of the specific CSRP program components could be isolated. Aides in the control condition and MHCs in the treatment condition spent comparable amounts of time in classrooms.

A previous analysis (Zhai et al., 2011) indicates that “nearly all” (p. 445) of the treatment group teachers attended the stress-reduction workshops and, on average, three out of five training sessions. Similarly, the MHCs completed an average of 29 classroom
visits to each of their assigned classrooms. Zhai and colleagues (2011, p. 445) indicated “fairly consistent[ly]” fidelity of implementation across the Head Start sites.

**Data Collection Procedures**

Teachers completed surveys about their Job Demands and their Confidence in Managing Children’s Behavior at the beginning and at the end of the Head Start year. Classroom observations were conducted in September, January, March and May during the Head Start year to capture classroom quality. Given the research questions of interest in this study, only baseline (September) and end-of-year (May) classroom observational data will be used. Reliability on the various measures is reported in the description of each instrument (see Appendix C for a more complete description of these measures).

**Measures**

**Outcome**

The Classroom Assessment Scoring System (CLASS; LaParo, Pianta & Stuhlman, 2004) provides global 7-point Likert scores (ranging from a low of 1 to a high of 7) on several subscales that reflect quality of the teacher-child interactions in both social and instructional interactions. The Emotional Climate scale is the average of scores on four dimensions: Positive Climate, Negative Climate (reverse coded), Teacher Sensitivity, and Behavior Management. According to other published reports from the CSRP study (Zhai et al., 2011), most (75%) of the observations were double-coded simultaneously to ensure inter-rater reliability, with moderate to high levels of inter-observer agreement (positive climate, $\alpha=0.82$; negative climate, $\alpha=0.70$; teacher sensitivity, $\alpha=0.77$, behavior management, $\alpha=0.66$ as reported in Zhai, Raver & Li-
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**Predictors**

The CSRP Child Care and Early Education Job Inventory, which was adapted from The Child Care Worker Job Stress Inventory (Curbow, Spratt, Ungaretti, McDonnell & Breckler, 2000), was designed for use with both family and center-based child care providers. Using a 5-point Likert scale (1=rarely, 5=most of the time), the Job Demands subscale ($\alpha = .67$) includes six items that were averaged to capture how often work-related demands and situations provoke feelings of stress (e.g., “Parents blame their children’s behavior on day care” and “Children with behavior problems are hard to deal with”). Higher scores indicate a high degree of teacher-experienced job-related stress.

Teachers’ “Confidence in Managing Children’s Behavior” is a composite of five items ($\alpha = .67$) that were averaged to represent teachers’ beliefs regarding the causes of children’s behavior (e.g., “Sometimes a child will deliberately misbehave to get me upset”) as well as their confidence in handling misbehavior (e.g., “Sometimes children do things that I do not know how to handle”) and was also measured using a 5-point Likert scale (1=disagree, 5=agree with some items reverse-coded). Higher scores indicate teachers felt more confident in managing children’s behavior, whereas lower scores indicate a lack of confidence.

**Baseline Covariates**

Teacher self-reports of depressive symptoms and baseline Emotional Climate scores were included as covariates. Teachers’ depressive symptoms were measured using the K6 (Kessler, Andrews, Colpe, Hiripi, Mroczek, Normand, Walters & Zaslavsky,
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2002), a shortened (6-item) version of a scale of psychological distress developed for the National Health Interview Survey. The K6 utilizes a 5-point scale (ranging from 1 “none of the time” to 5 “all of the time”). In this analysis, scores are summed and higher scores indicate that teachers experience depressive symptoms more often.

The relationship between depression and low teacher sensitivity has been well-documented (e.g., Gerber, Whitebook & Weinstein, 2007; Hamre & Pianta, 2004) in the broader population of early care and educational providers. As such, baseline teacher-reported depressive symptom scores were included in the final models to both address the possibility that teacher depressive symptoms could account for any association between job related stress and classroom quality and to more precisely isolate the moderating effects of interest. Baseline Emotional Climate was also included as end-of-year Emotional Climate is the outcome of interest. Appendix D includes a heuristic model for this analysis.

Preliminary Analysis

Preliminary analyses revealed several important considerations. These analyses revealed statistically significant differences at baseline between treatment and control group teachers for Job Demands, with teachers in the treatment group reporting higher job demands (t= -3.00, p<0.01). Given this, the variable Job Demands was also included as a covariate in the “Confidence in Managing Children’s Behavior” models (as evidenced in Equation 2, below).

Preliminary analyses indicated that Teacher 3002 was a highly influential data point; as such, this teacher was excluded from the analysis (see Appendix E for a more complete description of the regression diagnostics and subsequent sensitivity analyses).
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As a result, the analytic sample was reduced to 82 (N=78 in the final fitted models), after accounting for missing data.

With the removal of this teacher, baseline differences between the intervention groups in “Confidence in Managing Children’s Behavior” were statistically significant (t=2.00, p<0.05). Given this, Confidence in Managing Children’s Behavior was subsequently included as a covariate in the models that investigated the moderating effect of Job Demands on the CSRP treatment (as evidenced in Equation 1, below) to control for this difference at baseline.

**Analytic Strategy**

Given the small level of nesting within each site (i.e., two teachers within each classroom and two classrooms within each site), OLS regression models with robust standard errors were used to explore the moderating role of Job Demands and Confidence in Managing Children’s Behavior, respectively. To address the major question of this study, two primary models were tested.

The first model is specified as follows:

Eq. (1):

\[ SpEmotClim = \beta_0 + \beta_1 Treatment + \beta_2 JobDemands + \beta_3 JobDemands \times Treatment + nX_k \beta_1 + \epsilon \]

In this specification, \( SpEmotClim \) represents the Emotional Climate of a given classroom in May of the Head Start year. \( JobDemands \) represents the frequency with which job demands were reported by each teacher in a given classroom at baseline, and \( Treatment \) represents the intent-to-treat (ITT) effect of CSRP assignment. \( JobDemands \times Treatment \) represents the interaction between Job Demands at baseline...
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and CSRP treatment status; \( n \mathbf{X} \mathbf{k} \mathbf{\beta}_1 \) represents the \( nxk \) matrix of baseline covariates (i.e., teacher depressive symptoms, Confidence in Managing Children’s Behavior and baseline Emotional Climate) and \( \beta \) represents the \( k \times 1 \) vector of coefficients, while \( \epsilon \) is the error term.

The second model is specified as follows:

Eq. (2):

\[
SpEmotClim = \beta_0 + \beta_1 \text{Treatment} + \beta_2 \text{Confidence} + \\
\beta_3 \text{Confidence} \times \text{Treatment} + n \mathbf{X} \mathbf{k} \mathbf{\beta}_1 + \epsilon
\]

In this specification, \( SpEmotClim \) represents the Emotional Climate of a given classroom in May of the Head Start year. \( \text{Confidence} \) represents teacher perceptions of their Confidence in Managing Children’s Behavior as reported by each teacher in a given classroom, \( \text{Treatment} \) represents the ITT effect of CSRP assignment, and \( \text{Confidence} \times \text{Treatment} \) represents the interaction between Confidence in Managing Children’s Behavior and treatment status; \( n \mathbf{X} \mathbf{k} \mathbf{\beta}_1 \) represents the \( nxk \) matrix of baseline covariates (i.e., teacher depressive symptoms, Confidence in Managing Children’s Behavior and baseline Emotional Climate) and \( \beta \) represents the \( k \times 1 \) vector of coefficients, while \( \epsilon \) is the error term.

Results

The results are presented in three parts, starting with descriptive statistics, followed by results from the first set of models examining the main and the moderating effect of Job Demands on the CSRP treatment. Then, results from the second set of models examining the main and the moderating effect of Confidence in Managing Children’s Behavior on the CSRP treatment will be presented. Finally, for each case I
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present a set of sensitivity analyses to demonstrate the robustness of these findings to missing data.

It should be noted that the main effects for the CSRP treatment effects have been extensively reported and discussed in previous publications (see for example, Raver et al., 2008; Raver, Jones, Li-Grining, Zhai, Bub & Pressler, 2011). Given this, the main effects will be presented in this section briefly, only to provide context for presentation and discussion of the moderating effects that motivated this study.

Descriptive Statistics

Table 1 shows the descriptive statistics for teacher and classroom characteristics at baseline (i.e., September of the Head Start year) for the full sample and by treatment status. Two-tailed t-tests were conducted to examine the balance of covariates and socio-demographic characteristics across treatment and control groups. As indicated in Table 1, overall, the distributions of most demographic covariates at baseline were similar across treatment and control groups. Importantly, however, differences at baseline were noted in the variables of interest in this study. Specifically, higher scores in baseline Emotional Climate were observed in the control group classrooms ($t=3.52$, $p<0.01$). Teachers in the treatment group classrooms reported higher rates of depressive symptoms at baseline ($t=-2.41$, $p=0.02$), higher Job Demands ($t=-3.00$, $p<0.01$), and lower levels of Confidence in Managing Children’s Behavior ($t=2.00$, $p<0.05$). These covariates were included in these models both to increase precision and to help address these baseline differences. See Appendix F for additional tables and figures regarding these baseline characteristics and correlations between these observed characteristics.
Table 1. Descriptive statistics of predictor and outcome variables

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<td>African American</td>
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<tr>
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<tr>
<td>Confidence</td>
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<td>.81</td>
<td>83</td>
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**p < .01, *p < .05, for two-tailed t-statistics testing mean differences between control and treatment groups**

**Heterogeneity of Treatment Effects**

**Job Demands**

Because this study aimed to better understand the relationship between teachers’ reported job demands and the CSRP treatment effect, a sequence of models was tested. Building upon previously established treatment effects of the CSRP intervention (Raver et al., 2008), Model 1 included both the CSRP treatment and teachers’ reported Job Demands, which yielded a statistically significant positive effect on Emotional Climate of the classroom for teachers in the intervention ($\beta_{TREAT}^{(1)} = 0.40, p = 0.05$) indicating that teachers in the treatment group had, on average, classrooms with higher Emotional
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Climate than teachers in the control group when controlling statistically for teacher-reported Job Demands. Model 2 then tests for a possible interaction between these two main effects (Job Demands x CSRP treatment). In this model, the main effects were no longer statistically significant and, importantly, there was no statistically significant interaction ($\beta^{(2)}_{JOB\times TREAT} = -0.30, p \approx 0.23$) indicating that Job Demands played no moderating role in Emotional Climate among treatment teachers. Given the baseline differences noted between treatment and control groups in teachers’ reported Confidence in Managing Children’s Behavior, Model 3 incorporates this variable as a control. Inclusion of this control does not change the interaction term (Job Demands x CSRP treatment), which remains non-significant ($\beta^{(3)}_{JOB\times TREAT} = -0.32, p \approx 0.23$). Model 4 introduces the baseline Emotional Climate of the classroom, yielding statistically significant effects for both CSRP treatment ($\beta^{(1)}_{TREAT} = 1.42, p = 0.02$) and Job Demands ($\beta^{(2)}_{JOB} = 0.36, p = 0.04$) indicating that teachers in the treatment group have classrooms with higher Emotional Climate, on average, than teachers in the control group. Likewise, teachers in the control group who report higher Job Demands, on average, have classrooms with higher Emotional Climate. Again, however, the interaction term (Job Demands x CSRP treatment) in this model is non-significant ($\beta^{(3)}_{JOB\times TREAT} = -0.29, p \approx 0.16$) indicating that there is no variation in the average treatment effect by baseline Job Demands. Given the differences at baseline in teacher-reported depressive symptoms, this was added as an additional covariate to Model 5. In this final model, only the main effects of the CSRP treatment ($\beta^{(1)}_{TREAT} = 1.16, p = 0.08$) and Job Demands $\beta^{(2)}_{JOB} = 0.31, p = 0.09$ as well as baseline Emotional Climate of the classroom ($\beta^{(5)}_{EmotClim}$ =
0.57, \( p < 0.01 \) remain significant predictors of Spring Emotional Climate of the classroom. As indicated in Table 2 and shown in Figure 2, and contrary to my hypothesis, these findings provide no evidence of a moderating role of Job Demands in the impact of the CSRP treatment on Emotional Climate in spring of the Head Start year (\( \beta = -0.20, p \approx 0.38 \)).

*Table 2. Exploration of Moderating Effects of Job Demands on the Impact of the CSRP Intervention on Classroom Emotional Climate.*

<table>
<thead>
<tr>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
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<td>SpEmClim</td>
<td>SpEmClim</td>
<td>SpEmClim</td>
<td>SpEmClim</td>
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<td>1.23</td>
<td>1.42*</td>
<td>1.158~</td>
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<td>Job Demands</td>
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<td>0.35</td>
<td>0.30</td>
<td>0.36*</td>
<td>0.31~</td>
</tr>
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<td>Job DemandsX Treatment</td>
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<td>-0.32</td>
<td>-0.29</td>
<td>-0.20</td>
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<tr>
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<td>-0.15</td>
<td>-0.17</td>
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</tr>
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<td>Baseline</td>
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<td>Positive Emotional Climate Average</td>
<td></td>
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<td>Teacher Depressive Symptoms</td>
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<td>0.025</td>
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<td></td>
<td></td>
</tr>
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<td>3.73***</td>
<td>4.69***</td>
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<td></td>
<td>(11.67)</td>
<td>(6.04)</td>
<td>(5.64)</td>
<td>(1.35)</td>
<td>(1.41)</td>
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<td>N</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>82</td>
<td>78</td>
</tr>
</tbody>
</table>

\( t \) statistics in parentheses
\( ~ p<0.10, ~ * p<0.05, ~ ** p<0.01, ~ *** p<0.001 \)
Confidence in Managing Children’s Behavior

The second question of interest was whether teachers’ reported Confidence in Managing Children’s Behavior moderated the CSRP treatment effect. To address this question, a second set of models was constructed. Specifically, Model 1 tested for the main effects of treatment and Confidence in Managing Children’s Behavior, yielding a statistically significant positive effect on Emotional Climate of the classroom for the CSRP treatment \( \beta_{TREAT}^{(1)} = 0.41, p = 0.03 \) and a marginally significant negative effect for teachers’ reported Confidence \( \beta_{CONF}^{(2)} = -0.21, p = 0.06 \). Model 2 tested for a possible interaction between these two main effects (Confidence X CSRP treatment),
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which yielded a statistically significant ($\beta^{(3)}_{CONFXTREAT} = 0.62, p < 0.01$) differential treatment effect on Emotional Climate of the classroom that depended on teachers’ Confidence in Managing Children’s Behavior. Given the baseline differences noted between treatment and control groups in teachers’ reported Job Demands and baseline Emotional Climate of the classroom, these were added to Models 3 and 4 respectively and the interaction remained statistically significant ($from \beta^{(3)}_{CONFXTREAT} = 0.62, p < 0.01$ to $\beta^{(3)}_{CONFXTREAT} = 0.40, p = 0.03$), indicating that there is still variation in this average treatment effect that depends on teachers’ Confidence in Managing Children’s Behavior at baseline. Teacher-reported depressive symptoms was added as an additional covariate to Model 5. In this final model, the interaction term was no longer significant indicating that there is no moderating effect of Confidence in Managing Children’s Behavior on Emotional Climate of the classroom ($\beta^{(3)}_{CONFXTREAT} = 0.33, p \approx 0.11$). It is important to note that in this final model, confidence is still a statistically significant, negative predictor ($\beta^{(2)}_{CONF} = -0.36, p = 0.02$) of Emotional Climate of the classroom although there is no longer evidence of a CSRP treatment effect on Emotional Climate of the classroom ($\beta^{(1)}_{TREAT} = -0.78, p \approx 0.37$). Ultimately, however, as shown in Table 3, and contrary to my hypothesis, this data provides no evidence that confidence has a differential effect on Emotional Climate of the classroom for teachers in the CSRP treatment at conventional levels of significance.
Figure 2
Comparison of the statistically different teacher reports of Confidence Managing Children’s Behavior at baseline by treatment status.

It should be noted, however, that there appears to be censoring of the data at the positive end of the scale for baseline Confidence in Managing Children’s Behavior, which may have biased the estimates and is discussed further in the Limitations section (see Figure 2, above). Given the small sample size (i.e., n=40 in control, n=38 in treatment group), it is also possible that this study did not have sufficient power to detect a true effect in the final model (see, for example, the near-identical graphs depicting Model 4, $\beta_{CONFxTREAT}^{(3)} = 0.40, p = 0.03$ and Model 5 $\beta_{CONFxTREAT}^{(3)} = 0.33, p \approx 0.11$ in Figure 3). Though the final model fails to reach conventional levels of significance, these results can still provide an important foundation for subsequent analyses and suggests that the theoretical framework on which it is based may be worthy of further exploration in future studies. Given this and that the interaction was significant ($p<0.05$) in all previous models leading up to the final (non-significant) model, the substantive
importance of the interaction will be discussed.

![Figure 3](image)

**Figure 3**
Comparison of Model 4 and Model 5 that Shows the Moderating Effects of Confidence Managing Children’s Behavior, controlling for Baseline Depressive Symptoms, Job Demands and Emotional Climate of the classroom.

**Sensitivity Analyses**

A sensitivity analysis was conducted to ascertain the robustness of these findings to missing data. To account for the missing data, a dummy variable adjustment strategy (Cohen & Cohen, 1985) was utilized for all variables that were missing values (i.e., baseline teacher depression, job demands, and confidence managing children’s behavior). See Appendix G for complete description of this analytic strategy. In this case, however, coefficients for the interaction terms in all models were only marginally smaller in magnitude and no different in statistical significance, suggesting that the findings from the initial analysis were robust with regard to missing data.
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Table 3. Moderating Effects of Teacher Confidence in Managing Behavior on the Impact of the CSRP intervention on Classroom Emotional Climate.

<table>
<thead>
<tr>
<th></th>
<th>(1) SpEmClim</th>
<th>(2) SpEmClim</th>
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<td>-2.26**</td>
<td>-1.06</td>
<td>-0.78</td>
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<td>-0.57**</td>
<td>-0.40**</td>
<td>-0.36*</td>
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<tr>
<td></td>
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<td>(-3.34)</td>
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<td>0.62**</td>
<td>0.40*</td>
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<td>XTreatment</td>
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<td>Positive Emotional Climate Average</td>
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</table>

t statistics in parentheses
~p<0.10, *p<0.05, **p<0.01, ***p<0.001

Discussion

The aim of the present study was to investigate whether teachers’ perceived Job Demands and Confidence in Managing Children’s Behavior moderated the impact of the CSRP intervention on the Emotional Climate of the classroom. Previous studies have shown that more supportive teacher-reported relationships have been associated with positive social emotional and academic outcomes for young children (Howes et al., 2008;
Mashburn et al., 2008) suggesting that certain types of classroom interactions may play a particular role in fostering optimal outcomes in early childhood care and educational settings. The present study, however, finds no evidence of a moderating role for the teacher-level characteristic perceived Job Demands in the impact of the CSRP intervention on the Emotional Climate of the classroom. There is, however, some evidence of a moderating effect of Confidence in Managing Children’s Behavior on the CSRP treatment, although it is not robust to model specification and only trends towards significance in the final model.

Results of descriptive analyses showed important differences at baseline, which is not to be expected among participants in a randomized control trial. These differences may have been due to missing data (i.e., had all data been accounted for, perhaps the two groups would have been equal in expectation), although sensitivity analyses suggested that missingness did not play a significant role in this particular study. Although efforts were made to account for these differences in the regression models, the moderating effects of baseline teacher characteristics may be systematically biased and, as such, these findings should be interpreted with caution.

**Job Demand Models**

**Main Effects.** Consistent with previous studies (Raver et al., 2008), the present study exploring effects of Job Demands found that CSRP treatment had a positive impact on Emotional Climate of the classroom.

**No Moderating Role of Job Demands.** Contrary to my hypothesis, this study revealed that the CSRP treatment effect persists regardless of the level of teacher-reported Job Demands. Although this finding is somewhat counterintuitive, past research
has also shown that teachers’ perceptions have had no moderating impact on classroom quality (Brown et al., 2010). Moreover, previous studies of this specific intervention showed that, on average, CSRP led to significant benefits for treatment-assigned teachers, improving their feelings of job control and work-related resources, though they did not find treatment effects on teachers’ perceived job demands (Zhai et al., 2011). Further, a previous analysis showed that CSRP teachers participated in these intervention services at fairly even rates, regardless of personal and work-related stressors (Li Grining et al., 2010) which suggests that job-related stress was not a barrier to intervention dosage and therefore, in such cases, it is reasonable to expect consistent treatment effects. Moreover, the finding that Job Demands had no moderating effect on Emotional Climate of the classroom, while contrary to the hypothesis, may make sense given the comprehensive nature of the CSRP intervention. CSRP was a theoretically-based intervention that built on existing community resources and provided extensive supports to both teachers and children in the treatment group—key characteristics of effective program intervention previously identified in the literature (Durlak & DuPre, 2008). As such, it would be expected that treatment would be implemented with high fidelity and, therefore, there would be little variation in treatment effects across participants.

**Confidence In Managing Children’s Behavior Models**

**Main Effects.** This study found that teachers with lower confidence in their ability to effectively manage children’s behavior have classrooms with lower Emotional Climates, on average, than their peers with higher confidence in this aspect of their job responsibilities. Moreover, a previous analysis showed that the CSRP intervention led to
decreases in treatment-assigned teachers’ confidence in behavior management (Zhai et al., 2011).

The Moderating Role of Confidence in Managing Children’s Behavior. There is suggestive evidence for the moderating role of Confidence in Managing Children’s Behavior. Though not statistically significant at conventional levels ($\alpha = .05$ or $\alpha = .10$), the findings regarding the potential moderating effect of Confidence in Managing Children’s Behavior on the CSRP treatment may be worthy of attention since it was only in the final model that the interaction was no longer significant (i.e., once teacher-reported depressive symptoms were introduced). This moderating effect of teachers’ confidence suggests that teachers with lower confidence in their ability to effectively manage children’s behavior may not benefit from the CSRP intervention in the same ways as their peers with higher confidence. Specifically, in this sample, teachers with lower confidence in their ability to effectively manage children’s behavior (in the CSRP treatment group) have, on average, classrooms with less positive Emotional Climates than their peers in the control group who did not receive intervention services, whereas teachers in the CSRP treatment group with higher confidence in their ability to effectively manage children’s behavior, on average, have classrooms with higher Emotional Climate than control group teachers. Such a moderating treatment effect, if it indeed exists in the population, would have important implications for the ways in which interventions should be implemented in “real-world” contexts. While it is often assumed that participants (as with any group of individuals) have varying competencies present at baseline (e.g., different strengths, different areas for growth related to job performance/responsibilities), the findings from this study—if they could be
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generalized—would suggest that these baseline differences may need to be taken into account to ensure that interventions are robust to heterogeneity of treatment effects, particularly when implemented in schools and other community-based settings. More specifically, some teachers may need extra supports in order for the intervention to be effective.

Taken together, these findings suggest that the role of baseline teacher characteristics may be quite complex and could have cumulative negative impacts (of both treatment and baseline characteristics) on both the Emotional Climate of classrooms as well as the participants themselves. In the context of Head Start classrooms, in particular, teachers may need support in developing effective strategies for managing children’s behavior. Interventions may need to consider ways to build on teachers’ existing strengths in order to simultaneously increase their capacity to implement such strategies while improving their self-efficacy as confident care and educational providers with (more) effective behavior management strategies. In doing so, interventions, such as CSRP, may be more consistently and sustainably effective in promoting improved classroom climate and minimizing negative impacts on the participating teachers. Without considering teachers’ confidence in their own abilities, such intervention efforts may be compromised, if only because of the negative impacts to participants themselves.

Cumulative Findings

Previous research has already shown that individual-level characteristics play an important role in fidelity of intervention implementation. While no statistically significant heterogeneity of treatment effects were found in this analysis, the findings from this study add to this body of literature in two ways. First, an extensive, theory-
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based intervention, such as CSRP, can provide such a comprehensive set of services that the treatment effects are consistently dosed in ways that they are robust to teachers’ perceived job demands at baseline. That is, when job demands are intentionally taken into account (e.g., providing participants mental health consultation, stress reduction workshops), such job-related stressors may be offset such that they do not interfere with treatment participation. Second, the findings from this study build upon past CSRP findings and demonstrate the potential need for consideration of teachers’ Confidence in Managing Student Behavior when implementing interventions. This may particularly be the case when these characteristics pertain to such a critical aspect of participants’ daily roles and responsibilities as managing young children’s behavior in classroom settings. Specifically, interventions may need to be implemented in such a way that actively builds on the strengths of participants, even while providing services and resources for improvement. Such an intentional aim to improve teachers’ self-efficacy, as part of the intervention itself, would be consistent with Durlak and DuPre’s (2008) identification of participant confidence as one of four key factors in successful intervention implementation.

Limitations

There are several limitations of this study’s findings. Though this was a randomized control trial that assigned sites to the CSRP intervention, teacher characteristics were of course not randomly assigned to teachers. The current analyses are an attempt to better understand the “real world” implementation and how intervention effects may vary across participants. A second key limitation is the extent to which this study’s external validity is constrained. Sites volunteered to participate in the program
and then were randomly assigned to the CSRP intervention. Given this, it is unclear the extent to which these findings could be replicated in other interventions and/or locations. Perhaps most importantly, the baseline characteristics of these teachers were measured after teachers were notified of their treatment status, which may have influenced how they rated themselves with regard to the variables in this study (i.e., Job Demands, Confidence in Managing Children’s Behavior, depressive symptoms). Specifically, psychological theory posits the ways in which people will “self-preserve” in the face of perceived slight; this may be the reason that teachers in the control group reported significantly higher ratings of confidence and lower levels of job demands and depressive symptoms. Since these teachers knew that they would not be receiving (presumably desirable) services, they may have rated themselves higher/lower than they would have had they not known their treatment status at the time of completing baseline reports. In addition, the reported confidence levels in the control group appears to have a ceiling effect. Further, most reports are clustered at low to moderate ratings for Job Demands, with very few control group teachers reporting high levels (i.e., 4 or 5) of Job Demands at baseline. Both of these patterns, which are different by treatment status at baseline, may be different from the true relationship in the population, which should be equal in expectation (at baseline) when teachers are randomly assigned to treatment status.

Future studies should measure baseline characteristics of participants prior to notifying participants of treatment status, so that heterogeneity of treatment effects can be better understood in practice. Given that a moderating effect was noted until teacher depressive symptoms were added to the final “Confidence Models,” it is also possible that teacher depressive symptoms and Confidence in Managing Children’s Behavior are
overly similar theoretical constructs. Future studies may further explore this and consider alternate specifications to better understand the nature of this relationship. Other considerations include the small sample sizes in treatment and control groups, which may result in an under-powering of the study to find heterogeneity of treatment effects even if such relationships exist in the population.

**Implications for Policy and Practice**

Given the rapid expansion of publicly-funded preschool programs, particularly those that serve predominantly low-income children (i.e., means-tested programs such as Head Start), it is important to understand not only the types of intervention programs that are effective, but also the various contributing factors that may lead to heterogeneity of treatment effects, thereby impacting the extent to which such interventions can be effectively implemented.

This study suggests that implementing interventions with a strong theory of change and a comprehensive set of services may help to promote fidelity of implementation and uniform dosage, resulting in average treatment effects. As a result, some baseline characteristics of participants (i.e., job demands) may be robust to heterogeneity of treatment effects. This study provides suggestive evidence that some baseline teacher characteristics (i.e., confidence in managing children’s behavior) may impact the effectiveness of interventions in ways that may be neither intended nor desired (i.e., when Emotional Climate of the classroom is negatively impacted by an intervention for some participants). Such nuanced understandings of program effectiveness could play an important role in designing and expanding effective early childhood programs that address the needs of both young children and early childhood educators. Specifically, this
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research suggests it may be important to consider the characteristics of early care and educational professionals who are already working in these settings, so that we may consider the working conditions of these programs (e.g., helping teachers to manage job demands and maintain and/or improve confidence in managing children’s behavior) to ensure better, more robust implementation of subsequent interventions.

Teaching and learning have a reciprocal, dynamic relationship that is influenced by many factors. While we typically judge educational interventions and reform efforts by looking at child-level outcomes, the results from this study illustrate the ways in which teachers can play a pivotal role in high quality, robust implementation. As high-quality early childhood programs—which are defined here by responsive and positive teacher-child interactions—are developed and implemented more widely, it may be necessary to more routinely consider the needs of teachers as well as those of the children, as CSRP did, to ensure that implementation can be maximized. The findings of this study also suggest that, even with evidence-based interventions, it may be important to consider the specific needs of the participants across many dimensions and how each of these characteristics may impact the effectiveness of the intervention. Early childhood professionals are so important because we depend on them to provide high quality care and educational programs. Though the evidence from this study is far from conclusive, the trends suggest that the characteristics of these teachers—both their strengths and their areas for growth—may be important considerations for future investigations to promote truly effective early care and educational interventions.
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