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ORIGINAL PAPER

# Using Early Childhood Mental Health Consultation to Facilitate the Social–Emotional Competence and School Readiness of Preschool Children in Marginalized Communities

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**Abstract**
Early childhood mental health consultation (ECMHC) is a capacity-building intervention that aims to enhance the quality of young children's affective environments in order to promote children's social, emotional, and behavioral health. In this study, the effects of ECMHC on children's social–emotional and early academic outcomes over the course of one academic year were evaluated in 20 classrooms (15 intervention and 5 comparison) with 38 teachers (29 intervention and 8 comparison), and 390 children (282 intervention and 108 comparison; $M_{age} = 46.71$ months old) across 3 schools. Observations, teacher ratings, and direct assessment were used to evaluate children's social–emotional skills and early academic outcomes. A three-level model that accounted for the nesting of children within classrooms within schools found that children in intervention schools had more positive classroom behavior, fewer observed social–emotional challenges, and higher academic achievement in math, literacy, and writing at the end of the school year. Our findings suggest that this model of ECMHC is an effective way to spread out the expertise of mental health professionals and improve the social, emotional, and academic outcomes for children in the school setting. This is particularly important for marginalized and under-resourced communities who often face higher levels of adversity and mental health needs with fewer available resources as a result of structural factors including racism and underinvestment of public funds.

**Keywords** Early childhood mental health consultation · ECMHC · School readiness · Academic achievement · Social–emotional skills

## Introduction

Young children who exhibit social–emotional and behavioral difficulties are at risk for school readiness delays and poor achievement that persists into elementary school (Blair & Raver, 2012, 2015). Exposure to high levels of adversity, which is often confounded with living in under-resourced and marginalized communities, places children at greater risk for these problems (Blair & Raver, 2015). Children who are perceived to display elevated levels of problem behavior in early care and education (ECE) settings are also at greater risk of being suspended or expelled, and these practices are disproportionately applied to children of color (Gilliam, 2005; Gillaim & Shahar, 2006; US DOE OCR, 2016). Even if ECE programs have policies that prohibit expulsion, social–emotional competence and the capacity for self-regulation help children benefit from their educational experiences and predict future academic and life success (Graziano, et al., 2007; McClelland et al., 2006).

The positive effects of comprehensive, high-quality early education programming are well-established, particularly for under-resourced children and families (Camilli et al., 2010; Gormley et al., 2018; Yoshikawa et al., 2013). However, the quality and availability of mental health supports in

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community settings are often variable, and many teachers report that they feel ill-equipped to meet the full range of children's mental health needs (Azzi-Lessing, 2010). Furthermore, while K-12 school settings increasingly have staff and structures to address student's mental health, this is less commonly the case in early childhood settings making capacity-building interventions even more critical.

Early childhood mental health consultation (ECMHC) is a capacity-building intervention strategy that helps to establish environments that foster children's social–emotional development and reduce perceived problem behavior (Cohen & Kaufmann, 2005). In particular, ECMHC is aimed at building teacher's skills to promote early childhood mental health and foster a positive social–emotional environment in their classroom.[1] In particular, teacher's skills that build warm relationships, clearly communicate expectations, and reinforce positive behaviors are vital to building a positive social–emotional climate in the classroom and providing a learning environment in which children can take full advantage of academic instruction. ECMHC has become an increasingly common approach at the federal, state, and local levels to address the mental health needs of children and families within existing service delivery systems (Duran et al., 2009). In early care and education settings, this indirect approach involves the provision of consultation by a mental health clinician to administrative and teaching staff at the program and classroom level. This support is designed to build the skill set of the adults who interact with children and families to address the individual needs of children at-risk and to ensure that the overall quality of the environment supports the development of each child (Duran et al., 2009; Kaufmann et al., 2012).

## Research on ECMHC

Despite the increasing popularity of ECMHC nationally, there is very little rigorous research documenting its impact (Albritton et al., 2018; Brennan et al., 2008; Perry et al., 2010). In a randomized control evaluation of the Early Childhood Consultation Partnership (ECCP) model of this intervention approach conducted by Gilliam and colleagues, the classroom quality of teachers and outcomes of children in classrooms that received 4–6 h of consultation a week for eight weeks were compared to outcomes for teachers and children in waitlist control classrooms following standard educational practice (Gilliam et al., 2016a). Children whose teachers received consultation had significantly lower ratings of hyperactivity, restlessness, and problem behaviors compared to controls based on teacher ratings. There was no observed difference between the two conditions in classroom quality as rated by observers on the Classroom Assessment Scoring System (CLASS) (Gilliam et al., 2016a). However, the authors note that this null finding may have been the result of a measurement issue and the CLASS may not have been sensitive enough to detect change.

Although ECCP did not have observable differences in classroom climate using the CLASS, when other measures of teacher outcomes were used in a growing body of quasi-experimental studies, results indicate positive effects of ECMHC suggesting it as a promising professional development approach. One study examined the effects of ECMHC on teacher and child outcomes when consultation was delivered over the course of three years by community-based mental health providers in Arkansas working out of health clinics (Conners-Burrow et al., 2012). The study sample included 193 teachers and 1448 preschool-age children in Head Start and publicly-funded early education center classrooms. Teachers who received weekly consultation were pleased with the service and reported more positive relationships with mental health providers compared to those following standard practice. They were also observed to be less permissive and detached with children in their classroom compared to teachers who did not receive consultation. Teacher ratings of children's social competence and behavior were collected annually, and group differences favoring the intervention were found in the third year of the program, with children in classrooms with a consultant rated as having significantly fewer behavior problems and higher scores for attachment compared to the children in comparison classrooms (Conners-Burrow et al., 2012). This suggests that prolonged experience with ECMHC improves both teacher and child outcomes.

Several teams of researchers have used ECMHC to deliver evidence-based program content designed to improve teacher practices in the classroom as a way to achieve more positive child outcomes (Raver et al., 2009; Upshur et al., 2009; Williford & Shelton, 2008). In the Chicago School Readiness Project (CSRP), Head Start program sites were recruited and 18 pairs (35 classrooms) were created based on family and site characteristics and then randomized to receive the intervention or continue with practice as usual (Raver et al., 2009). In the intervention sites, teachers in two randomly selected classrooms were provided with 30 h of training in behavior management strategies using materials adapted from the Incredible Years Teacher Training Program (Webster-Stratton et al., 2004). Weekly coaching regarding how to effectively use these teaching strategies in the classrooms was provided by the consultants for a 10-week period

[1] For those interested in the distinction between consultation and coaching, see a discussion on that here: Bierman, K., Mathis, E.T., & Domitrovich, C. (2018). Serving the Needs of Young Children with Social, Emotional, and Behavioral Needs: A Commentary. *School Mental Health, 10*(3), 1–10.

at the beginning of the program year. Consultants also conducted stress reduction workshops. The coaching phase was followed by 10 weeks in which consultants provided direct services to children with elevated levels of problem behavior. Findings indicated that children in the intervention group were significantly more likely to be rated by teachers as having fewer internalizing and externalizing symptoms. Similar patterns of results were found on observations of children's behavior in the classroom (Raver et al., 2009). Direct assessments of children's self-regulation skills suggested that the program positively impacted children's executive function skills and attention (Raver et al., 2011). These findings add to the ECMHC evidence, highlighting potential school readiness benefits in addition to those clearly established for positive behavioral and social–emotional outcomes.

Very few evaluations of ECMHC assess its effects on children's school readiness. In the CSRP, measures of children's vocabulary, letter-naming, and math skills were assessed at the beginning and end of the Head Start program year. Positive intervention effects were documented on all three indicators with effect sizes that ranged from 0.34 to 0.63 (Raver et al., 2011).

Other research teams have used a consultation model as a way to specifically target children with elevated behavior problems (Upshur et al., 2009; Williford & Shelton, 2008). In one study, consultants drew on the Incredible Years teacher and parent training program content for the practices that were used to address classroom and child concerns. In this study, two advanced graduate students in a clinical training program who received supervision from a licensed clinical psychologist delivered consultation to teachers of preschool-age children attending Head Start (Williford & Shelton, 2008). Preschool children who displayed elevated behavior problems at baseline were eligible to be included in the sample ($N = 103$). The consultants began by conducting a group session with teachers that was followed by weekly individual consultation sessions. The duration of the services varied, but all teachers received at least 4 months of consultation. Twenty-one caregivers (35%) participated in at least 50% of the parent training sessions. At posttest, teachers in the intervention classrooms reported that children's behavior remained stable, while teachers in the control classrooms were significantly more likely to report increased disruptive behavior among the target children in their classroom (Williford & Shelton, 2008).

Our goals for the current study were to address current gaps in the extant ECMHC literature. While the allocation of funds for ECMHC programs have been increasing nationally, there are many more descriptive articles examining the efficacy of ECMHC than rigorous studies. Studies of ECMHC with a study design that includes a comparison group are needed. In addition, school readiness outcomes (both academic and social–emotional) are particularly important for preschool-aged children who are preparing to enter kindergarten, a connection to ECMHC that has been hypothesized, but not rigorously tested. Social–emotional outcomes have been considered by only a few studies, and academic school readiness has only been demonstrated in one rigorous study design (the Raver et al., 2011 summarized earlier), and this link needs to be replicated and further explored.

### The Current Study

The purpose of the current study is to evaluate the effects of ECMHC on children's social–emotional and early academic outcomes when delivered to preschool-age children in two public preschools over the course of one academic year. The model was developed in the context of a research-practice partnership between an academic medical center and an innovative charter school network that uses a comprehensive curriculum to support and educate children and families in the District of Columbia.

The current study is designed to replicate and expand previous research regarding the effectiveness of ECMHC for improving children's social–emotional and academic functioning. The consultation approach was consistent with other models that follow best practice guidelines by operating in a program with a solid infrastructure (e.g., clear model design, supervision), using highly qualified consultants, and delivering high-quality services (Duran et al., 2009). The content of the consultation was informed by developmentally appropriate educational and psychological practices and included advising to facilitate the application of the universal teaching practices included in the charter school's comprehensive, research-based curriculum. In addition to contributing to the ECMHC evidence base, the current study highlights the real-world application of ECMHC in a school system with existing structures and practices.

## Methods

### Setting

A quasi-experimental waitlist control evaluation of a school-based model of ECMHC was conducted in schools managed by AppleTree, a DC-based nonprofit founded in 1996, which serves 3- and 4-year-old children in the District of Columbia. At the time of the evaluation, the network consisted of 10 schools that educated approximately 1000 children. Of enrolled students, 85% percent qualified for free or reduced price lunch and 59% were regarded by the District of Columbia as being at risk for academic failure.[2] Approximately

[2] "At-Risk for academic failure" is defined by the office of the Deputy Mayor of Education as students who receive Temporary Assistance to Needy Families (TANF) or Supplemental Nutrition Assis-

89% of children identified as Black or African-American, 9% as White, and 2% as Other. Ten percent of students were English Language Learners and 5% received special education services. The student population of AppleTree, which largely functioned in Wards 7 and 8 during the 2016–2017 school year, was comparable to the population of the District of Columbia Public School System in Wards 7 and 8. In 2016–2017, 75.2% of students who attend DCPS schools in Wards 7 and 8 qualified for free or reduced price lunch (Free and Reduced Price Meals [FARMS program]; District of Columbia Office of the State Superintendent of Education [DC OSSE], 2017b). Ninety-five percent of DCPS students in Wards 7 and 8 were African-American, 3% Latino, 1% white, and 1% identified as other (Office of the Deputy Mayor for Education, 2017). Of DCPS students, 16% and 17% of students in Wards 7 and 8, respectively, were enrolled in special education, 2% and 1% of students, respectively, were English Language Learners, and 56% and 66% of students, respectively, were at-risk for academic failure (Office of the Deputy Mayor for Education, 2017). Families apply to all public schools in the District (public charter schools and DCPS), including AppleTree, through a common lottery system (MySchoolDC). If a family is enrolled at AppleTree in preschool (ages 3–4 years old), the child can continue attending AppleTree in prekindergarten (ages 4–5 years old), they do not have to re-apply to the lottery. The District of Columbia provides universal prekindergarten and in the 2016–2017 school year 78% of all 3- and 4-year olds in the District were enrolled in a preschool or prekindergarten program (DC OSSE, 2017a).

The majority of educators (lead teachers) at AppleTree self-identified as Black (67%). An additional 26% identified as White, 5% Other, and 1% Asian. The vast majority of educators were non-hispanic (97%). Most AppleTree educators had 2–5 years of experience (50%). Forty percent of educators had more than 5 years of experience, and 10% had 1 year or less experience. By comparison, the teacher workforce[3] of the District of Columbia Public Schools (PK3-12) self-identified as Black (56%), White (31%), Latino (7%), Asian (4%), and other (2%) (District of Columbia Office of the State Superintendent of Education, District of Columbia Teacher Workforce Report, 2019). The majority of DCPS educators had more than 5 years of experience (59%). An additional 28% of educators had 2–5 years of experience, and 11% had 1 year or less of experience (2% no data available; DC OSSE, 2019).

Three schools residing in the highest need communities in the AppleTree network participated in the evaluation. Two schools received the ECMHC intervention, and 1 school served as a comparison school delivering practice as usual. The comparison school served as a waitlist control and received the ECMHC intervention during the following school year. Treatment and comparison schools were chosen by the executive administration at the public charter school network in collaboration with individual school leaders. Selections were made based upon a range of factors including preferences of individual school leaders, needs identified by school leaders, and potential mental health needs of the schools, with the knowledge that the comparison school would be receiving the ECMHC intervention in the following year. The comparison school was selected to match the child demographics of the intervention schools after the intervention schools agreed to participate. Seventy-eight percent of children at intervention schools and 81% of the children at the comparison schools were considered by the District of Columbia to be at-risk (see footnote for definition). All 3 schools were located in Ward 8 in the District of Columbia. FARMS is often used as a proxy for socioeconomic status; however, all schools meet the National School Lunch Program's Community Eligibility Provision (CEP), meaning that all students in the school receive no-cost breakfast and lunch.

Both the intervention and comparison schools utilized the same instructional model, Every Child Ready (ECR; AppleTree Institute for Education Innovation, 2010a). ECR is a high-quality, research-based instructional model that incorporates curriculum, coaching, and assessment to support teachers and students (Carlson et al., 2017a). Additionally, participating schools used a positive behavior support approach (PBS) based on positive behavior and intervention supports practice. Schools have access to a school-based social worker and utilized a response to intervention process. ECMHC was incorporated as an additional social–emotional support for capacity building with school staff. All other social–emotional supports remained the same across the AppleTree system.

## Participants

Across the 3 schools, there were a total of 20 classrooms (15 intervention school and 5 comparison school), 38 teachers (29 intervention, 8 comparison), and 390 children (282 intervention, 108 comparison) that participated in the evaluation across one school year. Children in both the intervention and comparison schools were on average just under 4 years old, approximately half of the children were male, the vast majority of children were African-American (98% intervention,

Footnote 2 (continued)

tance Program (SNAP) benefits, are homeless, are involved with the foster care system, or over-age in high school.

[3] Teacher workforce data was available for the first time in the 2018–2019 school year for the District of Columbia Public Schools, thus it was unavailable for the 2016–2017 school year. 2018–2019 teacher workforce data is reported here as it was the closest school year to 2016–2017 in which teacher workforce data was available.

**Table 1** Child and teacher demographic characteristics

| | Intervention schools | | | | | | Comparison school | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | % | Mean | SD | Min | Max | *N* | % | Mean | SD | Min | Max |
| *Child demographics* | | | | | | | | | | | | |
| Male | 282 | 52 | | | | | 108 | 52 | | | | |
| White | 282 | 1 | | | | | 108 | 0 | | | | |
| Black or African-American | 282 | 98 | | | | | 108 | 100 | | | | |
| Asian | 282 | 0.5 | | | | | 108 | 0 | | | | |
| Native American | 282 | 0.5 | | | | | 108 | 0 | | | | |
| Hispanic | 282 | 1 | | | | | 108 | 0 | | | | |
| Free/Reduced Lunch | 282 | 100 | | | | | 108 | 100 | | | | |
| Special Education Services | 280 | 7 | | | | | 108 | 9 | | | | |
| English Language Learners | 282 | 3 | | | | | 108 | 0 | | | | |
| Age | 282 | | 46.71 | 6.85 | 32 | 68 | 108 | | 47.51 | 6.70 | 35 | 59 |
| *Teacher demographics* | | | | | | | | | | | | |
| Male | 29 | 3 | | | | | 8 | 3 | | | | |
| White | 29 | 27.6 | | | | | 8 | 12.5 | | | | |
| Black | 29 | 66.5 | | | | | 8 | 75 | | | | |
| Asian | 29 | 0 | | | | | 8 | 12.5 | | | | |
| Other | 29 | 6.9 | | | | | 8 | 6.9 | | | | |
| Total years teaching experience | 29 | | 5.52 | 4.03 | 1 | 16 | 8 | | 7.63 | 6.39 | 2 | 21 |
| Years teaching at AppleTree | 29 | | 1.52 | 1.68 | 0 | 6 | 8 | | 1.13 | 1.46 | 0 | 4 |

No statistically significant differences in child and teacher demographics between intervention and comparison schools were observed in *t* test and Chi-square analysis

100% comparison) and non-Hispanic (99% intervention, 100% comparison), and 81% were designated as "at-risk" as defined in the footnote above. Less than 10% of the children at both intervention and comparison schools were enrolled in special education services. No children were English Language Learners at the intervention school and 3% were English Language Learners at the comparison school. Please see Table 1 for detailed child demographic information.

Intervention and comparison school teachers had multiple years of experience in the field ($M = 5.52$, 7.63, respectively) and had been teaching in the AppleTree network for over one year ($M = 1.52$ 1.13, respectively). The majority of teachers at both intervention and comparison schools were African-American. Teachers in the intervention and comparison schools were majority female. Please see Table 1 for detailed teacher demographic information.

## Intervention: Early Childhood Mental Health Consultation

Consultants followed a framework for school-based mental health consultation developed by Georgetown University's Center for Child and Human Development (GUCCHD). The GUCCHD framework expanded upon the work of Duran et al. (2009), by defining ECMHC as activities that target the program, classroom, and child level (Hunter, et al., 2016). At all three levels, the process can be described in five steps: (1) Initiation—the consultant establishes expectations and aligns philosophy with the teacher, family, and/or or school leadership, (2) Exploration—concerns, priorities, and goals are all explored with the teacher, family, or school leadership, (3) Plan Development—the consultant facilitates and reaches consensus on a plan with the teachers and school leadership, (4) Plan Implementation—the consultant supports teachers, families, or school leadership in implementing new strategies and approaches, and (5) Revisiting plans and goals—the teacher and consultant together determine whether the plan is working and continue the iterative process of updating goals and plans as needed while working toward maintaining progress.

The current study used two highly qualified consultants (as defined by Duran et al., 2009) to provide ECMHC in the intervention schools. The two consultants were experienced with doctoral degrees in psychology, previous experience working in the school setting and with young children, and strong clinical and relationship building skills. One consultant was an employee of a nonprofit organization that specializes in school-based mental health services (separate from AppleTree and the academic medical center). The other consultant was an employee of the academic medical center and was part of the research team. Both consultants

were clinically supervised by senior staff at the nonprofit organization that specializes in school-based mental health services.

The infrastructure supporting the ECMHC intervention included a clear model design, partnership between an academic medical center and AppleTree to support implementation and evaluation of ECMHC, and supervision for consultants (Duran et al., 2009). Each consultant was assigned to one of the two intervention schools and spent one day a week in their designated school working with a caseload of 2–4 classrooms at a given time. Each day the consultants were in the school they met with principals and social workers in the morning (check-in meeting) to discuss children and classrooms on their caseload and receive updates from the past week. They also met with principals and social workers at the end of the day (checkout meeting) so the consultant could update the team on the goals and plans discussed with teachers throughout the day. This allowed for school leadership to stay informed on the goals and progress in each classroom. During the school day, consultants made observations of all supported classrooms and had individual classroom meetings with teachers/teaching teams on their caseload following the steps outlined in the GUCCHD ECMHC framework (described above) including building rapport, identifying areas of need in the classroom, defining goals for the classroom, developing an action plan to meet the goals, discussing outcomes of the plan implementation, and revising the plan in an iterative process until the goals of the classroom were met. While weekly consultation occurred with a caseload of teachers, the consultant was also available to all teachers in the school for brief consultation as needed. Consultants provided school-wide professional development sessions that were available to all teachers in the school. Professional development topics included wellness workshops (e.g., mindfulness, self-care) and a multi-part trauma-informed schools series. Consultants were also available to the principal and social workers for school-wide or classroom/child-specific consultation as needed. Consultants met weekly with a supervisor, who was a licensed psychologist, who provided support during the consultation process, discussed their individual cases, and problem-solved any concerns.

Consultation services included child, classroom, and programmatic consultation (Duran et al., 2009). Consultation typically started with supporting teachers with a focus child in the classroom. This allowed for relationship building between the consultant and teachers, focused the consultation on an area of stress for the teacher (e.g., a child with challenging behavior) and allowed some time to build trust in the consultation relationship. From there, after rapport, trust and some initial success with consultation were built, consultation could shift to whole classroom consultation if needed. For example, a consultant might work with a teacher on increasing the amount of verbal praise given to a child with challenging behavior. Success with the individual child might lead to the teacher being more open to suggestions to increase the amount of verbal praise he/she uses with her whole class as well as to feedback from the consultant on whole classroom interventions that the classroom might benefit from. Other practices targeted by either child-centered consultation or whole classroom consultation were: preventing problem behavior, (e.g., increased use of pre-corrections, routines), increased use of positive reinforcement (e.g., praise, incentives), appropriate response to challenging behavior (e.g., appropriate redirection, logical consequences), and building the teacher–child relationship.

The focus of the consultation was to address factors that affect young children's mental health, including social–emotional learning, the classroom climate,, and the relationships between teachers and children in the classroom. Other content areas, such as consultation on academic instruction, would have been outside the scope of a consultant's work (although a positive classroom climate aligns with the goals of strong academic instruction). A key tenet of the focus of consultation was the importance of positive relationships. High-quality relationships in the classroom are critical in creating a positive learning environment for students (Pianta & Stuhlman, 2004), and all other suggestions for consultation (such as the targets described above) were built upon this foundation. In addition, capacity building for adults (as opposed to direct service to children) and supporting adults in creating positive environments for children is at the heart of consultation. Therefore, when developing goals and interventions for the classroom, consultants pulled from theoretical frameworks such as ecological systems theory, attachment theory, developmental psychopathology, and behavioral theory.

Classroom selection for consultation was multifactorial and based on the social–emotional needs of the classroom, teacher's openness to consultation, the current distribution of available school resources as well as the need for child-focused consultation. Classrooms were selected based on consensus between the consultant, principal, and school social worker. Consultation could be focused on the classroom or individual child level, based on need. Consultation was an ongoing intervention with no predetermined time constraints and ended when the principal, teacher, and consultant agreed that the work had been completed and the identified goals had been met. Goals were determined at the start of consultation and were revised throughout consultation as needed. Consultants, teachers, and school administrators collaboratively decided when goals had been met based on consultant and leader observations and teachers' perspective on classroom functioning. In the case of child-level consultation, if there were no other needs in the classroom when consultation for the child ended, the classroom

**Table 2** ECMHC implementation at intervention schools

| | Intervention school 1 | | | | | Intervention school 2 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | Mean | SD | Min | Max | *N* | Mean | SD | Min | Max |
| *Implementation Indicator* | | | | | | | | | | |
| Focus Children | 15 | 2.5 | 1.05 | 1 | 4 | 14 | 2.3 | 0.52 | 2 | 3 |
| Meetings per classroom | 6 | 19.83 | 7.83 | 6 | 27 | 6 | 17.83 | 8.03 | 7 | 28 |
| Length of consultation (weeks) | 6 | 29.5 | 9.71 | 13 | 37 | 6 | 21.0 | 10.71 | 7 | 35 |

No statistically significant differences in implementation indicators were observed between intervention school 1 and intervention school 2 observed in *t* test analysis

consultation would end and focus would shift to another classroom. Alternatively, if there was a continued need in the classroom, consultation would continue for a new target child or shift to classroom level consultation.

### Implementation of ECMHC Model

At intervention school 1, over the course of the school year 15 children were the focus of consultation across 6 classrooms (out of 7 classrooms in the school; see Table 2). On average, the consultant held 20 consultation meetings per classroom (range 6–27) over the course of 29.5 weeks (range 13–37). Between 1 and 4 children per classroom were the focus of consultation ($M = 2.5$). At intervention school 2, 14 children were the focus of consultation across 6 classrooms (out of 8 classrooms in the school). On average, the consultant held 18 consultation meetings per classroom (range 7–28) over the course of 21 weeks (range 7–35). Between 2 and 3 children per classroom were the focus of consultation ($M = 2.3$). There were no significant differences between the intervention schools in the number of consultation meetings ($t(10) = -0.437$, $p = 0.672$), number of children that were the focus of consultation ($t(10) = 0.734$, $p = 0.734$), or number of weeks of consultation ($t(10) = -1.440$, $p = 0.180$). On average, teachers participated in 0.82 consultation meetings per week during the course of their consultation, which approaches the anticipated 1 meeting per week. This average is just under 1 meeting per week as teachers periodically skipped a week of consultation due to a school holiday or event (e.g., field trip), attending a professional development workshop or teacher's absence from school (e.g., vacation or sick day). Consultants implemented three professional development workshops at school one and four professional development workshops at school two.

### Data Collection Procedures

Social–emotional and academic achievement data were collected in the fall (beginning-of-year) and spring (end-of-year) of one school year. Social–emotional skills were measured using an observational measure of self-regulation and attention skills in the classroom (Social Emotional Screener; SES, AppleTree Institute for Education Innovation, 2011b) and a teacher-completed positive behavior rating scale (Positive Behavior Rating Scale; PBRS, AppleTree Institute for Education Innovation, 2011a). SES observations were completed for all children at the beginning of the school year by teachers and social workers and again for a random selection of children across one intervention school and one comparison school at the end of the school year by social workers and teaching assistants. At the beginning of the school year, the observational measure was collected as part of routine practice at all AppleTree schools before ECMHC services began and before school staff would have known a consultant was assigned to their school. Collecting the observational measure (SES) at the end of the school year was added to AppleTree's routine data collection in order to enhance the evaluation of the ECMHC program. Thus, in order to minimize burden for school staff, a random selection of children at one intervention school and the comparison school were selected. Teachers had to collect multiple other end of school year assessments (i.e., academic assessments); thus, Teaching Assistants assisted with the end of year data collection to minimize burden for lead teachers. At the end of the year, observers likely would have known there was a consultant assigned to their school; however, they were not necessarily aware of the purpose of the end of year observation (i.e., to compare changes across the year in the intervention and comparison school).

Children's academic achievement was measured in the fall and spring through three direct assessments (Every Child Ready: Math, Language and Literacy, and Letters and Writing Assessments, AppleTree Institute for Education Innovation, 2010b, 2010c, 2010d). Academic assessments and the social–emotional rating scale are completed by teachers. All research procedures followed the ethical guidelines of the American Psychological Association and were reviewed and approved by Georgetown University's IRB.

## Measures

As part of the AppleTree standard of practice, the charter system administers a number of measurement tools to track children's academic and social–emotional progress.

Child-facing tools align to the ECR curriculum standards and are designed to provide teachers and school leaders with actionable information to support teaching and learning.

## Child Social–Emotional Measures

AppleTree uses two measurement tools to monitor children's social–emotional progress. One observational tool is completed by teachers, teacher assistants, and social workers (SES) and one is a teacher rating scale (PBRS). All teachers completing assessments undergo live training prior to administration. In the case of the teacher rating scale (PBRS), teachers also participate in an online training with video exemplars and check for understanding.

The *Positive Behavior Rating Scale* (PBRS; AppleTree Institute for Education Innovation, 2011a) is a teacher rating scale consisting of 10 items assessing children's positive social–emotional behavior. These items tap into multiple social–emotional domains, including resiliency, attention/engagement, self-control, self-concept, and interactions with both peers and adults. Items are rated on a 5-point Likert scale indicating the frequency with which children display certain positive behaviors (ranging from 1 = never to 5 = always). The 10 items are divided into two subscales (1) behavior regulation and (2) social/self-awareness. Each scale has five items each and items are averaged with scores ranging from 1 to 5. Higher scores on the PBRS are indicative of stronger positive social–emotional behavior (i.e., "Adjusts well to changes in routine"). Ratings are completed for each child by teachers quarterly, with data entered into an online application.

Internal consistency for this 10-item instrument was high, with Cronbach's alphas ranging from $a = 0.93$ to $a = 0.96$ across measurement time points. PBRS was validated using the DECA and correlations between related scales on the PBRS and DECA were moderate to strong, ranging from $r = 0.325$ to $r = 0.692$ across measurement points. Additionally, correlations between opposing scales (e.g., PBRS behavior regulation and DECA behavioral concerns) were moderately to strongly negative, ranging from $r = -0.371$ to $r = -0.685$ across measurement points.

*The Social Emotional Screener* (SES; AppleTree Institute for Education Innovation, 2011b) is a screening observation of children's social emotional skills that was completed at the beginning and end of the school year. The SES is designed to identify children who may benefit from social–emotional supports early in the year. The SES is made up of three subscales: attention and ability to focus, skills in self-regulation, and red flag behaviors. Only the first two subscales were included in the present study because red flag behaviors were very infrequently observed. The SES is observational, with every child observed for five, eight-minute periods on five different days across a two- to three-week period in order to capture a broad picture of child self-regulation. To support observers' reliability on this measure, observers recorded their observations and shared them with their principals. Principals then checked coding to ensure reliability. Observers also received a standardized training and completed practice scoring during the training. The SES was validated against children's other academic and social outcomes, with higher ratings on the SES associated with lower academic scores and higher need for school-based social and emotional supports (Carlson et al., 2013).

## Child Early Academic Measures

AppleTree uses three measurement tools to monitor children's academic progress. All of these measures are direct child assessments and take place in a one-on-one setting. Teachers administer math, language, and literacy, and letters and writing assessments three to five times per year. Administration takes place during a two-week window. Before administering these assessments, teachers completed a standardized training and an online certificate test by demonstrating both implementation fidelity with a trained assessor and appropriate understanding of the instrument. Prior to each assessment window, teachers participate in online refresher training for any tool they will administer which includes video exemplars and checks for understanding. School leaders conduct fidelity checks by co-scoring observations for at least one administration of each assessment for each teacher. If 80% agreement or higher was achieved on co-scoring, then teachers could proceed administering assessments. If agreement was less than 80%, follow-up training was provided and then teachers completed another reliability assessment until 80% agreement was achieved. These academic assessments were validated as part of an I3 development grant (Project title: "Every Child Ready", Award number: U396C100243), which involved external data collection. Third-party data collection with nationally normed tools facilitated measurement development and validation for the tools described below. All indicators of reliability and validity reported for the assessments below are from this validation study.

*Every Child Ready: Math Assessment* (ECR:M; AppleTree Institute for Education Innovation, 2010d) is a curriculum-based measure of mathematical skills. ECR:M is a summed score of correct answers on 56 questions. ECR:M assesses the following early math domains: number concepts; patterns, functions & algebra; geometry & spatial sense; data analysis & planning; and measurement. A principal components factor analysis supported these domains in a five-factor model. Internal consistency for this instrument is high, with Cronbach's alphas ranging from 0.88 to 90 across three progress monitoring time points. ECR:M was validated using the Tests of Early Mathematics Ability

(TEMA; Ginsburg & Baroody, 2003). Correlations between ECR:M and the TEMA were primarily in the moderate range ($r = 0.53$–$0.66$; Cohen, 1992).

*Every Child Ready: Language & Literacy* Assessment (ECR:LL; AppleTree Institute for Education Innovation, 2010b) is a curriculum-based measure of early language and literacy skills and uses a summed score of correct answers on 35 questions. ECR:LL addresses the following domains: syllable awareness, rhyme discrimination, phoneme blending, compound word elision, phoneme substitution, exposure to print, expressive language, and narrative comprehension. Internal consistency was high, with Cronbach's alphas of 0.94 at three progress monitoring time points. ECR:LL was validated using the Peabody Picture Vocabulary Test (PPVT-IV; Dunn & Dunn, 2007) and three subtests of the Test of Preschool Early Literacy (TOPEL; Lonigan et al., 2007): phonological awareness, print knowledge, and definitional vocabulary. Validity was assessed by comparing performance on ECR:LL at three progress monitoring time points and the PPVT and TOPEL at baseline and outcome. Correlations between ECR:LL and the PPVT and TOPEL were primarily in the moderate range ($r = 0.57$-$0.59$; Cohen, 1992).

*Every Child Ready: Letters & Writing* (ECR:LW, AppleTree Institute for Education Innovation, 2010c) is a curriculum-based measure of early letter knowledge and emergent writing. ECR:LW tasks have high ecological validity, occurring naturally in the preschool environment. Subtests include letter identification, letter sound knowledge, name writing, and letter writing. Validity was assessed by comparing performance on ECR:LW subscales to performance on the Phonological Awareness Literacy Screener (PALS) letter identification, letter sounds, and name writing subscales. Correlations between similar subscales (i.e., ECR:LW letter ID and PALS letter ID) were all in the high range ($r = 0.84$–$0.94$; Cohen, 1992).

## Analysis Plan

Descriptive statistics were examined in SPSS version 26. Regression analyses were conducted in a multilevel framework using Mplus Version 7.1 (Muthén & Muthén, 2013) to account for the nesting of children within classrooms within schools. We fit three-level models that accounted for the nesting of children (within/level 1) within classrooms (between/level 2) within schools (between/level 3). We chose a conservative analysis approach where children from all classrooms in each school were included in these analyses, regardless of whether their teacher/classroom received classroom-level consultation. Our analysis of intervention effects was at the school population level for several reasons: (1) intervention assignment occurred at the school level, meaning that a school was assigned a consultant or they were not, (2) consultation included programmatic consultation (e.g., school-wide professional development, consultation with school administrator and social worker; see above intervention description) as well as classroom-level consultation with classrooms/teachers within a school, (3) the majority of classrooms within both intervention schools received consultation, and (4) within a school there may have been "spillover" of the intervention from classrooms that received consultation to classrooms that did not as there were not mechanisms in place to prevent communication about the intervention between classrooms. We examined whether participation in the treatment (ECMHC) predicted differences in children's teacher-rated positive behavior (PBRS), observed social–emotional skills (SES), and academic achievement (ECR) at the end of the school year. For each child outcome (social–emotional skills, positive behaviors, and academic achievement), we fit an unconditional model and a multilevel regression model. Unconditional models estimated the variance in the outcomes occurring at the within and between levels and estimated the intraclass correlations (ICCs), or the proportion of variance in the outcomes occurring at the between levels (across classrooms and schools). All regression models included a set of child covariates at the within (child) level: child's age, gender (male = 1, female = 0), and beginning-of-year score on the outcome measure (e.g., positive behavior, social–emotional skills, academic achievement). In the multilevel regression models, beginning-of-year scores and child age were grand-mean centered to control for potential differences between classrooms.[4] No covariates or predictors were entered at level 2/between classrooms. Regression models included the key predictor, participation in treatment (treatment = 1, no treatment = 0), at level 3/between schools. We calculated the proportion of variance explained and effect size for treatment in each model by examining the incremental proportion of variance explained ($R^2$) when comparing the full model to a model with only covariates included. We used the equation for $R^2$ and $f^2$ in multilevel models presented by Lorah (2018) to calculate proportion of variance explained and effect size.

All 390 children who attended one of the three schools who participated in this evaluation and were enrolled at AppleTree at the end of the year were included in the analyses. Of the 390 children, direct assessments of children's math, language/literacy, and letters/writing achievement were completed for 357, 354, and 352 children, respectively,

[4] We also fit our models using classroom-level group-mean centering. The only substantive difference in the results using the two centering approaches was that the treatment condition significantly predicted end of year Letters & Writing scores when grand mean centering was employed, but was not a significant predictor when group mean centering was utilized.

**Table 3** Descriptive statistics: child positive behavior, social–emotional skills, and academic skills

| | Comparison | | | Treatment | | |
|---|---|---|---|---|---|---|
| | *N* | Mean | SD | *N* | Mean | SD |
| *Beginning of year* | | | | | | |
| Behavioral Regulation (PBRS) | 105 | 3.81[a] | 0.94 | 272 | 3.52 | 1.01 |
| Social and Self-Awareness (PBRS) | 105 | 3.77[a] | 0.88 | 272 | 3.36 | 0.95 |
| Attention Problems (SES) | 100 | 1.03 | 0.73 | 133 | 1.12 | 1.22 |
| Self-Regulation Deficits (SES) | 100 | 0.52[a] | 0.65 | 133 | 0.85 | 1.46 |
| Math Achievement (ECR) | 106 | 37.10[a] | 24.13 | 251 | 26.69 | 17.91 |
| Language & Literacy Achievement (ECR) | 106 | 17.35[a] | 11.03 | 248 | 10.49 | 7.15 |
| Letters & Writing Achievement (ECR) | 104 | 21.38[a] | 19.39 | 248 | 12.70 | 15.78 |
| *End of year* | | | | | | |
| Behavioral Regulation (PBRS) | 107 | 3.68 | 0.90 | 279 | 4.20 | 0.79 |
| Social and Self-Awareness (PBRS) | 107 | 3.75 | 0.71 | 279 | 4.20 | 0.72 |
| Attention Problems (SES) | 104 | 0.69 | 0.71 | 57 | 0.20 | 0.38 |
| Self-Regulation Deficits (SES) | 104 | 0.43 | 0.63 | 57 | 0.22 | 0.40 |
| Math Achievement (ECR) | 106 | 74.70 | 18.25 | 273 | 80.74 | 18.84 |
| Language & Literacy Achievement (ECR) | 106 | 38.76 | 7.55 | 274 | 39.53 | 8.77 |
| Letters & Writing Achievement (ECR) | 107 | 44.98 | 14.76 | 275 | 44.89 | 15.37 |

[a]Statistically significant differences in *t* test analysis between the comparison group and treatment group baseline/beginning of the school year

in the fall and for 379, 380, and 383 children, respectively, in the spring. A total of 377 children had teacher ratings of behavioral functioning (PBRS) in the fall and 386 had teacher ratings in the spring. Of the 256 children at the intervention and comparison school where SES was collected in the fall and spring, 233 children were observed using the SES in the fall, 161 were observed using the SES in the spring (a randomized subset at one intervention school and one comparison school). Missing data occurred if a child was absent on the date of observation, the child moved, if a child was not part of the subset observed with the SES in the spring, if a child entered the school part way through the year, or if teachers' questionnaires were not completed. Missing rates for variables included in our analyses ranged from 5 to 9% (37% SES spring due to randomized sampling). Maximum likelihood estimation with robust standard errors was employed to handle missing data and make use of all available data. This approach to address missing data is considered preferable to listwise or pairwise due to its more efficient and unbiased parameter estimates (Enders & Bandalos, 2001).

# Results

## Preliminary Analyses

### Baseline Comparison of Intervention and Comparison Schools

We examined baseline equivalence between intervention and comparison schools by testing whether there were significant differences in child and teacher demographic characteristics. *T* test analysis for continuous demographic variables and Chi-square analyses for dichotomous and categorical variables indicated no significant differences between intervention and comparison schools in children's or teachers' demographic characteristics (see Table 1). *T* test analyses of baseline differences between the comparison and treatment groups for our outcomes (PBRS, SES, ECR) indicated significant differences. Children in the comparison school had higher teacher-rated behavioral regulation and social/self-awareness (PBRS), observed self-regulation deficits (SES), and directly assessed Math, Language & Literacy, and Letters & Writing Achievement (ECR) (see Table 3). No significant baseline differences were observed for observed child attention problems (SES). To account for baseline differences in the outcome measures, our primary analyses controlled for baseline scores.

**Table 4** Model summaries: observed child social–emotional skills

| Parameters | Attention problems | | Self-regulation deficits | |
|---|---|---|---|---|
| | Unconditional | Treatment level 3 fixed effect | Unconditional | Treatment level 3 fixed effect |
| *Regression coefficients (fixed effects)* | | | | |
| Intercept | 0.441 (0.17)** | 0.567 (0.03)*** | 0.309 (0.06)*** | 0.283 (0.02)*** |
| Age | – | −0.005 (0.01) | – | 0.006 (0.01)** |
| Male | – | 0.214 (0.05)*** | – | 0.177 (0.02)*** |
| Beginning-of-Year Score | – | 0.032 (0.01)*** | – | 0.028 (0.01)*** |
| Treatment | – | −0.500 (0.03)*** | – | −0.114 (0.01)*** |
| *Variance components (random effects)* | | | | |
| Level 1: Residual | 0.366 (0.11)** | 0.346 (0.11)** | 0.196 (0.02)*** | 0.181 (0.01)*** |
| Level 2: Intercept | 0.001 (0.01) | 0.001 (0.01) | 0.001 (0.01) | 0.000 (0.01) |
| Level 3: Intercept | 0.051 (0.01)*** | 0.000 (0.11) | 0.003 (0.01) | 0.000 (0.01) |

Parameter estimate standard errors shown in parentheses

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

**Table 5** Model summaries: teacher-reported child classroom positive behavior

| Parameters | Behavioral regulation | | Social and self-awareness | |
|---|---|---|---|---|
| | Unconditional | Treatment level 3 fixed effect | Unconditional | Treatment level 3 fixed effect |
| *Regression coefficients (fixed effects)* | | | | |
| Intercept | 4.034 (0.15)*** | 3.680 (0.04)*** | 4.077 (0.13)*** | 3.742 (0.02)*** |
| Age | – | −0.005 (0.01) | – | 0.009 (0.01)*** |
| Male | – | −0.220 (0.07)** | – | −0.171 (0.03)*** |
| Beginning-of-Year Score | – | 0.465 (0.04)*** | – | 0.291 (0.04)*** |
| Treatment | – | 0.662 (0.04)*** | – | 0.578 (0.03)*** |
| *Variance components (random effects)* | | | | |
| Level 1: Residual | 0.564 (0.04)*** | 0.328 (0.04)*** | 0.353 (0.03)** | 0.263 (0.02)*** |
| Level 2: Intercept | 0.121 (0.06)* | 0.084 (0.02)*** | 0.191 (0.04)*** | 0.168 (0.03)*** |
| Level 3: Intercept | 0.046 (0.04) | 0.000 (0.01) | 0.008 (0.04) | 0.000 (0.01) |

Parameter estimate standard errors shown in parentheses

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

### Preliminary Examination of End-of-School Year Child Positive Behavior, Social–Emotional Skills, and Academic Skills

See Table 3 for descriptive statistics of children's social–emotional skills, positive behaviors, and academic achievement at the beginning and end of the school year. An examination of skewness and kurtosis for our outcome variables indicated that the teacher-rated positive behaviors (PBRS) and academic achievement (ECR) at the end of the school year variables were adequately distributed and thus did not require transformations to be used as continuous variables in the analyses (Westfall & Henning, 2013). Skewness and kurtosis for observed social–emotional skills were initially moderately high; 2 outliers were excluded and skewness and then kurtosis were then within an acceptable range. In the unconditional model, the ICCs at the classroom level for end of year observed social–emotional skills, teacher-reported positive behavior, and directly assessed academic achievement were 0.003 (attention problems), 0.002 (self-regulation deficits), 0.166 (behavioral regulation), 0.304 (social and self-awareness), 0.167 (math), 0.273 (language and literacy), 0.084 (letters and writing) and at the school level for end of year observed social–emotional skills, teacher-reported behavior, and directly assessed academic achievement were 0.154 (attention problems), 0.018 (self-regulation deficits), 0.072 (behavioral regulation), 0.065 (social and self-awareness), 0.032 (math), 0.008 (language and literacy), 0.001 (letters and writing). Average classroom cluster size was 19.5, and average school cluster size was 130.

**Table 6** Model summary: directly assessed child academic skills

| Parameters | Every child ready: math | | Every child ready: language and literacy | | Every child ready: letters and writing | |
|---|---|---|---|---|---|---|
| | Unconditional | Treatment level 3 fixed effect | Unconditional | Treatment level 3 fixed effect | Unconditional | Treatment level 3 fixed effect |
| *Regression coefficients (fixed effects)* | | | | | | |
| Intercept | 79.045(2.49)*** | 72.871 (0.37)*** | 39.430 (0.33)*** | 37.089 (0.38)*** | 44.967 (0.56)*** | 44.304 (0.18)*** |
| Age | – | 0.197 (0.23) | – | 0.246 (0.12)* | – | 0.170 (0.28) |
| Male | – | -3.472 (1.03)** | – | -0.899 (0.32)** | – | -3.196 (0.40)*** |
| Beginning-of-Year Score | – | 0.467 (0.04)*** | – | 0.447 (0.07)*** | – | 0.338 (0.05)*** |
| Treatment | – | 11.009 (0.65)*** | – | 3.953 (0.59)*** | – | 3.164 (0.72)*** |
| *Variance components (random effects)* | | | | | | |
| Level 1: Residual | 288.605 (17.24)*** | 182.574 (22.40)*** | 51.490 (6.74)*** | 36.941 (5.53)*** | 210.847 (12.18)*** | 165.382 (15.66)*** |
| Level 2: Intercept | 65.877 (15.17)*** | 16.598 (3.63)*** | 19.643 (9.06)* | 8.527 (2.36)*** | 18.826 (8.82)* | 7.108 (2.75)** |
| Level 3: Intercept | 0.413 (24.60) | 0.066 (0.53) | 0.042 (0.97) | 0.024 (0.28) | 0.064 (1.01) | 0.046 (0.42) |

Parameter estimate standard errors shown in parentheses

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

## Participation in ECMHC and Child Positive Behavior, Social–Emotional Skills, and Academic Skills

An examination of the between (school) level predictor in our multilevel models revealed that a school's participation in the treatment (ECMHC) predicted fewer observed social–emotional challenges for children, including attention problems and self-regulation deficits, at the end of the year when compared to children in the comparison school (see Table 4). A school's participation in the treatment (ECMHC) also predicted higher teacher ratings of children's positive behavior at the end of the school year compared to children in the comparison school (see Table 5). Teachers' ratings of children's behavioral regulation and social and self-awareness were both higher at the end of the year for children in the treatment schools. Finally, participation in ECMHC predicted higher academic achievement, including math, language, and literacy, and letters and writing achievement, at the end of the school year for children in treatment compared to comparison schools (Table 6).[5] Please see our footnote in our *Analysis Plan* section regarding our centering approach and the letters and writing finding.

The incremental proportion of variance ($R^2$) explained by the treatment for observed social emotional challenges was 12% for attention problems and 2% for self-regulation deficits. A school's participation in ECMHC (treatment) accounted for 12% of the variance in teachers' report of both behavioral regulation and social and self-awareness. Participation in ECMHC (treatment) accounted for 6% of the variance in directly assessed math achievement, 3% of language and literacy achievement, and 1% of letters and writing achievement. The effect sizes ($f^2$) for a school's participation in ECMHC (treatment) predicting child outcomes ranged from small to medium. The effect sizes for treatment predicting observed social emotional challenges were small, 0.14 for attention problems and 0.02 for self-regulation deficits. For teacher-reported behavior, effect sizes for a school's participation in treatment were medium 0.21 for behavior regulation and 0.15 for social and self-awareness. Finally, the effect sizes for treatment predicting directly assessed academic outcomes were small with an effect size of 0.10 for math achievement, 0.05 for language and literacy, and 0.01 for letters and writing.

## Discussion

Early education programming is a particularly beneficial experience for children when the programming is high quality and able to meet the social–emotional and behavioral needs of all children. As a result of patterns of structural racism and divestment, young children growing up in marginalized and under-resourced communities are exposed to higher levels of adversity. This can put them at risk for social–emotional delays and behavior problems that undermine their ability to benefit from learning experiences in the classroom (Blair & Raver, 2015). Many teachers are ill-equipped to manage these issues in the classrooms, especially when

[5] We fit similar models in SPSS version 22 without using a multilevel framework and the results demonstrated the same pattern found in the multilevel analyses.

multiple children are experiencing difficulties, because of scarce mental health promotion, prevention, and intervention resources, as well as their own implicit biases (Onchwari, 2010; Gilliam et al., 2016b). Early childhood mental health consultation (ECMHC) is a capacity-building intervention for teachers that developed in response to this need. It has grown in popularity despite a limited amount of rigorous research to support its effectiveness. The purpose of the current study was to expand the evidence base for ECMHC by evaluating its effects on children's social–emotional and early academic outcomes of students over the course of an academic year. We compared the outcomes for preschool age children in two public charter preschools where this model of support was available to the outcomes of children in a preschool where teachers delivered instruction as usual and received standard professional supports.

Overall, the findings of this study were positive with outcomes favoring the children attending preschools where mental health consultation was provided to administrative and teaching staff at the program and classroom levels. Specifically, children in schools where ECMHC was provided were rated by their teachers as exhibiting higher levels of social–emotional competence and were observed by their teachers as exhibiting fewer self-regulation problems. These findings are consistent with previous research on ECMHC (Gilliam et al., 2016a; Raver et al., 2009, 2011; Williford & Shelton, 2008). In the only randomized-controlled trial of ECMHC, Gilliam and colleagues also used teacher ratings of children's behavior to measure the effects of consultation and found that children in the intervention classrooms were rated as higher functioning on measures of social–emotional competence and behavior compared to those in control classrooms (Gilliam et al., 2016a). In a quasi-experimental study of ECMHC, Conners-Burrow and colleagues also found that teachers who received consultation rated their children as exhibiting fewer behavior problems compared to teachers in control classrooms, but these effects did not emerge until the third year of program implementation (Conners-Burrow et al., 2012).

In several studies of ECMHC that also examined child outcomes, the focus of the design was on determining the effects of the intervention for at-risk students (i.e., students with elevated behavior problems at the beginning of the year; Upshur et al., 2009; Williford & Shelton, 2008). This is a common approach for universal interventions where a large portion of the participants may not need the intervention and therefore limit the ability for change to be detected on outcome measures. In the current study, significant benefits were documented in samples of children with and without documented behavioral challenges.

A unique feature of the current study was the inclusion of curriculum-based direct assessments of students' early academic performance around language and literacy skills, letter recognition and early writing abilities, and math. To our knowledge, there is only one other study that has examined the effects of ECMHC on children's school readiness (Raver et al., 2011). The Chicago School Readiness Program is an intervention for teachers of children in Head Start that combines the Incredible Years Teacher Training Series with stress reduction workshops and mental health consultation for teachers. After one year of program implementation, a random subset of children in programs that provided CSRP to their teachers had higher levels of vocabulary, letter naming, and math skills on direct assessments compared to children in control classrooms (Raver et al., 2011). Children in the intervention group also had better self-regulation skills as observed on a series of performance tasks, and mediation analyses showed that improvements in children's early academic skills were a function of improvements in their self-regulation (Raver et al., 2011). Similarly, in our study we found that students in the ECMHC schools demonstrated better language/literacy and math skills compared to students in the school that received standard educational programming. It may be that the improvements in social–emotional and behavioral skills allowed children to better take advantage of the high-quality classroom instruction. Additionally, it is likely that when teachers spend less time on behavior management they are able to spend more time on effective instruction and academic supports, benefiting all students in the classroom.

The CSRP team did not look at intervention effects on writing skills, and our study found significant improvements on the letters and writing assessment. However, this effect was only significant when we fit our models using grand mean centering. When classroom-level group mean centering was employed, the letters and writing assessment was not a significant predictor. This indicates that there was significant variation between classrooms in how children's beginning-of-year score was related to their end-of-year score based on classroom factors. Since these analyses included both PreK-3 and PreK-4 classrooms, it may be that there were differences in instructional focus on writing. PreK-4 classrooms likely have a more intensive instructional focus on letters and writing given children's developmental stage than PreK-3 classrooms. This may at least partially account for the difference in results using the two different centering approaches. In addition, writing is still an early and emerging skill that is highly dependent on fine motor development in early childhood and many early childhood interventions that look at academic outcomes do not include a writing assessment. Future studies should more consistently include writing as an academic assessment in the preschool age group to better understand the intervention effects.

An important issue to consider when interpreting the research on ECMHC is the nature of the consultation model. While there has been important work recently regarding the definition of consultation, core principles of its practice,

and strategies for monitoring fidelity of implementation, there is still significant amount of variability in how consultants build the capacity of the teachers they work with (Duran et al., 2009; Kaufmann et al., 2012). The framework of consultation used in the current study was based on the long-standing work of Georgetown University's Center for Child and Human Development (GUCCHD), which defines ECMHC activities across multiple levels of the program, classroom and child (Hunter et al., 2016). It adhered to the three core components as defined by Duran and colleagues, which include a solid program infrastructure, highly qualified consultants, and high-quality service (Duran et al., 2009). On average, consultants provided support to teachers for 25 weeks (5 months). This length of consultation is similar to the 4 months of consultation reported by Williford and Shelton (2008) and 20 weeks of consultation reported by Raver et al. On average, our consultants supported teachers for a longer duration than consultants in the model reported by Gilliam (2016), who provided consultation for 12 weeks, and for less time than the 3 years reported by Conners-Burrow et al. In the current study, we also reported the number of consultation meetings in which teachers participated in addition to the number of weeks over which consultation occurred. This level of specificity may contribute to increased precision regarding the dosage of consultation teachers receive. Dosage of consultation is one factor that may vary in how ECMHC is implemented. The more precisely we can measure implementation dosage and capture the variability between studies of ECMHC, the more we may be able to understand how consultation dose relates to positive outcomes for children.

## Study Strengths, Limitations, and Future Directions

There are far more descriptive studies of ECMHC implementation than studies of its effect relative to a comparison or control group. The current study uses a quasi-experimental design with a small number of schools and intervention and control schools were not randomized. This was a quasi-experimental study that should be replicated in a larger trial with an even more rigorous study design, such as a randomized controlled trial. Despite a small number of schools included in the current study, the analytic approach to analyzing the data was rigorous. Baseline equivalence in child and teacher demographic characteristics between the intervention and comparison schools was established, baselines scores for outcomes were controlled in our analyses, and multi-level modeling was used to account for the clustering of students within classrooms within schools. Additionally, we chose a conservative analysis approach where children from all classrooms in each school were included in the analyses, regardless of whether their teacher/classroom received classroom-level consultation and still found significant effects of ECMHC for children in schools that received the intervention. That is, all children in the intervention schools were included in our analyses—those whose classrooms received classroom consultation and those whose classrooms did not receive classroom consultation.

The study took place within a well-organized and effective public charter preschool network that delivers high-quality programming. All classroom teachers in the network are trained to deliver the same curriculum, *Every Child Ready*, as part of the standard educational practice (Carlson et al., 2017b). While this makes the study setting unique and may impact the generalizability of the findings to other early childhood education settings, the standardization and ongoing fidelity monitoring of the curriculum makes it more likely that any potential intervention effects attributable to the curriculum are similar across conditions. This means that improvements in the two ECMHC schools are likely a function of the consultation.

A limitation of the current study was that the assessments were all teacher-administered and used non-standardized self-report measures developed by AppleTree Institute to measure child outcomes. Fortunately, the Institute has validated these measures and teachers completing them undergo training prior to administration. Additionally, at the end of the year, even though teachers would have known if they had worked with a consultant that year, they filled out the PBRS and the academic measures as a matter of their standard program assessment at AppleTree and they were not necessarily aware that the data were being used to compare changes across the year in the intervention and comparison school. Lastly, the SES could only be collected on a randomized subset of children in the end of year observation in order to reduce staff burden and there was variability in who completed the observations. However, there are also systems in place to monitor the reliability of teachers' observations, which is a study strength that counters this concern. Still, future research should strive to utilize assessments administered by an external assessor whenever possible.

Additional suggestions for future research are a focus on the implementation of ECMHC including reporting fidelity. The field has not yet come to a consensus about what the focus or content of consultation should be and it can vary widely from program to program. More and better reporting on fidelity and unpacking the content would help the field have these important discussions. Dosage analyses could be particularly useful as centers and states are thinking about implementing their own ECMHC program. Does more time in consultation result in better outcomes? Or is there a point at which there is diminishing returns? It would also be informative to look at classroom and/or teacher level outcomes such as classroom climate and social–emotional teaching practices as potential proximal outcomes of ECMHC. Lastly, it would be helpful to do a cost–benefit analysis of ECMHC, given that the program can

be expensive and time intensive. Finding out whether this program can be successfully implemented by Master's level mental health professionals would help make this program more accessible throughout the country. Additionally, having a national certification program for ECMHC would provide the necessary training for mental health professionals to be able to implement this program with fidelity and potentially provide a supervision structure for professionals as they are first gaining experience in this method.

## Conclusion

Although ECMHC is growing in popularity across the country, there are very few studies that have evaluated ECMHC with a comparison group and only one other study that has looked at the effects of ECMHC on children's school readiness. This study is a well-designed and much-needed evaluation of ECMHC that provides support for the efficacy of ECMCH on children's school readiness outcomes including social–emotional skills as well as academic achievement. With an increasing number of children spending time in early childhood education settings and not enough mental health resources to go around, our findings suggest that this model of ECMHC is an effective way to spread out the expertise of mental health professionals and build the capacity of the adults in children's schools. This is particularly important for marginalized and underserved communities that face critical structural factors including racism and divestment and as a result have higher levels of adversity and need but fewer available resources.

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