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RESEARCH ARTICLE

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Efficacy of a peer-based in-home education program in improving social-emotional outcomes of parents and children

Jennifer Koop[1] | **Daniel Holliday**[1] | **Brittany L. Mathews**[2] | **Jessica Namaste**[3] | **Rebecca Alt**[3] | **Christa Haring Biel**[4]

[1]Department of Neurology, Medical College of Wisconsin, Milwaukee, Wisconsin, USA

[2]Department of Psychiatry, Medical College of Wisconsin, Milwaukee, Wisconsin, USA

[3]HIPPY Program, COA Milwaukee, Milwaukee, Wisconsin, USA

[4]University of Virginia, Charlottesville, Virginia, USA

Correspondence
Jennifer Koop, Department of Neurology (Neuropsychology), Medical College of Wisconsin, 8701 W. Watertown Plank Rd., Milwaukee, WI 53226, USA.
Email: jkoop@mcw.edu

Brittany L. Mathews is no longer affiliated with Medical College of Wisconsin.

Abstract

Significant disparities in education and social-emotional outcomes exist between racial/ethnic groups, particularly impacting children growing up in impoverished environments. Home visitation intervention programs, such as the Home Instruction for Parents of Preschool Youngsters (HIPPY), have been used for decades to improve academic readiness in these vulnerable preschool-aged children. Although the benefits of HIPPY on academic readiness and performance are well-documented, there has been no examination of social-emotional benefits to participating parent-child dyads. This study followed a HIPPY cohort over the course of 1 year to evaluate change in maternal and child social-emotional and behavioral functioning. Program participants demonstrated reduced parental stress and depression and increased parental social connection as well as reduced child externalizing behaviors and improved child adaptive functioning over the course of the program, even in the context of the COVID-19 pandemic and associated lockdown. These data highlight the additional benefits of early home-based academic intervention programs.

KEYWORDS

home visitation, preschool, social-emotional functioning, parent-child dyads

1 | SOCIAL-EMOTIONAL STRESS RELATED TO CAREGIVING

Caregiving for young children is a rewarding and joyful experience for many parents, yet this period also includes an abundance of stressful challenges. Ensuring children's safety and healthy development, managing their emotions and behavior, and balancing childcare with other life responsibilities are but a few of the challenges that parents of young children face daily. The culmination of daily responsibilities and stressors place parents at increased risk for depression, high levels of stress, and lack of social connectedness (Liang et al., 2019; National Research Council and Institute of Medicine, 2009). These parental stressors and experiences can negatively impact children's early mental health, social-emotional functioning and cognitive development.

1.1 | How parental stressors and risk factors impact children

The social-emotional functioning of caregivers has substantial influence on the context of the parent-child

relationship and children's early childhood mental health and overall development. It is well-established in the literature that parental depression is associated with increased risk for developmental delays (Chorbadjian et al., 2020; Lui et al., 2016; Sacchi et al., 2018) as well as both internalizing and externalizing psychological problems (Goodman et al., 2011) in children. Furthermore, research has demonstrated that high levels of parental stress negatively impact children's academic achievement, social-emotional competence, and behavioral outcomes (Cappa et al., 2011; Whittaker et al., 2011). Caregiver experience of trauma has also been shown to negatively impact the social-emotional development of preschoolers (Briggs et al., 2014; Garcia, 2015). The negative effect of parental stressors and poor social-emotional functioning on child outcomes may be lessened when parents are connected with the community around them and experience higher levels of social support (Lee et al., 2006; McConnell et al., 2011).

1.2 | Child risk factors

Poverty has long been recognized as a risk factor for poor child developmental outcomes (Korenman et al., 1995) with evidence of more profound effects for early (Duncan et al., 2010) or prolonged experience of poverty (Najman et al., 2009). Research suggests poverty impacts development and young children's mental health via family stress and resulting impoverished home environments (Bradley & Corwyn, 2002; Chaudry & Wimer, 2016). A mediating effect of maternal depression in the relationship between poverty and child outcomes (Petterson & Burke Albers, 2001) has also been identified. Reduced parental education is often associated with reduced income, commonly characterized together as a family's socioeconomic status (SES). SES impacts child development and mental health via child and family characteristics as well as external or community support systems (Davis-Kean, 2005). Families in impoverished environments experience higher rates of trauma, which also can negatively impact developmental outcomes. Childhood experience of trauma is associated with later depression (Chapman et al., 2004). Fortunately, improved parent-child interaction quality can mediate the impact of SES and maternal depression on later childhood social-emotional and behavioral outcomes (McCarty et al., 2003).

1.3 | Home visiting programs as interventions

Home visiting programs, which typically involve a professional, paraprofessional, or community member visiting the home of an at-risk family to provide support and services for the parent-child dyad or family, are one method which has been utilized to address and ameliorate the negative impact of risk factors on parents and children in impoverished environments. Most recent meta-analyses of the literature on home visiting program effectiveness (Filene et al., 2013; Sweet & Appelbaum, 2004) found that overall home visits had a significant effect on improving outcomes for parents (e.g., parenting behavior) and children (e.g., social-emotional functioning).

Children who are delayed early in life often remain behind their same-aged peers throughout their school career and into adulthood (Chetty et al., 2011; Duncan et al., 2007). Additionally, children who demonstrate mental health difficulties, such as internalizing problems or negative emotionality, are at increased risk for mental and physical health problems in adolescence (Jamnik & DiLalla, 2019). Thus, addressing infant mental health and providing early intervention in the preschool years has been identified as one means by which to improve later life cognitive, social-emotional and behavioral outcomes (Anderson et al., 2003; McLuckie et al., 2019). Numerous early intervention programs have been developed over the years, including the federal Head Start Program (Deming, 2009), the Triple P-Positive Parenting Program (Bor et al., 2002), and the Research-Based and Developmentally Informed-Parent (REDI-P) program (Bierman et al., 2018). Each has demonstrated improved academic preparedness and the latter two have demonstrated sustained improved behavioral outcomes in children as well.

Several notable national models including the Nurse-Family Partnership, Safe Care, Healthy Families America, and Home Instruction for Parents of Preschool Youngsters (HIPPY) incorporate evidence-based practices and use home visiting as their primary mode of service delivery (Boller, Strong & Daro, 2010). By meeting parents and families in their homes, these models aim to overcome barriers to participation and create positive change in the social, emotional, mental, and intellectual health of parents and children. During visits, skilled coaches take information and interventions to the family's natural environment and work within their daily occurring context and dynamic to create patterns of behavior that will benefit the infant/young child and family as a whole.

Prior research with HIPPY specifically has demonstrated improved academic readiness in young children at risk (Bradley & Gilkey, 2002; Palladino, 2015) with maintained benefit into mid-elementary school (Bradley & Gilkey, 2002; Brown & Lee, 2014; Nievar et al., 2011). The HIPPY program's efficacy in improving mental health or social-emotional functioning for the parent or child has not been evaluated previously in any systematic manner. Other home-based early intervention programs have

provided evidence of improved social-emotional outcomes in children and parents (e.g., Bierman, Welsh, Heinrichs, Nix, & Mathis, 2015; Chazan-Cohen et al., 2007; Love et al., 2005).

There is a strong rationale that the HIPPY program positively impacts the early mental health and social-emotional functioning of children and families in addition to improving academic readiness. HIPPY places an emphasis on providing peer social support for parents and improving the quality of parent-child interactions, both of which are key components in improving mental health outcomes for children growing up in impoverished environments (Morris et al., 2017). Demonstration of improved social-emotional functioning for participating parent-child dyads would establish a broader purpose for the HIPPY program and a possible mechanism by which home visiting programs at large can reduce disparities and improve mental health outcomes in young children and at-risk families.

The purpose of the current project was to investigate the social-emotional outcomes associated with a peer-based home visiting program by following a cohort of parent-child dyad participants over the course of 1 year. We aimed to evaluate the impact of a parent peer home visitor intervention on parent and child social-emotional outcomes in high-risk families and examine the impact and sustainability of a community-based intervention with peer relationship building by answering the following research questions:

1. Does participation in HIPPY impact parental self-reports of stress, depression, or perceptions of social connectivity?
2. Does participation in HIPPY impact child mental health, including internalizing and externalizing symptoms as well as adaptive functioning?
3. Are outcomes related to participation in HIPPY moderated by parental exposure to trauma during their own childhood and cumulative psychosocial risk factors?
4. Do benefits of participation in HIPPY increase with duration of time in the program?

2 | METHOD

2.1 | Participants

At the beginning of the HIPPY program year, the study team met with HIPPY instructors to explain the consent process and testing procedures. The identified HIPPY program enrolled 358 caregiver/child dyads in the program year with an 86% retention rate of dyads to the end of the program. All families enrolled in the HIPPY program were eligible to participate in this study. If interested, parents provided informed consent and were enrolled in the study during their initial home visit of the program year.

Shortly after the midpoint of the program year, stay-at-home orders were issued in response to the COVID-19 pandemic, which altered the program and data collection. The program rapidly transitioned to contactless delivery of HIPPY materials and phone/virtual visits. At the initiation of stay-at-home orders, peer home-visitors reached out to participating parent-child dyads and offered continued engagement through the program. Packets of the HIPPY educational materials, as well as additional books and activities, were left on doorsteps for those dyads who wanted to continue. Peer home-visitors completed 1750 weekly phone or video calls to check-in on families, review materials, or even guide use of materials after stay-at-home orders were implemented. These weekly check-ins were completed even when families may have been required to quarantine. Endpoint evaluation materials, including an additional measure concerning COVID-19 exposure, were mailed to participants rather than given in person. All measures were provided in the parent's preferred language. The study was reviewed and approved by appropriate Internal Review Board.

2.1.1 | Parent characteristics

One hundred and fifty-seven caregiver/child dyads (43.8% of full HIPPY cohort) consented to the study and completed baseline testing. Some families withdrew from the HIPPY program and the study over the course of the year. Twenty-three families withdrew prior to mid-point data collection and 13 additional withdrew prior to the endpoint, resulting in a 77% retention rate for the study. The HIPPY cohort was diverse in race/ethnicity and primary language (see Table 1). Although 22.9% of the sample did not report their race/ethnicity, 49% of the sample identified as White, 12% as Black/African American, 11.5% as Asian/Pacific Islander, and 4.5% as other. Sixty-five percent of the sample listed Spanish as their primary language. Ninety-eight percent of the parent participants identified as female and 70.7% were married. Most participating caregivers were mothers (95%). Children's ages at baseline testing ranged from 1.85 years to 6.44 years (M = 4.06 years, sd = 1.12 years). A slight majority of children were identified as female (51.6%). Additional demographic information is presented in Table 1.

Intervention description: HIPPY model

The HIPPY model has served families internationally for more than 30 years and is based on four basic principles:

TABLE 1 Demographic characteristics

	Full sample (n = 157 dyads) N (%)	**New (n = 53 dyads) N (%)**	**Returning (n = 104 dyads) N (%)**
PARENT			
Relation to child			
Mother	148 (94.87)	51 (96.20)	97 (94.20)
Father	4 (2.56)	1 (1.90)	3 (2.90)
Grandmother	4 (2.56)	1 (1.90)	3 (2.90)
Highest level of education completed			
Less than high school diploma or GED	44 (28.57)	13 (25.00)	31 (31.40)
GED	8 (5.19)	5 (25.00)	3 (2.90)
High school diploma	33 (21.43)	7 (13.50)	26 (25.50)
Non-college certified/Licensed	7 (4.50)	4 (7.70)	3 (2.90)
Some college	15 (9.74)	4 (7.70)	11 (10.80)
Associate's degree	8 (5.19)	1 (1.90)	7 (6.90)
Bachelor's degree	22 (14.29)	14 (26.90)	8 (7.80)
Master's degree	16 (10.39)	3 (5.80)	13 (12.70)
Doctoral degree	1 (.65)	1 (1.90)	0 (.00)
Marital status			
Single	39 (25.16)	18 (34.00)	21 (20.60)
Separated	3 (1.94)	1 (1.90)	2 (2.00)
Divorced	2 (1.29)	0 (.00)	2 (2.00)
Married	111 (71.61)	34 (64.20)	77 (75.50)
Race/Ethnicity			
American Indian/Alaskan Native	1 (.64)	1 (1.90)	0 (.00)
Asian/Pacific Islander	18 (11.54)	8 (15.10)	10 (9.70)
Black or African American	19 (12.18)	10 (18.90)	9 (8.70)
Multi-racial	3 (1.92)	1 (1.90)	2 (1.90)
White	77 (49.36)	18 (34.00)	59 (57.30)
Other	2 (1.28)	2 (3.80)	0 (.00)
Unknown	36 (23.08)	13 (24.50)	23 (22.30)
Hispanic/Latinx	115 (73.20)	34 (64.20)	81 (77.90)
Primary family language			
English	45 (28.66)	21 (39.60)	24 (23.10)
Spanish	103 (65.61)	30 (56.60)	73 (70.20)
Other	9 (5.73)	2 (3.80)	7 (6.70)
Annual household income			
$0–$20,000	39 (24.84)	14 (26.40)	25 (24.00)
$20,001–$40,000	56 (35.67)	12 (22.60)	44 (42.30)
$40,001–$60,000	25 (15.92)	9 (17.00)	16 (15.40)
$60,001 or more	20 (12.74)	9 (17.00)	11 (10.60)
Not comfortable answering	17 (10.83)	9 (17.00)	8 (7.70)
Employment status			
Full time	36 (22.90)	12 (23.53)	24 (23.30)
Part time	13 (8.30)	4 (7.84)	9 (8.74)
Homemaker	96 (61.10)	31 (60.78)	65 (63.11)

(Continues)

TABLE 1 (Continued)

	Full sample (n = 157 dyads) N (%)	**New (n = 53 dyads) N (%)**	**Returning (n = 104 dyads) N (%)**
Student	2 (1.30)	0 (.00)	2 (1.94)
Unemployed	7 (4.50)	4 (7.84)	3 (2.91)
Type of insurance			
Medicaid	85 (57.43)	25 (50.00)	60 (61.20)
Private	39 (26.35)	15 (30.00)	24 (24.50)
State Children's Health Insurance Program (CHIP)	19 (12.84)	6 (12.00)	13 (13.30)
None	5 (3.38)	4 (8.00)	1 (1.00)
CHILD			
	***N* (%)**	***N* (%)**	***N* (%)**
Gender			
Female	81 (51.60)	29 (54.72)	52 (50.00)
Male	76 (58.40)	24 (45.28)	52 (50.00)
Race/Ethnicity			
American Indian/Alaskan Native	2 (1.28)	2 (3.80)	0 (.00)
Asian/Pacific Islander	18 (11.54)	8 (15.10)	10 (9.70)
Black or African American	18 (11.54)	9 (17.00)	9 (8.70)
Multi-racial	8 (5.13)	1 (1.90)	7 (6.80)
White	73 (46.79)	18 (34.00)	55 (53.40)
Other	2 (1.28)	2 (3.80)	0 (.00)
Unknown	35 (22.44)	13 (24.50)	22 (21.40)
Hispanic/Latinx	115 (73.20)	33 (62.30)	82 (78.80)
	M (SD)	**M (SD)**	**M (SD)**
Age at baseline; years	4.06 (1.12)	5.74 (.94)	4.5 (.94)
Developmental level			
ASQ			
Communication	51.27 (12.54)	46.32 (15.63)	54.22 (9.23)
Gross motor	52.82 (9.72)	51.45 (10.20)	53.62 (9.42)
Fine motor	43.45 (15.29)	36.84 (15.53)	47.31 (13.87)
Problem solving	50.78 (11.69)	46.32 (14.41)	53.38 (8.89)
Personal/Social	50.49 (10.95)	45.26 (13.71)	53.54 (7.54)
PPVT	104.84 (15.90)	100.13 (8.87)	106.42 (17.51)

a) a common curriculum designed to prepare children for entrance to kindergarten using engaging and evidence-based activities;
b) use of prior parent participants as home visitors for new enrollees;
c) use of peer-to-peer modeling and role play to teach parents both educational activities and strategies to engage children; and
d) implementation of curriculum in a natural setting (the home) with weekly support of experienced implementers (home visitors).

The HIPPY curriculum was designed to be easily implemented by the person who knows their child best - the parent. Home visitors deliver a total of 30 activity packets designed for parents to use with their children one-on-one for 15—20 min per day. Together parents work with their three-, four-, or five-year-old child through lessons on colors, shapes, letter, and number recognition and shared-book reading experiences. Rather than targeting just one component of school readiness, the HIPPY program incorporates social-emotional activities, practice with fine and gross motor skills, and opportunities to practice writing

to prepare children for related activities in kindergarten. Other activities involve shared experiences with cooking, drawing, and those designed to promote environments rich in language and literacy.

Unique to the HIPPY model is the employment of prior participants as home visitors and their peer-to-peer implementation. As both parents and peers, these home visitors are prepared to answer questions and empathize with concerns of new parent participants. Experienced home visitors deliver activity packets weekly and practice lessons with parents using a role-play scenario. Here the parent plays the part of their child and completes the activity with the home visitor acting as the parent-teacher. Significant to this method is the insight parents can gain in taking on the part of their child learning a new skill while concurrently observing teaching strategies and engagement techniques modeled by the home visitor, to be applied in future lessons.

2.2 | Measures

2.2.1 | Parent functioning

HIPPY parents complete a demographic questionnaire at the initiation of the program. Parents who participated in the study also completed five additional self-report measures.

2.2.2 | Adverse Childhood Experiences (ACES)

The Adverse Childhood Experiences questionnaire (ACES; Felitti et al., 1998) is a simple reporting of the number of adverse experiences to which one has been exposed over their lifetime. The total score reflects the total number of experiences the individual reported, with higher scores reflecting more trauma exposure. Internal consistency for the measure is reported as a Cronbach's alpha of .88 (Felitti et al., 1998)[1].

2.2.3 | The Center for Epidemiologic Studies Depression Scale - Revised (CESD-R)

The Center for Epidemiologic Studies Depression Scale – Revised (CESD-R; Radloff, 1977) is a 20-item self-report measure of depressive symptoms experienced within the past week. Each item is rated from 0 to 3 in terms of frequency symptoms are experienced (0 = rarely or none to 3 = most or almost all the time). The CESD-R total score combines ratings across all items and can range from 0 to 60, with higher scores reflecting more depressive symptoms. A cut-score of 16 is often used to indicate clinically significant depressive symptoms (Weissman et al,, 1977). The measure's author reports an internal reliability coefficient alpha of .85–.90 (Radloff, 1977.)

2.2.4 | Parenting Stress Index (PSI)

The Parenting Stress Index (PSI), Short Form (Abidin, 2012) is a 36-item norm-referenced self-report measure assessing perception of stress related to parenting and the parent-child interaction. The score used in analyses was the Total Stress Percentile score. Scores between 15 and 80 are considered typical. Scores between 81 and 89 are indicative of high stress and scores above 90 are considered clinically significant. The test author reports a coefficient alpha range of .78 – .88 for subscales in the child domain, .75–.87 for subscales in the parent domain, and coefficients for the combined subscales and the total stress scale were reported to be .96 or above for the long form (Abidin, 2012).

2.2.5 | Social Network Index (SNI)

The Social Network Index (SNI; Treadwell et al., 1993) is a simple 12-item self-report measure of an individual's participation in various specific relationships (e.g., spouse, parents, friends, etc.). The SNI score can range from 0 to 12 and reflects the number of types of social relationships reported by the individual. Prior research has suggested that SNI scores between 1 and reflect low social diversity; 4 and 5 reflect moderate social diversity and 6 and above reflect high social diversity. Authors of this measure have not published Internal validity data.

2.2.6 | COVID-19 Exposure and Family Impact Survey (CEFIS)

Unfortunately, the COVID-19 Pandemic and resultant stay-at-home orders and closures disrupted our planned data collection and program year (e.g., right after the midpoint data collection). To assess for impact of the pandemic on participating families, the COVID-19 Exposure and Family Impact Survey (CEFIS; Center for Pediatric Traumatic Stress, 2020) was administered at the endpoint data collection. The CEFIS includes assessment of both exposure to

[1] All questionnaire data was collected and scored by our community partner, COA HIPPY. This limited our access to item level data precluding our ability to calculate sample-specific Cronbach's alphas. We have instead provided the published statistics for each questionnaire when available.

and impact from COVID-19 related events. Higher scores on the exposure scale indicate exposure to a greater number of COVID-19 related events, and higher scores on the impact scale indicate greater negative impact/higher levels of distress. Although not included in our initial hypotheses, CEFIS data was examined as a possible covariate in changes in both parent and child functioning. Developed using a 'rapid iterative process' during the pandemic, initial measures of internal consistency were .80 for exposure and .92 for impact (Kazak et al., 2021).

2.3 | Child functioning

2.3.1 | Behavior Assessment System for Children (BASC)

Child social-emotional and behavioral functioning was assessed via parent report on the Behavior Assessment System for Children (3rd Edition) (Reynolds & Kamphaus, 2015). This is a ~150 item norm-referenced parent-report questionnaire that assesses the frequency a parent observes behaviors/emotions in their child. The resulting scores examined are T-scores, which have a mean of 50 and standard deviation of 10. The Internalizing Problems (i.e., anxiety, depression, somatization), Externalizing Problems (i.e., hyperactivity, aggression, conduct problems), and Adaptive Skills (i.e., adaptability, social skills, leadership, activities of daily living, functional communication) composite scale scores were examined for the purposes of the current study. On the Internalizing and Externalizing scales, higher scores reflect greater behavioral symptoms and scores above 70 are considered clinically significant. The Adaptive scale is reversed scored such that lower scores reflect greater problems and scores below 30 are considered clinically significant. Cronbach's alpha, a measure of internal consistency, is reported to be .80 or higher for each subscale (Altmann et al., 2018).

2.4 | Analyses

All data were entered into data management software in a deidentified manner and analyzed using SPSS v26. Descriptive statistics were run on all data from the demographic questionnaire and other predictive and outcome variables as necessary to describe the sample (*Table 2*). Associations between demographic and moderator variables (e.g., parental ACES) with the main outcome variables (e.g., BASC, CESD-R, PSI) were examined. Repeated measures ANOVAs were used to explore change in parent and child social-emotional functioning over the course of the program. Specifically, we examined changes on the BASC, CESD-R, PSI, and SNI scales from baseline to endpoint of intervention. Repeated measures ANCOVAs were used to examine the impact of parent trauma exposure on outcomes. Specifically, we examined whether parents' experiences of adverse childhood experiences/trauma (ACES score) moderated the change in parental stress and depression symptoms as well as children's internalizing/externalizing symptoms and adaptive functioning from pre- to post-intervention. Finally, a 3×2 repeated measures ANOVA with *time* as the within subjects factor and *participant status* (new or returning) as the between subjects factor was run to examine the impact of duration of participation on parental and child outcomes. With a sample size of 157 dyads, there was sufficient power to identify moderate effect sizes.

3 | RESULTS

Despite presumed psychosocial vulnerability in the participants based on socioeconomic status and eligibility for the HIPPY program, the sample reported minimal socio-emotional distress at baseline overall. Although there was a significant range in the number of reported trauma experiences (0-14), the mean number of exposures was low ($m = 2.89$, $sd = 3.31$). Participant parents also reported relatively low levels of stress (PSI percentile $m = 37.17$, $sd = 27.17$) and depression (CESD-R $m = 8.37$, $sd = 10.17$) at baseline. Importantly, 3.8% ($N = 6$) of the sample reported clinically significant levels of stress and 19.7% ($N = 31$) of the sample reported clinically significant depressive symptoms. Reported baseline social connection diversity was high with a sample mode number of relationship types of 7 ($m = 6.58$, $sd = 1.75$). Parent participants also reported low levels of behavioral problems in their children. Mean report of baseline child internalizing behaviors (T-score $M = 50.26$, $sd = 9.14$), externalizing behaviors (T-score $M = 48.48$, $sd = 8.95$), and adaptive behaviors (T-score $M = 52.14$, $sd = 8.37$) were all within the normal range and did not reflect any clinical behavioral problems in the sample (see Table 1).

3.1 | Parent psychosocial outcomes

There was a significant change in parent report of stress and social connectivity over the course of the intervention. Consistent with our hypothesis, reported parental stress significantly decreased from baseline to the endpoint, $F(1.87, 205.29) = 5.46$, $P = .006$ and social connectivity significantly increased from baseline to the endpoint, $F(2, 224) = 5.19$, $P < .006$. There was no significant change in self-reported depression symptoms over the course of the HIPPY program, $F(1.91, 211.79) = .49$, $P = .60$, for the full sample. However, there was a statistically significant

TABLE 2 Psychological and behavioral functioning across time

	TIMEPOINT		
	Baseline	Midpoint	Endpoint
MEASURE	M (SD)	M (SD)	M (SD)
PARENT			
ACES	2.89 (3.31)	–	–
PSI	37.17 (27.17)	34.48 (25.48)	30.88 (25.41)
CESD-R	8.37 (10.17)	6.78 (9.39)	7.52 (9.11)
SNI	6.56 (1.79)	6.84 (1.81)	6.83 (1.68)
CHILD			
BASC externalizing	48.48 (8.95)	–	46.49 (8.38)
BASC internalizing	50.26 (9.14)	–	49.25 (9.43)
BASC adaptive	52.14 (8.37)	–	54.33 (8.73)

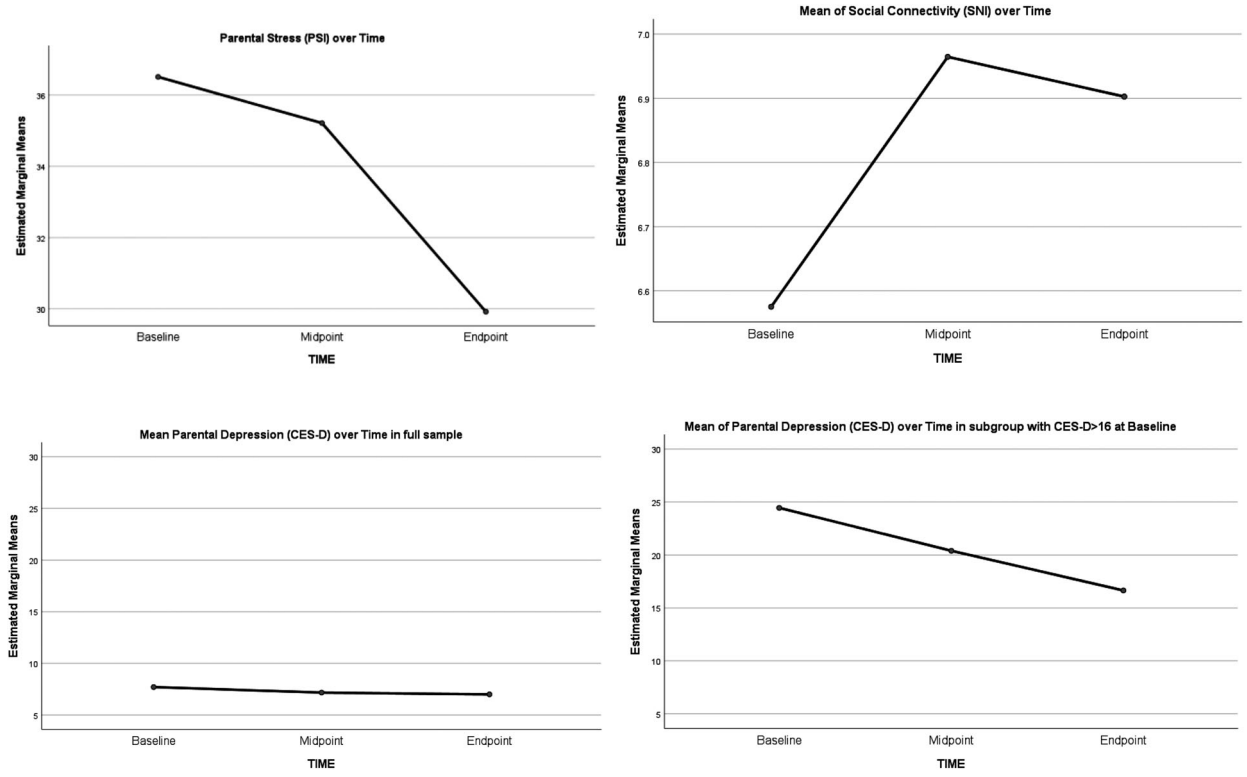

FIGURE 1 Change in parental functioning over course of HIPPY program

decrease in depression over the course of the HIPPY program in the subset of the sample who reported clinically significant depressive symptoms at baseline, $F(2, 38) = 4.24$, $P = .02$ (see Figure 1).

3.2 | Child social-emotional outcomes

There was significant change in parental report of child externalizing, $F(1,97) = 12.24$, $P = .001$, and adaptive, $F(1,97) = 7.59$, $P = .007$, behaviors over the course of the HIPPY program. As hypothesized, report of child externalizing behaviors decreased, and adaptive behaviors improved (see figure 2). There was no significant change in internalizing behaviors $F(1,97) = 2.51$, $P = .117$.

3.3 | Effect of psychosocial risk factors on outcomes

There was no significant effect of baseline ACES score on change in parental reports of depression, $F(1.89, 203.86) =$

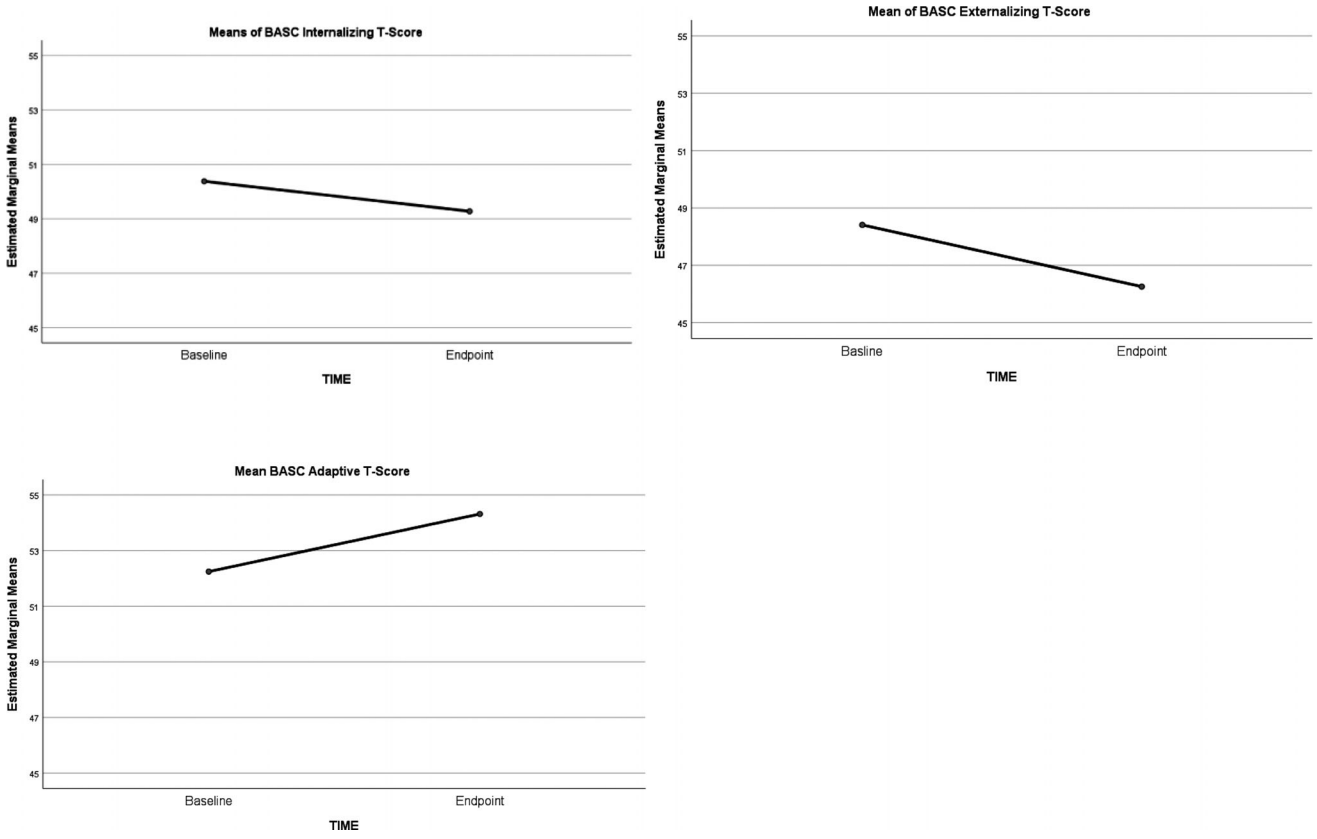

FIGURE 2 Change in child behavioral functioning over course of HIPPY program

1.81, $P = .17$, stress, $F(1.87, 198.12) = .35$, $P = .69$, or social connectivity, $F(2, 216) = .78$, $P = .46$. Baseline ACES score also had no significant impact on change in child externalizing, $F(1, 93) = .001$, $P = .98$, internalizing, $F(1,93) = .91$, $P = .34$, or adaptive, $F(1,93) = .03$, $P = .87$ behaviors.

3.4 | Impact of duration of participation on outcomes

There was a significant interaction effect between *time* and *participant status* for social connectivity, $F(2, 222) = 4.53$, $P = .01$. This reflected greater change over time in the new participants than in the continuing participants (see Figure 3) but there were no differences in group means at baseline, $t(1, 154) = 1.38$, $P = .17$, at midpoint, $t(1, 131) = -.32$, $P = .75$, or at endpoint, $t(1116) = 1.40$, $P = .17$. There was no significant interaction effect between *time* and *participant status* for reported parental stress, $F(1.86, 203.09) = .49$, P = .60, or reported depression, $F(1.90, 209.16) = .73$, $P = .48$.

3.5 | Impact of COVID-19 pandemic

Responses to the CEFIS reflected relatively low stress and impact from COVID-19 in the full sample (see Table 3).

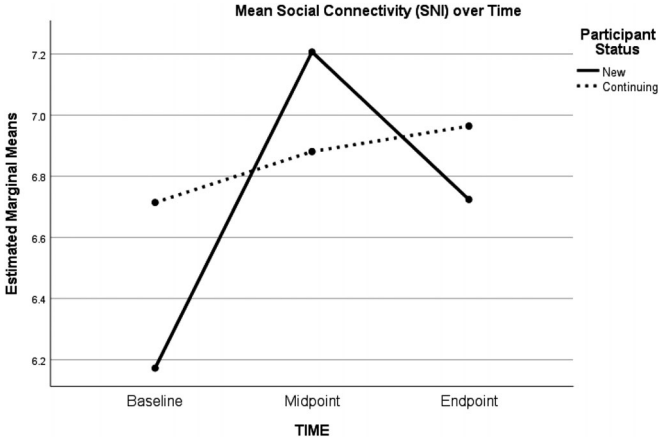

FIGURE 3 Change in social connectivity over time by participant status

There was no difference in reported CEFIS parent distress, $t(107) = -.46$, $P = .65$, child distress, $t(107) = .59$, $P = .56$, exposure, $t(109) = .27$, $P = .79$, or impact, $t(109) = .27$, $P = .79$ based on participant status (e.g., new vs. continuing). As has been reported broadly, there were differential patterns of COVID-19 exposure based on race, $F(3, 79) = 8.98$, $P < .0001$: A Tukey post hoc test revealed that those identifying as Black reported greater exposure than those identifying as Asian, 3.35 ± 1.03, $P = .009$, and those

TABLE 3 CEFIS responses

Scale	Range	Mean (SD)
Parent distress	1–10	5.54 (2.47)
Child distress	1–10	4.83 (2.59)
Exposure	1–20	7.70 (2.75)
Impact	10–56	28.88 ((.93)

TABLE 4 Correlation between CEFIS and baseline ACES Score

		ACES total score ($N = 106$)
CEFIS parent distress	Pearson Correlation	.248
	Sig. (2-tailed)	.010
CEFIS child distress	Pearson Correlation	.262
	Sig. (2-tailed)	.007
CEFIS exposure	Pearson Correlation	.363
	Sig. (2-tailed)	.000
CEFIS impact	Pearson Correlation	.290
	Sig. (2-tailed)	.002

identifying as White had greater exposure than those identifying as Asian, 2.93 ± .75, $P = .001$. There were no differences on reported COVID-19 parent stress, $F(3, 77) = 1.70$, $P = .17$, child stress, $F(3, 80) = 1.40$, $P = .25$, or impact, $F(3, 79) = 2.23$, $P = .09$, based on race/ethnicity, although reported impact approached significance.

We also examined the relationship between our hypothesized moderating variable (ACES) and the CEFIS indices. There were significant positive correlations between all CEFIS scores and baseline ACES (see Table 4). Those with higher baseline ACES score reported greater COVID-19 parent stress, $r(104) = .25$, $P = .01$, child stress, $r(104) = .26$, $P = .007$, exposure, $r(106) = .36$, $P < .0001$ and impact, $r(106) = .29$, $P = .002$.

4 | DISCUSSION

Educational, social-emotional, and health disparities between racial/ethnic groups have been well documented. These disparities unduly impact those children of families living in impoverished environments (Bradley et al., 2001; Halle et al., 2009; Hart & Risley, 1995). Many community programs have been developed to address educational disparities. It is well recognized that a child's academic potential is impacted by their home environment, the parent-child relationship, social-emotional well-being, exposure to adverse/traumatic events, and access to appropriate interventions (Van IJzendoorn et al., 1994; West et al., 2012). Unfortunately, the relationships between these variables and their impact on child and family outcomes is complex and enmeshed (Alexander et al, 1988; Doi et al., 2020).

The aims of the current study were to evaluate mental health and social-emotional outcomes associated with HIPPY, an evidence-based school readiness program for children ages 3—5 years, and examine the impact and sustainability of a community-based intervention with peer relationship building. Participants completing the 30-week home visitation parent peer program demonstrated decreased parental stress and parents reported improved child mental health as evidenced by decreased child externalizing behaviors (e.g., hyperactivity, aggression) and improved adaptive behaviors (e.g., adaptability, social skills). There were no statistically significant changes in overall parental depression, parental social connectivity, or parent-reported child internalizing problems (e.g., depression, anxiety). Although there was not a significant group change in parental depression, there was a significant decline in depression in the subset of participants who reported clinically significant depression symptoms at baseline. Parental history of exposure to childhood trauma was not a significant moderator. Interestingly, participants enrolled in the program for the first time evidenced greater change in social connectivity over time than did those participants who had participated in prior years, but there were no other significant effects based on duration of time in the program.

The current study adds to the existing literature on the effectiveness of the HIPPY program (Bradley & Gilkey, 2002; Brown & Lee, 2014; Nievar et al., 2011; Palladino, 2015) and provides novel evidence that HIPPY positively impacts parents' and children's mental health and social-emotional functioning. Results demonstrate the HIPPY parent peer home visitation model had a broader effect than just improving children's academic readiness and had a positive impact on children's mental health outcomes. The current study's findings are in line with prior research demonstrating that home visiting programs have a positive impact on the mental health and social-emotional functioning of both parents and children (Filene et al., 2013; Sweet & Appelbaum, 2004). These results expand the evidence base for HIPPY specifically as a home visiting program that improves parents' and children's social-emotional functioning in addition to children's academic readiness in at-risk children (Bradley & Gilkey, 2002; Palladino, 2015). There are implications for the implementation of HIPPY in high-risk communities and suggest a broader purpose for the program to promote optimal social-emotional functioning of both parent and child.

Additionally, the current study's findings provide empirical evidence for a community-based intervention that is sustainable with peer relationship building. Prior research

has demonstrated that whether a home visitor was a professional or not did not have a significant effect on parenting or child social-emotional outcomes (Filene et al., 2013). The current study provides support for a parent peer home visitor model of programming to address parent and child mental health and social-emotional outcomes in at-risk families. The emphasis on parent peer relationships utilized by the HIPPY program provides a cost-effective, sustainable community-based intervention as an alternative to more costly interventions implemented by professionals in the community and without placing additional burden on families to obtain needed services (i.e., transportation, insurance coverage, etc.).

Of note was the onset of the COVID-19 pandemic and the associated stay-at-home order that created unexpected circumstances which impacted the current study. The way in which the HIPPY program was delivered changed from in-home to virtual visits by parent peers for the last several months of the program. Despite the onset of significant stress associated with these circumstances, the sample demonstrated exceptional resilience. We added a measure of COVID-19 exposure and impact to our study prior to the end point, which indicated that families reported minimal stress and impact from COVID-19. It is noteworthy that the sample reported a decline in stress and depression in the midst of a global pandemic in which most data collected to date indicate significant increase in social-emotional and psychological problems in the general population (Xiong et al., 2020). Although it is not possible to say that improvement in stress and depression were because these parents were participating in HIPPY, the fact that there was a decline despite the pandemic prior to our endpoint data collection indicates that it was unlikely they were participating in many other interventions or programs at that time. Lastly, although there was no significant decline in report of child internalizing behaviors of indicative of anxiety and depression symptoms, there was also no reported increase. All child social-emotional results are particularly noteworthy again given the onset of the COVID-19 pandemic during which reports of child behavioral and psychological problems have escalated across the country (Marques de Miranda et al., 2020). Some of the federal interventions implemented to minimize the negative financial impact of the COVID-19 pandemic shut down on families, such as the eviction moratorium and the CURES act economic stimulus distributed within the last month of the HIPPY program, may have contributed to reductions in parental stress and depression. However, it also is reasonable to hypothesize that the HIPPY program served as a protective buffer for families against the stress of the COVID-19 pandemic.

Parental experience of childhood trauma or increased psychosocial vulnerability did not appear to moderate the change in parent and child social-emotional functioning over the course of the program. These results should be considered in context of the relatively low mean ACES Score (See Figure 4). It is possible that an effect may have been observed in a sample with greater trauma exposure. However, the lack of an interaction effect also indicates that even those parent-child dyads in whom the parents experienced greater trauma and had greater psychosocial risk benefitted from participation in the HIPPY program.

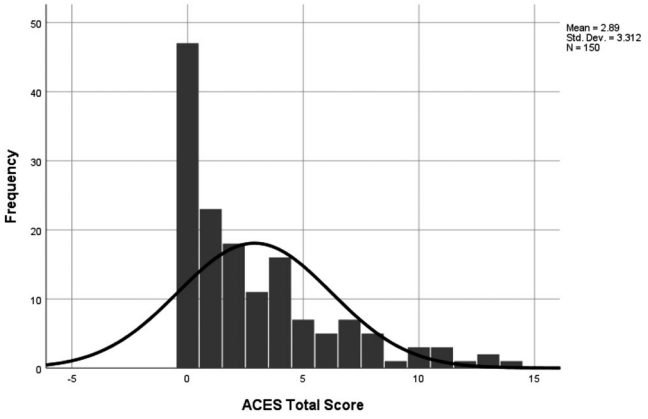

FIGURE 4 Distribution of ACES scores

Another strength of the current study was the relatively high retention rate of participants in the 30-week program. The study had a 75% retention rate over the year, just slightly lower than the 86% retention rate of the prior program year. All but two families who discontinued study participation also discontinued HIPPY program participation. Thus, this sample is representative of a typical HIPPY cohort. This high retention rate is particularly remarkable given the onset of the COVID-19 pandemic and associated change in how the program was delivered (i.e., in-home to virtual). Despite these challenges, three quarters of enrolled families were able to remain engaged and connected to the HIPPY program.

4.1 | Limitations and future research

The participating sample was diverse and generally reflective of the local population. Despite the presumed vulnerability based on socioeconomic status, the participants reported low levels of parental stress and depression as well as child mental health or behavioral problems at baseline. The sample also reported a high level of social connection diversity at baseline. Thus, for the most part the self-report of psychosocial functioning by the participants were all within the normal range at the outset of the program. In some ways, this high level of functioning on most indices

at baseline raises the possibility of a ceiling effect. That is, the parent-child dyads reportedly had little need for improvement in social-emotional functioning. This may be one potential explanation of why there were no significant changes in several of the social-emotional measures over the course of the program year.

There is also the possibility that there is a self-selection bias in the final sample: Those who were experiencing less stress, depression, and isolation were more willing to participate in the study. Another possible explanation is that the parents who persisted throughout the program and completed all endpoint data measures were those that were experiencing less distress and received more benefit from the program than those that dropped out along the way. However, comparison of baseline parental functioning for those that completed the program and those who discontinued early did not show significant differences in parent stress t (1, 153) = -.46, P = .65, parent depression t (1, 154) = -1.34, P = .18, or social connectivity t (1, 154) = .27, P = .79. Future studies examining the effectiveness of HIPPY would benefit from assuring greater variability in the sample's social-emotional functioning and assessing reasons for attrition.

5 | CONCLUSION

Home visiting programs have long been recognized as an effective means by which to improve educational readiness in vulnerable populations. The current project suggests that this type of parent-peer mentorship program may have additional mental health and social-emotional benefits for the participating parent and child dyads. Participants in our sample demonstrated reduced parental stress, reduced child externalizing behaviors and improved child adaptive functioning over the course of the program. Additionally, the subset of parents who reported significant symptoms of depression at baseline demonstrated a decline in depression over time. These results are particularly impressive in that the endpoint data collection occurred following the onset of the COVID-19 Pandemic and resultant stay-at-home orders.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

HUMAN SUBJECTS APPROVAL

This work was approved by the Internal Review Board of the Medical College of Wisconsin (#PRO00035018).

CONFLICT OF INTEREST

We have no conflict of interest to disclose.

ORCID

Jennifer Koop https://orcid.org/0000-0002-4166-6488

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