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Florida HIPPY parents successfully prepare their children for kindergarten

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ABSTRACT

Home Instruction for Parents of Preschool Youngsters (HIPPY) is a home-based intervention for parent engagement and kindergarten readiness. Using a quasi-experimental design, this research sought to determine whether the HIPPY intervention increased children's likelihood of passing the Florida Kindergarten Readiness Screener and being promoted to the first grade. The sample included 730 children, of whom 379 participated in the intervention group (i.e., HIPPY) and 351 were identified for the comparison group using propensity score matching techniques. Among families at risk due to poverty and limited English language proficiency, the odds of passing the Florida Kindergarten Readiness Screener were almost two times greater for children whose parents participated in the HIPPY program and their odds of being promoted to the first grade were five times greater than a matched sample of non-participants. This research provides evidence of a successful HIPPY scale-up in real-world contexts and among a diverse sample. The discussion includes implications for policy and directions for future research.

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1. Introduction

School readiness became a national priority when it was ranked first among the eight goals itemized in the *Goals 2000: Educate America Act (1994)*. This law aimed to ensure “by the year 2000, all children in America will start school ready to learn” (sec.102.1A). This emphasis on children's growth and development before they started formal education was an effort toward increasing equity between groups that historically performed very differently on achievement tests by addressing skills and knowledge gaps early in students' K-12 careers (Rimm-Kaufman & Pianta, 2000). Based on results from model early childhood interventions that showed immediate and long-term benefits for economically disadvantaged children, this law hoped to replicate those effects on a national scale (Magnuson & Waldfogel, 2005).

For the decade following the passage of *Goals 2000 (1994)*, an enormous amount of time and financial resources were expended trying to define and measure the construct of school readiness. School readiness is broadly defined as the academic, cognitive, social-emotional, behavioral, and other developmental competen-

cies needed for school success (Hair, Halle, Terry-Humen, Lavelle, & Calkins, 2006; Sandilos, Whittaker, Vitiello, & Kinzie, 2019). In 2000, however, the results of a survey of early childhood representatives from each of the 50 states indicated that school readiness was determined by children's age alone (Saluja, Scott-Little, & Clifford, 2000). In 2016, Pierson (2018) reported that half of the states had developed a concrete definition of kindergarten readiness, another six states were in the process of developing a definition, and the majority of states implemented a formal kindergarten entry assessment.

Kindergarten Entry Assessments or Kindergarten Readiness Assessments (KEAs or KRAs) were meant to inform policy makers and stakeholders of the supports and services young children need prior to kindergarten and to maximize learning opportunities (Daily & Maxwell, 2018). However, KEAs and KRAs are now more widely used as a screening or diagnostic tool, a high stakes determinant of school readiness, and to evaluate kindergarten readiness programs (Bagnato & Ho, 2006). The ongoing problem is that test success is highly correlated with parental income, favoring children from economically advantaged homes.

The income disparities in performance on standardized tests of academic achievement have been difficult to narrow despite national efforts (Reardon, 2011). Reardon and Portilla (2016) report the gap in performance by kindergarten students from high- and low-income families was roughly 1.25 standard devi-

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ations in 1998, which persisted as children progressed through school. Another report estimated that fewer than half (48%) of children from low-income families have the academic and social-emotional skills needed to be considered ready for school at age five, compared to 75% of children from moderate- or high-income families (Isaacs, 2012). Closing the gap early, before children start school, has become a national priority and an elusive goal.

When children do not test “ready for kindergarten,” schools either make provisions for remediation or recommendations to parents on alternatives for their child besides starting school at the same time as children who passed the test. Nationally, the three most common alternatives to entering kindergarten on time are academic redshirting, retention, and transition classes (Carlton & Winsler, 1999). Delaying the start of kindergarten by one year, or redshirting, is an option in cases where children may have the academic knowledge and skills but may benefit from an additional year of maturation. Retention is the act of repeating a year in school that has already been completed and is most often recommended when children have not mastered the academic skills needed for success in kindergarten. Transition classes are offered where they are available and, like retention, provide an opportunity to master important early learning skills; but unlike retention, classes are held in a new classroom with a new teacher and may include several other children not yet ready for the demands of kindergarten. After almost two decades of research, there is inconclusive evidence of any academic advantage for children whose parents choose one of the aforementioned alternatives (for a more thorough review, see Carlton & Winsler, 1999).

Many factors contribute to a child’s readiness for formal schooling, but none has been more firmly established than the association between family socioeconomic status and student achievement (Bowles & Gintis, 2002; Brooks-Gunn & Duncan, 1997; Coleman et al., 1966; Duncan & Brooks-Gunn, 2000; Duncan, Brooks-Gunn, & Klebanov, 1994). The causes and mechanisms of this relationship have been the focus of much research, with parenting style and the home learning environment accounting for as much as 50% of the school readiness gaps (Brooks-Gunn & Markman, 2005; Gershoff, Aber, Raver, & Lennon, 2007). Nurturing parenting styles and high-quality interactions are associated with better performance on measures of pre-literacy and pre-math, both of which are correlated with household income (Hirsh-Pasek et al., 2015). Early research also highlights parents’ lack of understanding of the body of skills and knowledge that make a child “ready for school” (Piotrkowski, Botsko, & Matthews, 2000; West, Hausken, & Collins, 1993). For this reason, parent education programs have become an important intervention strategy for improving children’s well-being.

Parent education programs allow social workers, nurses, or other trained home visiting practitioners to deliver support, resources, and information to parents and families. Home-based programs, also known as home visiting programs, are one approach to delivering parent education. Delivering parent education in the home has shown to have higher parent participation than other models delivering parent education (Nievar, Van Egeren, & Pollard, 2010). Nievar and colleagues’ meta-analysis reports on three types of home visiting programs with a focus on changing parenting behaviors to improve child outcomes: improvement of maternal life-course outcomes, promotion of children’s health, and early childhood education. Their research found that intensive programs, defined as programs with at least three visits per month, were more than twice as effective as were less-intensive programs. In addition, home visiting programs using paraprofessionals as service providers were similarly effective as those using nurses or mental health professionals. HIPPY is one intensive home visiting model that uses paraprofessionals who partner with par-

ents to prepare their children for success in school (HIPPY USA, 2020).

1.1. The HIPPY program

HIPPY originated in Israel more than 50 years ago and was designed to acclimatize marginalized groups by providing parents with one-to-one training, support, and curriculum that would prepare young children for school. HIPPY sought to address the needs of both parents and their children and to remove any barriers to families’ successful integration into the school communities. Today, HIPPY is a home-based, parent involvement and kindergarten readiness program that targets families and communities with children who are most at risk for school readiness delay (HIPPY USA, 2020). At-risk families include those living in poverty, with limited education, and who speak English as a second language. National trainers administer a test of model fidelity each year to ensure adherence to the four essential features of HIPPY: (1) a 30 week, evidence-based curriculum at each of the two-, three-, four-, and five-year-old levels; (2) a professional site coordinator and paraprofessional staff; (3) a unique role play method of instruction and curriculum delivery; and (4) weekly one-hour home visits and monthly group meetings (HIPPY USA, 2020). Currently, HIPPY operates in 10 countries and nationally serves approximately 14,000 families in 119 communities located in 19 United States and the District of Columbia (HIPPY USA, 2020).

A large body of qualitative and quantitative research exists in support of the HIPPY program’s efficacy and effectiveness. A meta-analysis of 26 studies from seven countries that used an experimental design to evaluate the HIPPY intervention found an overall weighted effect size of $d=0.54$ on child-level outcomes immediately following the intervention, which decreased slightly to $d=0.44$ one or more years following the intervention (Goldstein, 2017). Looking at specific outcomes, HIPPY has medium (Cohen, 1988), substantive effects when measured just following the intervention for language ($d=0.64$), math ($d=0.50$), and behaviors ($d=0.62$). Among studies that included a follow up one or more years after the intervention, the effect sizes decreased for language ($d=0.30$), math ($d=0.44$), and behaviors ($d=0.30$), but HIPPY’s effect on participants remained significant and substantive.

Goldstein’s (2017) meta-analysis of HIPPY research included 14 studies conducted in the USA between 1999 and 2015. Since 2015, there have been several publications referencing the national HIPPY home visiting model and three studies reporting new findings on the effect of participating in HIPPY. A study by Brown and Lee (2017) based on a small sample of Head Start children found evidence that children enrolled in Head Start and HIPPY were better prepared for school than children who only participated in Head Start alone. A second study examining the long-term effects of HIPPY among 254 mostly low-income, Latino families found participation in HIPPY predicted higher academic achievement through the fifth grade (Nievar, Brown, Nathans, Chen, & Martinez-Cantu, 2018). The third and most recently released study found significant associations between HIPPY home visiting and mothers’ reports of parenting self-efficacy, parent-child closeness, and parent engagement in education among a mostly Latino, inner-city population (Nathans, Nievar, & Tucker, 2019). The positive effects reported in or after the meta-analysis summarizing research on the HIPPY program did not include any published research from the Florida HIPPY program; thus, the relative impact of the Florida HIPPY program is unknown.

1.2. The current study

Given the emphasis placed on research linking early childhood interventions with school success, social mobility and high rates of

return to society, policy makers, researchers, and stakeholders are interested in the implementation and growth of evidence-based interventions (Morris, Wooding, & Grant, 2011). Many evidence-based interventions have demonstrated strong effects in one condition, then failed to show similar effects when services were expanded in the same population, replicated in new locations, or adapted for different populations (Aarons, Sklar, Mustanski, Benbow, & Brown, 2017).

The mission of HIPPY is to partner with parents to prepare their children for school. In the state of Florida, HIPPY has been operating for 30 years. To date, there has been no published empirical study on the implementation and impact of HIPPY programs in Florida. The current study adds to the existing body of literature by evaluating Florida's implementation of the HIPPY intervention, as evidenced by children's likelihood of passing Florida's kindergarten readiness test and on-time promotions to the first grade. Moreover, this study adds to the research literature about the HIPPY intervention and examines the effects for a different and more diverse population of participants than those included in previously conducted research.

1.3. Research questions

The research questions of interest are:

1. Does participating in a Florida HIPPY program increase the likelihood of children from low-income households passing the Florida Kindergarten Readiness Screener?
2. Does participating in a Florida HIPPY program increase the likelihood of children from low-income households being promoted to the first grade?

2. Method

2.1. Data sources

Data for this study were obtained from two sources: Florida HIPPY Participant Information form and the school administrative dataset maintained by the Florida Department of Education (FLDOE). At the time families applied to a HIPPY program in Florida, they completed the Florida HIPPY Participant Information form which asked for information about the family and child. In addition to providing demographic information and documentation verifying eligibility for Temporary Assistance for Needy Families (TANF), parents and guardians were asked for their consent to allow the FLDOE to provide authorized representatives of the Florida HIPPY program with academic data on the participating child upon school entry.

2.2. Study design

The study consisted of a quasi-experimental design to compare the outcomes of children who had formally participated in HIPPY (i.e., the intervention group) to a matched sample of children who had not participated in HIPPY (i.e., the comparison group). Because students were not randomly assigned to the groups, the propensity score method was used to control for initial differences across multiple background characteristics and baseline variables (Rosenbaum & Rubin, 1984). The propensity score technique is used for group equivalence when participants are initially assigned to different conditions as well as in observational studies when subjects cannot be randomly assigned to different groups. For this study, the propensity score technique was chosen for several reasons: (a) randomization at an individual level was not possible because of the nature of the intervention (i.e., intervention was implemented for all qualified families); (b) as Rosenbaum and Rubin (1983) noted, the propensity score balances participants in

different intervention conditions on pre-intervention covariates; and (c) as indicated by McCaffrey, Ridgeway, & Morral (2004), propensity score methods account for differences between treatment and control groups by modeling the selection process.

The propensity score was calculated using logistic regression to obtain the predicted probability of being in the intervention group (Rosenbaum & Rubin, 1984). Propensity scoring yields a single composite score and, therefore, allows for a sensible estimation of treatment vs. control effects (McCaffrey et al., 2004; Rosenbaum & Rubin, 1984). The aim of this matching technique models the controlling of differences in child characteristics. Rubin and Thomas (1996) and Rubin (1997) advise that all variables presumptively related to outcome, even if weakly so, should be included in the equation. Because sociodemographic characteristics are believed to be among the most important covariates that might affect outcomes, race and ethnicity, gender, and age were included in the calculation of the propensity scores. In addition, eligibility for reduced or free lunch, academic year, and the county in which the child attended school were included as covariates. Because Florida counties differ on a variety of important indicators, including the percentage of children living in poverty, the median county income, and the per capita crime rate, it was important to include a county variable to account for these differences.

As a result, all children in the database provided by the FLDOE ($N = 21,150$), which contained HIPPY participants and a pool of non-participant children to select the matched sample group, had an estimated probability of being in the intervention group. After the propensity score was calculated, all cases were ranked according to their predicted value obtained from a logistic regression analysis. Because of the large number of cases available to choose for selecting a comparison group, cases were matched using the nearest neighbor technique (Dehejia & Wahba, 2002), in which each child in the intervention group is paired with the child from the comparison group who has the propensity score closest in value. After matching was completed, the intervention and the comparison groups were checked for balance on the child characteristics included in the calculation of propensity score. No significant differences between groups were found when the groups were examined on each of the covariates (i.e., child characteristics) included in the propensity score.

2.3. Participants

Five hundred seventy-three children from 12 HIPPY programs in Florida had a valid informed consent and were age-eligible for kindergarten entry in the fall of 2013. Of the 573 children, 379 children had no missing data on any variable used to calculate propensity scores. The full sample ($N = 730$) was comprised of 379 HIPPY participants and a comparison group of 351 children matched with the HIPPY participants. All children in the full sample were (a) from the 12 Florida counties where a HIPPY Program was available; (b) eligible for the federal free and reduced lunch program; and (c) tested within the first 30 days of kindergarten entry in 2013 for the 2013–2014 academic school year. Of these children, 49% were male. The average age was 5 years ($M = 5.47$, $SD = 0.33$). Most children (43%) were Hispanic, an additional 40% were African American, 12% were non-Hispanic White, 3% were Asian, and the remaining 2% represented other racial and ethnic groups (see Table 1).

2.4. Outcome measures

State of Florida law directs the FLDOE to establish a kindergarten readiness screening based upon the performance standards adopted by the Department of Education. In accordance with Florida law, each school must administer a kindergarten readi-

Table 1
Description of sample (N = 730).

	HIPPY (N = 379)	Comparison group (N = 351)	Full sample (N = 730)
Age at kindergarten entry	5.45(SD = 0.35)	5.48 (SD = 0.33)	5.47 (SD = 0.33)
Gender (male)	187 (49%)	171 (49%)	358 (49%)
Race and ethnicity			
Other ^a	14 (3%)	6 (2%)	20 (3%)
White	44 (12%)	42 (12%)	86 (12%)
African American	146 (39%)	143 (41%)	289 (39%)
Hispanic	160 (42%)	153 (43%)	313 (43%)
Asian	15 (4%)	7 (2%)	22 (3%)
Eligibility for reduced or free lunch	379 (100%)	351 (100%)	730 (100%)
Academic year 2013	379 (96.6%)	339 (96.3%)	64 (96.4%)
County			
Alachua	12 (3.2%)	12 (3.4%)	24 (3.3%)
Bradford	10 (2.6%)	9 (2.6%)	19 (2.6%)
Broward	20 (5.3%)	20 (5.7%)	40 (5.5%)
DeSoto	7 (1.8%)	0 (0%)	7 (1.0%)
Escambia	1 (0.3%)	0 (0%)	1 (0.1%)
Hillsborough	57 (15.0%)	55 (15.7%)	112 (15.3%)
Lee	2 (0.5%)	1 (0.3%)	3 (0.4%)
Manatee	8 (2.1%)	8 (2.3%)	16 (2.2%)
Marion	34 (9.0%)	34 (9.7%)	68 (9.3%)
Miami-Dade	67 (17.7%)	61 (17.4%)	128 (17.5%)
Palm Beach	66 (17.4%)	66 (18.8%)	132 (18.1%)
Pinellas	93 (24.5%)	85 (24.2%)	178 (24.4%)
Sarasota	2 (0.5%)	0 (0%)	2 (0.3%)

^a Note. The reference group for race is other race and ethnicity.

ness screening to all kindergarten students in the school district within the first 30 school days of each school year. Academic school year 2013–2014 was the eighth year for which the FLKRS was administered to assess the readiness of each child for kindergarten (FLDOE, 2013). In each district, the District Coordinator is responsible for the overall administration of FLKRS (FLDOE, 2013). District Coordinators are responsible for providing training to school test administrators in order to ensure a valid and uniform administration of the FLKRS screening instruments. District Coordinators, or their designees, participated in the train-the-trainer training conducted by the Florida Center for Reading Research, and in turn, were responsible for ensuring all test administrators (i.e., teachers) are trained to administer the FLKRS.

In 2013–2014, the FLKRS was comprised of two instruments: (1) The Florida Assessments for Instruction in Reading–Kindergarten (FAIR-K) and (2) The Early Childhood Observation System (ECHOS)TM. Teachers were expected to plan activities, many of them prescribed by the assessment tools, that allowed them to observe children in context and answer questions about their skills and behaviors within the first 30 days of kindergarten. Both instruments, according to FLDOE guidelines, were administered in English to all children. For a child to be characterized as ready-for-school, he or she had to meet the conditions for passing both the FAIR-K and ECHOS.

As outlined in Florida law, if children did not pass both of the assessments that compose FLKRS, they were to receive explicit and systematic reading intervention during their kindergarten school year. At the end of kindergarten, as with subsequent grades, parents of students who were not performing at grade-level were notified and included in discussions between teachers and administrators about how to address children's needs, which included more intensive interventions, Individualized Education Plans, remediation, and retention practices.

2.4.1. FAIR-K

In 2013–2014, the Broad Screen and Broad Diagnostic Inventory from the FAIR-K were used to gather information on a child's development in emergent reading. The Broad Screen is comprised

of a letter naming task and a phonemic awareness task. The Broad Diagnostic Inventory is comprised of a vocabulary task and a listening comprehension task. The FAIR-K was developed using item response theory and subjected to rigorous psychometric testing to ensure high reliability and validity. The assessment provided a score between 1% and 99% that estimated students' probability of reading at or above their grade level by the end of the school year. Children who scored at the 67th percentile or higher on the FAIR-K met the first condition for school readiness (FLDOE, 2013).

2.4.2. ECHOS

ECHOS (Pearson Education, Inc., 2007) is an observational measure that reflects national standards for children's learning and development in seven domains: language and literacy, mathematics, social and personal skills, science, social studies, physical development and fitness, and creative arts. The instrument had high construct validity for the prekindergarten scale as established by the Stanford Achievement Test Series, strong test-retest reliability, and a high level of internal consistency (as reviewed by Dickinson & Neuman, 2007). For each domain, teachers observe children's behavior relevant to specific benchmarks and rate children's progress on that benchmark as 1 = Not Yet Demonstrating, 2 = Emerging/Progressing, or 3 = Demonstrating. The average score across domains was obtained and children whose final score of 2 or higher met the second condition for school readiness (FLDOE, 2013).

2.4.3. Kindergarten readiness

In order to be considered ready for kindergarten, the conditions for passing scores on both the FAIR-K and the ECHOS needed to be met. A dichotomized variable for kindergarten readiness was created and was coded as 1 (kindergarten ready) if both conditions were met, and 0 (not ready for kindergarten) if at least one of these two conditions was not met.

2.4.4. Promotion to the first grade

A dichotomized variable was created identifying whether the child was promoted to the next grade level at the end of the academic year and it was coded as 1.

2.4.5. Attendance

Attendance was defined as the number of days the child attended school during the 2013–2014 academic year.

2.5. Predictor variables

A variable that identified the group (i.e., HIPPY or the comparison group) was the independent variable of interest. Covariates included in the models were the following children's sociodemographic characteristics: age at the beginning of the academic year; gender; and race and ethnicity categorized into African American, Caucasian, Hispanic, Asian, and Other.

2.6. Analytical approach

To answer the research questions, statistical analyses consisted of chi-square tests of significant differences between proportions of children in each condition who (1) passed the ECHOS, (2) met the conditions for kindergarten readiness, and (3) were promoted to first grade. These tests were followed by analysis of variance (ANOVA) tests of significant differences between mean scores of children in each condition on the FAIR-K. After it was determined that there were statistically significant differences by group, one multiple regression and three logistic regression analyses were performed to assess the magnitude of the effect. Multivariate logistic regressions were used to calculate odds ratio to estimate the likelihood of being promoted to first grade and being kindergarten ready for each predictor.

2.7. Missing data

Little's (1988) Missing Completely at Random (MCAR) test was conducted to ensure missing data were unrelated to outcomes. Results were non-significant, indicating that missing values of study variables represented a random subset of cases and there was not a systematic or selective attrition pattern, $\chi^2(573) = 0.822$, $p = .364$. As indicated by Kang (2013), if the assumption of MCAR is satisfied, a listwise deletion is known to produce unbiased estimates and conservative results. Considering that we had a sufficient sample size, we chose to use listwise deletion for handling missing data.

3. Results

3.1. FAIR-K

The first criterion for passing FLKRS was achieving a 67% or above on the FAIR-K. The results of the multiple regression analysis indicated there were significant group and gender effects. Specifically, girls had higher scores on the FAIR-K test, and children who participated in the HIPPY program scored higher than children who did not participate in HIPPY. Participation in HIPPY explained almost 7% of the variation in FAIR-K scores. Neither children's age nor race and ethnicity were correlated with children's FAIR-K probability of reading success (see Table 2).

3.2. ECHOS

The second criterion for passing FLKRS was to achieve a D (Demonstrating) or E/P (Emerging/Progressing) on the ECHOS. The results of the multivariate logistic regression model estimating the

Table 2

Summary of multiple regression analysis for FAIR-K probability of reading success ($N = 689$).

Variable	B	SE B	β
Group	7.86*	1.91	0.15
Child age	1.45	2.91	0.02
Child gender	-4.22*	1.91	-0.08
Child race ^a			
White	9.19	6.34	0.12
African American	1.22	5.92	0.02
Hispanic	-5.86	5.90	-0.11
Asian	4.16	7.98	0.03

Note.

^a The reference group for race is other race and ethnicity.

* $p < .05$.

$R^2 = .069$.

Table 3

Summary of multivariate logistic regression analysis for ECHOS ($N = 647$).

	B	Wald $\chi^2(1)$	OR	95% CI
Age	-0.61	2.20	0.54	[0.24, 1.22]
Gender	-0.82	8.28*	0.44	[0.25, 0.77]
African American**	-1.07	4.49*	0.34	[0.13, 0.93]
Hispanic	-1.12	5.01*	0.33	[0.12, 0.87]
Group	0.71	6.43*	2.03	[1.17, 3.51]

Note. OR = odds ratio; CI = confidence interval.

* $p < .05$.

** The reference group for race is White, Asian, and other race and ethnicity.

Table 4

Summary of multivariate logistic regression model for kindergarten readiness based on both ECHOS and FAIR-K ($N = 730$).

	B	Wald $\chi^2(1)$	OR	95% CI
Age	-0.03	0.02	0.97	[0.61, 1.55]
Gender	-0.41	6.82*	0.67	[0.49, 0.90]
African American**	-0.89	12.87*	0.41	[0.25, 0.67]
Hispanic	-1.39	32.09*	0.25	[0.16, 0.40]
Group	0.51	10.86*	1.67	[1.23, 2.27]

Note. OR = odds ratio; CI = confidence interval.

* $p < .05$.

odds of passing the ECHOS assessment indicated effects for race and ethnicity, group, and gender. The odds of passing the ECHOS assessment for children who participated in HIPPY were two times greater than for children with similar characteristics who did not participate in HIPPY (OR = 2.03, $p < .05$). Age was not associated with passing the ECHOS, but the odds of passing the ECHOS for girls were 44% greater than for boys and the odds of passing for children in the racial and ethnic reference group (i.e., White, Asian, or Other Race and Ethnicity) were 33% and 34% greater than for Hispanic and African American children, respectively (see Table 3).

3.3. Kindergarten readiness

The results of the multivariate logistic regression analysis estimating the odds of testing ready for kindergarten indicated that there was a significant association between group and passing the FLKRS (both the FAIR-K and ECHOS). The odds of passing the FLKRS for children who participated in HIPPY were almost two times greater than for children who did not participate in the HIPPY intervention (OR = 1.67, $p < .05$). In addition, race and ethnicity as well as gender were significantly associated with kindergarten readiness. The odds of girls testing ready for kindergarten were 49% greater compared to boys. In contrast, the odds of African American and Hispanic students' failure to test kindergarten ready were respectively over two times and over four times greater compared to Caucasian students (see Table 4).

Table 5
Summary of multivariate logistic regression model for first grade promotion status (N = 710).

	B	Wald $\chi^2(1)$	OR	95% CI
Age	−0.79	4.36*	0.46	[0.22, 0.95]
Gender	−0.42	2.57	0.66	[0.40, 1.10]
African American**	0.44	1.74	1.55	[0.81, 2.98]
Hispanic	0.73	4.51*	2.07	[1.06, 4.05]
Group	1.61	28.11*	5.00	[2.76, 9.08]

Note. OR = odds ratio; CI = confidence interval.

* $p < .05$.

3.4. Promotion and attendance

The results of the multivariate logistic regression analysis estimating the odds of being promoted to the first grade in the year following kindergarten indicated that the odds of being promoted were five times greater for children who participated in the HIPPY program compared to children who did not participate in HIPPY (OR = 5.0, $p < 0.5$). Promotion to the first grade was the only outcome associated with age. Interestingly, older children were less likely to be promoted. Also, the odds of being promoted on time for children of Hispanic ethnicity were two times greater than those in the reference group (see Table 5). No significant differences were found between HIPPY students and the comparison group regarding the average number of school days attended.

4. Discussion

HIPPY has operated programs internationally and nationally for decades. There is a large body of published research on the effects of participating in this home visiting and school readiness intervention for children, parents, and families. Of the published research on HIPPY, the effects of the Florida HIPPY program is unknown. Given the growing emphasis and interest in early childhood interventions and home visitation models as a means of supporting families, Florida HIPPY sought to examine whether the HIPPY intervention increased children's likelihood of passing Florida's Kindergarten Readiness Screener and being promoted to first grade.

To examine these questions, this quasi-experimental study used data from the FLDOE and propensity scoring methods to compare kindergarten and first grade outcomes of 730 children from low-income homes across the state of Florida, 379 children who had participated in the HIPPY program for varying lengths of time with a matched sample of 351 children. The results of this study found participation in the HIPPY program significantly increases children's odds of meeting the criteria for Kindergarten Readiness and being promoted to the first grade on time. These results corroborate existing evidence of the HIPPY model's effectiveness, but also quantify its effects. Children from families at risk due to poverty and English language proficiency were 1.67 times more likely to pass Florida's Kindergarten Readiness Screener and exactly five times more likely to be promoted to the first grade.

This study used a different measure for evaluating children's academic success compared to the meta-analysis summarizing HIPPY research (Goldstein, 2017). However, this research substantiates the overall findings of the meta-analysis by demonstrating a significant impact of the HIPPY intervention on participants' academic outcomes. The impact remains evident at the end of the kindergarten year. In contrast to the findings described in the HIPPY meta-analysis (Goldstein, 2017), this study did not find significant differences between HIPPY and non-HIPPY participants' attendance. This may be attributed to differences between the Florida sample and samples included in the meta-analysis.

4.1. Secondary findings between covariates and outcomes

While the relationships found between outcomes and covariates do not answer the study's primary research questions, there are significant associations that can inform directions for future research. For example, gender was significantly associated with children's probability of reading success, passing the ECHOS, and passing the FLKRS, in favor of female students. Research by Matthews, Morrison, & Cameron (2009) reviewed early gender differences in self-regulation and academic achievement. They report that while the gender effect on school readiness is inconclusive, there is substantial evidence of a gender effect on self-regulation at school entry, favoring girls, and equally compelling evidence of a gender effect on academic achievement in late elementary school. Their research suggests the two are related. The secondary finding that gender was related to both outcome measures used to determine school readiness lends weight to their hypothesis.

Promotion to first grade was the only outcome correlated with age, but in an unexpected direction. The older children in the sample were less likely to be promoted to the first grade. While all Florida HIPPY programs assess children using developmental screeners and cognitive assessments, no child is excluded from services because of cognitive, social, developmental delay or disability. It is possible that the older children in the HIPPY sample were children with such challenges. It is also possible that the older children were children who had been previously retained or red-shirted and were now demonstrating challenging behaviors that hindered their promotion to the first grade. Both theories warrant further investigation.

Race and ethnicity were not significantly associated with scores on the FAIR-K probability of reading success, but were significantly associated with passing the ECHOS. This finding suggests it is ECHOS that accounts for the negative association between race and ethnicity and passing the FLKRS. African American and Hispanic students were less likely to test kindergarten ready, although Hispanic children were two times more likely to be promoted to the first grade than those in the reference group (i.e., White, Asian, and other). These findings correspond with research reported by Winsler, Kim, & Richard (2014) in which Spanish-speaking preschoolers with greater initiative, self-control, and attachment and fewer behavior problems at age four were more successful in obtaining English proficiency by the end of kindergarten compared to those initially weaker in these skills. The researchers concluded that greater facility in Spanish at age four predicted the attainment of English proficiency. The HIPPY curriculum has been translated into several other languages besides English, but all Florida HIPPY programs deliver the curriculum in either English or Spanish. This finding demonstrates that promoting literacy in either language is advantageous to later school success. Furthermore, this finding highlights a need for states who have legal mandates to administer KRAs to include Spanish-language assessments in the mandate in order to accurately gauge the knowledge of Spanish-speaking English Language Learners at the beginning of kindergarten.

4.2. Implications for policy and future research

Considering the large public investment in early childhood education and home visiting programs, it is prudent to examine which types of publicly funded programs are most effective at preparing children for school. The Florida HIPPY program has maintained substantial public support from state legislators and from community agencies who have heard firsthand reports from past and present HIPPY families about program effects; however, these are the first quantitative analyses published to validate that support.

It is noteworthy that the current findings emerge from 12 distinct HIPPY sites from across Florida. It is not uncommon to find

programs with strong effects in tightly-controlled settings that have lost their significance or lost the strength of their effects once scaled up to serve a larger number of participants in one context or scaled out to serve diverse participants in differing contexts. This research demonstrates a successful scale up and the replicability of the program model.

This research focuses only on child-level outcomes, but there are other levels to explore. Future directions for research should include evaluating the HIPPPY effect at the parent-family level, among home visitors, and in communities where participation is dense. Moreover, it is important to investigate what might be the most important feature or combination of features that make HIPPPY a successful home-based intervention model. Given both the evidence provided in this study and the growth in home visiting programs as a service delivery system for parent interventions, it would be valuable to learn how to achieve participation and engagement among families who do not self-select into the intervention.

4.3. Limitations

This study has several limitations that bear discussion. The first limitation is that parent and family dynamics were not available for inclusion in the model. The theoretical model of change suggests that the effect of HIPPPY on children's outcomes is mediated by parent behaviors. The results of this study demonstrate a direct effect of participation in HIPPPY on children's school readiness and first grade promotion; therefore, future research should include parent data to test its mediating effect. The second limitation, related to the first, is that participants self-select into the intervention by volunteering to work weekly with home visitors, then deliver instruction and curriculum to their own children. This level of commitment could be indicative of qualitative differences not accounted for in the propensity score. A third limitation is the possibility that the comparison group included those who had the program offered to them but declined to participate. A fourth limitation is the absence of information on the additional program interventions in which children participated. Data on whether children were enrolled in Voluntary Prekindergarten or Head Start/Early Head Start would have lent greater accuracy to the propensity score estimate. A fifth limitation is the absence of information on dosage. Children in the HIPPPY sample were children whose parents enrolled in the program but could have failed to follow through on delivering the intervention to children as intended or could have dropped out of the intervention at any time. Including a variable on the number of hours a parent spent with the child doing enrichment activities or the number of years that parents had delivered HIPPPY curriculum to any of his or her children would have provided a better estimate of HIPPPY's child-level effectiveness. Finally, educational administrative data provided information on eligibility for free or reduced-price lunch recorded as one variable and this study did not include specific tests that examine program effectiveness across subgroups.

5. Conclusion

HIPPPY is an evidence-based intervention that was initially developed for immigrant populations. Prior research has shown positive effects by participation in HIPPPY, but none included effects by the Florida HIPPPY program. The current study shows significant differences between children from low-income families whose parents enrolled in HIPPPY as compared to a matched sample. Children who participated in the HIPPPY program prior to kindergarten were found to be more likely to pass the school readiness assessments and to be promoted on time to the first grade. The results suggest partici-

pation in HIPPPY benefits children living in low-income households, the HIPPPY model is an effective strategy for preparing children for school, and that the effects are replicable and scalable.

Authors contribution

Tracy Payne: project administration, writing – original draft; Ruby Joseph: investigation, validation; Svetlana Yampolskaya: data curation, formal analysis; Angela Vatalaro: data curation, writing – review & editing

Declarations of interest

None.

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