Family Participation and Involvement in Early Head Start Home Visiting Services: Relations with Longitudinal Outcomes

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Introduction

Home visiting is an intervention approach widely used to provide individualized services to families living in poverty and children facing risks for poor development. Home visiting programs are typically designed to promote child health and developmental outcomes by preventing child maltreatment, increasing parent support of learning and development, or both (PEW Center on the States, 2010). The research literature on home visiting is growing but remains limited regarding within-program variations in home visiting services, either descriptively or in relation to longitudinal outcomes for children and families enrolled in these programs.

While the broad goals of home visiting programs are often similar, the staff and services vary. For example, the training and practices of home visitors often reflect the goals of the agency providing services, with somewhat more emphasis on promoting safe physical care in health-oriented home visiting programs and more on promoting developmental support in education-oriented programs. Further, home visitors are commonly trained as nurses, teachers, or social workers, while some programs employ community members as home visitors without requiring specific professional preparation. Finally, families themselves may have different needs or interests that influence the information they receive during home visits or the home visiting activities in which they participate.

Home visiting programs are often, by design, an indirect means to promote healthy child development. Home visiting programs target a variety of strategies ranging from checking child health and safety to encouraging positive parenting to helping parents to access education and employment opportunities. Most home visiting programs, however, state that promoting child development is their overarching goal. Home visitors often facilitate “developmental parenting,” a term introduced by Roggman, Boyce, and Innocenti (2008) to describe healthy parent-child

interactions likely to support positive outcomes for their children. Promoting developmental parenting captures the overall approach of Early Head Start (EHS) home visiting programs, the focus of this report (Administration on Children and Families, 2002, December). These programs use a two-generation approach: they aim to enhance the adult family members' capacities to promote their children's health and developmental outcomes, as well as their own health and self-sufficiency. To do this, EHS programs identify and prepare staff members to work effectively with families and facilitate building informal and formal community supports. Some parents may be more receptive than others to these efforts to increase their capacities for a range of responsibilities and opportunities, and their current capacities may affect their abilities to participate in a home visiting program or engage in the home visiting process.

Within home visiting programs, there are likely to be wide variations across families in their home visiting experiences. Although some of these variations may be related to content addressed, in that certain content may be emphasized differentially by individual practitioners, variations in home visiting experiences are primarily in terms of family involvement. Some families participate more by accepting more home visits for a longer enrollment period, and some families are more engaged in home visiting activities and process. Family involvement is not only likely to affect each family's experience of the home visiting program, it is also likely to affect the impact of home visiting services and limit or enhance the potential promise of those services.

Home Visiting Services Today

During 2011, EHS programs enrolled nearly 110,000 infants, toddlers, and pregnant women in more than 1,000 programs (Office of Head Start, 2011), but at state and local levels, EHS is only one of several large-scale home visiting programs serving families with young

children. Estimates are that all these home visiting programs serve as many as 500,000 children at a cost of nearly $1 billion per year (Gomby, 2005; Stoltzfus & Lynch, 2009). Recent health care legislation, the Patient Protection and Affordable Care Act, includes $1.5 billion over five years to help states establish, expand, and/or strengthen home visiting programs for at-risk pregnant women and children up to age 5 (Caudell-Feagan, Doctors, & Newman, 2011). This federal initiative supports infrastructure to undergird home visiting services and has spawned activities in every state; new programs are being developed, existing programs are being expanded, home visitors are being trained, and systems to document program participation and effectiveness are being implemented. As well, this proliferation of home visiting has expanded calls for rigorous evaluation of these programs. If the promise of home visiting is to be realized, the field needs more accurate descriptions of home visiting services provided and a better understanding of the complex relations among these services, family and provider characteristics, family involvement, and child and family outcomes.

Examinations of home visiting interventions have produced, to date, results showing that family participation and persistence in home visiting programs is variable (Gomby, Culross, & Behrman, 1999) and that outcomes are generally quite modest and mixed (Gomby et al., 1999; Sweet & Appelbaum, 2004). A recent review of the literature on home visiting identified EHS as one of nine model programs recommended for implementation (Administration on Children and Families, 2011), based largely on a random assignment evaluation of EHS that revealed immediate and long-term positive impacts for families in home-based programs (Administration on Children and Families, 2002, June; 2006b). Benefits were mainly in the realms of children's social-emotional functioning, parenting, and family self-sufficiency outcomes. Furthermore, patterns of impacts varied depending on how well the programs implemented the Head Start

Program Performance Standards. Those programs that fully implemented the standards had important impacts on child outcomes, including impacts on child cognitive and academic outcomes rarely seen in home-visiting programs, as well as broader impacts for parents. Interestingly, those programs that did not fully implement the standards still had some impacts, especially on some parenting behaviors and on parent participation in education and job training. These variations between programs, in terms of program model or implementation, are important, but variations within programs may also matter. Within-program variations in the actual home visiting services received by individual families are rarely examined, particularly in relation to long-term outcomes of home visiting years after the intervention ends.

Multiple researchers have documented relations among demographic characteristics and retention in home visiting programs, although the nature of the findings has been mixed. Families facing fewer demographic risks generally had better program retention, while families with higher levels of risk (e.g., being a single mother, being a teen mother, minority ethnicity) were less likely to stay enrolled in EHS programs (Roggman, Cook, Peterson, & Raikes, 2008). Older mothers were more likely to remain enrolled in a Parents as Teachers program (Wagner, Spiker, Hernandez, Song, & Gerlach-Downie, 2001), as well as in Healthy Families America programs (Daro, McCurdy, Falconnier, & Stojanovic, 2003) and the Oregon Healthy Start Program (McGuigan, Katzev, & Pratt, 2001). Mothers who were married (Navaie-Waliser et al., 2000; Roggman, Cook et al., 2008) or of higher socioeconomic status (e.g., level of education, annual income; Daro et al., 2003; Hicks, Larson, Nelson, Olds, & Johnston, 2008; Wagner et al., 2001) were also more likely to stay in home visiting programs. Considering home language in addition to ethnicity when examining associations among demographic factors and retention in home visiting programs reveals even more inconsistencies. Being Caucasian has been related to

both program retention (Ammermann et al., 2006; Wagner et al., 2001) and program attrition (Daro et al., 2003). However, ethnicity per se may not be the issue; mothers with poor English skills were more likely than those with better English skills to stay enrolled in EHS home visiting programs (Roggman, Cook et al., 2008). Unfortunately, these inconsistent findings limit the guidance that information about demographic characteristics can provide for increasing family involvement in home visiting programs and reducing attrition.

Several researchers have documented positive associations among a variety of family risk factors, including being of minority group ethnicity and low income or having poor maternal psychosocial functioning (e.g., higher levels of family stress, lower levels of social support, greater frequency of maternal depressive symptoms), and longer program retention (Ammermann et al., 2006; Girvin, DePanfilis, & Daining, 2007; Hicks, et al., 2008; Navaie-Waliser et al., 2000). Specific child-related risk factors have been related to program retention as well. For example, longer enrollment has been associated with parenting a child with a developmental delay or disability in EHS home visiting programs (Roggman, Cook et al., 2008) or with low birth weight in the Hawaii Healthy Start program (Duggan et al., 2000). Again, these findings have not been consistent across all evaluations (McGuigan et al., 2003). Together, these studies suggest that families' needs may influence why some families stay in programs and participate at high levels while other families do not (Barlow, Kirkpatrick, Steward-Brown, & Davis, 2005).

To better understand how to enhance families' involvement in home visiting programs, a clearer understanding is needed of the variations in home visiting services across families enrolled in the same program, the family characteristics associated with those variations, and the implications of those variations for lasting program impacts. Calls for more comprehensive

examination of families' experiences in home visiting programs have been voiced for more than a decade (Hebbeler & Gerlach-Downie, 2002; Powell, 1993) and echo calls for "second generation" research designed to elucidate the program variations needed to enhance intervention effectiveness for all participants (Guralnick, 1997).

Parent Involvement in Home Visiting Programs

Korfmacher and colleagues (2008) argue that documenting parent involvement is key not only to understanding home visiting programs, but also, perhaps more importantly, to guiding program improvements to reduce attrition and enhance effectiveness. Parent involvement, a complex, multi-faceted construct, is important to understand but challenging to measure. Korfmacher et al. proposed a framework for describing the intervention process and experiences in home visiting programs that includes two related but qualitatively different dimensions of parent involvement – participation and engagement. Participation describes the overall amount of services a family receives as measured by enrollment duration and frequency and length of visits. Engagement describes the quality of the family's participation in home visits and relationships with the service providers as measured by observation of parental behaviors, staff ratings, or parent self-ratings.

Several studies spawned by the EHS Research and Evaluation Project (EHSREP) have expanded our knowledge of parent involvement in home visiting services. These studies have, in addition to examining relations among home visiting services and family and child characteristics, examined actual program services more thoroughly and provided some information about relations among program services and child and family experiences and outcomes. For example, enrollment duration, number of home visits, and EHS staff members ratings of family engagement with the program were all related positively to the mother's rating

of the quality of her relationship with the EHS home visitor (Korfmacher, Green, Spellman, & Thornburg, 2007). More positive outcomes of EHS home visiting programs were related to family persistence in the program (Raikes et al., 2006; Roggman, Cook et al., 2008) and to overall program quality as measured by the degree to which the program was fully implemented as designed (Jones Harden, Chazan-Cohen, Raikes, & Vogel, 2012). As well, specific intervention services received during home visits, such as percentage of time devoted to child-related content (Raikes et al., 2006) or percentage of time during which the interventionist facilitated parent-child interactions (Peterson, Luze, Eshbaugh, Jeon, & Kantz, 2007) have been related to higher quality parental engagement during home visits. Additionally, some positive outcomes of home visiting programs appear to be specific to location and family demographics (Cook, Roggman, & Boyce, 2011; Olds et al., 2004) or are quite long-term and not detected immediately (Administration on Children and Families, 2006b; Raikes et al., 2012).

The present study, following from the framework proposed by Korfmacher and colleagues (2008), was undertaken to examine family participation and engagement in program services. The longitudinal nature of the EHSREP, along with the detailed reports of home visiting services provided by participating EHS programs, enabled this examination that builds on previous work from the EHSREP. Raikes and colleagues (2012) identified the impact of EHS home visiting programs on parenting outcomes when the children were two years of age and child development outcomes when they were three. Here, we seek to explore how variations home visiting experiences during the infant-toddler period are related to child and family status during the children's preschool and elementary school years.

First, we sought to identify clusters of intervention experiences that meaningfully differentiated patterns of service participation. Information regarding duration of enrollment in

EHS home visiting programs and the intensity of home visits received was combined to classify each family into a service participation group; these groups represented each family's overall level of service participation. Four service participation groups were identified based on the duration and intensity of family participation in the home visiting program. Then, structural equation modeling was used to examine the relations of families' involvement in EHS home visiting programs—considering enrollment duration, intensity of home visits, and family engagement with the program—with children's and families' outcomes at prekindergarten and during fifth grade.

Four specific research questions guided this study: (1) What proportion of families enrolled in EHS home visiting programs were in each service participation group? (2) What were the demographic characteristics of the families in each service participation group? (3) What were the home visiting experiences of the families in each service participation group? and (4) How did family involvement in EHS home visiting program services relate to outcomes experienced?

Method

The EHSREP was an experimental design study conducted in collaboration with 17 EHS programs. This study, nested within the EHSREP, was undertaken to examine services received by families who were assigned randomly to the EHS services (program or experimental) group at 11 sites that participated in the EHSREP. These 11 programs included those in which over 80% of the families received home visits; thus, either all families (seven programs) or most families (four programs) were scheduled to receive weekly home visits. The 11 programs included those providing services in both rural and urban areas in the western, midwestern, and eastern United States. The EHSREP was an experimental design study; however, the purpose of this study was

to assess within-group variation among families assigned to receive EHS home visiting services. Thus, no data from control group participants were included in the analyses presented.

Families participated in data collection efforts at multiple time points. During the original EHSREP, researchers completed assessments of children and interviews with parents when the children were 14, 24, and 36 months of age. In addition, the Head Start Family Information System Enrollment Form was completed at study enrollment, and Parent Services Interviews (PSIs) were completed at 7, 16, and 28 months, on average, after enrollment. These interviews were used to capture descriptive information regarding family demographics and composition; family circumstances, including employment, education, income, and daily routines; as well as families' participation in a variety of program services delivered by EHS and other community agencies. Program staff also completed surveys on individual families' involvement in EHS during home visits and at exit from the program. Families participated in tracking interviews after their children had aged out of EHS services, at age 3, until the spring before their children were age-eligible to enter kindergarten. Child assessments and family interviews were completed again the spring before the children's entry into kindergarten and the spring of the children's sixth year of school attendance when the majority of children were in fifth grade.

Participants

Participants included 1,053 families assigned to receive EHS services at the 11 sites described above. All participating families were enrolled in the EHS program at their respective sites when their children were less than 12 months old. In this sample, 42% of the children's primary caregivers (almost all mothers) were white, 29% were African American, 24% were Hispanic, and another 5% were from other ethnic groups. The vast majority (78%) of the respondents used English as their primary language at home. About two-thirds of the children

were first born (62%), and about a third (36%) of the mothers were teenagers at the time of the child's birth. Accordingly, 47% percent of the sample had not finished high school at enrollment into the EHSREP, and 19% were enrolled in school or training. Only 27% of the mothers lived with a husband, although another 35% lived with other adults. Demographic characteristics of participating families are presented on Table 1.

Measures

Measures used to capture aspects of EHS home visiting services, as well as child and family outcomes at the pre-kindergarten and fifth-grade time points are described below. Home visiting services measures were based on home visitor reports and parent interviews to capture family involvement in home visiting that differentiated service participation groups. To facilitate simultaneous examination of multiple aspects of service participation in relation to child and family outcomes, a latent measure of family involvement in home visiting was developed, as described below.

Different outcome measures were selected for different ages, because of their relevance to that developmental stage. All measures proposed to capture child and family outcome data were evaluated according to the following criteria: (1) continuity across waves of the EHSREP; (2) use in other studies with large, national samples; (3) good psychometric performance when used with similar samples; (4) feasibility of administration and coding; (5) age-appropriateness for children at the specific time point; (6) outcome targeted or affected by the EHS program; and (7) utility for future cost-benefit analyses of EHS. Additionally, to simplify models given the relatively modest sample size, a number of outcome indices were constructed related to key domains of interest, based on designated cutoff scores. Outcome indices were constructed, using data from the measures as described below, to represent constructs as similarly as possible at the prekindergarten and fifth grade time points. Table 2 presents information regarding the specific

measures used in each outcome index, along with the sample mean for that measure, and description of how the measure was used in the index.

Measures of home visiting services. Information regarding participation and engagement in home visiting services was collected from parents during PSIs and from EHS staff member reports. Data from these sources were combined to describe, for each family, the overall amount of home visiting services received, the content addressed during home visits, and the quality of the family's engagement in the home visiting program.

Duration and intensity of home visits. During each PSI, parents were asked to report how often, in terms of frequency per week or month, they had received EHS home visits since enrollment (for the first PSI) or since the time of the last interview (for subsequent PSIs). A measure of program enrollment duration was created, for each family, by subtracting the family's enrollment date from the date recorded by staff members as the last contact with the family. The total number of home visits each family received was calculated by multiplying the frequency of home visits per month reported on the PSIs by the total number of months of program enrollment. Staff members documented the length of a subset of home visits in individual home visit reports; the reported length of each home visit was divided by the total number of reports to estimate the average length of home visits for each family. The overall number of home visit minutes received by each family was calculated by multiplying the average length of each home visit and the calculated number of home visits.

Content of home visits. The content of home visits was based on staff reports of the percentage of time spent on each of three content areas: child-focused activities (e.g., activities to promote child development), family-focused activities (e.g., activities focused on family relationships, service use, parental education), and relationship-building activities (e.g., activities focused on building and/or enhancing the quality of relationships between the home visitor and

the family). At the completion of each visit, home visitors used the individual home visit reports to record the percentage of time that had been devoted to each of these three activities, and these percentages were averaged across all documented home visits for each family. On average, home visitors reported spending 56% of the time during home visits on child-focused activities (*SD* = 17). The average percentage of time focused on family-focused content was 29.4% *(SD* = 14.1), and the average percentage of time focused on building relationships was 14.8% (*SD* = 10.6). As each visit was divided among these three variables, they were necessarily inversely related to one another. Staff reports of the percentages of home visit time spent on each activity were multiplied by the total number of minutes of home visiting services to calculate, for each family, the total number of minutes spent on each documented activity during home visits.

Quality of family engagement in the program. The quality of family engagement in the program was assessed in two ways. Home visitors rated, as part of the report completed at the end of each visit, the engagement level of each adult family member present during that individual visit. At the end of the program experience, a designated program staff member who had known the family well rated the family's overall engagement in the program. Thus, this measure of global engagement accounts for the family's overall participation as well as the quality of their engagement with the program over time. Staff rated family overall engagement with the program on the following scale: 4 = consistently highly involved in the program throughout enrollment, 3 = involvement varied and was sometimes high, sometimes low during the family's enrollment, 2 = involvement was consistently low throughout enrollment, 1 = not involved at all. On average, staff rated the families' overall involvement as 2.95 (*SD* = .98).

Service participation groups. Participants in the EHSREP assigned to the EHS program group at the 11 home visiting sites were classified into one of four service

participation groups based on available data regarding their overall level of participation in EHS services. Specifically, the variables constructed to describe the duration of the family's enrollment in the EHS program and the average number of home visits per month were used to construct the service participation group variable. The enrollment duration variable was constructed as described above. The variable to describe the average number of home visits received each month was constructed from the families' reports gathered during the PSIs. These service participation groups were used in subsequent analyses to describe the range of services these families experienced as well as the demographic characteristics of families in each service participation group. The four groups and inclusion criteria are described below.

Intensive participation. These families participated in EHS for at least 12 months and received, on average, at least 4 home visits per month during the full 28-month follow-up period.

Consistent participation. These families participated in EHS for at least 12 months and received, on average, between 2 and 4 home visits per month during the follow-up period.

Limited participation. These families participated in EHS for at least 12 months but received, on average, fewer than 2 home visits per month during the follow-up period.

Early exit. These families participated in EHS services for less than 12 months.

Child developmental and academic status. Children's developmental and academic status were assessed during in-home visits prior to kindergarten enrollment and again during fifth grade. At each time point, available data were used to capture similar constructs (e.g., language

development, academic achievement, social skills) related to their overall development and academic progress. This section describes the assessments used as well as the outcome indices constructed to capture the children's overall developmental status in the structural equation model.

Child developmental status at prekindergarten. Children were assessed directly, generally in their homes, shortly before they were age eligible for kindergarten enrollment.

Peabody Picture Vocabulary Test, Third Edition (PPVT-III). The PPVT-III, developed as a measure of receptive vocabulary and screening test for verbal ability (Dunn & Dunn, 1997), has two parallel versions (Forms A and B) and is comprised of 204 items grouped into 17 sets of 12 items each, arranged in increasing order of difficulty. The test administrator says a word and the test-taker points to the one drawing out of a panel of four pictures that best represents the word. The PPVT-III has been used widely among ethnically and linguistically diverse populations, as well as among individuals with disabilities (see Robertson & Eisenberg, 1981; Williams & Wang, 1997; Washington & Craig, 1999). The PPVT-III was normed on a nationally representative sample of 2,725 children and adults tested at 240 sites across the U.S. For Form A, the version used here, the developer reports average internal consistencies for ages 4.5- to 6-year-olds of $\alpha = .94$ and test-retest reliabilities of $\alpha = .89$ (Dunn & Dunn, 1997). The internal consistency in the EHS prekindergarten study was $\alpha = .96$ ($n = 1{,}691$). The Test de Vocabulario en Imagenes Peabody (Dunn, Padilla, Lugo, & Dunn, 1986) was used for children whose primary language was Spanish (approximately 4.2% of the sample during the prekindergarten assessment); the scores for children who completed the measure in English ($M = 93.2$, $SD = 17.78$) and Spanish ($M = 87.5$, $SD = 15.56$) were not statistically significantly different ($t = 1.67$; $p = .95$).

Woodcock-Johnson Psycho-Educational Test Battery-Revised. The Letter-Word Identification and Applied Problems subtests of the Woodcock-Johnson Psycho-Educational Test Battery-Revised (W-J; Woodcock & Johnson, 1990) were used during the pre-kindergarten assessment. The Letter-Word Identification subtest captures children's symbolic learning skills (matching a schematic line drawing to the picture of an object) as well as their abilities to identify decontextualized individual letters and words. Used with preschool-age children, these aptitudes are considered important foundations for later literacy skills. The internal consistency of the Letter-Word Identification subtest with preschool children averages $\alpha = .92$ (Woodcock & Johnson, 1990). In the prekindergarten evaluation, internal consistency was $\alpha = .84$ ($n = 1,757$). The Spanish version, the Woodcock-Muñoz-Revised Identifcación de Letras y Palabras (Woodcock & Munoz-Sandoval, 1996) was used for children whose primary language was Spanish (only two children in this study were administered the Spanish version during the prekindergarten assessment).

The Applied Problems subtest measures children's skills in analyzing and solving practical problems in mathematics. Children must recognize the correct procedure to be followed and then perform simple calculations to solve the problems successfully. For preschool-age children, the aptitudes needed to solve these problems are considered important precursors for later numeracy and practical problem-solving skills. The internal consistency of the Applied Problems subtest with preschool children reported by the authors averages $\alpha = .91$ (Woodcock & Johnson, 1990), while the internal consistency in the EHS prekindergarten evaluation was $\alpha = .85$ ($n = 1,870$). The Woodcock-Muñoz-Revised Problemas Aplicados (Woodcock & Munoz-Sandoval, 1996) was used for children whose primary language was Spanish (again only two children).

The Leiter International Performance Scale-Revised (Leiter-R). The Leiter-R (Roid & Miller, 1997) was developed as a set of cross-culturally appropriate intellectual functioning assessments for individuals with limited verbal abilities. The full battery comprises 20 subtests organized into 4 domains: reasoning, visualization, memory, and attention. The Attention Sustained subtest for 4- to 5-year-olds, used at the prekindergarten assessment, is a timed cancellation task. Children are presented with a target figure (''flower,'' ''butterfly,'' ''funny guy,'' or ''goat'') at the top of a page. They are asked to find and cross out as many of the target figures on the page as possible and to work as fast as they can within the allotted time (which varies by target figure from 30 to 60 seconds). The task measures visual prolonged attention and requires good visual scanning and motoric inhibition (Roid & Miller, 1997). The Leiter-R manual reports an internal consistency of $\alpha = .83$ for the Attention Sustained subtest for 4- to 5-year-olds of, and test-retest reliability of $\alpha = .85$ for 6- to 18-year-olds (Roid & Miller, 1997). The internal consistency in the EHSREP study was $\alpha = .75$ ($n = 1{,}782$).

Leiter-R Examiner Rating Scales. The Leiter-R Examiner Rating Scales (Roid & Miller, 1997), originally used in conjunction with the administration of the Leiter-R test, were used at the prekindergarten assessment to measure children's affect and behavior during testing. It was completed based on behavioral observations of the child throughout the entire child assessment. Observers used the 4-point Leiter-R Examiner Rating Scales to rate children's attention, organization and impulse control, activity level, sociability, energy and feelings, anxiety, and sensory reactivity. In the EHSREP prekindergarten child assessment, internal consistencies of the subscales and composites for the Leiter-R Examiner Rating Scales ranged from $\alpha = .81$ (sociability subscale) to $\alpha = .96$ (cognitive/social composite). The internal consistencies of the attention rating, the emotion regulation composite, and the cognitive/social composite, the three

Examiner Rating subscales used subsequently, were α = .93 (*n* = 1,821), α = .93 (*n* = 1,796), and α = .96 (*n* = 1,803), respectively.

Prekindergarten Overall Child Developmental Status Index. An index score was constructed to capture an overall picture of the children's developmental and academic status prior to kindergarten enrollment using the measures described above. Specifically, a child's score was coded 1 on each measure if he/she was at or above developmental expectations (above 1 standard deviation below the sample mean for that measure); if the child scored 1 standard deviation or more below the sample mean, the score for that measure was coded 0. These scores were added for each child and divided by the number of measures included in the index for that individual child; for example, this number was divided by 6 if a child had completed all six measures and by 4 if the child had completed only four of the measures (see Table 2).

Child developmental and academic status at fifth grade. Children completed several measures designed to capture their language, academic, and psychological status during an in-home interview conducted during the children's sixth year of formal schooling. The majority of children were in fifth grade when these assessments were completed, and all participating children chose to complete all assessments in English.

Peabody Picture Vocabulary Test, Third Edition (PPVT-III). The PPVT-III (Dunn & Dunn, 1997), described above, was administered again when the children were in fifth grade. Among ten-year-olds in the national norming sample (*n* = 100), the internal consistency for Form A was α = .96, split-half reliability was α = .94, and test-retest reliabilities of α = .88 (Dunn & Dunn, 1997).

WISC-IV Matrix Reasoning Subscale. The Matrix Reasoning subscale from the Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV; Wecshler, 2003) is a measure of children's cognitive abilities. The test requires limited language and no hand manipulation on the

part of the child. Internal consistency split-half reliability is $\alpha = .89$ and test-retest reliability is $\alpha = .85$ for the published measure.

The Ability Success Index. The Ability Success Index was based on performance on two cognitive outcomes; means from the national norm group were used as cutoff points for both measures. Success was defined as a score greater than or equal to 100 on the PPVT and a score greater than or equal to 10 on the Matrix Reasoning subscale. For the Ability Success Index, children were categorized as successful (Index = 1) if they scored above the cutoff on both measures.

ECLS-K Language and Literacy and Mathematics Assessments. The ECLS-K Language and Literacy and Mathematics Assessments, developed initially for the U.S. Department of Education's Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 cohort (ECLS-K; National Center for Education Statistics), are designed to assess children's reading and mathematics achievement in spring of fifth grade. The reading assessment provides information about children's overall reading achievement and their mastery of specific skill sets or levels of comprehension, such as deriving meaning from and making interpretations beyond text. The ECLS-K mathematics assessment is designed to measure skills in conceptual knowledge, procedural knowledge, and problem solving (Princiotta, Flanagan, & Germino Hausken, 2006). Internal consistency coefficients were calculated across the six rounds of reading assessment completed as part of the ECLS-K. These coefficients ranged from $\alpha = .69$ to $\alpha = .93$ for the reading assessments and from $\alpha = .58$ to $\alpha = .88$ for the mathematics assessments (Pollack, Atkins-Burnett, Najarian, & Rock, 2005).

The Academic Success Index. The Academic Success Index was defined by performance on the ECLS-K Language and Literacy and Mathematics Assessments, using national norms from the ECLS-K as a guide for cut-off points for the EHSREP sample. Thus, for Language and

Literacy, children scoring at or above 50 points were considered successful. For mathematics, the cutoff score was 9.6 on the Mathematics Routing Scale. For the Academic Success Index, children are categorized as successful (Index = 1) if they score above the cutoff on both measures.

Self-Description Questionnaire (SDQ). The SDQ, used in the ECLS-K (Marsh 1990), is a short self-report questionnaire that asks children to rate their perceptions of competence and interests in reading, mathematics, and school in general as well as their popularity with peers and competence in peer relationships. The Peer Relations subscale, used in this study, contains six items to which children responded using a four point scale: 1 = not at all true, 2 = a little bit true, 3 = mostly true, and 4 = very true. The subscale score is the mean score for all items. Internal consistency for the Peer Relations Subscale of the SDQ was $\alpha = .82$ for the ECLS-K sample (Pollack, et al., 2005).

The Peer Relations Index. The Peer Relations subscale of the SDQ was used to construct this index. Children were rated as successful (Index = 1) if they scored above 2.67 on the Peer Relations subscale of the SDQ; this was the mean score for the nationally representative sample that participated in the ECLS-K.

Peer Bullying Scale. This four item bullying scale, used in the Panel Study of Income Dynamics-Child Development Supplement, Wave 2 (PSID-CDS2), was based on the work of Loeber and colleagues (1989). Children responded on a four point scale where 1 = never, 2 = once or twice, 3 = a few times, and 4 = many times to questions regarding whether they had been bullied by peers in their school or neighborhood during the past month. Items were summed to develop the score. Author reported internal consistency for this scale is $\alpha = .62$; internal consistency for EHSREP participants was $\alpha = .66$.

Self-Reported Delinquent Behavior Scale. This 14-item scale asked children to report (yes or no) whether they have ever engaged in a series of delinquent behaviors. Self-report is the most frequently used method to gather information about offending behaviors, and a similar measure was found to have concurrent and predictive validity with another group of fifth graders (Jolliffe, et al., 2003). Items used in the EHSREP were drawn from the work of Loeber and colleagues (1989), the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development, or created for this study. Internal consistency for EHSREP participants was $\alpha = .70$. Items were summed to create the scale score.

Child Behavior Checklist (CBCL). The children's primary caregivers completed the CBCL (Achenbach & Rescorla, 2000), which is commonly used as a measure of children's behavior problems and includes scoring procedures for indicating both externalizing problems and internalizing problems. The authors report that test-retest reliability for the Internalizing subscale is $\alpha = .90$ and for the Externalizing subscale is $\alpha = .87$. Construct validity correlations are consistently over .55 with a high of .75. Internal consistency for the current sample and the measures used averaged $\alpha = .95$.

Social Emotional Risk Index. This dichotomous composite indicates whether the child is at risk based on five social-emotional outcomes: externalizing behavior, internalizing behavior, attention problems, peer bullying, and delinquent behaviors. The first three variables are based on CBCL subscales. Sum scores were transformed to T-scores based on the CBCL scoring manual. Children were considered at risk if their T-scores were over 63 for the Internalizing or Externalizing subscales or 69 for the Attention Problems subscale. For the Peer Bullying subscale, risk was defined by a score greater than or equal to 8. For the Self-Reported Delinquent Behavior scale, risk was defined by a score greater than or equal to 4.

Retention. Parents reported whether their child had ever repeated a grade since starting elementary school. This single item is a direct indicator of grade retention.

School attendance. Parents reported on the frequency of their children's absences from school on a five-point scale on which 1 = no absences, 2 = one or two absences, 3 = one absence per month, 4 = a few absences per month, or 5 = one or more absences per week.

Retention and Absence Risk Index. Parent reports of their children's grade retention and school attendance were used to construct this index. Children were considered successful (Index = 1) if they had not repeated a grade and were absent from school, on average, less than one day per month.

Fifth Grade Child Overall Success Index. A Fifth Grade Child Overall Success Index was constructed, for each child, by adding scores from each of five indices constructed from the measures, as described above. If a child's score on any of these five indices indicated risk, then they were considered at risk based on the composite. Each child's score on this index ranged from 0 to 5 (see Table 2).

Parental health and family functioning. Parents reported on a variety of measures designed to capture a snapshot of their own physical and mental health, as well as multiple aspects of their overall family functioning and well-being. This section describes the assessments used as well as the outcome indices constructed to capture the families' overall health and functioning in the structural equation model.

Parental health and home environment at prekindergarten. The prekindergarten parent interview included measures related to parent physical and mental health, family substance abuse, and exposure to violence. In addition, observers recorded their ratings of the home environment.

Home Observation for Measurement of the Environment (HOME). An abbreviated version of the HOME Scale (Caldwell & Bradley, 1984) was used at the prekindergarten interview. The HOME is one of the most widely used measures designed to assess characteristics of a child's home environment important for stimulating children's development at that age (Caldwell & Bradley, 1984; Bradley, 1994; Parenting, 2004). A trained interviewer scores the measure through direct observation in combination with parent's responses to interview items. Reviews of the measure have found it to be a reliable measure of the home environment, with inter-observer agreement on each subscale score over 90%, and a valid measure, given its associations with a variety of child health and developmental outcomes (Bradley, 1994; Bradley & Caldwell, 1988; Elardo & Bradley, 1981; Bradley, Corwyn & Whiteside-Mansell, 1996; Gottfried, 1984; Parenting, 2004). An abbreviated version of the HOME scale, (Administration on Children and Families, 2007), was employed in the EHSREP prekindergarten battery. The shortened form contains 42 items organized into 4 scales: Warmth (6 items), Learning Environment (14 items), Physical Environment (7 items), and an overall HOME Total Score (42 items). The HOME Total Score was used in this study. We do not report the internal consistency of the HOME. Although initial scale development work was based on factor analytic and internal consistency criteria, recently Bradley has argued persuasively that items on the HOME scale are best conceived as ''formative'' rather than ''effect'' indicators (Bradley, 2004; Bollen, 2002). Measures of internal consistency, which are inapplicable to formative indicators, are therefore irrelevant for characterizing HOME scale psychometrics. As well, one question asked parents about the number of books available in the home.

Center for Epidemiologic Studies-Depression Scale (CES-D). Depressive symptoms, one of the most common mental health conditions affecting people in poverty, were measured using the CES-D (Radloff, 1977). The CES-D is one of the most common measures used to assess

depressive symptomatology in community-based and epidemiological studies (Eaton, Smith, Ybarra, Muntaner & Tien 2004; Murphy, 2002; Nezu, Nezu, McClure & Zwick 2002). For the EHSREP prekindergarten study, parent depressive symptoms were captured using a 12-item short form of the CES-D Scale. This shortened form of the CES-D (Ross, Mirowsky, & Huber, 1983) was employed in the FACES study (Administration on Children and Families, 2006a) as well as the EHSREP parent interview when the children were 36 months of age (Administration on Children and Families, 2007). Responses to all items are made on a 4- point Likert scale anchored to the frequency with which a symptom has been experienced during the past week where 0 = rarely or none of the time (less than one day) to 3 = most or all of the time (5-7 days). Total scores on this CES-D short form range from 0 to 36, with higher scores indicating greater frequency of depressive symptoms. A cutoff score of 10 on the short form, which proportionally scales to the standard cutoff score of 16 from the original 20-item CES-D, was used to identify individuals with non-negligible depressive symptoms. Author reported internal consistency for the CES-D is $\alpha = .92$; in the EHS prekindergarten sample, the internal consistency was $\alpha = .88$ (n = 2,033).

Substance abuse and violence exposure. Specific questions included in these analyses addressed whether anyone in the household had drug or alcohol problems, whether the mother had witnessed or been a victim of violence, and whether the mother had been abused within the past year.

Prekindergarten Home Environment Index. The index score constructed to capture an overall picture of the family's home environment and the parent's health prior to the child's kindergarten enrollment was based on the measures described above. Specifically, a family's score was coded 1 on each measure if it fell at or above the designated cutoff score as described above for the child developmental and academic status indices; the family's score was coded 0 if

the parent or family (depending on the measure) did not meet that expectation. These scores were added for each family and divided by the number of measures included in the index for that individual family (see Table 2).

Parental health and home environment at fifth grade. When the children were in fifth grade, the parent interview included items to capture the family's overall financial, physical, and emotional well-being. As well, interviewers rated a variety of aspects of observed parent-child interactions.

Home Observation for Measurement of the Environment (HOME). An abbreviated version of the HOME Scale (Caldwell & Bradley, 1984) was used at the fifth grade interview. As previously described, the HOME Total Score was used to build this index.

Home environment and homework support. A section of the fifth grade parent interview included questions about the nature of the home environment as it related to the child's schoolwork. Questions on family involvement with homework and number of children's books were adapted from ECLS-K, NHES 2003 Parent Interview. Specifically, parents were asked how frequently an adult checks their child's homework and how frequently someone helps their child with homework outside of school. One question was used to capture whether the child had numerous (> 26) children's books.

Center for Epidemiologic Studies-Depression Scale (CES-D). Mothers' depressive symptoms were measured using the CES-D. Administration and scoring procedures, as described above (Radloff, 1977), were used again.

Poverty. The number of people and the number of children in the household were examined together with the household annual income to categorize each family into dichotomous groups, either at risk of poverty or not at risk of poverty.

Substance abuse. One specific question addressed whether anyone in the household had drug or alcohol problems, as described above.

Discipline and family interactions. Interviewers worked with both the children and parents during the in-home assessment that included a parent-child interaction task that involved discussion of three child-identified topics, selected from a list provided by the interviewer, that caused conflict between them. Observation of the parent-child interaction during this task, as well as during the entire assessment process, were used to rate the parent on two dichotomous items: (1) the parent scolds or criticizes the child more than once and (2) the parent encourages the child to talk and takes time to listen.

Fifth Grade Home Environment Index. This index score, constructed to capture an overall picture of the family's home environment during the child's sixth year of formal schooling, was based on the measures described above. Specifically, a family's score was coded 1 on each measure if it fell at or above the designated cutoff score as described above; the family's score was coded 0 when the family did not meet that expectation. These scores were added for each family and divided by the number of measures included in the index for that individual family (see Table 2).

Parent-teacher relations at fifth grade. As part of the interview, parents were asked to rate how welcome they feel to visit their child's school, a question that was part of the NICHD Parent Report of School Involvement. The children's teachers were asked to report whether or not the parent had attended a parent-teacher conference during the current academic year.

Fifth Grade Parent-Teacher Relationship Index. This index score was constructed to capture an overall rating of the relationship between the parent and the child's teacher and the parent's participation in school-sponsored events. Specifically, a family's score was coded 1 on each measure if it fell at or above the designated cutoff score as described above; the family's

score was coded 0 when the family did not meet that expectation. These scores were added for each family and divided by the number of measures included in the index for that individual family (see Table 2).

Overview of Analyses

SPSS version 18 and Mplus version 6.10 were used to complete the analyses reported here. First, we describe results related to our first three research questions focused on understanding demographic and home visiting experience differences for families in different service participation groups. To examine these questions, each family was classified as belonging to one of four service participation groups as described above. Next, using logistic regression, descriptive analyses, and inferential statistics the service participation group variable was used to examine the relations among family demographic characteristics and group assignment, as well as to describe the home visiting intervention experiences of participants assigned to each group.

Second, we used a path analysis and longitudinal structural equations modeling (SEM) approach to simultaneously test the influence of the set of home visiting variables on outcomes at prekindergarten and fifth grade. A number of initial steps were undertaken to examine the relations among intervention experiences in EHS home visiting programs and longitudinal outcomes. First, correlations among all variables of interest were examined, with the goal of identifying potential associations among service participation variables, family demographic characteristics, and child and family outcomes. Based on these results, we identified outcome variables that were significantly associated with home visiting participation, engagement, and service participation groups. These included outcomes in the areas of child outcomes at prekindergarten and during fifth grade, home environments and interactions at prekindergarten and during fifth grade, and parent-teacher relationships at fifth grade . As described previously,

to further simplify models, outcome indices were constructed, to represent each of these five outcome areas, using measured variables that represented constructs of interest and had significant relations with home visiting experiences. These indices were used as outcome variables in subsequent SEM analyses.

Family involvement in home visiting experiences was captured by a latent variable that included information regarding duration of program enrollment, intensity of participation, and quality of overall engagement with the program. Before building this final latent variable and model, however, a series of path analyses, using the service participation group variable, a categorical, measured variable, as a preliminary proxy variable, to test the associations among model components. To do this, the hypothesized final model was broken into pieces to test the model fit with the data for each path of potential interest. Specifically, the associations between service participation groups and fifth grade outcomes, as mediated by the prekindergarten outcomes, were examined. Models with a comparative fix index (CFI) value equal to or greater than .90 (Hu & Bentler, 1999) and a root mean square error of approximation (RMSEA) value less than or equal to .05 (Schumacker & Lomax, 2004) are considered good. Results of the preliminary correlational and path analyses are reported in the Appendix. Paths that demonstrated good model fit in the preliminary analyses were included in the final SEMs presented below on Figures 1 and 2. Path analyses and structural equation modeling were conducted using Mplus 6.1.

Results

Family Participation in EHS Home Visiting

First, the distribution of EHS families across home visiting service participation groups was examined. The number of families in each service participation group is presented on Table

3. The majority of families were classified into the Intensive or Consistent service participation groups while less than one-fourth of participants left their EHS programs after fewer than 12 months of home visiting services.

Logistic regression analyses were used to examine the relations among families' demographic characteristics and their service participation group classifications. Results of these analyses are presented on Table 4; note that for each of these analyses, the referent group is designated. Referent groups were chosen based on our research interests as well as the specifics of each test. Generally, the referent group contained a relatively higher proportion of the participants. For example, Caucasian families, who represented the largest proportion of families from a specific ethnic group, were more likely than those from other ethnic groups to be classified into the Intensive service participation group. The likelihood that Caucasian families were assigned to the Intensive participation group was statistically significantly different than that of families who were either African-American or Hispanic. Differences among the other ethnic groups were not statistically significantly different. Results of other logistic regression analyses revealed that families facing a moderate level of risks were more likely than those facing either fewer or more risks to be included in the Intensive participation group. Teen mothers were more likely to be included in the Limited participation group than were older mothers. As well, mothers with less than a high school education were more likely to be included in the Limited participation than mothers with more education.

Families classified into the different service participation groups had quite different EHS program experiences in terms of the amount and type of services they received, as well as in terms of the staff ratings of the quality of their overall engagement with the EHS program (see Table 5). As would be expected, families in the Intensive or Consistent service participation

groups were enrolled for significantly more months than families in the Limited participation or Early Exit groups. By definition, families at the intensive and consistent levels had, on average, more visits per month than did those families with limited participation. Early exit families, nevertheless, received as many home visits per month, on average, as families in the groups with stronger participation levels, and there were no differences among the service participation groups in the average length of home visits. Staff ratings of overall family engagement (rated at family exit from services) with the EHS program were significantly higher for families in the Intensive or Consistent participation groups than for those in the other two groups, although staff member ratings of mothers' and fathers' engagement during individual home visits, as captured by the staff rating forms completed at the end of each visit, were not significantly different across the groups.

It is important to note that families in the different service participation groups spent their time during home visits engaged in different types of activities. Families in the Intensive and Consistent service participation groups spent a greater percentage of their time on child-focused activities than did families in the other two groups. These differences in percentages of time, along with duration of enrollment and frequency of home visits, translated into significantly more total minutes spent on child-focused activities among these families. Families who left the program early spent the greatest percentage of time in activities focused on building relationships between staff members and family members. The overall percentage of time spent on family-focused activities did not differ significantly across service participation groups. Again, however, it is important to note the overall amount of time spent in these activities differs among families classified into each service participation group.

Program Experiences and Outcomes

Structural equation modeling was used to examine the associations between the families' experiences in the EHS home visiting programs and the child and family outcomes experienced prior to the children's kindergarten enrollment and when the children were in fifth grade. Sample size was 1,053. First, the direct effects of family involvement in the EHS home visiting program on fifth grade outcomes were examined. In the second step, the mediating effects of prekindergarten outcomes on the fifth grade outcomes were examined. The hypothesized direct effects model is presented on Figure 1. The overall chi-square value for the model [$\chi^2(14, n = 1{,}053) = 18.13$, $p = 0.18$] provides a measure of discrepancy between the covariance matrix of the sample and the estimated matrix (Schumacker & Lomax, 2004) and shows that the model fits the data well. The model reveals that level of family involvement has a direct and statistically significant effect on the fifth grade outcomes. Specifically, higher levels of family involvement in the EHS home visiting program were associated with more favorable child outcomes and parent-teacher relationships.

The second model included the two prekindergarten level outcomes in order to test whether they mediated the levels of family involvement on the fifth grade outcome variables. Again, the hypothesized model fit the data well [$\chi^2(14, n = 1{,}053) = 18.34$, $p = 0.19$]. Path coefficients for the mediation model, presented on Figure 2, reveal that when prekindergarten outcomes were included in the model, the direct relationship between family involvement level and fifth grade parent-teacher interaction and fifth grade child status are statistically significant, but at the 0.1 level. Results showed that higher levels of family involvement with the EHS home visiting program was related to more favorable prekindergarten child developmental status; better child developmental status at prekindergarten was associated with better child developmental and academic status as well as more favorable parent-teacher relationships when

the children were in fifth grade. The paths from family involvement level to the prekindergarten home environment and from the prekindergarten home environment to the home environment and parent-teacher relationship at fifth grade are significant and positive. Families who have higher levels of involvement with the EHS home visiting program provided more stimulating and nurturing home environments at both time points and enjoyed more favorable parent-teacher relationships when their children were in fifth grade. Model results indicate that the children's developmental status at the prekindergarten time point partially mediated the influence of the families' involvement in EHS home visiting on the children's fifth grade developmental and academic status and the quality of the relationships between their parents and teachers. Additionally, prekindergarten child outcomes and home environments had significant positive relations with the fifth grade home environments, parent-teacher interactions, and child academic outcomes. As well, the home environments and child developmental and academic status were related positively at prekindergarten and during fifth grade.

Discussion

Variations in the quality of family involvement, even within home visiting programs, make a difference in program outcomes; evidence to support this is accumulating. Within EHS programs providing most of their services through home visiting, those parents who received longer and more intensive home visiting services and were more highly engaged with their programs were those who experienced more positive outcomes for both their children and their families. Furthermore, findings presented here provide evidence that positive influences can accrue across the long-term and influence positive results for children and their families even years later. Additionally, this study contributes additional information about the content and quality of the interactions between home visitors and families, information that is sorely needed

to enhance the effectiveness of home visiting programs by supporting refinement and strong implementation of home visiting models, enhancing family engagement and retention, and guiding evaluation efforts.

The present findings confirm that more than half of families enrolled in EHS home visiting programs participated actively over at least two years and received, on average, several home visits each month. Among families who participated actively, greater percentages of time were spent on child-related activities; the difference in percentages of time among service participation groups, while statistically significant, were not large. These differences, however, translated into significantly more time, sometimes referred to as dosage, spent on this content area. In practical terms, this represents time home visitors spent facilitating parents' responsive and developmentally supportive interactions with their young children, providing information about child health and development, and supporting parents' development of goals for their children, all of which are important efforts in optimizing children's development.

Families who remained enrolled and participated actively were rated by EHS home visitors as more highly engaged in the program. It is not possible to untangle the causal direction of this association and determine whether highly engaged families participated more fully or home visitors were likely to perceive families who participated actively as highly engaged. Nonetheless, this association supports the assumption that families who participated actively over a longer period of time had not only more extensive opportunities to receive parenting support during home visits, but also were more receptive to and likely to benefit from both that support and additional supports available from other program staff and services, including group socialization activities provided regularly by EHS home visiting programs.

The theory that home visiting interventions work through parents' prolonged and active involvement and high quality engagement with their programs is intuitively logical and appealing. Still, documentation of relations between specific home visit activities and family engagement with the program are quite rare despite the fact that such documentation provides insight into the intervention processes, sometimes called active intervention ingredients, that are important to understand if we are to realize the high expectations held for home visiting services. Further examination of these relations across types of programs and models, with home visitors who have different types of training and support, and with families who represent various demographic groups will be very important to guide refinement of program models and continuous improvement efforts. Current findings regarding the relations among families' demographic characteristics and home visiting participation levels are similar to those from earlier reports from the EHSREP and some other home visiting programs. Caucasian families were more likely than families from other ethnic groups to be in the Intensive or Consistent service participation groups. As well, those families facing moderate levels of risk were more likely than those families facing lower or higher levels of risk to be classified into the Intensive service participation group. This appears to match information regarding motivation to seek and persist in services deemed important and helpful by the participant (Duggan et al., 2000; Roggman, Cook et al., 2008). The fact that home visits with families who left the program early were those where the greatest percentage of time was spent on building relationships between the family members and home visitors is interesting. The explanation for this is not clear from the data, but this finding leads to speculation regarding whether home visitors focused on these activities in anticipation that the family was likely to drop out or whether families became

disenchanted with the program due to a focus on activities they did not deem as important to addressing their needs.

Likely, it is high quality home visiting programs that are able to facilitate persistent, frequent involvement and high quality engagement for families. Quality implementation of program specifications has been related positively to child and family outcomes for EHS home visiting programs previously (Jones Harden et al., 2012); still, clearer and more frequent description of intervention experiences associated with positive outcomes is key to enhancing the efficacy of home visiting programs. This study contributes to the mounting evidence that devoting home visit time to child-focused activities is associated with better outcomes (Raikes et al., 2006) for families overall. The way home visitors interact with families, however, may be as important as the content being addressed. Peterson and her colleagues (2007) demonstrated that while addressing child-related content, mothers who were typically harder to engage (e.g., teen mothers and those with low levels of education) were more likely to be highly engaged in the home visit activities when interacting directly with her child while the interventionist was coaching her, compared with other home visit activities. Together, these findings argue for clear and purposeful effort to maintain and support child-focused activities and facilitate parent-child interactions during home visits. Overall quality is important for any program, but a focus on engaging the parent actively in child-focused activities during home visits will likely require clear articulation of this as a goal, as well as strong leadership to maintain this focus and ensure that home visitors have the training and support they need to achieve this process oriented goal.

An interesting exception to the evidence that supports devoting a majority of home visit time to child-focused activities was identified by Roggman and colleagues (2012). These researchers found that for a small minority of mothers participating in the EHSREP, more home

visit time focused on building a relationship between the home visitor and the family was related to more positive outcomes when their children were three years of age. This small group included mothers who did not demonstrate warm and supportive interactions with their 14-month-old infants. This finding, somewhat surprising and counter intuitive, speaks to the need for further research to examine the relations among family and interventionist characteristics, intervention strategies, and outcomes. As well, it highlights how and why home visitors must be keenly attuned to family interactions, especially mother-child interactions, and poised to adapt intervention strategies and topics accordingly. It is likely that many home visitors will need additional training to facilitate such flexibility, and measures that can document the quality of mother-child interactions with sufficient accuracy and sensitivity to guide intervention adaptations that match varying family strengths and needs will likely need to be developed.

The positive relations identified in the current study between home visiting services during the infant and toddler years and family and child outcomes in middle childhood is especially noteworthy. Relationships between home visiting experiences and such long-term outcomes have seldom been identified, and this study provides further evidence that both child and home factors are related to later outcomes. As well, this study demonstrates that positive effects on children's developmental and academic status and parent-teacher relationships when the children were in fifth grade, were mediated by the child's developmental status at prekindergarten. Thus, earlier outcomes related to child status mediated later outcomes in multiple areas; this contrasts with mediation effects that have been identified previously.

Effects of home visiting experiences on parenting have been shown to mediate child-related outcomes more frequently. Raikes and her colleagues (2012) demonstrated that positive impacts of EHS home visiting on parenting outcomes, observed when children were 2 years of

age, mediated positive impacts on children's social-emotional and cognitive functioning at age 3. Chazen-Cohen and her colleagues (2009) showed, similarly, that EHS impacts on parenting during the first five years of life contributed to positive child outcomes at prekindergarten. Similar results were reported from an examination of the Nurse Family Partnership program where positive impacts, on both maternal life course and child development outcomes, were reported more than four years after participation (Olds, et al., 2004).

Reports of experimental impacts from earlier phases of the EHSREP revealed that families who had received home visiting EHS services showed positive outcomes, as compared to control group participants, for both parents (e.g., reduced parenting stress) and children (e.g., social-emotional development) when the participating children were age three (Administration on Children and Families, 2002, June; Love et al., 2005) and at the pre-kindergarten time point (Administration on Children and Families, 2006). As well, impacts were broader and stronger for programs that implemented the Head Start Program Performance Standards more fully (Jones Harden et al., 2012). The present findings help to unpack home visits and provide insights into the within-program variation that families experience and how that variation is related to outcomes.

Limitations

Several limitations should be noted. First, all data reported here are related to EHS programs. While EHS has been identified as an evidence-based program (Administration on Children and Families, 2011) and EHS programs enroll more than 110,000 infants, toddlers, and pregnant women (Office of Head Start, 2011), EHS is only one of many home visiting programs available across the country. It is possible that findings reported here could be generalized to other home visiting programs. More specific information about interventions delivered within the

context of a variety of home visiting programs, if collected routinely, will enable greater understanding of the similarities and differences among home visiting services experienced by families enrolled in different program models.

Data used in the EHSREP were gathered from a variety of informants and using a variety of methods. Data to describe home visiting experiences, used in the current study, were based primarily on parent or interventionist report and frequently were collected some months after services were received. Researchers and EHS program staff communicated frequently during the years that EHSREP participants were enrolled in EHS, but it was not possible, in most instances, to corroborate data regarding specific services that families received. For example, available resources did not permit review of program administrative records to verify that families reported the number of home visits they received accurately.

As stated, our sample size was relatively modest; numbers of families classified into each service participation group was somewhat small. This likely affected our ability to identify consistent patterns of intervention experiences. Data regarding families' home visiting experiences from a larger sample could potentially reveal much more about within-program variations, as well as contribute to greater understanding of the relations among these variations, family and provider characteristics, and outcomes. Data regarding within-program variations could, as well, help program developers and administrators better understand the supports that home visitors need to implement a program as it is envisioned and thus, be used to guide staff recruitment, professional development and supervision activities.

Implications for Research, Practice, and Policy

The current study contributes new information and builds on earlier information to reinforce calls for research that will enhance understanding of the pathways through which home

visiting programs produce positive outcomes, provide guidance for implementation of home visiting programs, and strengthen calls to increase access to home visiting services. Clearly, there is still much to learn about families' experiences in home visiting programs, the pathways through which home visiting programs influence child and family outcomes, and strategies that can facilitate families' involvement in home visiting programs. Findings from this study add to the evidence base to address all these needs. Clear description of families' intervention experiences in home visiting programs is an essential first step in elucidating the relations between program goals and program activities; the relative match between these can guide model refinements. Clearly articulating program activities provides, in turn, guidance on identifying the desirable skills and characteristics staff members, as well as the training and support activities they will need to enhance families' involvement with the program.

The evidence that families who persisted in the program, identified in this study as well as by Raikes et al. (2006), spent significantly more time on child-focused content helps build a clearer explanation for why longer enrollment is related to more positive outcomes for both child development and positive parenting behaviors. Details regarding the relations between intervention experiences and families' persistence in their programs provide evidence to bolster the notion that strategies that help focus home visiting activities on child-related content and strategies likely to facilitate parent-child interactions may be effective for facilitating and maintaining families' active involvement in home visiting programs.

The duration of enrollment and frequency of home visits, sometimes called participation (Korfmacher et al., 2008), and the quality of engagement are both important, however. Together, they are related to outcomes, and as demonstrated here, can contribute to a more nuanced understanding of families' actual intervention experiences. Leaving home visiting programs

early, or "dropping out," has been associated with less positive outcomes (Gomby, 1999; Raikes et al., 2006; Roggman, Cook et al., 2008). This study demonstrated, however, that early leaving is more nuanced than simple attrition. It is notable that families in the Early Exit service participation group had, on average while enrolled in the program, the same frequency of home visits as did families in other service participation groups. Families leave for a number of reasons, some of which are not associated with dissatisfaction with or disinterest in the program. Home visiting programs are not universally available; moving from one community to another may necessitate a family's attrition for either practical (e.g., too far to travel) or policy (e.g., program funded to serve a specific catchment area) reasons. Approximately one-third of families participating in the EHSREP reported that they left their programs early because they moved away (Roggman, Cook et al., 2008); clearly, it is not possible to know how many of these families may have experienced more favorable outcomes had it been possible for them to stay enrolled longer. Home visiting services are being expanded and strengthened across the U.S. Still, fewer than 5% of families with children below age 5 participate in home visiting programs.

Increasing the reach and enhancing the efficacy of home visiting programs are crucial goals. Public investment in home visiting programs has been broadened significantly, attention to program efficacy has been heightened, and home visiting programs are being targeted primarily to some of the most vulnerable families in our country. It is imperative that researchers, practitioners, and policy makers use all available information to optimize services for families, maximize our public investment, and enhance public will to embrace the need to make it a collective endeavor to ensure that family support programs work for all children in all kinds of families (Daro, 2012).

Table 1

Demographic Characteristics of Participants

Demographic	When Assessed	Sample
Race/ethnicity	Baseline	1,037
White		41.6%
Black/African American		29.4%
Hispanic		24.1%
Other		4.9%
Language spoken at home	Baseline	1,024
English		77.6%
Not English		22.4%
Child is first born	Baseline	1,046
Yes		61.8%
No		38.2%
Teen mom	Baseline	1,026
Yes		35.7%
No		64.3%
Highest grade completed	Baseline	1,015
<12		47.3%
12		27.8%
>12		24.9%
Lives with	Baseline	1,053
Husband		26.9%
Other adults		34.9%
Alone		38.2%

Primary occupation	Baseline	1020
Working		20.6%
In school or training		18.8%
Neither		60.6%
Family mobility	7, 16, 28 months after enrollment, exit	774
Moved at least one		24.9%
Did not move		75.1%
Received Part C services	7, 16, 28 months after enrollment, exit	954
Yes		11.2%
No		88.8%

Table 2

Indices Used in Structural Equation Model – Variables and Description

Variable	Sample Mean (SD)	Cut point (description)
Prekindergarten Child Status		
PPVT-III Standard Score	92.85 (15.47)	77.39 (1 SD < mean)
WJ Letter-Word Identification Standard Score	89.19 (12.97)	76.22 (1 SD < mean)
WJ Applied Problems Standard Score	88.92 (20.22)	68.7 (1 SD < mean)
Leiter-R scaled attention	8.68 (1.87)	6.8 (1 SD < mean)
Leiter-R standard emotion regulation e2	91.06 (11.07)	79.99 (1 SD < mean)
Prek: Leiter-R standard cognitive social e2	93.93 (11.28)	82.66 (1 SD < mean)
Fifth Grade Child Status		
Ability Success Index	.23 (.42)	Dichotomous
Academic Success Index	.28 (.45)	Dichotomous
Peer Relations Index	3.12 (.63)	2.67 (Lowest 25% of sample)
Social Problems Index	.44 (.50)	Dichotomous
Retention and Absence Risk Index	.58 (.49)	Dichotomous
Prekindergarten Home Environment		
HOME total score	34.49 (5.99)	30.86 (Lowest 25% of sample)
Home has 26 or more children's books	.64 (.48)	Dichotomous
CES-Depress short form (SF) scale	7.7 (7.12)	10 (proportional to SF)
Mother lived with someone with an alcohol or drug problem in the past year	.08 (.28)	Dichotomous
Mother was abused in past year	.08 (.27)	Dichotomous
Mother witnessed violence in past year	.32 (.47)	Dichotomous
Fifth Grade Home Environment		
HOME total score	31.15 (4.07)	28 (Lowest 25% of sample)
Home has 26 or more children's	.64 (.48)	Dichotomous

books		
Frequency of Homework at Home/Outside of School	3.93 (1.09)	2.0 (Less than once a week)
External support for education	-.26 (4.52)	-4.78 (1 SD < mean)
CES-Depress short form (SF) scale	7.02 (6.31)	10 (proportional to SF)
Mother lived with someone with an alcohol or drug problem in the past year	.07 (.26)	Dichotomous
Family living below poverty		Dichotomous
Parent scolds/criticizes child more than once	.02 (.14)	Dichotomous
Parent encourages child to talk, takes time to listen	.88 (.33)	Dichotomous
Fifth Grade Parent-Teacher Relations		
Parent feels welcome to visit school	4.4 (.88)	2.0 (Less than some)
Attended parent/teacher conference	.89 (.31)	Dichotomous

Table 3

Levels of Participation — Definitions and Participants

Service Participation Group	Definition	Participants N (%)
Intensive	In EHS for at least 12 months, 4 or more home visits per month on average over 28 months	204 (22.5%)
Consistent	In EHS for at least 12 months, 2 to 4 home visits per month on average over 28 months	303 (33.5%)
Limited	In EHS for at least 12 months, fewer than 2 home visits per month over 28 months	181 (20.0%)
Early exit	In EHS for less than 12 months	216 (23.9%)

Table 4

Demographic Characteristics of Families across Service Participation Groups

		Participation Level							
		Intensive		Consistent		Limited		Early Exit	
		Percent (*n*)	Odds ratio (OR), 95% confidence interval (CI)	Percent (*n*)	Odds ratio (OR), 95% confidence interval (CI)	Percent (*n*)	Odds ratio (OR), 95% confidence interval (CI)	Percent (*n*)	
Ethnicity (n = 890)									
	White* 43.3% (*n* = 385)	46.2% (*n* = 98)		24.4% (*n* = 44)		39.1% (*n* = 117)		63.3% (*n* = 126)	
	Black 27.2% (*n* = 242)	24.1% (*n* = 51)	1.873, (1.131, 3.104)	39.4% (*n* = 71)	5.809, (3.417, 9.876)	28 .4% (*n* = 85)	2.613, (1.639, 4.173)	17.6% (*n* = 35)	0[b]
	Hispanic 24.4% (*n* = 217)	20.8% (*n* = 44)	1.768, (1.044, 2.993)	32.2% (*n* = 58)	5.190, (2.990, 9.009)	27.8% (*n* = 83)	2.793, (1.730, 4.511)	16.1% (*n* = 32)	0[b]
	Other 5.2% (*n* = 46)	9.0% (*n* = 19)	4.071, (1.567, 10.581)	3.9% (*n* = 7)	3.341, (1.065, 10.479)	4.7% (*n* = 14)	2.513, (0.935, 6.755)	3.0% (*n* = 6)	0[b]
Family Risk (n = 818)									
	Index = 0-1* 18.6% (*n* = 152)	14.7% (*n* = 29)		13.3% (*n* = 22)		18.4% (*n* = 51)		27.9% (*n* = 50)	
	Index = 2-3	56.3%	1.994,	56.4%	2.202,	54.5%	1.542,	53.6%	

	55.1% (*n* = 451)	(*n* = 111)	(1.170, 3.397)	(*n* = 93)	(1.237, 3.920)	(*n* = 151)	(.967, 2.459)	(*n* = 96)
	Index = 4-5 26.3% (*n* = 215)	28.9% (*n* = 57)	2.978, (1.591, 5.575)	30.3% (*n* = 50)	3.444, (1.768, 6.708)	27.1% (*n* = 75)	2.228, (1.266, 3.922)	18.4% (*n* = 33)
Maternal Age (n =)								
	Older* (*n* = 576)	24.3% (*n* = 140)		18.8% (*n* = 108)		32.8% (*n* = 189)		24.1% (*n* = 139)
	Mom < 20 at Birth of FC (*n* = 305)	23.3% (*n* = 71)	1.330, (.868, 2.307)	23.0% (*n* = 70)	1.700, (1.099, 2.630)	36.4% (*n* = 111)	1.540, (1.039, 2.284)	17.4% (*n* = 53)
Mother's Education (n = 867)								
	Less than hs* 45.9% (*n* = 398)	25.4% (*n* = 101)		21.9% (*n* = 87)		36.4% (*n* = 145)		16.3% (*n* = 65)
	HS or GED 28.7% (*n* = 249)	20.9% (*n* = 52)	.485, (.301, .781)	16.9% (*n* = 42)	.455, (.276, .750)	34.5% (*n* = 86)	.559, (.363, .860)	7.7% (*n* = 69)
	Some college but no degree 19.6% (*n* = 170)	24.1% (*n* = 41)	.600, (.354, 1.016)	20.6% (*n* = 35)	.594, (.344, 1.028)	29.4% (*n* = 50)	.509, (.309, .840)	25.9% (*n* = 44)
	AA or BA or MA or higher 5.8% (*n* = 50)	22.0% (*n* = 11)	.373, (.167, .834)	18.0% (*n* = 9)	.354, (.150, .833)	22.0% (*n* = 11)	.260, (.117, .577)	38.0% (*n* = 19)

Note: * indicate the reference category of each analysis

Table 5

Service experiences of families across participation levels

	Service Participation Group				Total	
	Early Exit	Limited	Consistent	Intensive		F (df)
Total number of minutes spent on child-focused activities	585.8 (39)	1,527.5 (92)	3,921.0 (217)	6,462.7 (174)	4,096.7 (523)	135.769*** (3,521)
Total number of minutes spent on family-focused activities	436.0 (39)	832.7 (92)	2,149.3 (217)	3,337.1 (174)	2,186.5 (522)	52.78*** (3,521)
Total number of minutes spent on relationship-building activities	276.9 (39)	415.3 (92)	1,098.9 (217)	1,467.5 (174)	1,039.9 (522)	19.741*** (3,521)
Average % time on child-focused activities	50.0 (39)	54.7 (92)	56.0 (217)	58.1 (174)	56.0 (522)	2.814* (3,522)
Average % time on family-focused activities	29.3 (39)	30.1 (92)	29.1 (217)	28.7 (174)	29.2 (522)	0.200 (3,521)
Average % time on relationship-building activities	20.7 (39)	15.2 (92)	14.9 (217)	13.2 (174)	14.8 (522)	5.36** (3,521)
Family duration in program until child was 36 months of age	7.0 (216)	26.6 (181)	28.3 (303)	29.6 (204)	23.2 (904)	499.508*** (3,903)
Staff rating of overall family engagement	2.0 (164)	3.0 (141)	3.2 (273)	3.4 (186)	3.0 (764)	97.560*** (3,763)
	2.02 2.0 2.0					97.162*** (3,764)

Figure 1

Structural Equation Model – Direct Effects of Family Involvement in EHS on Fifth Grade Outcomes (n = 1,053)

$\chi^2(14, n = 1{,}053) = 18.13$, $p = 0.18$, (** $p < .05$)

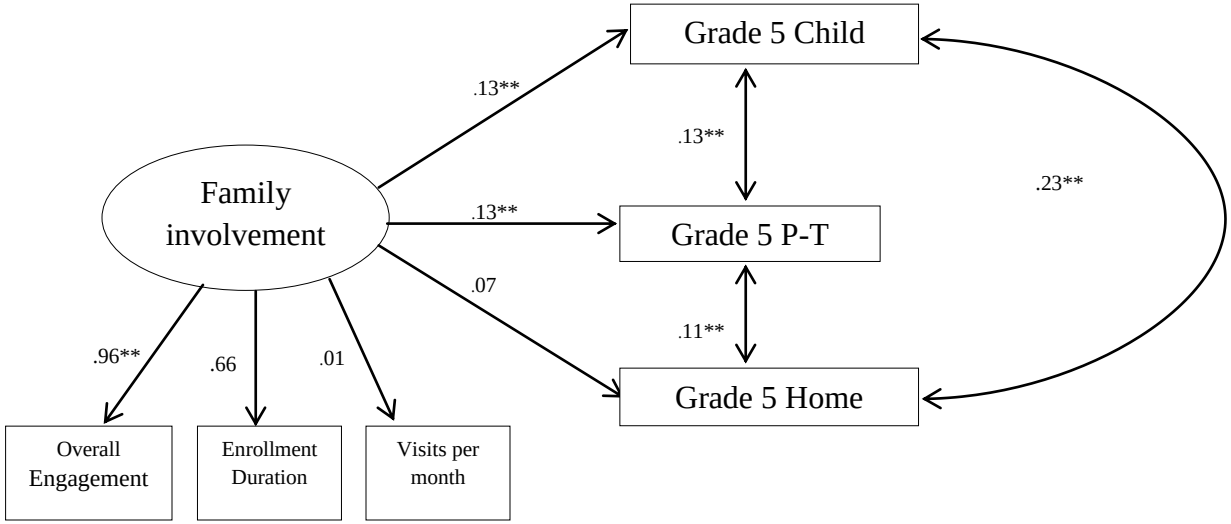
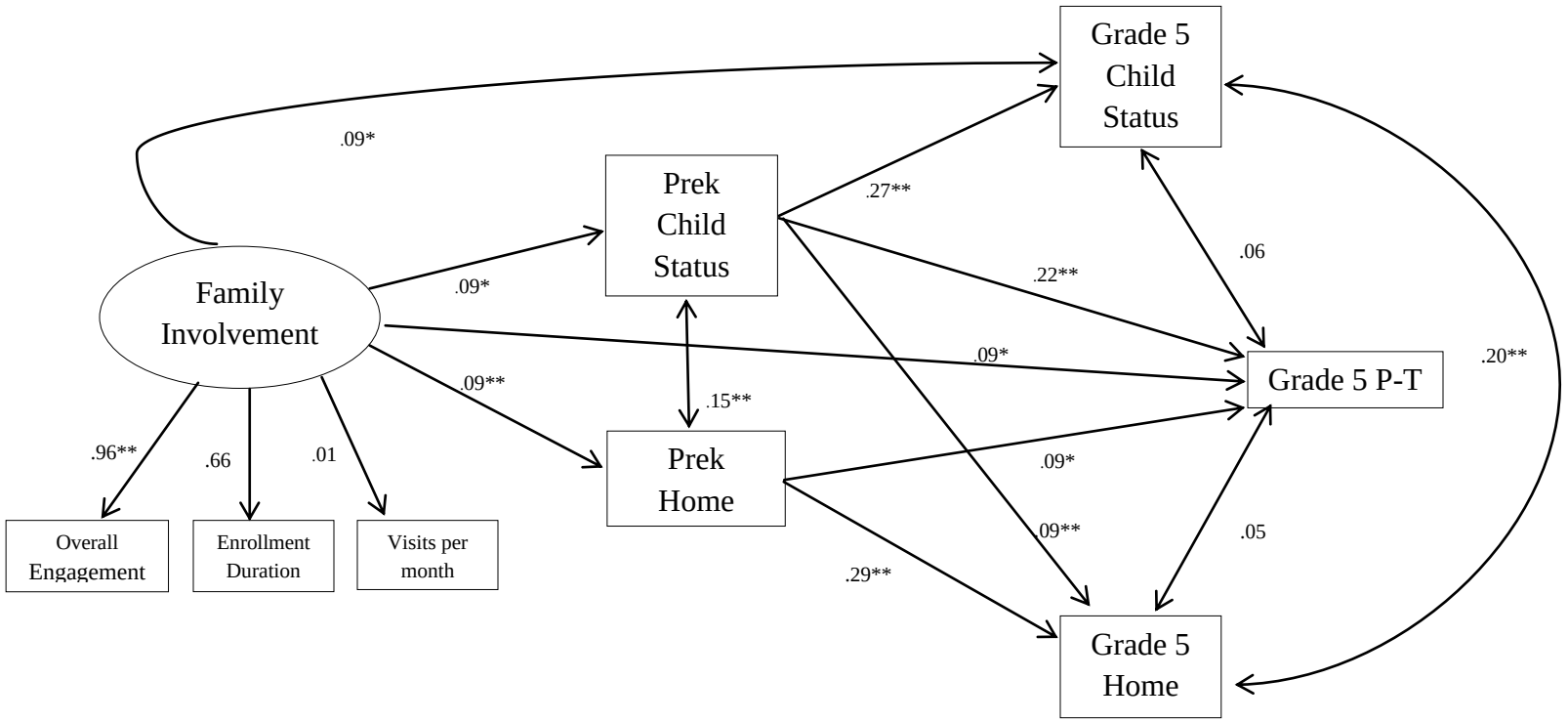


Figure 2

Structural Equation Model – Mediated Effects of Family Involvement in EHS on Fifth Grade Outcomes (n = 1,053)

$\chi^2(14, n = 1{,}053) = 18.34$, $p = 0.19$, (** $p < .05$, * $p < .1$)



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Appendix

Correlation Tables

Child Outcome Constructs and Measures				
Prekindergarten				
Dependent variables	Independent Variables	Pearson correlation	sig	*N*
WJ Applied Problems Standard Score	Mean % time on child-focused activity	.120	.020	376
	Service participation group	.105	.012	563
PPVT-III Standard Score	Mean % time on child-focused activity	.139	.009	353
	Mean % time on family-focused activity	-.150	.005	353
	Service participation group	.147	.001	526
WJ Letter-Word Identification Standard Score	Mean % time on child-focused activity	.106	.040	376
	Mean % time on family-focused activity	-.107	.039	376
	Mean distraction level	.136	.011	346
	Staff rated engagement level	.118	.007	528
	Service participation group	.112	.008	562
Fifth Grade				
Success on the 3 CBCL subscales, bullying, and delinquent	Mean % time on family-focused activity	-.114	.035	340
	Mean distraction level	.140	.015	299
SDQ Peer Relations Subscale	Mean % time on family-	.129	.016	345

	focused activity			
	Mean %time on staff-build act	-.114	.034	345
Academic success	Mean % time on child-focused activity	.131	.015	347
	Mean % time on family-focused activity	-.108	.044	347
	Service participation group	.125	.005	507
Ability success	Staff rated engagement level	.095	.041	465
	Service participation group	.099	.026	508
Absence and retention success	Mean % time on child-focused activity	.142	.007	355
	Mean % time on family-focused activity	-.163	.002	355
	Staff rated engagement level	.098	.032	478

Family (Home) Constructs and Measures				
Prekindergarten				
Dependent variables	Independent Variables	Pearson Correlation	sig	*N*
Respondent lived with someone with alcohol/drug problem past year	Mean % time on child-focused activity	-.187	.000	421
	Mean % time on family-focused activity	.165	.001	421
	Service participation group	.082	.036	651
Respondent been abused past year	Mean % time on child-focused activity	-.102	.037	421
	Mean % time on family-focused activity	.140	.004	421
CES-Depress short form (SF) scale	Mean % time on child-focused activity	-.115	.019	410
	Mean % time on family-focused activity	.101	.041	410
	Mean distraction level	-.115	.025	378
	Mean engagement of mom	-.141	.006	375
	Staff rated engagement level	-.087	.032	605
	Service participation group	.080	.043	638
Parent witnessed violence	Mean % time on family-focused activity	.119	.015	421
	Staff rated engagement level	-.150	.000	616
HOME total score	Mean % time on child-focused activity	.208	.000	345

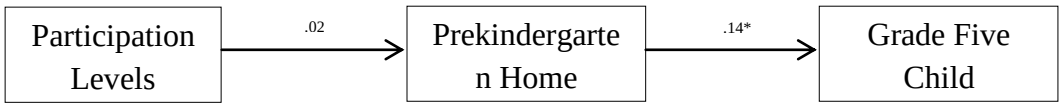
	Mean % time on family-focused activity	-.234	.000	345
Family (Home) Constructs and Measures				
Fifth Grade				
Household Annual Income	Mean % time on child-focused activity	.174	.001	354
	Mean % time on family-focused activity	-.174	.001	354
	Mean engagement of mom	.116	.041	312
Parent scolds/criticizes Child more than once	Mean engagement of mom	-.123	.032	301
Frequency of Homework at Home/Outside of School	Mean % time on child-focused activity	.208	.000	354
	Mean % time on family-focused activity	-.229	.000	354
26 or more children's books	Mean engagement of dad	.137	.048	208
	Staff rated engagement level	.105	.022	483
	Service participation group	.129	.003	530
Parent encourages child to talk, takes time to listen	Avg % time on child-focused activity	.108	.045	346
	Avg % time on family-focused activity	-.147	.006	346
	Avg distraction level	.117	.040	305
	Mean engagement of mom	.131	.023	301

Family-School Relationship				
Fifth Grade				
Dependent variables	Independent Variables	Pearson correlation	sig	*N*
Feel welcome to visit school	Service participation group	.092	.035	524
How often stopped to talk to teacher this year	Staff rated engagement level	.198	.002	243

Path Analyses

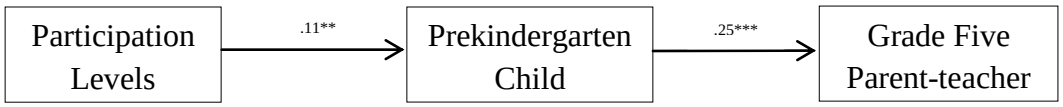
N = 734 Chi square: 3.414 (*df* = 1, *p* = 0.065) CFI: .933 RMSEA .057

N = 734 Chi square:3.55 (*df* = 1, *p* = 0.059) CFI: .762 RMSEA .059



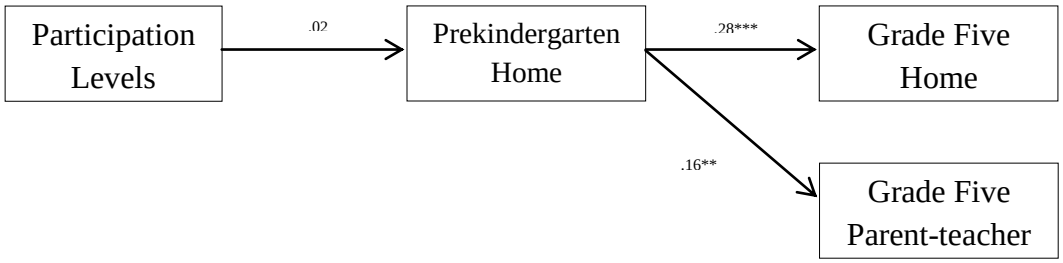
N = 729 Chi square: 6.35 (*df* = 1, *p* <= .01) CFI: .517 RMSEA .09

N = 714 Chi square: 2.92 (*df* = 1, *p* = .087) CFI: .867 RMSEA .052

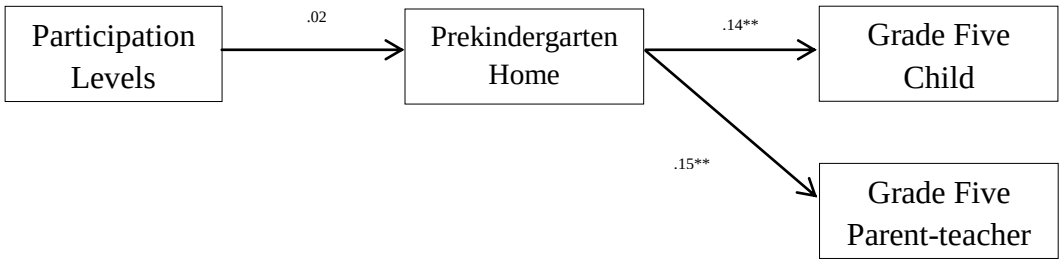


N = 714 Chi square: 2 (*df* = 1, *p* = .16) CFI: .97 RMSEA .037

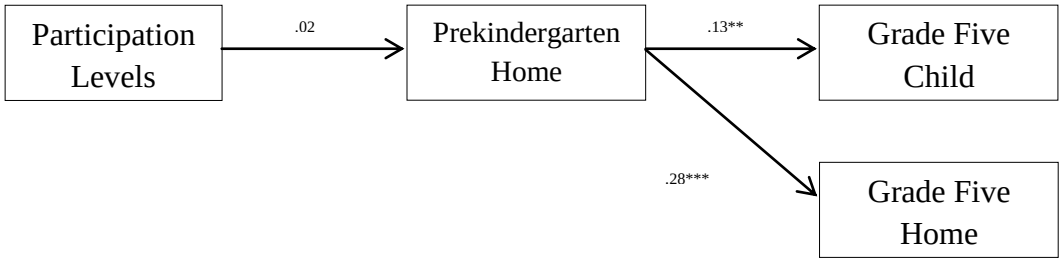
N = 703 Chi square: 3.43 (*df* = 1, *p* = .064) CFI: .95 RMSEA .059



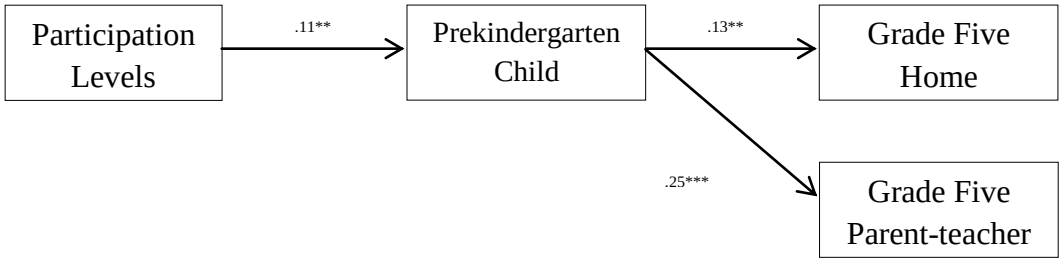
N = 734 Chi square: 6.63 (*df* = 2, *p* = .04) CFI: .905 RMSEA .056



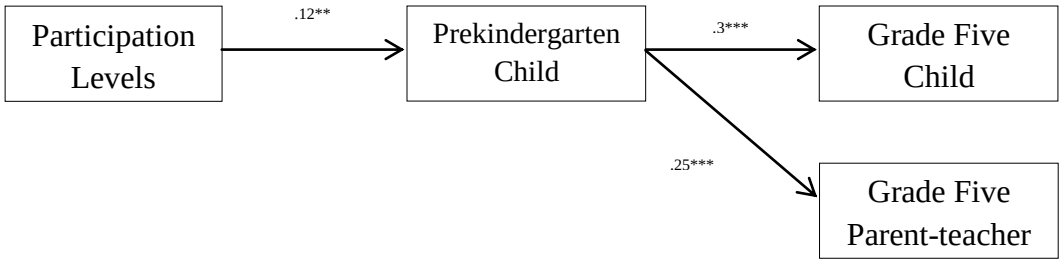
N = 734 Chi square: 8.36 (*df* = 2, *p* = .015) CFI: .79 RMSEA .07



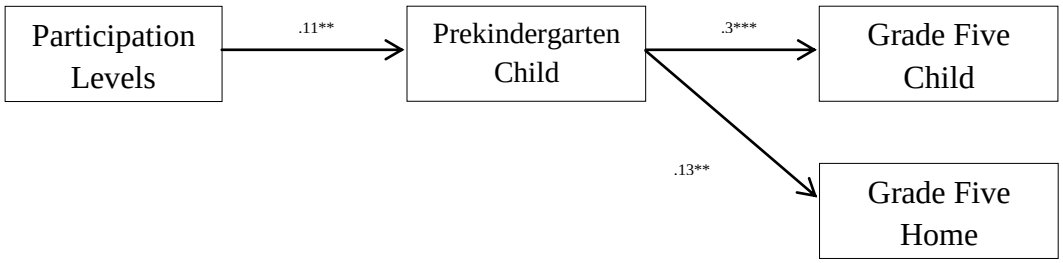
N = 734 Chi square: 8.59 (*df* = 2, *p* = .014) CFI: .898 RMSEA .067



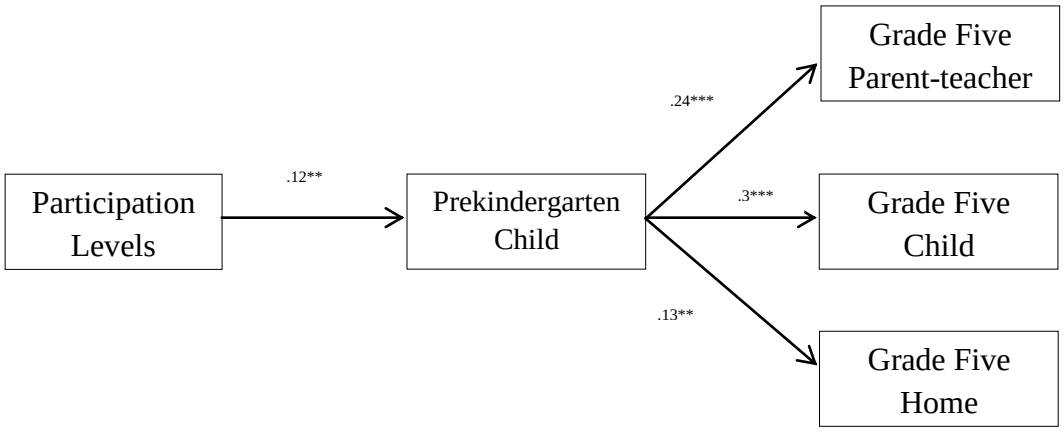
N = 714 Chi square: 4.65 (*df* = 2, *p* = .098) CFI: .938 RMSEA .043



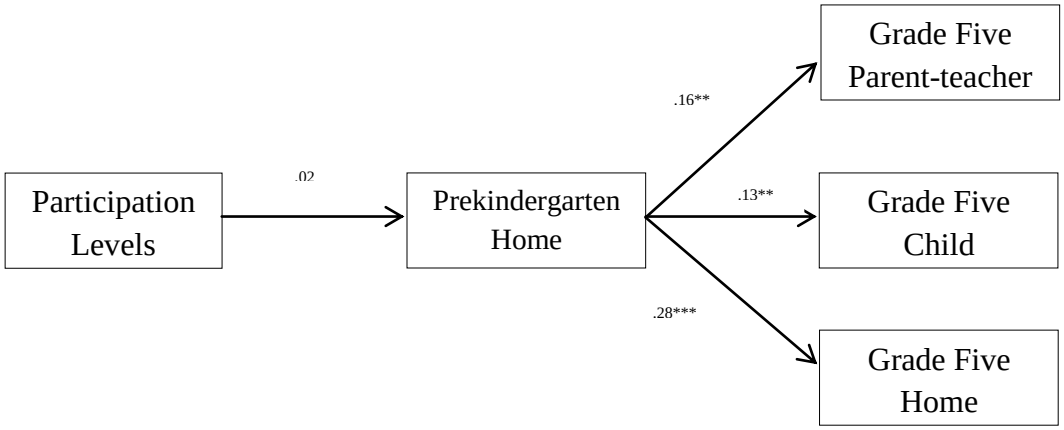
N = 714 Chi square: 4.723 (*df* = 2, *p* = .09) CFI: .964 RMSEA .044



N = 714 Chi square: 5.76 (*df* = 2, *p* = .06) CFI: 950 RMSEA .050



N = 714 Chi square: 6.72 (*df* = 3, p = .08) CFI: .963 RMSEA .042



N = 734 Chi square: 10.54 (*df* = 3, p =.015) CFI: .91 RMSEA .059

***<.001 **<.05 *<.1