

ABSTRACT

Title of Dissertation: AN ASSESSMENT OF A HOME-VISITING INTERVENTION ON RURAL, LOW-INCOME CHILDREN'S SCHOOL READINESS

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School readiness is an important educational success indicator for children and communities, and an equally important educational goal after research revealed that nearly half of all children are not ready for kindergarten because they have not acquired the appropriate necessary pre-literacy, and social competencies (Rimm-Kauffman, Pianta, & Cox, 2000). Rural children are at particular risk given that isolation, poverty, and limited parental educational attainment levels are associated with difficulty learning and getting ready for school (Perroncel, 2000). The purpose of this study was to assess the effects of a home visiting program on school readiness in a population of low-income, rural children in Garrett County, MD.

Children (n=164), who entered the Healthy Families Garrett County program in 1999 or 2000 shortly after birth and completed the school readiness assessment upon kindergarten entry in 2004 or 2005, were selected along with their families. Path analyses were used to examine the relationships among frequency, intensity, and duration of the home visiting intervention, and home safety, parental knowledge of infant development, and school readiness. All variables, (1) home visiting frequency, (2) home visiting intensity, (3) home visiting duration, (4) parental knowledge of infant

development, and (5) home safety were considered to be paths leading directly to the enhanced outcome of school readiness in this low-income, rural sample.

Path analyses revealed that: (1) Duration of home visiting had a positive, direct effect on home safety; (2) Duration of home visiting had a positive, direct effect on parental knowledge of infant development, (3) Home safety had a positive, direct effect on school readiness in the composite and all tested subscales (personal and social, language and literacy, mathematical thinking, physical health and development); and 4) Duration has an indirect effect on school readiness through home safety. Recommendations include maintaining program duration, implementation of new parental knowledge or home environment measures, and continued emphasis on home safety and collaboration with local agencies for impacting school readiness.

AN ASSESSMENT OF A HOME-VISITING INTERVENTION ON
RURAL, LOW-INCOME CHILDREN'S SCHOOL READINESS

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Chapter I

INTRODUCTION

The objectives set forth by the National Education Goals Panel in 1992 (NEGP) established guidelines for school readiness. The National Education Goals Panel, established in 1989 by agreement between the President and all fifty governors, included a special panel of appointees, and subsequently Congressional representatives appointed to set education goals for the nation. The National Education Goals were incorporated into law in March 1994 as part of the Goals 2000: Educate America Act (H.R. 1804), and the first of the six listed goals is to prepare children such that “all children in America [by 2000] will start school ready to learn”. The three listed objectives to facilitate this goal specify that children must: (1) be in good health, (2) have enriching early experiences in the home, and (3) have access to high quality early education (H.R. 1804).

Consequently, school readiness has become an important educational success indicator for children and communities, and an equally important educational goal after research revealed that nearly half of all U.S. children are “not ready” for kindergarten because they have not acquired the appropriate necessary pre-literacy, and social competencies (Rimm-Kauffman, Pianta, & Cox, 2000). Further, in populations where poverty is prevalent, school readiness scores are lower (Gershoff, 2003), and activities that help promote school readiness such as being read to, are less frequently engaged in by those families (Nord, Lennon, Liu, & Chandler, 2000).

Children in rural, low-income families are particularly vulnerable to diminished school readiness. Rural families face stressors including high poverty rates (Economic Research Service, 2004), low educational attainment, elevated school dropout rates

(Paasch & Swaim, 1995), and limited access to health and social services (Lichter, 2000). Risk factors in rural children's environments include isolation, poverty, and limited parental educational attainment often associated with their difficulty learning and getting ready for school (Perroncel, 2000). The combination of low wage employment, low educational attainment, and geographical distances between areas challenge quality service provision to address school readiness for rural children. This pile-up of stress factors leads to the question, "What health, home, and early education interventions can help rural families prepare their children for school?" To answer this question, the school readiness of rural, poor children must be studied in relation to children's health and safety, enriching home environments including parental knowledge, and their access to quality early education.

An appropriate setting to address the above question is Garrett County, Maryland, which forms the northwestern edge of Maryland and is bordered by West Virginia and Pennsylvania. The county is part of the designated Appalachian region, and is poor, rural, mountainous and sparsely populated. Almost two of every five (37.2%) female-headed households with related children under age 18 live at or below the poverty level (U.S. Bureau of the Census, 2000). The median income is 61% of the state median income and many of the available jobs are seasonal and/or part-time with no benefits (Economic Research Service, 2005). Twenty-one percent of adults ages 25 and over do not have a high school diploma or equivalency degree as compared to 16.2% for Maryland, a disparity even more compelling with higher education. Less than 14% of Garrett County adults have a bachelor's degree or higher as compared to 31.4% of adults in Maryland (Economic Research Service, 2005).

The socio-economic and educational challenges faced by the residents of Garrett County appear to be affecting the school readiness of its young children. As of Fall 2005, full school readiness was demonstrated by only 54% of students receiving free/reduced lunch, and 68% of students who did not qualify for these benefits (Maryland State Department of Education [MSDE], 2006). This lack of school readiness indicates that children in Garrett County are at increased risk for academic difficulties. Participation in community programs that directly address school readiness goals may buffer the risk factors. Research regarding the impact of community programs that simultaneously address all three of the objectives for promoting school readiness identified by the National Education Goals Panel (NEGP) has yet to be undertaken, not only in this rural community, but in any area similar to Garrett County, MD. Thus, greater attention to issues related to school readiness and the interventions provided to families in rural settings is warranted.

Healthy Families Garrett County (HFGC) began providing services in 1998 after Maryland approved a statewide initiative to implement Healthy Families America and a community needs assessment in 1997 revealed gaps in existing services (Garrett County Partnership for Children and Families, 2005). The program lists as its main goal: to enhance family functioning by building trusting relationships, teaching problem-solving skills and improving the family's support system, and promoting positive parent-child relationships. The program targets families with children ages 0 to 5, with no income criteria. Healthy Families Garrett County has chosen to provide home visitation as a universal service as opposed to metropolitan sites that often offer home visitation to high-risk families only. HFGC provides support to families, answers questions about

pregnancy and what to eat as well as makes referrals to other community services - such as childbirth classes. HFGC helps parents to identify and respond to their child's needs. The program also provides information on what to expect as the baby grows, making the home "baby safe", and how to encourage optimum development in one's child. Healthy Families Garrett County, like all Healthy Families Maryland programs incorporates Early Head Start and pre-kindergarten programs as part of their resource mix through the use of referrals. Services are provided to at-risk families as determined by a standardized assessment measure: the Family Stress Checklist.

Additionally, adult-oriented programs are designed to enhance the success opportunities for early childhood education. Healthy Families Garrett County has chosen to implement a curriculum with a school readiness focus entitled, "Parents as Teachers" (Parents as Teachers National Center, 2006). According to HFGC administration guidelines, participation in the Parents as Teachers curriculum requires that parents have at least five home visits per year. Thus families who receive only quarterly visits do not participate. Some parents may choose to not participate in Parents as Teachers as it is an enhancement to the core Healthy Families America package and requires parents to complete a parenting exercise facilitated by the home visitor which takes an hour as compared to the half hour non-PAT home visit that focuses more on health goals.

In summary, literature appears to be sparse in the area of multi-modal school readiness programming, particularly in rural areas (Capizzano & Fiorello, 2004). In order to address shortcomings in the literature, and to examine the potential impact of NEGP aligned programming, research must be undertaken to explore the factors predicted to improve school readiness – health, home environment, and quality early education –

particularly in a low-income rural population such as in Garrett County, Maryland.

Exploring the relationship between these three school readiness objectives will maximize the potential for further positive programming. Thus, this research study focused on the extent to which the HFGC program is affecting the school readiness of children in a poor, rural county. Ecological theory was utilized to guide the conceptual model and the research questions. Implications for program development and policy are discussed.

Chapter II

REVIEW OF THE LITERATURE

Children enter the kindergarten classroom with a wide range of skills. Some children may be reading, while others are working on alphabet letter recognition. This range of differences is true not only in the area of literacy, but also represented in children physically, socially, emotionally, and cognitively (Child Trends, 2003). Children who are far behind enter school at a disadvantage compared to their more proficient classmates. Nearly half (46%) of kindergarten teachers surveyed in the late 1990s indicated that at least 50% of the children in their classrooms were not school ready as indicated by poor skills in following directions, poor academic skills, or because of difficulties working with other children (Rimm-Kaufman, Pianta, & Cox, 2000).

Starting off with the lack of skills necessary for school readiness is likely to hinder academic achievement throughout one's school experience. School readiness predicts academic achievement, which is associated with a number of positive outcomes for children across the lifespan. One study found that half of the racial gap in achievement scores of high school students was already evident when children first began school (Duncan & Magnuson, 2005). In rural populations, this same difficulty in catching up can be seen by observing entry and exit from the educational system. Rural children overall are more likely to be placed in special education in kindergarten, and less likely than non-rural children to have parents with at least a bachelor's degree (National Center for Rural Early Childhood Learning Initiatives, 2005).

Children who are ready for school must be exposed to a physical environment that is safe and predictable; to consistent, stable adults who are emotionally invested in them; to

regular routines and rhythms of activity; to competent peers; and to materials that stimulate their explorations and enjoyment of the object world and from which they derive a sense of mastery (Pianta & Walsh, 1996). The NEGP suggests that school readiness has five primary components: (1) physical well-being and motor development, (2) social and emotional development, (3) approaches to learning, (4) language development, and (5) cognition and general knowledge (National Education Goals Panel, 1992).

Several primary factors influencing children's school readiness are their participation in early learning environments, the level of stress in the family, the health and safety status of children, and the early care or preschool environments in the years preceding kindergarten (Hawley, 2000). There is a high need for programmatic intervention in order to address each area of the NEGP goals. The umbrella of early childhood services to promote school readiness usually provides family support and early enrichment at home and school by providing preschool programs, home visiting, nutritional support, health care enrollment and monitoring, child developmental information, and parent education. Thus, several layers of programmatic interventions are necessary to address the dimensions of school readiness.

The Maryland State Department of Education promotes school readiness goals similar to the nationally adopted NEGP goals, and indicates that assessment of young children should use a variety of methods including portfolios-or collections of children's work over time, performance-based assessments, and systematic and ongoing observation (MSDE, 2004). The resultant framework to promote these competencies is known as the Maryland Model for School Readiness (MMSR) and encompasses Maryland's definition

of school readiness, the learning standards, indicators, and objectives for prekindergarten and kindergarten (MSDE, 2004). In order to track progress in the state, a comprehensive and systematic assessment method known as the Work Sampling System (Meisels et al., 1995) is utilized. The Maryland Model indicates that school readiness is a state of early development that results from nurturing family interactions and early learning experiences. A young child said to be school ready “has reached certain levels of social and emotional development, cognition and general knowledge, language development, and physical well-being and motor development” (MSDE, 2004, p.7). If a child is given the opportunity to receive family nurturing and cognitively stimulating interactions with others, in tandem with having good health, then ideally a child should be able to demonstrate competencies in all the assessment areas.

Theoretical Framework

The ecological theory of human development emphasizes the contextual interrelationships that exist between individuals, families, the physical environment, the community, and cultural norms and values of a society. Each of these relationships exerts contextual influence on the individual and is depicted by concentric circles embedded within one another. They are labeled the: microsystem, mesosystem, exosystem, and the macrosystem with each system based on a greater complexity of influence (Bronfenbrenner, 1979). This theory holds that the understanding of human development must take into account environmental aspects beyond the immediate situation containing the subject. For the purposes of this study, the contexts considered are the microsystem (child) and the mesosystem (home visiting program). The subjects in this research are individual children, representing the microsystem. Each child’s

microsystem consists of his/her own distinct temperament, personality, values, abilities, personal beliefs and previous experiences.

Typically, family provides the home environment for the child and is the principle microsystem context in which the young person's development occurs. While all levels exert influence, the family or home has the most immediate impact on the child.

Development in the microsystem is reflected in the activities and roles in which a child engages (Bronfenbrenner, 1989), and was examined in this research by reviewing scores on the Work Sampling System at kindergarten entry. A child's mesosystem includes the relationships between family and other settings such as a community program in which the child interacts and impacts the child directly. The mesosystem includes the linkage between parents and a home-visiting program with all its associated services including home safety help and facilitation of enriching activities and parental knowledge. The overall safety of the home can be measured and activities designed to enhance characteristics at the family level for the well-being of the child. In contrast, in the exosystem are programs or settings that exert their effects on the developing child indirectly through parental behavior and may include the community in which a child lives, and/or where a program is housed. In this case, the rural environment represents the exosystem where the participants for this study lived.

Finally, the macrosystem is the societal level where policy decisions take place. This level sets the guidelines for enhancing school readiness and allocates funding for interventions that promote health, family well-being and quality early education.

Although not directly observed in this study, it is understood that the exosystem and

macrosystem greatly impact service provision and subsequently families' abilities to manage the demands of the other two levels.

Conceptual Model

The early years are critical in preparing children to be ready for school. Yet, the research literature provides limited insight into the experiences and conditions that affect the school readiness of low-income preschool, rural children. Particularly limited are those studies that examine the impact of programs designed to support the interactive role that parents and programs play in their children's early learning and development and children's school readiness outcomes in the mesosystem. The purpose of this study was to examine the effectiveness of one program's interventions on parental knowledge of child development and home safety on rural children's school readiness. See Figure 1 for a depiction of the conceptual model for this study.

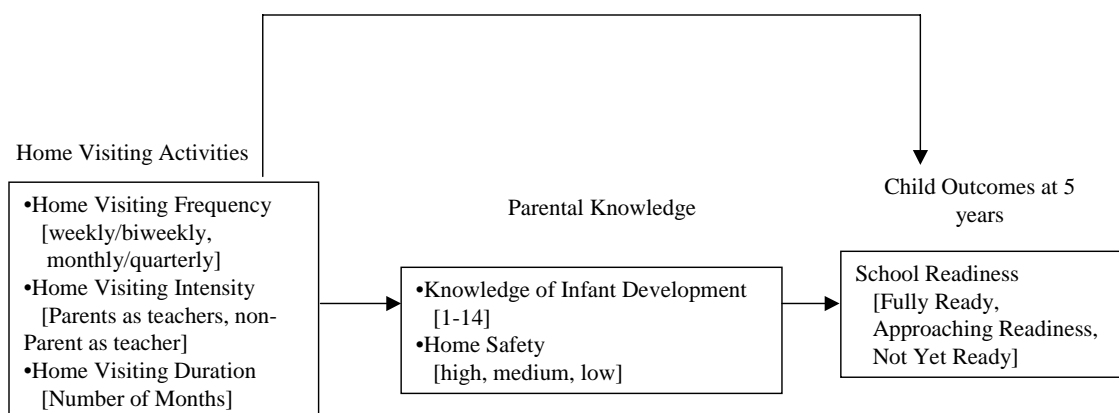


Figure 1. Conceptual Model

Problems in the macrosystem such as poverty increase family stress (Middlemiss, 2003) and make families and communities less able to maximize outcomes for individual members. Rural location exacerbates the problem of poverty by isolating families and creating a lack of access to services (Lichter, 2000; Reinschmiedt, Henry, Weber, Davis, & Lewis, 1999). These stressors often become risk factors that increase the possibility

that rural children will have low school readiness scores (National Center for Rural Early Childhood Learning Initiatives, 2005). In response to these stressors, community programs that support families at the life stage with a new child may serve as a buffer against impeded child school readiness (Bauch, 1994; Davies 1991, Hinson, 1990). Mesosystem activities such as home visiting programs (demonstrated through frequency of contact, duration of participation and type of intervention) impact the family by expanding parental knowledge in the areas of infant development and home safety. Home visiting activities also directly impact the microsystem, or child as the activities themselves often include child participation and foster skills that build school readiness. In addition, enhancing parental knowledge and home safety at the mesosystem or parental level will positively impact the microsystem or individual child's school readiness at five years of age.

Research on school readiness outcomes reveals how family environment, community programs and structural barriers impact children's ability to learn upon kindergarten entry. Ultimately, the child, and his/her school readiness is impacted directly and indirectly by the availability (or lack thereof) of community programs, and directly by parents' abilities to apply the knowledge and ideas suggested by community programs. Structural problems in the macrosystem, such as poverty, isolation and the distribution of funds that impact whether or not programs are implemented also have an impact on children, although the impact was not measured in this research project.

Family environment, including home safety and parental knowledge of development has a direct impact on whether or not children have the necessary competencies to enter school. Programs that provide support through home visiting directly enhance parental

knowledge by providing practical ideas and support, and indirectly affect children's school readiness. Additionally, home safety support that helps parents acquire the resources and ideas they need to make a home safer (such as water testing or baby gates) or cognitively enhances their resources through activities, ideas, or books, directly impacts school readiness by facilitating enriching parent-child interaction during the actual home visit.

Conceptualizing School Readiness

As a national goal, school readiness is of increasing priority and most recommendations align with the National Education Goals Panel recommendations to emphasize early health, home environment, and early education/child care environments. The National Education Goals Panel identifies proficiency in all curricular areas during school years to be important, but mathematics and literacy are independently highlighted (National Education Goals Panel, 1997). Barnett, Lamy, and Jung (2005) in their examination of five state school readiness projects, found that state funded-preschool programs had statistically significant and meaningful impacts on children's early language, literacy and mathematical development for children in low-income families. Numeric skills and other mathematics goals such as shape recognition, and literacy/preliteracy skills are identified as important cognitive skills and examined in Head Start research and the Early Childhood Longitudinal Study (U.S. Department of Education, 2004).

Personal and social development and resultant social skills have been shown to facilitate school readiness and are widely perceived to be an intrinsic portion of school readiness. These measures are also included in comprehensive studies such as the goals

for High/Scope preschool key experience (High/Scope Educational Research Foundation, 2000), and the Early Childhood Longitudinal Study (U.S. Department of Education, 2004). Physical health and development is not traditionally emphasized when reviewing school readiness scores, however participation in a program that targets health and well-being might impact achievement in this area.

The definition of what makes a child “ready to learn” in kindergarten can be difficult to establish. To this end, the National Education Goals Panel identified five domains in which students may be assessed in order to be deemed school ready: (1) physical well-being and motor development, (2) social and emotional development, (3) approaches to learning, (4) language development, and (5) cognition and general knowledge (National Education Goals Panel, 1992). Maryland has its own assessment system focusing on the goals established by the Maryland Model for School Readiness, and assessed by the Work Sampling System (Meisels et al., 1994). School readiness, therefore, can be thought of as mastery in domains related to the goals established by the National Education Goals Panel listed above. Thus, school readiness is comprised of the totality of measured domains, and can also be examined by an individual component. A child can be “ready” socially, but lacking in rudimentary numeracy skills. Children who display measurable lags in developing in any one area, such as literacy or social competence, can be designated as less than “ready for school” in this particular area, even if they are deemed “ready for school” overall in light of their composite scores. For this reason, it is imperative to examine not only composite school readiness scores, but also scores for individual domains in any area that is addressed by an intervention program.

Rural Children and School Readiness

Forty-three percent of the nation's public schools are in rural communities or small towns of fewer than 25,000 people, with 31% of the nation's children attending these schools (Beeson & Strange, 2003). Achievement scores in later school years of rural students lag behind metro counterparts (Paasch & Swain, 1995). Consequently, early intervention and school readiness have increasingly become a focus of rural programming and research. Historically, educational attainment measures such as high school completion and college attendance are lower in rural than non-rural areas (Paasch & Swain, 1995). School readiness is an emerging field of research in rural areas mainly because of difficulty defining rurality, and acquiring educational data that identifies socio-economic factors in non-metro areas (Capizzano & Fiorello, 2004). Subsequently, there is a significant rural information gap as it pertains to school readiness of young children. The National Rural Education Association (2004) acknowledges the importance of interventions for school readiness. The association also lists as a legislative goal the support of educational services for parenting and early childhood programs from birth on, for the purposes of increasing school readiness (2004).

The Early Childhood Longitudinal Study is an ongoing investigation of a nationally representative sample of children who entered kindergarten in fall 1998. The National Center for Rural Early Childhood is launching its own rural to non-rural comparison of these data for the kindergarten cohort. Preliminary results indicate disadvantages in several school readiness areas. Rural children overall are 60% more likely to be placed in special education in kindergarten (National Center for Rural Early Childhood Learning Initiatives, 2005). Given that performance on school readiness tests

is often used to inform special education or alternative placement decisions, these placements may be a direct reflection of rural children being less able to demonstrate academic proficiency upon school entry. In addition, school readiness disparities between rural and non-rural children can be associated with ethnicity. Nearly three times as many Black children in non-rural areas as Black children in rural areas were proficient at identifying the beginning sounds of words (22% vs. 8%). White children from non-rural areas also showed advantages with beginning word sounds when compared to white children from rural backgrounds (40% vs. 26%). Non-rural white children were nearly one and a half times more likely than rural Black children to be proficient in letter recognition upon entering kindergarten (National Center for Rural Early Childhood Learning Initiatives, 2005).

Income distribution makes a difference for school readiness in the rural context. A comparison of standardized test scores from “high-achieving” rural schools with “low-achieving” rural schools in West Virginia revealed that the schools with the lowest test scores had 2.5 times more students receiving free and reduced meals, as well as teachers with lower education levels and less experience (Hughes, 1999). The same study also found that parents gave low positive responses concerning the importance and effectiveness of their rural schools. Given the historically lower rural emphasis on education, it may be possible that the rural environment provides a context that may not emphasize the importance of early activities for promoting school readiness.

Limits in access to recreation, education, and mental health services are problematic for rural families (Sherman, 1992). Difficult economic conditions in rural areas lead to problems within the family, which then predicts child behavior problems (Conger &

Elder, 1994). Overall, rural people depend on the following factors for their well-being: (1) access to critical services, such as education and healthcare, (2) strong communities, (3) natural healthy environments, and (4) availability of good-paying jobs (Lichter, 2000). Given that these are in short supply in many rural areas, they create multiple layers of stress on families. When the normative stressor of having a child is introduced to the family, in addition to multiple rural stressors, the cumulative effect puts the family at risk for crisis.

Additionally, the poverty of many rural communities limits parents' ability to augment their children's education with resources in the home. The lack of job opportunities makes it harder for rural families to see financial payoff for school attendance and success (Bickel & Lange, 1995). Rural parents have lower educational attainment than their non-rural counterparts. In fact, 27% of children in rural areas live with a householder who does not have a high school education or equivalent (Rivers, 2005), and it has been suggested that if parents lack personal experience of education beyond basic skills, education might not be emphasized in the home (Capper, 1993). Finally, barriers to educational success are geographic in nature. Rural adolescents have been reported to express conflict about career aspirations that might necessitate pursuit of higher education because such advancement takes them out of the community and away from friends and family (Gibbs, 1995). The cyclical process of de-emphasizing educational success starts early in rural communities, even before children are school aged, thus impacting school readiness.

Poverty and School Readiness

Poverty can contribute to negative outcomes for children. This relationship is often linear-suggesting as poverty becomes more extreme, so too are the consequences (Aber, Jones, & Cohen, 2000; Duncan, Brooks-Gunn, & Aber, 1997). School readiness scores of children whose incomes are below the poverty level are problematic. Gershoff (2003) found that children in the Early Childhood Longitudinal Study (ECLS) whose families' incomes fell below 200% of the federal poverty level were well below average on kindergarten readiness tests as compared to children whose families reported higher incomes. Nord, Lennon, Liu, and Chandler (2000) in their research on school readiness have found that children with incomes below the poverty threshold are less likely than other children to show signs of emerging literacy, and children with two or more educational risk factors are less likely than other children to recognize all letters of the alphabet.

Since many negative factors relate to poverty, at-risk students have traditionally been defined according to demographics and/or familial characteristics that relate to income variables (Knitzer, 2000; Moore, Zaslow, Coiro, Miller, & Magenheim, 1996; NICHD Early Child Care Research Network, 1999). These characteristics include: low socioeconomic status, family structure, and low educational attainment by parents (Pallas, Natriello, & McDill, 1989). The link between poverty and school readiness has also been found to be related to family dynamics and support. Noble, Tottenham, and Casey (2005), established that children from impoverished backgrounds are at an increased risk for poor academic readiness because of differences in their physical health,

the quality of the cognitive and emotional stimulation they receive at home, their parenting, and their early childhood education.

The Family and Child Experiences Survey (FACES) revealed that community risk factors have a direct bearing on children's school readiness, resulting in 35% of the lower-income four-year-olds participating in the study using unstructured time in unacceptable ways such as aggressive behavior with children or adults. Forty percent were reported to have a difficult time following school-related rules such as waiting for a turn, or following teacher direction (U.S. Department of Health and Human Services, 2003). Social competence and emotional capacity to be "ready" to learn is a prerequisite for academic success, thus these social-emotional deficits are risk factors for lack of school readiness (U.S. Department of Health and Human Services, 2003). Given that poverty and family stress place the child at risk for negative school readiness outcomes, programmatic support that helps families in poverty to build enriching and positive relationships along with positive early educational experiences will support children's kindergarten readiness.

Twenty-one percent of rural children are in families below the poverty level, compared with 18% of children in urban areas (Economic Research Services, 2005). When examining poverty from the vantage point of extreme poverty, metro-non-metro comparisons are even more striking. Fifty-one percent of rural children live below 200% of poverty, compared with 37% of urban children (Rivers, 2005). Rural families tend to be more isolated from support services such as health-care and community assistance programs and they tend to be geographically separated from other members of their own support system or community (Lichter, 2000). Rural areas may have some characteristics

that might make positive outcomes more difficult than in urban areas including issues with public transportation and geographic isolation (Reinschmiedt, Henry, Weber, Davis, & Lewis, 1999). The geographic isolation that exists not only creates stress by heightening the likelihood of financial struggle, but also makes accessibility of social services and access to agencies, including early childhood care virtually impossible. If poverty, lack of access to services, and family stress impact one's ability to be born and remain healthy in the early years, to experience cognitively enriching experiences and family support, and to have access to early formal school environments, then children in rural areas are at a heightened risk for low school readiness.

Family Environment and School Readiness

Parental involvement and school readiness are inextricably linked. When parents are involved in children's learning, there is a positive impact on children's school performance (Yan & Lin, 2002) and social and emotional development (Fantuzzo & McWayne, 2002). Interactions connected to educational activities, such as reading to children daily lead to enhanced reading skills and pre-reading knowledge (Snow, Burns, & Griffin, 1998). Children enter school with higher levels of literacy skills if family literacy, or home emphasis on reading, has been instigated (Nord, Lennon, Liu, & Chandler, 2000). Parenting behaviors can foster both formal and informal learning. For example, when a parent asks a child to count the cookies on a plate, he/she promotes numeracy skills in the child. For this reason, it is important to examine the types of parenting programs related to children's early literacy and their relationship to school readiness in kindergarten. Previous research, from the Early Childhood Longitudinal Studies Kindergarten dataset, found early home resources, including home literacy

environment and home cognitive stimulation predict almost all kindergartners early literacy skills, with the exception of Asian children's reading and math (Lin, 2003).

Children who are exposed to enriching early environments are more apt to later display school readiness. Formal learning programs such as preschool offer opportunities to learn life-skills in a structured context, but informal opportunities in a home likewise provide unlimited chances for a child to learn to count, to read, to seek out knowledge, and to develop social competence. It is critical to augment children's literacy through informal activities (Saracho, 1999), and parents who have the developmental knowledge to provide activities or engage in games will foster school readiness in their children (Saracho, 1997). Parental knowledge includes recognition of skills that children need in order to be school-ready. Enhancing parental skills in introducing letters and numbers in informal ways is crucial. The literacy skills of young children are supported through a variety of adult-directed activities including keeping books in the home and introducing language concepts (Saracho, 2002). Children whose parents provide these literacy opportunities have higher literacy scores (Saracho, 1997). Previous research suggests that reciprocal parental-child interactions facilitate cognitive development (Bornstein, Haynes, O'Reilly, & Painter, 1996; Ketschis, Ryan, & Adams, 1998). Additionally, when parents understand the developmental importance of play, there is an increase in children's school readiness (Lamb-Parker, Boak, Griffin, Ripple, & Peay, 1999).

Parental Knowledge

Early development of low-income, rural, Appalachian children has been studied longitudinally by Fish, Jacquet, and Frye (2003). A group of 100 mothers and children were recruited upon the child's birth and tracked to kindergarten. Language development

was examined at four years and prior to kindergarten entry. The developmental age in the area of language for rural low-income Appalachian children was, on average nearly a full year below their chronological age. Head Start participation made a modest difference, with children attending this early childhood setting having higher total language scores and notably higher language critical thinking scores. Additionally, children whose language scores were higher had more books at home, demonstrated secure attachment as infants, and had mothers who were facilitative with their infants and not over-controlling with their four year olds (Fish, Jacquet, & Frye, 2003). These results suggest that developmental knowledge of a parent, evidenced by displaying developmentally appropriate behaviors, fostering attachments, and providing enriching materials make a difference in the school readiness goal of language development.

With regard to kindergarten performance, teachers were asked to fill out rating scales assessing children's progress across academic areas. Children reported by teachers to be more focused and on-task in kindergarten were also reported to have been more focused and cooperative at 4 years and prior to kindergarten, and they had higher early language scores. In addition, their mothers were low in negative control and the children had more books at home (Fish, Jacquet, & Frye, 2003). Ultimately the children who were successful in school were probably "ready for school" having demonstrated this prior to school entry through higher early language scores.

Even when controlling for other demographic factors such as ethnicity, mothers who are low-income tend to exhibit highly-stressed parenting behaviors and to perceive low support from family and community (Middlemiss, 2003). In fact, by 18 to 23 months, children are more likely to experience delays if they come from environments

characterized by low education, poverty, and high levels of parenting stress. Expressive language delays are prevalent problems that appear to be associated with poor social competence (Horwitz, Irwin, Briggs-Gowan, Hennan, Medoza, & Carter, 2003). Given that social competence and expressive language are identified elements of academic success, these risk factors that predict stress can be considered to have a direct effect on school readiness. In addition, engaged parenting has been identified as a buffer to lower academic achievement and learning problems (Luster & McAdoo, 1994; Zaslow, Dion, Morrison, Weinfield, Ogawa & Tagbors, 1999). Parental interactions have demonstrated significant impacts on socialization outcomes in the cognitive or academic realms (Bettler & Burns, 2003). Additionally, furthering parental understanding of child development helps parents to guide their children's interaction and the early learning environments for their children (Benasich & Brooks-Gunn, 1996; Goodnow & Collins, 1990). Given that some families are at a higher risk of environmental stress, and therefore less able and likely to provide enrichment, family support services are necessary as a supportive family intervention. Family context and parent behavior has been found to make a difference, suggesting that intervention which fosters social support and developmental knowledge enhances children's cognitive outcomes. These results lend credence to the notion that the NEGP goals of promoting early enrichment at home and through formalized education will enhance school performance in kindergarten, and additionally suggest programs that enhance parental knowledge will increase school readiness in children.

Children's Health and Home Safety

Health problems affect a child's school readiness both directly and indirectly. Any substance or risk that impairs a child's physiological growth and development has a direct bearing on all aspects of development. Indirectly, if a family has a child with health problems, the family dynamics may shift such that a child is discouraged from participating in activities that support early learning, or those opportunities may not be available. Programs that support families in promoting children's early developmental outcomes often include home safety measures to ensure that the environment is enriching for children. This intervention further meets the NEGP goal of promoting health as a requirement for school readiness. Children who are exposed to dangerous and toxic environments are less able to meet school readiness goals (Currie, 2005). It is costly to baby-proof a home and to administer tests or make corrections based on lead-levels or other environmental toxins. Nonetheless, the literature suggests exposure to even modest amounts of lead has long-term implications for the cognitive development and functioning of children (Bellinger, Leviton, Waternaux, Needleman, & Rabinowitz, 1987; Coscia, Ris, Succop, & Dietrich, 2003), further impacting school readiness. Many homes, particularly those in poor areas still have lead in the water or paint. These environmental hazards pose risks and also may be an increasingly important cause of disparities in school readiness (Currie, 2005).

Programmatic Approaches for Promoting School Readiness

The NEGP identifies parents as the child's first teacher, and suggests that efforts enhancing the parent-child relationship and home environment facilitate school readiness. One primary way of promoting this parental partnership is to offer home visits for the

purpose of providing parents with the support and knowledge of child development. Additionally, home visiting is specifically targeted as an activity that increases parental knowledge, which enhances home environment and simultaneously enhances school readiness in current legislative efforts. A variety of programs used by educators to address the challenges of rural life have similar characteristics. Features recommended to enhance school achievement for school-age children include parenting education programs and initiatives helping parents provide learning experiences at home (Bauch, 1994; Davies, 1991; Hinson, 1990). In addition, home visiting may empower parents to seek out the best outcomes for their school-aged children. In a setting with historically low educational attainment and risk factors such as poverty, it is imperative to begin the educational process early using the strategies of promoting health, providing parental support through home visiting and increasing access to early childhood education to enhance school readiness.

Home Visiting and the Parent-Child Relationship

Spiker, Ferguson, and Brooks-Gunn (1993) conducted a study to examine the effects of a comprehensive early intervention program for low birthweight, premature infants. Participation in a program for promoting infant health and development was examined as a factor affecting mother-child interaction with 985 infants and their families. The intervention program, which lasted from hospital discharge until the child reached 36 months of age, consisted of weekly home visits the first year, biweekly home visits thereafter, child development center attendance and parent group meetings. Home visiting staff used a problem solving curriculum with parents. Child ratings included task persistence, percentage of time off-task, and enthusiasm for tasks. The overall results for

these child ratings yielded small but significant positive effects and indicated that the intervention program enhanced child behavioral competence and adaptive functioning assessed in the interaction tasks. The authors suggest that these findings demonstrate the positive effects of early intervention on social competence beyond infancy in terms of persistence, involvement, and enthusiastic problem solving while interacting with the mother. Given that these social skills are part of many school readiness inventories, it makes sense to surmise that growth in these areas enhances readiness for school.

Lamb-Parker, Boak, Griffin, Ripple, and Peay (1999) conducted an exploratory study regarding the parent-child relationship, home learning environment, and school readiness. The authors hypothesized that greater parental involvement and the associated development training would lead to enhanced parent-child relationships and enhanced home learning environments. Fostering the parent-child bond, and creating enriching environments would lead to greater school readiness including enhanced behavioral and cognitive preparedness for school. The authors conducted interviews with 173 parents recruited from Head Start centers to assess school readiness through the use of a preschool inventory and a teacher assessment. Changes in the parent-child relationship were found to be associated with improvements in school readiness. Increases in parents' understanding of play and the ability to facilitate learning positively impacted children's independence and creativity/curiosity in the classroom. Negative parenting behaviors such as increased parental aggravation and strictness were associated with areas that would detract from readiness such as increased distractibility and hostility, and lower vocabulary skills. The researchers concluded that enhancing parent-child relationships and learning environments could have crucial roles to play in school readiness promotion.

Home visiting programs, proven successful in other venues, might be particularly helpful for rural families. Although rural populations are under-researched with regard to home visiting and school readiness, home visiting programs generally have been found to heighten parent's skills and confidence. Maternal isolation and poor community health, which in theory are a driving force for home visiting programs, may actually make it less likely that mothers will enroll or engage in home visiting programs (McGuigan, Katzev, & Pratt, 2003). Once parents are involved, however, level of parental participation in home visiting made a difference in caregiver involvement in one rural study, with the highest scores achieved by the parents who attended parenting groups and received home-intervention (Stormshak, Kaminski, & Goodman, 2002). In addition, for these rural families, who were visited by a familiar staff person, there was a significant correlation between dosage (number of home visits) and caregiver involvement scores, though it was not true for groups that did not have a familiar staff person or only participated in group activities. Additionally, participants reported that they were most comfortable with home visiting as an intervention because in the small, rural community where the research project took place, families feared their problems would not be anonymous or confidential (Stormshak, Kaminski, & Goodman, 2002). In fact, 76% of the families in their study preferred home visiting, in spite of attempts to encourage parenting groups (2002). Community context may indeed make a difference in program engagement. According to research, practitioners need to know what services families need and want in order to promote program participation (McGuigan, Katzev, & Pratt, 2003). The preference for home visiting may be higher in rural communities because in

smaller communities, people know one another and privacy is compromised in group settings, but maintained in home visiting.

An additional benefit of the home visiting model for rural families is that the context is more fully understood. To rural families who may already face barriers in seeking out services that are geographically spread apart, home visiting provides an opportunity for families to access what they need without packing up a baby or young child and driving long distances. Rural home visiting programs may understand the unique needs of families in that environment. A variety of service programs in rural environments implement home visiting models, thus acknowledging the important role of home visiting in relation to school readiness.

Parent education components are sometimes added to the home visiting model. Age-appropriate activities and general information regarding a child's age and stage are presented. Parents are given the opportunity to talk through scenarios and to receive modeling and instruction from trained professionals. Few analyses have focused on the educational component within the home visiting model, but center-based programs with a parent-education component report successful outcomes in improving parental ability to solve developmentally appropriate problems (Spiker, Ferguson, & Brooks-Gunn, 1993). Interventions that give parents strategies for promoting developmental growth of the child support school readiness.

Home Visiting Intensity

Some home visiting programs offer the Parents as Teachers (PAT) curriculum training program. PAT states that its mission is to “provide the information, support and encouragement parents need to help their children develop optimally during the crucial

early years of life” (Parents as Teachers National Center, 2005). PAT is closely aligned with the NEGP objective of improving the home environment in the early years to promote school readiness, and also includes screenings and group networks to refer participants to community resources relating to child health, such as immunizations or early education programs. The major thrust of PAT activities revolve around home visits to help parents increase their knowledge of child development and parenting practices, and to empower parents by reinforcing strengths and encouraging educational involvement (Parents as Teachers National Center, 2005).

Wagner and Spiker (2001) found that incorporating PAT into the home visiting model made a difference for school readiness. In a multi-site study with 667 low-income families, parents with infants were randomly assigned to a PAT treatment group or a no-treatment control group. Outcomes from the first two years revealed that participation in PAT was effective in promoting positive parenting behaviors and children’s language and literacy in moderate and low income families. In families who were low income, participation in PAT was associated with a higher likelihood of reading aloud to children, telling stories, singing nursery rhymes and other early literacy activities (Wagner & Spiker, 2001). A follow-up study followed children at age three and found that PAT participating children were more likely to be immunized, and less likely to report injury. Parents were more knowledgeable about child development and showed positive home environment behaviors (Wagner, Iida, & Spiker, 2001). When PAT is combined with exposure to preschool, high-poverty children score above average on school readiness tests (Pfannenstiel, 1999), and PAT participants score higher on school readiness outcomes than children in no-treatment control groups (Coleman, Rowland, & Hutchins,

1997). The PAT home visiting program showed higher school readiness results for children enrolled in prekindergarten or child care centers, although the sample sizes were very small (Maryland State Department of Education, 2005). This Maryland study suggests that multi-modal programming combining NEGP objectives is most effective, and home visiting models that reinforce parental child development knowledge and appropriate practices provide a foundation for school readiness. In legislative efforts including the School Readiness Act of 2005 and the Education Begins at Home Act, PAT is acknowledged as particularly intense and effective, and is identified as an ideal model for home visiting.

Home Visiting Frequency and Duration

Home visiting programs provide a multi-faceted approach to working and intervening with families. In addition to intensity, the frequency of services, whether weekly, twice monthly, or quarterly, also make a difference for parents. Parental involvement has been found to be higher in home visiting when there is a high number of visits and a familiar caregiver (Stormshak, Kaminski, & Goodman, 2002). One natural outcome is that when parents have increased contact with family service workers they will be more engaged in their community services. In other words, parents have more opportunities to ask questions and learn new skills when services are weekly or twice a month, than when they have quarterly or yearly visits. In the same way, family service workers will have increased opportunity to ask questions or help parents monitor safety and their child's growth and development when there is a consistent, frequent visitation schedule. The outcomes of frequent home visiting are difficult to isolate, because parents often qualify for greater home visiting frequency if they are more at risk. Nonetheless, one study in

Jamaica comparing cognitive and health outcomes found that frequency of visits has a positive effect on developmental measures. It was suggested that frequent home visits provide families with consistency and opportunity to build relationships with their family service worker, thereby impacting the effectiveness of the program (Ounce of Prevention Fund, 2003). When parents spend more time with family workers there is enhanced opportunity to develop a relationship and enable parents to drop their guard and ask more questions.

In the same way, duration of services could make a difference. If a family has participated in a program for several years, then all parties are likely to be more invested than if the services were only provided for a few months. A greater number of total visits can be accomplished through frequent home visits providing increased opportunities, which buffer the family immediately in a high-risk period, as well as providing assistance over time if the duration of the home visiting program is extended. The argument for frequency and duration is particularly compelling when examining families at higher-risk. Research has found that mothers who are socially isolated may be difficult to engage in home visitation, thus frequency and duration of outreach efforts must increase when this area of family stress is apparent at outreach or intake (McGuigan, Katzev, & Pratt, 2003). Meta-analyses of home visiting programs reveal that in studies showing positive outcomes for program effectiveness, home visitation was provided for at least one year, whereas programs that are shorter in duration show no significant results (Prilleltensky, Nelson, & Pierson, 2001). Thus, duration of participation is an important consideration when examining the impact of a program on school readiness.

Summary

In general, enhancing the parent-child relationship and the home learning environment, has an important role in promoting school readiness. Home visiting programs affect these positive outcomes by focusing mainly on nurturance, discipline, language and materials (Brooks-Gunn & Markman, 2005). Positive benefits of home visiting have been found in meta-analyses of multiple studies in terms of mother-child interactions, particularly in the area of reducing parental insensitivity (Brooks-Gunn, Fuligni, & Berlin, 2003). These heightened developmental capacities strengthen bonds and promote engagement that is enriching and developmentally appropriate, thereby also promoting school readiness.

The Healthy Families Garrett County Program uses as its motto: “Garrett County children and youth will achieve success within safe and healthy families and communities.” In order to facilitate success, there is a strong programmatic emphasis supporting parental skills that will enhance the social relationships between parent and child. Research has shown that this relationship has an impact on cognitive development, and literacy in particular. Additionally, HFGC includes components that promote health and safety. Finally, the comprehensive services provided under the HFGC umbrella include services such as Parents as Teachers (PAT), with an explicit goal of improving child development and school performance, and Healthy Start with an explicit goal of improving health and safety outcomes. Thus, direct and indirect effects of program effectiveness on school readiness were examined for the purposes of this research. Program evaluation data on service provision and subsequent parental and home scores were examined along with composite Work Sampling Scores and individual subscales

including literacy, social competence, mathematics, and physical health and development.

Research Questions and Hypotheses

The current study appears to be the first investigation of the impact of a multi-tiered NEGP-aligned program approach on school readiness in a rural population. The overall goals for this research study were to examine the relationship between different levels of home visiting services to parents and the resultant school readiness of their children, and to examine parental child development knowledge and home safety that mediate the relationship between program participation and school readiness in a sample of low-income, rural children. In addition, the direct relationship between home safety and parental child development and school readiness were examined.

The research questions and their resulting hypotheses for this project were:

- 1) Does home visiting frequency predict children's school readiness?

H₁=High home visiting frequency will predict high school readiness composite scores at five years.

H₂=High home visiting frequency will predict high school personal and social competence domain scores at five years.

H₃=High home visiting frequency will predict high language and literacy domain scores at five years.

H₄=High home visiting frequency will predict high mathematical thinking domain scores at five years.

H₅=High home visiting frequency will predict high physical health and development domain scores at five years.

2) Does home visiting intensity predict children's school readiness?

H₆=High home visiting intensity will predict high school readiness composite scores at five years.

H₇=High home visiting intensity will predict high personal and social competence domain scores at five years.

H₈=High home visiting intensity will predict high language and literacy domain scores at five years.

H₉=High home visiting intensity will predict high mathematical thinking domain scores at five years.

H₁₀=High home visiting intensity will predict high physical health and development domain scores at five years.

3) Does the duration of home visiting service predict children's school readiness?

H₁₁=High home visiting duration will predict high school readiness composite scores at five years.

H₁₂=High home visiting duration will predict high social competence domain scores at five years.

H₁₃=High home visiting duration will predict high language and literacy domain scores at five years.

H₁₄=High home visiting duration will predict high mathematical thinking domain scores at five years.

H₁₅=High home visiting duration will predict high physical health and development scores at five years.

4) Does home visiting predict parental knowledge of child development?

H₁₆=High home visiting frequency will predict high knowledge of infant development.

H₁₇=High home visiting intensity will predict high knowledge of infant development.

H₁₈=High home visiting duration will predict high knowledge of infant development

5) Does home visiting predict home safety?

H₁₉=High home visiting frequency will predict higher home safety scores at 12 months.

H₂₀=High home visiting intensity will predict higher home safety scores at 12 months.

H₂₁=High home visiting duration will predict higher home safety scores at 12 months.

6) Does parental knowledge of child development predict children's school readiness?

H₂₂=High knowledge of infant development in infancy/toddlerhood will predict high school readiness composite scores at five years.

H₂₃=High knowledge of infant development in infancy/toddlerhood will predict high personal and social competence domain scores at five years.

H₂₄=High knowledge of infant development in infancy/toddlerhood will predict high language and literacy domain scores at five years.

H₂₅=High knowledge of infant development in infancy/toddlerhood will predict high mathematical thinking domain scores at five years.

H₂₆=High knowledge of infant development in infancy/toddlerhood will predict high physical health and development scores at five years.

7) Does home safety predict children's school readiness?

H₂₇=High home safety will predict high school readiness composite scores at five years.

H₂₈=High home safety will predict high personal and social competence domain scores at five years.

H₂₉=High home safety will predict high language and literacy domain scores at five years.

H₃₀=High home safety will predict high mathematical thinking domain scores at five years.

H₃₁=High home safety will predict high physical health and development scores at five years.

8) Does home visiting have an effect on school readiness by increasing home safety scores?

H₃₂ =The relationships between high level of frequency, intensity, and duration of service and high school readiness composite scores will decrease when controlling for high home safety.

H₃₃ =The relationships between high level of frequency, intensity, and duration of service and high personal and social competence domain scores will decrease when controlling for high home safety.

H₃₄ =The relationships between high level of frequency, intensity, and duration of service and high language and literacy domain scores will decrease when controlling for high home safety.

H₃₅ =The relationships between high level of frequency, intensity, and duration of service and high mathematical thinking domain scores will decrease when controlling for high home safety.

H₃₆ =The relationships between high level of frequency, intensity, and duration of service and high physical health and development domain scores will decrease when controlling for high home safety.

- 9) Does home visiting have an effect on school readiness by increasing parental knowledge of infant development scores?

H₃₇ =The relationships between high level of frequency, intensity, and duration of service and high school readiness composite scores will decrease when controlling for high parental knowledge of infant development.

H₃₈ =The relationships between high frequency, intensity, and duration of service and high personal and social competence domain scores will decrease when controlling for high parental knowledge of infant development.

H₃₉ =The relationships between high frequency, intensity, and duration of service and high language and literacy domain scores will decrease when controlling for high parental knowledge of infant development.

H₄₀ =The relationships between high frequency, intensity, and duration of service and high mathematical thinking domain scores will decrease when controlling for high parental knowledge of infant development.

H₄₁ =The relationships between high frequency, intensity, and duration of service and high physical health and development domain scores will decrease when controlling for high parental knowledge of infant development.

Chapter III

RESEARCH METHODS

Population

The population eligible for enrollment in Healthy Families Garrett County (HFGC) consists of all expectant mothers and families with newborns (less than three months of age) who reside in Garrett County, Maryland. Services are offered until the target child reaches age five or transitions into another early childhood program. Between 1999 and 2004, HFGC provided services to approximately 55% of all estimated eligible families for a cumulative total of 1,029 families. Of those receiving intensive services, 81% had annual incomes below \$20,000. Approximately 80% of families were enrolled prenatally or within two weeks of delivery. Families are made aware of the program through a variety of sources including: enrollment in the State Child Health Insurance Plan; the Women, Infants, and Children program (WIC), childbirth classes, personal physicians, referrals, Garrett County Memorial Hospital, and the Garrett County Personal Health-Family Planning Center. Additionally, HFGC reports strong relationships with other community programs and organizations including Cooperative Extension and Head Start. Informal partnerships between programs and organizations result in many self, family, and friend referrals.

Sample

There were two groups of children in the final sample for a total of 164 children. The first subset of children (n=90), who entered the Healthy Families Garrett County program in 1999 as infants and completed the Work Sampling System (WSS) in 2004 were selected from the total population of HFGC families. Included in the subset were 50 boys

and 40 girls with mean age of 5.33 years. The remaining subset of the sample was comprised of 74 Kindergarten children (42 boys and 32 girls), with a mean age of 5.42 years, who were enrolled in HFGC in 2000 as infants and completed the WSS in the fall of 2005. For both subsets, all of the children were Caucasian and none of the children had limited English proficiency status.

Procedure

The data for this study were collected from all participating families in Garrett County Healthy Families over five years, 1999 to 2004. Once families are referred by either a formal or informal collaborating partner, they are contacted by a family assessment worker who arranges an intake home visit. At the first home visit, the family assessment worker has the family fill out a consent form, and a family stress measure is administered to the mother and/or father or father figure. The results of the family stress measure determined the level of home visiting services offered, based on the highest score from either parent. Parents may choose to accept a lower level of service, if they feel that the frequency of home visiting will be too intrusive, or the intensity of the Parents As Teachers curriculum will be too invasive, although HFGC reports that parents typically accept services at the recommended level. Garrett County Healthy Families home visiting is carried out by a paraprofessional family assessment worker who is trained and certified by Parents As Teachers (PAT). The family assessment worker comes to the primary home of the child and works with the parents on developmental outcomes by making suggestions, following up on programmatic goals jointly set by the parent and worker, and introducing developmental information and activities. The Knowledge of Infant Development Index (MacPhee, 1981) is administered during the first 30 months.

The Home Safety Scale (Healthy Families Maryland, 2002) is completed upon program entry within the first few visits and annually or sooner if a family moves to a new residence within Garrett County. For this research project, the 12-month score was used to examine the effect of home safety. The kindergarten entry WSS is completed in the beginning of the school year with children in their classroom at school. Early care environment at four years is indicated on the Work Sampling System in Kindergarten. Home visiting levels are monitored quarterly. Approval for this project was obtained by the University of Maryland Human Subjects Review Committee (see Appendix G).

Instruments

School Readiness

School readiness is assessed using the Work Sampling System Preschool Developmental Checklist (Appendix C). The WSS, which is used across the state of Maryland to assess school readiness, documents children's skills, knowledge and behavior across curricular areas (Meisels, Jablon, Marsden, Dichtelmiller, & Dorfman, 1994). There are seven major domains used to observe the child: (1) personal and social development, (2) language and literacy, (3) mathematical thinking, (4) scientific thinking, (5) social studies, (6) the arts, and (7) physical development and health. The scale is completed by the classroom teacher and a score is given indicating if a child's proficiency in a domain reflects that he/she is developing readiness (1), approaching readiness (2), or fully ready (3). A sum is then calculated for the values of each of four or six indicators from each of the domains separately and added together for a composite score. For the purposes of this study, the composite score was examined, as well as each of the following subscales:

(1) personal and social development, (2) language and literacy, (3) mathematical thinking, and (4) physical development and health. The other three domains which examine skills for learning about science, social studies, and the arts were not examined because these areas have not been connected in the research to home visiting programs and HFGC does not specifically target these areas for improvement.

The personal and social development learning domain is assessed by examining developmentally appropriate social competencies such as seeking out play and learning experiences without teacher direction, task perseverance, self-direction, and following established routines. Social self-regulation is demonstrated by students initiating and maintaining relationships with peers-including skills such as turn taking, and seeking adult help. Students should demonstrate that they can participate cooperatively in group activities and exhibit caring, concern, and empathy for others. Showing eagerness and curiosity as a learner and attending to learning tasks with guidance are positive indicators of student demonstration in learning and study skills to new tasks (MSDE, 2004).

The language and literacy development domain is demonstrated through speech, written activities, emergent reading and listening. Indicators of language and literacy include phonemic awareness-or the ability to discriminate sounds and recognize that each sound is represented by a letter or letter combination. The ability to identify initial and ending sounds, rhymes, and alliteration are all parts of phonemic awareness. General reading skills are the processes that enable students to develop their knowledge of sound/symbol relationships to decode unfamiliar words with fluency. Letter identification, and the reading of common words (sight words) such as colors, frequently occurring words, or one's name are important strategies that must be demonstrated as

well as an ability to comprehend written material using a variety of cues. Children must also demonstrate an ability to understand word meaning and increase vocabulary, as well as show competencies by writing or prewriting using their phonemic awareness, fluency, vocabulary and other reading strategies (MSDE, 2004).

The mathematical thinking domain is demonstrated by showing proficiency in the concepts of patterns, quantity, shape attributes, order, measurement, and numeral-symbol relationships. Students must also use strategies to solve mathematical problems and demonstrate solutions to these problems using manipulative representations and a written form (MSDE, 2004).

The physical development and health subscale involves fine and gross motor control, knowledge of dietary practices, and health and hygiene that allow children to fully participate at their own level in physical and health related activities. Indicators for physical development include being able to move with balance and control and coordinating movement to perform simple tasks. Age appropriate activities associated with this goal would include walking, jumping, and hopping. Basic health and safety rules are indicated by children being able to identify that in an emergency one would contact an adult and explain that the human body needs food for health (MSDE, 2004).

Students are evaluated for readiness in 30 specific behaviors aggregated into the previously listed domains. A sum is then calculated for the values of four indicators from six of the domains and the values of six indicators from the domain language and literacy. For the language and literacy domain, consisting of the six indicator items, scores can range from 18 to 6 (18-15=fully ready, 14-10=approaching readiness, and 9-6=developing readiness). For the other domains of personal and social development, mathematics, and

physical development and health the scores can range from 12 to 4 (12-10=fully ready, 9-7=approaching readiness, and 6-4=developing readiness). For the composite scores, children may score from 90 to 30. Children are considered to be fully ready if they achieve an overall score of 90-71, approaching readiness if they score 70-50, and developing readiness if they score 49-30. Overall readiness scores are frequently presented as overall percentages of children deemed fully ready according to their WSS score on individual domains and the composite score. The Work Sampling System was determined to have a high internal reliability, Cronbach's $\alpha=.95$ (Meisels, Liaw, Dorfman, & Nelson, 1995), and validity has been examined by comparing the relatively new Work Sampling System to the more established Woodcock Johnson Psychoeducational Battery. The correlation coefficients between the subscales of the WSS and the Woodcock Johnson battery ranged for kindergartners from .45 to .62 (Meisels, Bickel, Nicholson, Xue, & Atkins-Burnett, 2001). According to the author, S. Meisels (personal communication, May 17, 2006), the Work Sampling System has not previously been used in research that focuses on rural children.

Home Visiting Variables

Data regarding home visiting intensity, duration, or frequency are included in the HFGC database as program evaluation variables. Frequency of home visits reflects whether families received weekly home visits (high frequency=5), biweekly home visits (moderate frequency=4), monthly home visits (low frequency=3), quarterly (very low frequency=2), and semi-annual visits (nominal participation=1). Intensity is indicated by whether or not parents participated in the Parents As Teachers curriculum (yes =1, no=0). Duration of home visiting equals the total number of years that parents participated in the

program between the first visit and program termination ranging from less than one year to six years.

Home Safety

The Home Safety Scale (Appendix D) used by Healthy Families Maryland, and provided by Healthy Families Garrett County is an 11-item scale that assesses if a home is childproof, and safe for inhabiting. Sample items include whether smoke detectors are installed, or well water has been tested within the last year. The home visiting worker completes this scale upon program entry and annually, as well as each time a family moves. Each of the 11 questions is coded as yes=2, and no=0. The final score is computed by adding the responses from all questions. Scores could range from 22 to 0. A high home safety rating results if scores range from 22-18. A medium home safety rating results if scores range from 17-13, and a low rating results if the score is 12 or lower. Reliability and validity information are not available on this scale, and responses for this sample were analyzed using the coded High/Medium/Low data provided by HFGC. For the purposes of this research 12-month Home Safety Scale scores were used.

Knowledge of Infant Development

The Knowledge of Infant Development Inventory (KIDI) developed by MacPhee (1981) is a 14-item abbreviated scale taken from a 58-item, self-administered scale reflecting parents' knowledge of how infants and children behave and develop, and how best to care for them (Appendix E). A supervisor from Healthy Families Garrett County modified the scale, in order to reduce the amount of parental time spent filling out a measure. The fourteen items included were selected on the basis of preference by the supervisor. Although titled, "Knowledge of Infant Development Index", the abbreviated

scale contains a number of measures that assess parental knowledge into the toddler and preschool years. Healthy Families Garrett County has established this instrument as a dichotomous pass/fail measure, with an established guideline of 7 or higher as passing. In this sample, the data were analyzed with all fourteen items to determine scaling. The KIDI in its original form has demonstrated strong psychometric properties, has been proven sensitive to intervention effects, and the author reports that it has been widely used (MacPhee, 1981). The 58-item KIDI displays an internal reliability of .82 and with regard to validity, the author reports that most issues commonly found in the literature on parent concerns or well-child care are included on the KIDI (MacPhee, 1981). Internal reliability and validity measures could not be completed with the abbreviated 14-item scale because the responses by individual question were not available from HFGC. Additional challenges with the use of the KIDI scores included a wide range of administration time from prenatal to two years for an initial measure, and only families who received higher frequency visits taking the scale more than once. As a result, there are substantial missing data for this variable; thus linear interpolation is used to replace missing cases.

Early Care Environment

Data on early care environment are provided through school report of parental response on the WSS in kindergarten. On their child's kindergarten registration forms, parents respond to the question, "In what kind of early care (other than home or care by a relative) did the child spend most of the time since September [of the year preceding preschool]?" When information is not provided on the registration form, the teacher is instructed to follow-up to determine the type of early care at four years. The possible

responses include: Head Start, prekindergarten, child care center, family child care, non-public nursery school, and kindergarten. Informal and home care are also provided as options on the WSS in the absence of other more formalized care settings (MSDE, 2005). For the purposes of this study, the early care environments have been grouped into public (including Head Start, pre-kindergarten), private (child care center, family child care, and non-public nursery school), and home/informal care. The coding followed numerical assignments, though the variable was treated as categorical (public=3, private=2, home/informal=1). This variable was used as a control.

Income

Data on income are not available and might be an unreliable measure given that this population often works seasonal jobs. County data suggest that the poverty rate in Garrett County exceeds the rest of the state, but these data are not available for the individual cases in this study. Enrollment in the Free and Reduced Meals program in kindergarten was provided by the Garrett County Board of Education with the Work Sampling System scores and was used as a proxy for income in this research design as a control variable. Free and Reduced Meals eligibility is determined by household size and income. Approximately 46% of Garrett County elementary school students are enrolled in the Free and Reduced Meals program, as compared to 38% enrollment for the state of Maryland (Maryland State Department of Education, 2005). Free and Reduced Meals (FARM) Rate is a standard inclusion on school readiness reports by the Maryland State Department of Education.

Analyses

Descriptive analyses were conducted to describe the demographic characteristics of the sample including family income, type of child care arrangements, and parental level of education. Additionally, descriptive analyses described the frequency, duration, and intensity of home visiting services, parental knowledge of infant development, home safety and children's school readiness characteristics of the sample. Pearson's Product-Moment correlation coefficients were computed to examine the relationships among all non-dichotomous variables.

Path analysis on the manifest variables was employed to examine the conceptual model. Path analysis is a linear, causal statistical modeling technique. It is used to measure the direct and indirect effects of variables hypothesized as causal. Path analysis is a specific use of multiple regression that parcels out sources of variance by calculating coefficients equal to standardized regression coefficients, and enables analyses of dependent variables' influences on each other as indirect effects to the outcome variable. Income and type of child care reported the year before kindergarten were controlled for during the analysis.

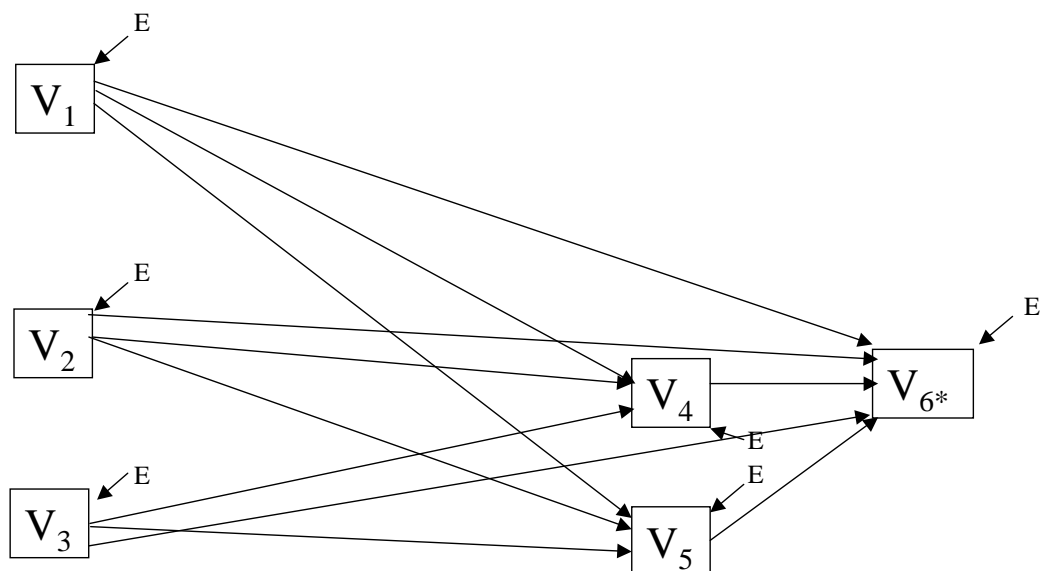
It is hypothesized that home visiting program interventions have both direct and indirect effects on school readiness, and direct effects on home safety and knowledge of infant development. See Figure 2 for a depiction of the path analysis model. The model proposed relationships between the variables of home visiting frequency (V1), home visiting intensity (V2), home visiting duration (V3), knowledge of infant development between 12 and 30 months of age (V4), home safety (V5), and the school readiness composite score (V6). Income and type of child care the year before kindergarten were

included as control variables. The model also was used to examine the effect of home visiting frequency, intensity, and duration, and parental knowledge and home safety on individual WSS subscales: social competence (V7), literacy (V8), mathematics (V9), and health (V10). Income and type of child care the year before kindergarten again were included as control variables. The path analysis was repeated for each subscale in place of the composite score in order to examine individual areas of readiness including: social competence (V7), literacy (V8), mathematics (V9), and physical health and development (V10).

The model included direct causal effects from home visiting variables (V1, V2, V3) to school readiness (V6), knowledge of infant development by 30 months of age (V4) to school readiness (V6), and home safety at one year (V5) to school readiness (V6). Direct causal effects were also observed between the home visiting variables (V1, V2, V3) to knowledge of infant development (V4) and home safety (V5). Additionally, the model predicted indirect causal effects from home visiting variables (V1, V2, V3) to children's school readiness through the relationship between home visiting involvement (V1, V2, V3) and the 30-month scores of knowledge of infant development (V4) and home safety (V5). The model is an over-identified recursive model with manifest variables.

The covariance matrix was used as the foundation of the analyses, which was conducted with the use of EQS 6.1 statistical software. The analyses used the maximum-likelihood method of parameter estimation with all analyses performed on the variance-covariance matrix. In terms of the model fit, chi-square and several fit indices were used to test the null hypothesis that the model would fit the data.

Based on the relevant literature, a model to graphically represent the relationships among the observed variables was designed. The results of the analysis determined the specification searches conducted to improve the model.



V₁=Home Visiting Frequency
 V₂=Home Visiting Intensity
 V₃=Home Visiting Duration
 V₄=Knowledge of Infant Development

V₅=Home Safety
 V₆=School Readiness Composite*
 V₇=Social competence subscale
 V₈=Literacy subscale
 V₉=Mathematics subscale
 V₁₀=Health subscale

Figure 2. Path Analysis Model

Exposure to enriching home environments was observed in the context of service provision. By examining the level of program service, with an emphasis on home visitation, it is possible to determine if the level of frequency, intensity, or duration of home visiting helps to predict school readiness. Health and safety were examined by looking at home safety scores. Also considered were parental perception of developmental competencies and home safety. All variables: ((1) home visiting

frequency, (2) home visiting intensity, (3) home visiting duration, (4) knowledge of infant development, and (5) home safety were considered to be paths that lead to the enhanced outcome of school readiness in a low-income, rural sample.

Chapter IV

RESULTS

The primary purpose of this research was to investigate home and program environments that influence children's school readiness at kindergarten entry by looking at the direct influences of home visiting variables, parental developmental knowledge, and home safety; and by examining the mediating and indirect effects of home visiting on parental knowledge and home safety in a sample of rural children.

Missing Data

In assessing the results from Healthy Families Garrett County, missing data were found for the Knowledge of Infant Development Index (KIDI) scores. Families were to take the KIDI upon program entry for a baseline score and annually if receiving higher levels of service (twice monthly or weekly). In the first cohort (n=90), the KIDI was administered, but not necessarily at program entry. The time range of KIDI administration ranged from prenatally to 24 months after child's date of birth, with a mean of 17.17 months (SD=9.25 months) for KIDI administration. In the second cohort (n=74), many families had a baseline score upon program entry, but other families received their baseline after participating in HFGC for a period of several months, with a mean of 13.00 months (SD=11.3 months) for KIDI administration. In both cohorts, families who received a lower level of service (monthly or quarterly) did not complete the KIDI a second time or at all. For the purposes of this research project, KIDI scores were used if they were taken after program services were rendered for at least two months after the child was born, because at this time all participants had received home visits. Some KIDI scores were discounted because they were completed prior to the

child's birth, and many families did not report KIDI scores (n=48 in Cohort I, n=34 in Cohort II). Table 5 depicts the frequency of KIDI scores. Linear interpolation was used to replace the missing KIDI scores. All cases in the model were examined, including both interpolated KIDI scores and cases with recorded KIDI scores. There were no differences in the significance or occurrence of any paths in the multivariate analyses based on the interpolated or recorded KIDI score.

Descriptive Analyses

Descriptive statistics, including frequencies, means, and standard deviations were used to summarize the demographic information of families, using SPSS statistical package version 14.0. These variables included frequency, intensity, and duration of home visiting, knowledge of infant development, home safety, and school readiness composite and subscale scores. In addition, income was examined by using free and reduced meals rate. Prior child care the year before kindergarten was also examined as these variables were controlled for during the multivariate analyses. Demographic information was further analyzed by comparing characteristics of the two cohorts, using independent t-tests for continuous data and Chi-Square tests for nominal data analysis (intensity). Finally, Pearson's Product-Moment correlation coefficients, Eta coefficients, or Phi coefficients and point-biserial Pearson's Product-Moment correlation coefficients were computed to examine the relationships among all variables.

The means and standard deviations suggested that students and parents demonstrated a range of frequency of services and were more likely to receive lower levels of service (quarterly or monthly), than the highest levels of service (weekly or twice monthly). Parents signed up for longer periods of time, with nearly 75% in cohort I, and 78% in

cohort II staying in HFGC for 4 years or longer. The mean and standard deviations also revealed that most parents got a higher than passing (7/14) score on the KIDI, and high (versus medium or low) home safety ratings, and that most children achieved high scores on the school readiness measure composite and all subscales. Given that the skewness and kurtosis of the data were minimal as presented in Table 1, the Maximum Likelihood Estimation method was used to test the fit of the conceptual model to the data for the path analyses.

Table 1

Descriptive Statistics for Path Model Variables for Total Sample

Variable	Mean	SD	Range	Scale Range	Skew	Kurtosis
Frequency ^a	2.73	.93	1-5	1-5	.70	-.10
Intensity ^b	.66	.48	0-1	0-1	-.68	-1.56
Duration ^c	4.62	1.52	1-6	1-6	-.84	-.53
Knowledge of Infant Development	10.9	2.27	5-14	1-14	-.53	-.28
Home Safety ^d	2.72	.48	2-3	1-3	.19	.567
Readiness Composite	75.12	15.19	30-90	30-90	-1.02	.44
Personal/Social	10	2.17	4-12	4-12	-1.00	.27
Language/Literacy	14.75	3.46	6-18	6-18	-.97	.10
Mathematical Thinking	9.85	2.40	4-12	4-12	-.85	-.39
Physical Health and Development	10.75	1.84	4-12	4-12	-1.85	3.31

Note: SD=Standard Deviation.

^aOnce/twice per year, Quarterly/five times per year, Monthly, Twice-monthly, Weekly

^bParticipation/non-participation in Parents as Teachers. ^cDuration in years. ^dHigh and Medium/Low

Cohort I

The first cohort, entered the HFGC program in 1998/1999 and entered kindergarten in September, 2004. These children were all Caucasian, and the group included 90 children

with 50 boys and 40 girls. Income was not reported, but 58% of the children (n=52) received free or reduced meals in kindergarten. Sixty-eight percent of the children (n=61) participated in Head Start or pre-kindergarten with a nearly even split the year preceding kindergarten. Ten children were in family child care or a child care center (11%), 18 children were at home (20%), and 1 child had missing data for this variable.

Cohort II

The second cohort, entered the HFGC program in 1999/2000 and entered kindergarten in September 2005. These 74 children also were all Caucasian. Forty-two children were boys and 32 were girls. Forty percent of the children (n=37) received free or reduced meals in kindergarten. Sixty-four percent (n=47) participated in Head Start, Early Head Start or pre-kindergarten. Six children (8%) participated in child care programs. A large group of children were reported to be at home the year before kindergarten (28.4%; N=21).

Home Visiting Frequency

In the first cohort, more than three-quarters of the children (n=71; 78.9%) received services monthly or quarterly/five times per year. As depicted in Table 2, only 14 subjects (14.5%) received more frequent home visits. In cohort 2, nearly three-quarters received monthly or quarterly/five times per year visits (n=55; 74.3%), and 19 (25.7%) received home visits weekly or twice-monthly. There was a statistically significant difference between cohorts ($t=-2.18, p=.03$), due to the fact that cohort II parents received a slightly higher frequency of services, thus cohort was controlled for in the multivariate analyses.

Table 2

Home Visiting Frequency by Cohort

Frequency of Home Visiting Program	Cohort I Count (Percent)	Cohort II Count (Percent)	Total Count (Percent)
Quarterly/Five times per year	43 (47.8%)	32 (43.2%)	75 (45.7%)
Monthly	28 (31.1%)	23 (31.1%)	51 (31.1%)
Twice-Monthly	12 (13.3%)	13 (17.6%)	25 (15.2%)
Weekly	2 (2.2%)	6 (8.1%)	8 (4.9%)
Annual/semi-annual	5 (5.6%)	0 (0%)	5 (3%)
Total	90 (100%)	74 (100%)	164 (100%)

Home Visiting Intensity

More than half of the parents (108/164) were enrolled in the Parents as Teachers program (PAT). As shown in Table 3, parents who enrolled in HFGC during cohort II signed up for PAT in greater numbers than cohort I and this difference was significant as shown in Table 7 ($t=-4.37, p=.00$), consequently, cohort was controlled for in the multivariate analyses.

Table 3

Home Visiting Intensity (Parents as Teachers) by Cohort

PAT	Cohort I	Cohort II	Total
Enrolled	47 (52.2%)	61 (82.4%)	108 (65.9%)
Not Enrolled	43 (47.8 %)	13 (17.6%)	56 (34.1%)
Total	90 (100%)	74 (100%)	164 (100%)

Home Visiting Duration

Parents' length of time enrolled in the program varied. Many participants stayed enrolled until kindergarten entry at age five (six years of duration), in effect maxing out the program as shown in Table 4. The mean number of years of home visiting duration was 4.48 years for cohort I and 4.78 years for cohort II. There was no statistically

significant difference between the two cohorts for home visiting duration ($t=-1.29$, $p=.20$).

Table 4

Home Visiting Duration in Years by Cohort

Duration	Cohort I	Cohort II	Total
1 year or less	3 (3.3%)	2 (2/7%)	5 (3%)
2 years	12 (13.3%)	7 (9.5%)	19 (11.6%)
3 years	9 (10%)	7 (9.5%)	16 (9.8%)
4 years	11 (12.2%)	8 (10.8%)	19 (11.6%)
5 years	25 (27.8%)	15 (20.3%)	40 (24.4%)
6 years	30 (33.3%)	35 (47.3%)	65 (39.6%)
Total	90 (100%)	74 (100%)	164 (100%)

Knowledge of Infant Development

Table 5 illustrates the range of respondents' scores for the Knowledge of Infant Development Index (KIDI). None of the participants in the first cohort achieved a score lower than 7/14. According to the criteria for HFGC, an 8/14 is passing, and under these criterion only 8/164 subjects from the two cohorts failed to meet this passing criteria. Half of the HFGC participants in this sample ($n=82/164$) did not complete the KIDI scale and were unable to be assessed in this area. There was no statistically significant difference between the two cohorts on this variable ($t=-.87$, $p=.39$) as shown in Table 7.

Table 5

Frequency Scores on the Knowledge of Infant Development Index

KIDI Score	Cohort I	Cohort II	Total
5	0 (0%)	2 (2.7%)	2 (1.2%)
6	0 (0%)	0 (0%)	0 (0%)
7	5 (5.6%)	1 (1.4%)	6 (3.7%)
8	2 (2.2%)	4 (5.4%)	6 (3.7%)
9	4 (4.4%)	1 (1.4%)	5 (3.0%)
10	8 (8.9%)	7 (9.5%)	15 (9.1%)
11	6 (6.7%)	3 (4.1%)	9 (5.5%)
12	10 (11.1%)	10 (13.5%)	20 (12.2%)
13	2 (2.2%)	4 (5.4%)	6 (3.7%)
14	5 (5.6%)	8 (10.8%)	13 (7.9%)
Missing	48 (53.3%)	34 (45.9%)	82 (50%)
Total	90 (100%)	74 (100%)	164 (100%)

Home Safety

The Home Safety Scale (HSS) scores at one year were high for both groups as seen in Table 6. In the first cohort, no parents failed the assessment, and in the second cohort, only two subjects got a low score. Fifteen cases in the first cohort, and three in the second were unable to be assessed on home safety, as they exited the program before the one-year HSS scale was administered. For the purposes of the multivariate analyses, the two low scores were combined with the medium scores and only two groups were used for comparison, high and medium/low. As displayed in Table 7, home safety did not yield any statistically significant differences between the two cohorts ($t=1.067$, $p=.29$).

Table 6

Home Safety Scale Scores at 12 months by Cohort

Home Safety Score	Cohort I	Cohort II	Total
High	61 (67.8%)	50 (45.0%)	111 (67.7%)
Medium/Low	14 (15.6%)	21 (28.4%)	35 (21.3%)
Unknown	15 (16.7%)	3 (4.1%)	18 (11.0%)
Total	90 (100%)	74 (100%)	164 (100%)

Cohort Differences on Path Model Variables

Differences between cohorts were examined using t-tests for all variables used as controls or as observable paths. Most of the t-tests were non-significant suggesting that including all 164 cases together would be an appropriate method for testing the path model. Differences by cohort were suggested for two levels of service (frequency and intensity) and these variables were controlled for by cohort membership in the path model. T-tests were also conducted to check for differences in kindergarten readiness by gender, but were not significant in the school readiness composite or any subscales.

Table 7

Cohort Differences on Path Model Variables

Variable	Mean Difference	SD	<i>t</i>	<i>df</i>	Sig. Level (2-tailed)
Home Visiting Frequency	-.32	.97	-2.178	162	.031
Home Visiting Intensity	-.30	.38	-4.37	162	.000
Home Visiting Duration	-.31	1.53	-1.29	162	.20
Knowledge of Infant Development	-.44	-.73	-.87	80	.39
Home Safety Readiness Composite	.08	.53	1.07	162	.29
Personal/social Lang./literacy	-.52	15.92	-.22	162	.83
Mathematical Thinking	-.25	2.28	-.73	162	.47
Physical Health/develop.	-.06	3.64	-.11	162	.91
	-.07	2.42	-.18	162	.85
	-.21	1.92	-.73	162	.47

Correlations Among Control Variables and Path Model Variables

Cohort membership, participation in the PAT program (intensity) and membership in the free and reduced meals program are coded categorically. For this reason, parametric statistics could not be used for all of the correlations depicted in Tables 8 and 9. In order to compute association between variables using non-numerical data, non-parametric measures were used. Eta was used to examine association between prior care, which is a categorical variable with more than one possibility, with variables using interval or numerical data (Work Sampling Scores, Home Safety Scores, KIDI, duration, and frequency). Phi coefficient was used for examining the effect of prior care on other categorical variables (cohort, meals, intensity), and free and reduced meals with cohort membership. Correlations between dichotomous variables and numerical variables were computed using point-biserial Pearson's R Correlation Coefficient. For all other variables, Pearson's R Correlation Coefficient was used. Table 8 shows that cohort membership significantly impacts the level of service parents receive in terms of frequency, and intensity (the likelihood that parents will enroll in the PAT program). Additionally, there are significant relationships between the proxy variable for income (free and reduced meals) and school readiness measures, as well as prior care experience and school readiness measure composite and subscale scores. These significant correlations confirm the need to remove the effect of these control variables from the path model variables before proceeding to the multivariate analyses.

Changes in the correlations among path model variables can be observed when comparing correlation coefficients before and after partialing out the effect of control variables from the path model variables (Tables 8 and 9). In Table 9, the association

between frequency and intensity is diminished by the controls, but the association between duration and frequency increases. Home visiting frequency and home safety, which were shown to be correlated in Table 8, are no longer significantly associated in the partial correlations in Table 9. Home visiting duration was positively associated with the recorded KIDI in both correlational analyses.

Table 8

Correlations Among Path Model Variables and Control Variables

Variables	Freq	Inten ^a	Dur	KIDI	Home Safety	Cohort ^b	Meals ^c	Prior Care ^d
Frequency	-							
Intensity ^a	.43**	-						
Duration	-.24**	.157*	-					
KIDI	.15	-.05	.24*	-				
Home Safety	-.19*	-.05	.28**	.01	-			
Cohort ^b	.17*	.32**	.10	.10	-.08	-		
Meals ^c	.13	.06	-.02	-.19	.03	-.08	-	
Prior Care ^d	.27	.22	.20	.04	-.07	.24	.25	-
WSS total	-.18*	-.12	.03	-.07	.11	.02	-.25**	.16**
Pers/Soc	-.08	-.05	.05	-.11	.05	.06	-.22**	.20**
Lang/Liter	-.22	-.14	.01	-.09	.06	.01	-.23**	.15
Math	-.21**	-.16*	.02	-.05	.14	.02	-.24**	.11
Phys Dev	-.04	-.07	-.02	-.12	.07	.06	-.21	.17**

Note: Freq=Frequency. Inten=Intensity. Pers/Soc=Personal and Social Competence Subscale. Lang/Liter=Language and Literacy Subscale. Math=Mathematical Thinking Subscale. Phys Dev=Physical Health and Development Subscale.

* $p < .05$. ** $p < .01$. ^{a,b,c}Point-biserial correlations. ^dPhi coefficient, Eta

Table 9

Partial Correlations Among Path Model Variables Controlling for Cohort, Free and Reduced Meal Status, and Prior Care

Variables	Frequency	Intensity ^a	Duration	KIDI	Home Safety
Frequency	-				
Intensity	.26*	-			
Duration	-.31*	.03	-		
KIDI	.15	-.13	.30**	-	
Home Safety	-.20	-.12	.16	.06	-
WSS total	-.15	-.11	-.02	-.00	.03
Pers/Soc	-.05	-.05	.04	-.06	-.02
Lang/Liter	-.20**	-.14	.01	-.03	-.02
Math	-.18*	-.16*	.01	-.01	-.02
Phys Dev	-.07	-.08	-.03	-.07	.00

Note: Pers/Soc=Personal and Social Competence Subscale.

Lang/Liter=Language and Literacy Subscale. Math=Mathematical Thinking Subscale. Phys Dev=Physical Health and Development Subscale.

* $p < .05$. ** $p < .01$. ^aPoint-biserial correlations

Control Variables

Before proceeding to the multivariate analysis, the influence of income was partialled out from the data. School readiness was regressed on income and unstandardized residuals were obtained. These unstandardized residuals became the data for the observed variables in the path analysis. Child care during the year preceding kindergarten was partialled out by regressing it and obtaining unstandardized residuals on school readiness measure scores only. Cohort was partialled out on home visiting frequency, intensity and duration only. By partialing out the effects of income and prior care, and cohort on school readiness, the findings from the multivariate analysis would not be biased because of the linear effects of any of these variables. Initial partialing out the effects of control variables is a strategy that has been used in other studies and is

considered to be an appropriate statistical technique that is particularly useful for small sample sizes (Newcomb & Bentler, 1988).

Multivariate Analyses

In this study, EQS (version 6.1) for windows was used to conduct the path analyses. The conceptual model was run five individual times to see if paths or model fit changed with the school readiness composite versus individual subscale scores. Hu and Bentler (1999) recommend joint criteria to retain a path model. Bentler's Comparative Fit Index (CFI) was examined in order to determine if it was greater than or equal to .95 and Standardized Root Mean-Square Residual (SRMR) less than or equal to .10. In addition, the Root Mean Square Error of Approximation (RMSEA) should be less than or equal to .06 and SRMR less than or equal to .10 (Hu & Bentler, 1999). Exploratory analyses were conducted using the Lagrange Multiplier to assess which paths could be added to improve the model fit.

The model, Figure 3, predicts that a higher level of frequency, intensity, and duration of home visiting will each positively influence parental knowledge and home safety. Frequency, intensity, and duration of home visiting, knowledge of infant development, and home safety are each predicted to positively influence school readiness composite and subscale scores. In addition, frequency, intensity, and duration of home visiting are predicted to positively influence school readiness by increasing home safety and knowledge of infant development scores.

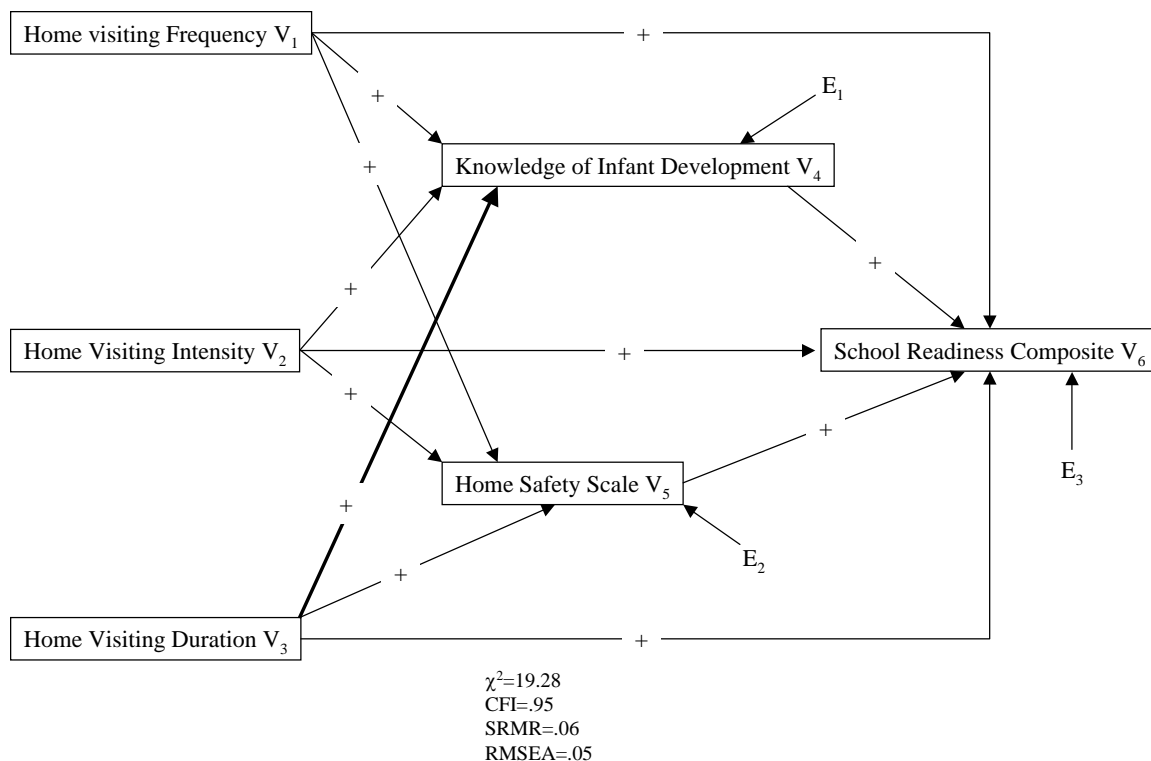


Figure 3: Multivariate Analyses

Modern path analysis was completed using the EQS (6.1) maximum likelihood estimation method to test the fit of the conceptual model with the data. The chi-square for this initial composite score model was 69.93 with 36.46 degrees of freedom. However, as Table 10 demonstrates, the CFI, SRMR and RMSEA show a poor fit of the model using the indices suggested by Hu and Bentler (1999). The Lagrange Multiplier (LM) Test suggested which paths could be added to improve the fit of the model with the data, which was then examined considering the theoretical grounds for adding particular paths. Although the LM test indicated that there was a correlation between frequency and intensity, and between intensity and duration, only one statistically significant path was added at a time. The first added path was the correlation between frequency and intensity, suggesting that parents might have been likely to sign up for a certain level of frequency based on their willingness to participate in Parents as Teachers, and parents

who participated in PAT might have accepted a certain level of frequency. Model 2 also showed a poor fit of the model and the path from intensity to duration was added, suggesting a relationship between PAT participation and duration in the program. After the addition of these two paths, the model fit the data according to the criteria. In other words, as Table 10 indicates, for Model 2, the CFI was higher than .96, the SRMR was lower than .10, and the RMSEA was lower than .06. After the addition of the two paths, the RMSEA was lower than .06, and the SRMR was lower than .10. Each path was checked for its critical ratio. When the critical ratio (CR) is greater than 1.96 or less than -1.96, then that estimated path parameter is considered to be significant at the .05 level in accordance with EQS guidelines.

Table 10

Summary of the Fit Statistics for each Composite Model

Fit Indices		Model 1 (original model)	Model 2 (1 path added)	Model 3 (2 paths added)
Chi Square	$\chi^2=$	69.93	36.46	19.28
	$df=$	15	14	13
	$p=$.00	<.01	.11
	CFI=	.569	.824	.95
	SRMR=	.11	.078	.062
	RMSEA	.15	.10	.05
	90% Confidence Interval	(.115, .185)	(.06, .14)	(.00, .102)

The difference between the chi-square values of Model 2 and Model 3 was calculated to determine if Model 3 was significantly better than Model 2. The difference was 17.18 with 1 degree of freedom ($p < .05$), demonstrating that Model 3 was significantly better than Model 2.

The conceptual model was run five different times. Each time, different scores for the school readiness measure (Work Sampling System) were examined, (1) Composite score, (2) Personal and Social Competence Subscale, (3) Language and Literacy Subscale, (4) Mathematical Reasoning Subscale, and (5) Physical Health and Development Subscale. Just as in the path analysis model using the school readiness composite score, for each subscale the fit indices and LM tests necessitated the addition of the two paths between frequency and intensity, and duration and intensity. The progression from the first to third models adding these two paths for each subscale are included in Appendix F.

Figure 4 shows Model 3 for the composite school readiness score. Small dotted lines indicate the paths from the original Model 1 that were not statistically significant (V_1 to V_4 , V_5 , V_6 ; V_2 to V_4 , V_5 , V_6 ; V_3 to V_5). Broken lines indicate the paths (V_1 correlated with V_2 ; V_2 correlated with V_3) that have been added to the original model (Model 1), and the order in which paths were added, is indicated by the numbers enclosed in parentheses. Bold lines were used in cases where statistical significance for path effects was reached at the .05 level, including duration to KIDI, duration to home safety, and home safety to school readiness scores. The R^2 values are listed next to the error terms of the endogenous variables (parental knowledge, home safety, and school readiness composite and subscales). Table 11 shows the standardized direct, indirect, and total effects of the relationships between variables.

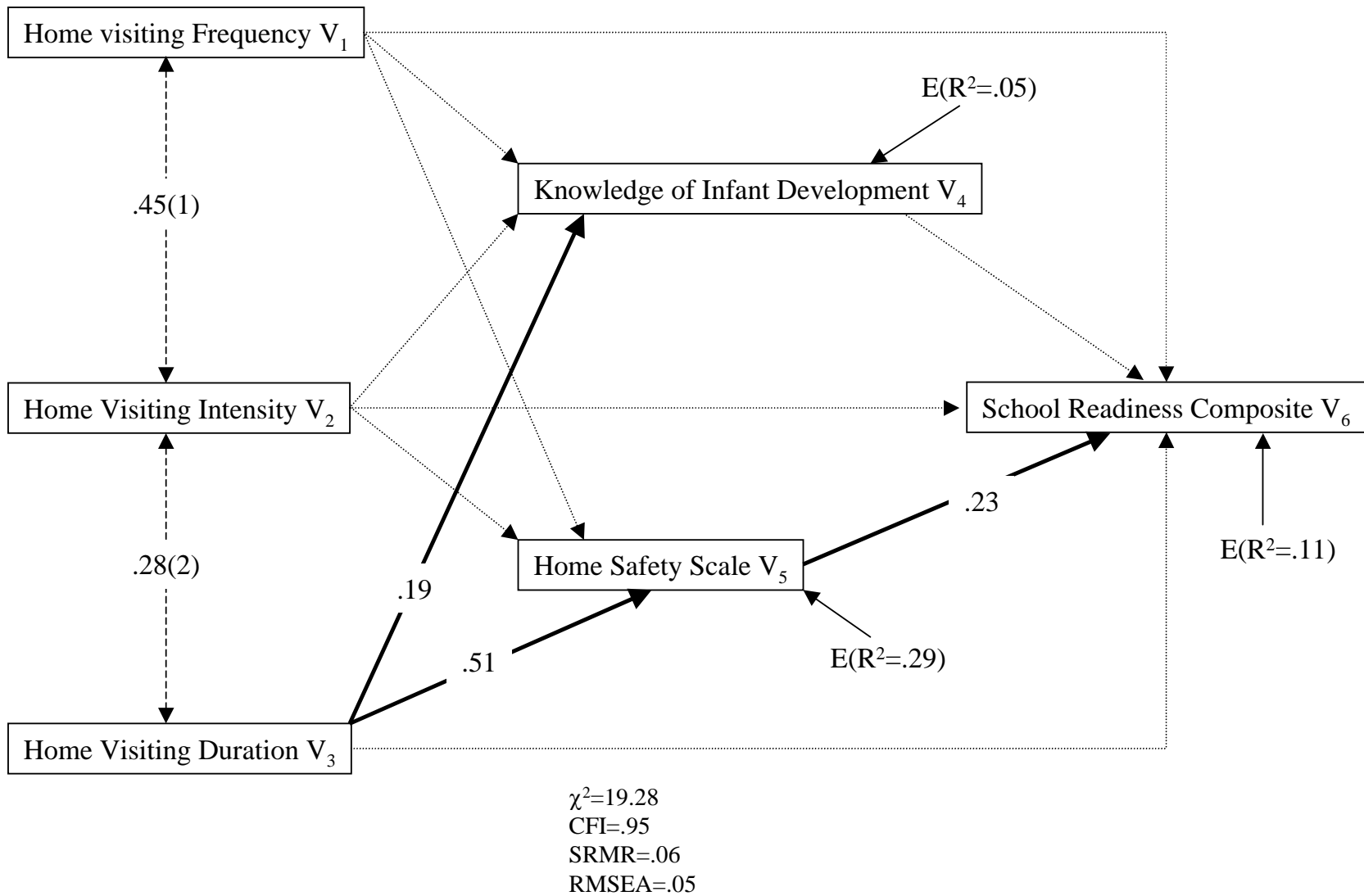


Figure 4: Path Analysis Model: Standardized Results School Readiness Composite

Table 11

Standardized Direct, Indirect, and Total Effects for Total Sample

Predictor	Dependent Variable	Direct Effect	Indirect Effect	Total Effect
<u>Home Visiting Frequency</u>				
	Knowledge of Infant Dev	.164	--	.164
	Home Safety	.008	--	.008
	Readiness Composite	.094	-.008	-.102
	Personal and Social Comp.	.164	-.009	.002
	Language and Literacy	.148	-.011	-.159
	Mathematical Thinking	.125	-.007	-.132
	Physical Health and Dev.	.031	.004	-.027
<u>Home Visiting Intensity</u>				
	Knowledge of Infant Dev	.123	--	.123
	Home Safety	.092	--	.092
	Readiness Composite	-.108	.028	-.079
	Personal and Social Comp.	-.092	.032	-.060
	Language and Literacy	-.102	.027	-.076
	Mathematical Thinking	-.122	.022	-.10
	Physical Health and Dev.	-.10	.028	-.072
<u>Home Visiting Duration</u>				
	Knowledge of Infant Dev	.187*	--	.187
	Home Safety	.507*	--	.507
	Readiness Composite	.038	.105*	.067
	Personal and Social Comp.	-.009	.119*	.110
	Language and Literacy	.021	.080	.058
	Mathematical Thinking	.035	.079	.044
	Physical Health and Dev.	.044	.122*	.022
<u>Knowledge of Infant Development</u>				
	Readiness Composite	-.058	--	-.058
	Personal and Social Comp.	-.068	--	-.068
	Language and Literacy	-.078	--	.078
	Mathematical Thinking	-.050	--	-.050
	Physical Health and Dev.	-.038	--	-.038
<u>Home Safety</u>				
	Readiness Composite	-.229*	--	-.229
	Personal and Social Comp.	.260*	--	.260
	Language and Literacy	.186*	--	.186
	Mathematical Thinking	.173*	--	.173
	Physical Health and Dev.	.255*	--	.255

Note: * $p < .05$. ** $p < .01$.

Analyses of Research Questions and Hypotheses

No empirical support was found for Research Question 1 and resultant hypotheses predicting that high home visiting frequency would have a positive and direct influence on school readiness scores including, H₁) composite scores, H₂) personal and social competence subscale scores, H₃) language and literacy subscale scores, H₄) mathematical thinking subscale scores, or H₅) physical health and development subscale scores. The LM Test indicated that adding a path from the home visiting frequency to the home visiting intensity would improve the fit of the model. In accordance with the conceptual model, the correlational path addition made sense because parents who enroll in Parents as Teachers (PAT) have a minimum number of visits per year (five), and parents who qualify for higher frequency are more available to the program for the administration of PAT under its auspices. Nonetheless, as Figure 4 shows, the frequency of home visiting did not predict any of the school readiness measure scores, even in the final model.

Research Question 2, and its hypotheses predicted positive direct effects from PAT participation (intensity) to school readiness. There were no statistically significant paths leading from home visiting intensity to school readiness scores on the composite (H₆), or any of the subscales including, H₇) personal and social competence subscale scores, H₁₀) language and literacy subscale scores, H₉) mathematical thinking subscale scores, or H₁₀) physical health and development subscale scores. In addition to the correlational path between home visiting frequency and home visiting intensity added on Model 2, a correlational path between home visiting intensity and home visiting duration was added for Model 3. It is conceptually possible and makes sense to think that parents may be more likely to stay in the HFGF program longer if they participate in PAT and in these

two cohorts, there were families who signed up for PAT after having participated in the program for a period of months. However, the added program intensity of participation in PAT was not statistically significant in any of the three models.

Research Question 3 addressed the duration of the participation in HFGC and includes hypotheses predicting positive direct effects leading to school readiness composite and subscale scores. The direct path from home visiting duration to school readiness was not significant for any of the school readiness measures including, (H₁₁) composite scores, (H₁₂) personal and social competence subscale scores, (H₁₃) language and literacy subscale scores, (H₁₄) mathematical thinking subscale scores, or (H₁₅) physical health and development subscale scores. In spite of the addition of the correlational path from intensity to duration for Model 3 there were no significant paths leading from home visiting duration to school readiness, thus research Question 3 and related hypotheses were not supported.

Research Question 4 predicted that high home visiting frequency (H₁₆), intensity (H₁₇) and duration (H₁₈) would predict parental knowledge of infant development. There was no empirical support demonstrating that high home visiting frequency, or intensity predicted parental knowledge of infant development, disproving Hypothesis 16 (high home visiting will predict high knowledge of infant development), or Hypothesis 17 (high home visiting intensity will predict high knowledge of infant development). Hypothesis 18 predicted a positive, direct effect from duration to parental knowledge of infant development. A significant, small path coefficient was found (.19, CR=2.32) suggesting that longer duration predicts higher knowledge of infant development. This

coefficient and associated critical ratio stayed the same in each path model equation whether using the school readiness composite score or any of the subscales.

Research Question 5 predicted positive direct effects from high home visiting frequency (H_{19}), home visiting intensity (H_{20}), and home visiting duration (H_{21}) to high Home Safety (HSS) scores. There were no significant paths leading from high home frequency, or high intensity to HSS scores, disproving hypotheses 19 and 20. High home visiting duration was found to predict high home safety scores as specified in Hypothesis 21. A significant, positive, moderate path coefficient (.51, $CR=7.31$) was found showing that length of time increased the safety in the home. The coefficient was the same in each of the path analysis models whether composite or subscale scores.

Research Question 6 and its ensuing hypotheses predicted that higher parental knowledge of infant development would result in higher home safety composite and subscale scores. No empirical evidence was found to support these hypotheses. There were no significant direct paths from knowledge of infant development to either the school readiness composite score (H_{22}), nor any of the subscale scores including, H_{23}) personal and social competence subscale scores, H_{24}) language and literacy subscale scores, H_{25}) mathematical thinking subscale scores, or H_{26}) physical health and development subscale scores.

Research Question 7 addressed whether or not home safety scale scores predict children's school readiness on the composite or individual subscale scores. Empirical evidence was found for each hypothesis suggesting direct effects from home safety to the composite and all subscale scores. Hypothesis 27 predicted that high home safety would predict high school readiness composite scores. Hypothesis 28 predicted that high home

safety scores will result in higher personal and social subscale scores. Hypothesis 29 predicted that high home safety would predict high language and literacy subscale scores. Hypothesis 30 predicted that high home safety will predict high mathematical thinking subscale scores, and Hypothesis 31 predicted that high home safety will have a positive effect on physical health and development subscale scores. Small to moderate effects were found in the paths leading from home safety to the school readiness measure composite, and all subscale scores. These results are reported in Table 12 and depicted in Figures 5-8.

Table 12

Direct Effects from Home Safety to School Readiness

	School Readiness Composite	Personal and Social Subscale	Language and Literacy Subscale	Mathematical Thinking Subscale	Physical Health and Development Subscale
Effect	.23*	.26*	.19*	.17*	.26*

* $p < .05$.

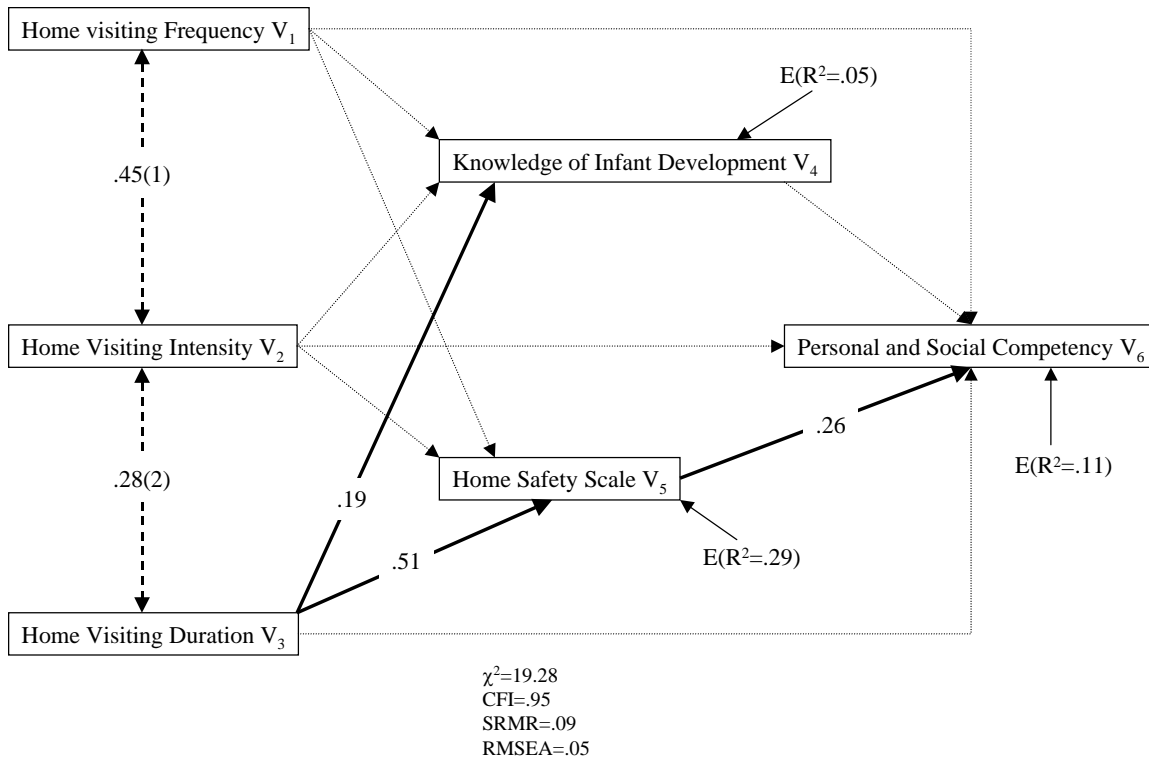


Figure 5. Path Analysis Model: Standardized Results Personal and Social Competence Subscale

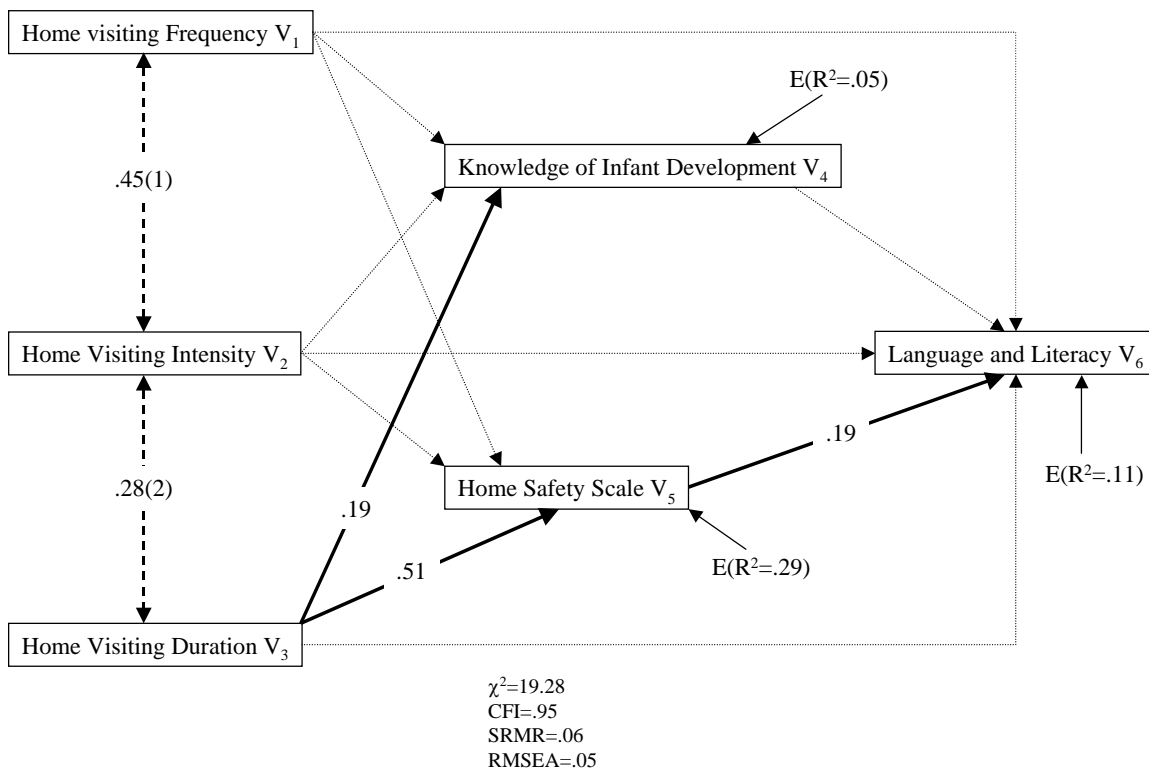


Figure 6. Path Analysis Model: Standardized Results Language and Literacy Subscale

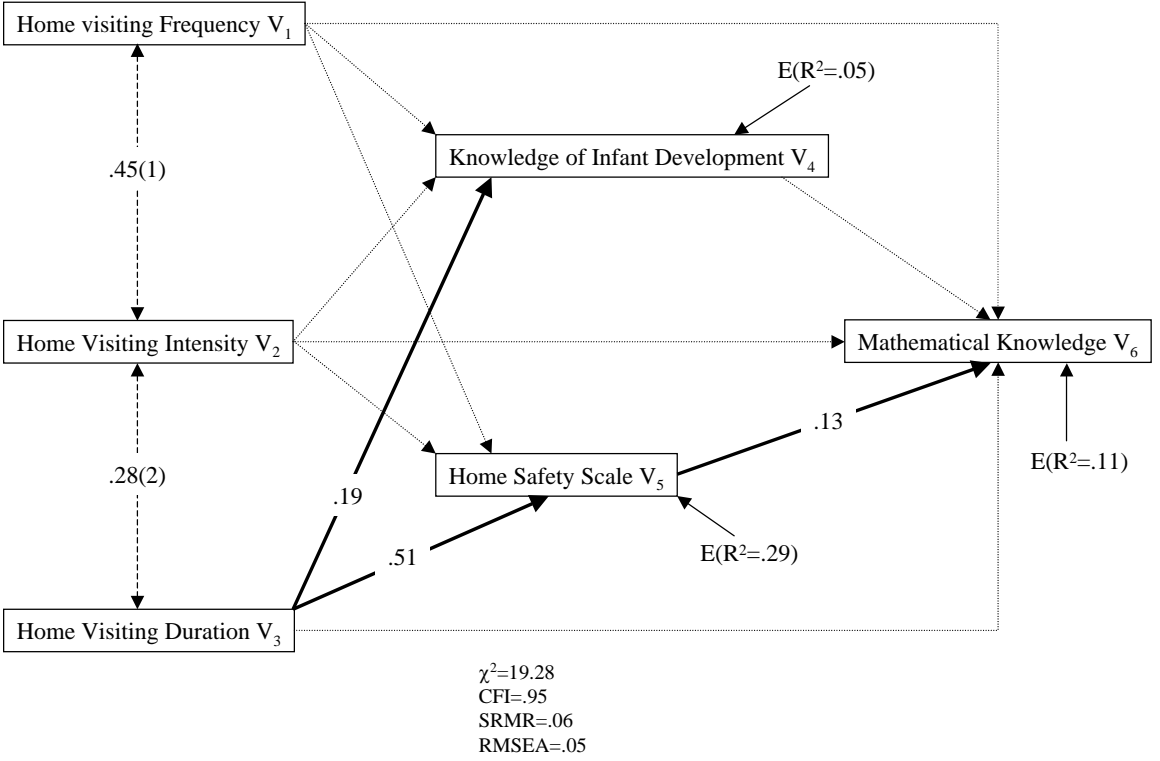


Figure 7. Path Analysis Model: Standardized Results Mathematical Thinking Subscale

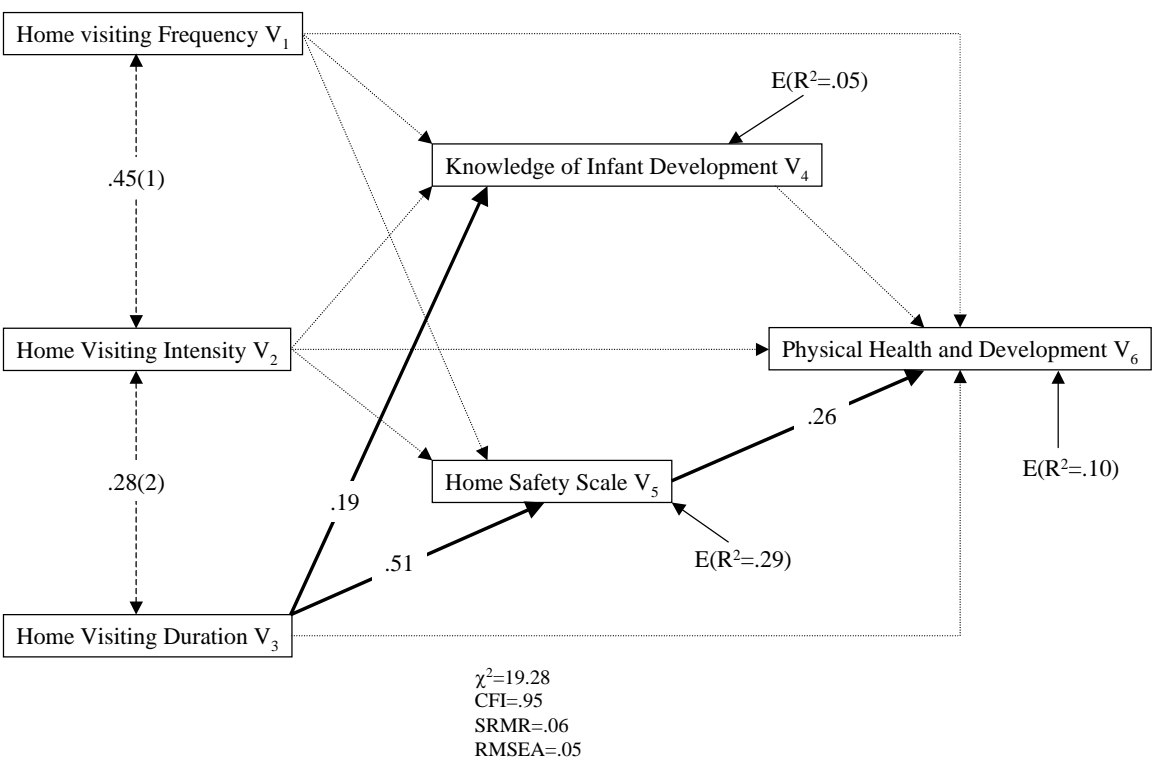


Figure 8. Path Analysis Model: Standardized Results Physical Health and Development Subscale

Indirect Effects

The model predicted that the relationships between high frequency, intensity, and duration of service and school readiness scores would decrease when controlling for high home safety scores. There were no direct effects, from home visiting frequency, intensity or duration to school readiness. Thus, research Question 8 and the associated hypotheses (32-36), suggesting that home safety would mediate the relationship between the home visiting variables and school readiness were untenable. Indirect effects were found and are reported in Tables 11 and 13.

Table 13

Indirect Effects of Home Visiting Duration on School Readiness

	School Readiness Composite	Personal and Social Subscale	Language and Literacy Subscale	Mathematical Thinking Subscale	Physical Health and Development Subscale
Duration	.11*	.12*	.08	.08	.12*

* $p < .05$.

There were no statistically significant indirect effects for home visiting frequency and intensity on school readiness. Home visiting duration did have an indirect effect on school readiness through home safety in three areas: the composite score, the personal and social subscale, and the physical health and development subscale. The small indirect effects in these areas suggest that as duration in the HFGC program increased, home safety increased, and subsequently school readiness.

The model predicted mediated effects of frequency, intensity, and duration of service on high home safety composite and subscale scores via parental knowledge of infant development. There were no statistically significant direct or indirect effects from home

visiting frequency to knowledge of infant development, or knowledge of infant development to school readiness scores. As a result, there was no empirical evidence to suggest mediating effects in support of hypotheses 37-41 which indicated that home visiting frequency, intensity, and duration of service, and school readiness (H₃₇=composite, H₃₈=personal and social, H₃₉=language and literacy, H₄₀=mathematical thinking, and H₄₁=physical health and development) would decrease when controlling for high parental knowledge of infant development. The effect prior care as a control variable was not statistically significant (CR=.70), but the effect of free and reduced meal status was significant (CR=-3.01) with an effect size of .22.

With all results considered together, the final model was able to explain modest amounts of variation in the endogenous variables. The relationships in the model explained a small amount of variation for the school readiness composite ($R^2=.12$), with less explained for the physical health and development subscale ($R^2=.10$), and small amounts for the personal and social, language and literacy, and mathematical thinking subscale ($R^2=.11$ for each). The knowledge of infant development index variation in scores was not explained by any variables in the model ($R^2=.05$ for all subscales and composite). The greatest amount of variation explained by the model was for the home safety, where effects were consistent across subscales and the composite ($R^2=.29$).

Summary of Results

The summary of results, presented in Table 14 outline the significant findings for each of the research questions. The major findings were in the areas of home visiting duration and its effect on parental knowledge of infant development and home safety. Additional findings included the effect of home safety on school readiness.

Table 14

Summary of Results

Research Question	Findings
1 - Does home visiting frequency predict school readiness?	No significant findings.
2 - Does participation intensity (PAT) predict school readiness?	No significant findings.
3 - Does duration of home visiting services predict school readiness?	No significant findings
4 - Does home visiting (frequency, intensity, duration) predict parental knowledge of infant development	Duration of home visiting has a positive, direct effect on parental knowledge of infant development.
5 - Does home visiting (frequency, intensity, duration) predict home safety?	Duration of home visiting has a positive, direct effect on home safety.
6 - Does the level of parental knowledge predict school readiness?	No significant findings.
7 - Does home safety predict school readiness?	Home safety predicts school readiness in the composite and all tested subscales (personal and social, language and literacy, mathematical thinking, physical health and development).
8 - Does home visiting (frequency, intensity, duration) have an effect on school readiness by increasing home safety scores?	Duration has an indirect effect on school readiness through home safety.
9 - Does home visiting (frequency, intensity, duration) have an effect on school readiness by increasing parental knowledge of infant development scores?	No significant findings.

Chapter V

DISCUSSION

This project examined the direct and indirect effects to school readiness through intervention provided by a home visiting program. Healthy Families Garrett County has provided intensive services through frequency, duration, and intensity to rural, low-income families. In this study, parental knowledge and home safety were predicted to improve as a result of participation in the HFGC program, and to mediate an increase in school readiness as well.

Direct Paths to School Readiness Composite and Subscale Scores

The state of Maryland uses the Maryland Model for School Readiness (MMSR). The extensive framework, which tracks children's readiness upon kindergarten entry is used throughout the state and enables the Maryland Department of Education to track early achievement across areas and demographic groups including, (1) school systems and counties, (2) racial/ethnic groups, (3) language proficiency status, 4) special education status, and (5) prior participation in early educational environments. The MMSR incorporates early learning standards into their statewide assessment and instructional system for local schools. Because this model incorporates research-based instruction and developmental assessment between families, child care providers, and teachers, it is featured by the National Child Care Information Center as an example of a comprehensive accountability system for tracking school readiness outcomes (U.S. Department of Health and Human Services, 2006). This research, which uses the accepted school readiness measure for the state of Maryland adds to the body of work highlighting the magnitude of school readiness measures, and specifically the Work

Sampling System. While the WSS has been used across the state of Maryland, it has never been used to specifically examine school readiness as an outcome in rural populations. Given the importance of the Work Sampling System in Maryland, the findings of this project will be particularly useful in considering school readiness outcomes for rural children in the State of Maryland.

Home Safety

The paths leading from home safety scale scores to school readiness scores were significant for the composite and all subscale scores. Within the context of the Healthy Families Garrett County program, the scale is not only a diagnostic tool, but also a call for action. Many families significantly improved their home safety scale score from their baseline at intake to the 12-month home safety score used for the multivariate analyses ($t=73.01, p=.00$). The intervention that HFGC provides for home safety is multi-faceted. HFGC provides a home safety kit that includes some of the items on the scale such as outlet protectors. When parents do not have safety gates, safety guards on windows, car seats, or well water that has been tested, HFGC staff immediately make referrals and use their extensive web of resources to help families attain the necessities in order to facilitate a secure haven for the child and family. In many cases, they actually purchase items, such as fire alarms for the families. It is this proactive intervention that best explains the improvement between baseline home safety scores and scores at 12 months. While individual question items could not be analyzed for the purpose of this research, program staff report that many families smoke tobacco upon program entry and continue to do so over time. Given that this item is worth 2/22 points, it is likely that this question in conjunction with any other missed question would prevent a family from attaining a high

score. Smoking behavior is addressed by program staff, but is articulated by HFGC staff as a difficult area for intervention. The other comprehensive approaches by HFGC staff for home safety appear to make an important difference for children's school readiness.

The path leading from home safety to the school readiness composite score was moderate and likely explained by the paths leading to the subscales of physical growth and development and to social competence. The weakest paths, though significant, were to mathematical thinking and literacy. Though these findings are small in effect, they are in agreement with previous research suggesting that a safe and healthy environment facilitates child growth and development. The two strongest paths were leading to the subscales of physical growth and development, and to personal and social competence, which underscores recent research related to the importance of emotional/social health in the early years and its lasting impact on school readiness in general (Johnson & Knitzer, 2005). These findings make sense when one considers that as the physical safety and healthfulness of a home improves, so too does the capacity of the child to grow and develop in ways that promote school readiness. It is particularly important to consider health and safety as a mechanism for school readiness when the impact of program participation is considered, particularly for components addressing health and children's readiness. A recent issue brief from the National Center for Children in Poverty identifies the primary groups of children most vulnerable to early school failure due to developmental and emotional difficulties (Knitzer & Lefkowitz, 2006). These at-risk children have early experiences lacking in stimulation, nurturing, parental care, and are disproportionately present in low-income families.

Parental Knowledge

Results from the present study indicate that there is no empirical support for the directional link from parental knowledge to kindergarten readiness. These findings are surprising when considering that previous research does indicate that parenting relationships make a difference in cognitive skills in rural children (Fish, Jacquet, & Frye, 2003), suggesting that global school readiness would be affected. Social and emotional competencies as an evaluation of school readiness are in theory, impacted by parental knowledge and subsequent behaviors. Improved parenting of infants and toddlers is connected to improvement in cognitive and language abilities and behavior skills in three year olds (Administration for Children, Youth, and Families, 2006). This finding implies that parental knowledge, and subsequent improvement in parenting behaviors would have an impact on school readiness. Parenting styles, which may have been reflected through parental knowledge have been found to influence children's emotional styles (Eisenberg & Fabes, 1992; Wakschlag & Hans, 1999). Raver suggests that many emotional problems in children are deeply impacted by parenting processes, and intervention programs that enhance parenting skills may indirectly improve children's emotional and behavioral outcomes (2006).

In the present study, the results may have been affected because the Knowledge of Infant Development Index (KIDI) had been reduced from a 58-item measure, and it may not have been an accurate indicator of parental knowledge. Additionally, the missing data and subsequent linear interpolation to replace such data may have resulted in this measure being inadequate for the analyses.

Frequency of Home Visiting Services

Frequency of home visiting service for any of the school readiness measures was not supported by empirical evidence, nor was parental knowledge of infant development, or home safety. This finding might best be explained by taking into account the frequency of visitation, which is based upon the level of family stress that a family exhibits at intake. Stress is assessed through the use of a family stress checklist filled out by either one or both parents, and frequency of services is subsequently determined. Family stress has been linked to poorer cooperation with children, and ability to follow directions and concentrate (Murray-Harvey, & Slee, 1998). All of these are important for school readiness in kindergarten and are salient examples of the impact of family stress on school readiness of children. The Healthy Families Garrett County program attempts to buffer these stressful factors by offering each family the level of service that they need as an individual family unit. It is possible then, that each family is receiving what they need, and thus frequency becomes negated as a predictive variable. In effect, the frequency of services may be a factor that moderates family stress level and furthers parental knowledge and school readiness.

Unfortunately, the family stress measures are only administered at intake, so it was not possible to observe stress decrease over time, although program evaluation reports and anecdotal data suggested that parents feel supported by the frequency of the program recommended to them. Over the last five years, in all but a handful of cases, parents accepted the level of service for which they qualify. In the absence of a control group of families who refused service or chose not to enroll, it is difficult to obtain a true measure

of the impact of frequency. Instead, these findings compellingly suggest that HFGC has done a thorough job of matching the right amount of intervention to families.

Intensity of Home Visiting Services

Participation in Parents as Teachers was not found to be a significant predictor for school readiness in this sample. Parents as Teachers list school readiness as a primary goal (Parents as Teachers National Center, 2006) for program impact. However in this sample, there was no empirical basis for demonstrating that the program increased school readiness. This finding was surprising considering that previous research by Pfannenstiel, Seitz, and Zigler (2002) found that participation in PAT was significant for improving school readiness scores as compared to children in families who did not participate. With regard to subscale content areas, PAT children have been found to perform better on academic screening measures including literacy and math (Pfannenstiel & Seltzer, 1989) in school readiness measures, and in these same areas on measures in subsequent grades through third grade (Pfannenstiel, Lambson, & Yarnell, 1996). Literacy, in particular, has been found to be connected to previous participation in PAT (Coleman, Rowland, & Hutchins, 1997). PAT participating parents have also been reported to engage in a variety of activities supporting literacy such as visiting the library regularly, and having more books and reading and writing opportunities in the home (Pfannenstiel, Lambson, & Yarnell, 1996), as well as parenting behaviors that promote literacy skills, such as reading aloud to children in the home, telling nursery rhymes and singing with children in the home.

Social and emotional development is normally improved for PAT participants. Children whose parents participate have been found to demonstrate significantly more

aspects of positive social development than comparison children, and the importance of social/emotional development has been widely researched as both an aspect of school readiness (Hamre & Pianta, 2001; Eisenberg & Fabes, 1992; Rubin, Coplan, Fox & Calkins, 1995), and a predictor for school readiness (Ladd, Kochendorfer, & Coleman, 1997, O'Neil, Walsh, Parke, Wang & Strand, 1997, Raver, 2002). Given an extensive body of research suggests that PAT is effective for school readiness raises the possibility that in the current study, something is not consistent. An explanation for not finding significant results in the context for this research project is that so many more participants were enrolled in PAT than non-enrolled, differences could not be observed. Another compelling explanation is that there was no control group for this variable. HFGC staff report that home visiting for PAT and non-PAT parents are conducted by the same home-visiting workers and that non-PAT parents do receive information in many of the content areas covered by PAT. In essence, non-PAT parents receive a smaller dosage of PAT, but cannot truly be considered to be non-participants in the program or a control group. In fact, the higher school readiness scores might actually suggest that the HFGC intervention, which includes PAT in varying degrees of formality, makes a difference over time.

Direct Paths to Parental Knowledge of Infant Development

Parents as Teachers as a predictor of parental knowledge as measured by the KIDI, was not empirically supported. This finding is in direct opposition with widely accepted research suggesting that home visiting programs, and PAT in particular, produce gains and improved parenting skills for some groups of children and families (Dyer Harnish, Dodge, & Valente, 1995; Wagner & Clayton, 1999). PAT has been linked to improved

parental knowledge in previous research that included a comparison group. PAT parents scored higher on parental knowledge of child development scales in multiple areas including the importance of physical stimuli in the child's environment, appropriate discipline, and knowledge of child development (Pfannenstiel & Seltzer, 1989).

Weaknesses in this area are most likely attributable to the problem of the data reduction from a 58-item scale, to a 14-item scale, on which no internal consistency or reliability measures could be undertaken. In addition, this measure had a fifty-percent missing data rate, which likely negates it as a useful predictor or dependent variable.

Contrary to the hypotheses, frequency of home visiting was not found to predict knowledge of infant development. Consistent with the research, however was the finding that duration in home visiting programs had a small effect on knowledge of infant development. It makes sense to surmise that home visiting program participation over a long period of time provides the family with support and ideas that facilitate parental knowledge. Given that participation in Parents as Teachers was correlated with duration, it is possible that the program itself had a positive effect that was interactive with the variable of duration.

Direct Paths to Home Safety

Home safety was not predicted by frequency of services and intensity of services. As mentioned previously, these shortcomings may be due to the fact that frequency might not be revealing if families are all receiving the recommended dosage, and the majority of parents choose the more intensive curriculum. Duration, however, was a significant path leading to home safety. The effect size of .51 is the largest in the model and clearly shows that parents who participate in the program longer are more likely to demonstrate

higher home safety practices. This finding may be because duration reflects a higher level of commitment to the program and subsequently to follow recommendations given by program staff. It may also reflect heightened opportunity that program staff had to intervene on behalf of the family for the well-being of the child. Particularly in families where chronic stress is a factor, continued exposure to a program may be particularly important in helping a family to cope and then to flourish.

Indirect Links Between Home Visiting and School Readiness

Consistent with the literature, indirect effects were found between home visiting duration and school readiness through home safety. It was hypothesized in this present study and has been found in other research that level of participation in home visiting has a positive impact for children. Recent research makes the case for duration of home visiting and long-term outcomes, including school readiness. An 18-year follow-up of infant health and development revealed persistence of early school outcomes, including at age five to longer-term outcomes for educational success in adolescence (McCormick et al, 2006). This research, conducted with children in low-income environments, connects early health and home visiting interventions to school outcomes later, supporting the indirect role of a healthy home environment as promoted by home visiting on school success.

There were no indirect effects leading from the home visiting variables to school readiness with knowledge of infant development as a mediator, and it is likely that this is due to the problems with this variable as a measure, rather than the theoretical connection between home visiting to school readiness via parental knowledge. Previous research has found that parenting practices have also been found to create a moderating effect, with

mothers who demonstrate high maternal sensitivity predicting better outcomes for children than those who have depressed mothers (NICHD Early Child Care Research Network 1999). The parental knowledge hypotheses of the present study did not, however, receive empirical support. Although duration in the program did have an effect on parental knowledge, the path from parental knowledge to school readiness scores was not significant. Thus parental knowledge of infant development as measured by the KIDI, did not mediate the relationship between home visiting frequency, duration, and/or intensity and school readiness.

Prior Child Care and Income

There was no empirical support for the direct effect of prior child care on school readiness. This result may be explained by the fact that 76% of the children in the sample attended child care in a formal setting that may have prepared them for school. Sixty-six percent of the HFGC children in this sample did participate in Head Start and the Garrett County preschool program. HFGC program staff report that they informally encourage parents to enroll their children and collaborate with other county staff to help parents to access Head Start and Garrett County preschool. However, participation in the free and reduced meals program did show a significant effect on school readiness, suggesting that having limited income continues to be a compelling risk factor for children, even when buffered by an intervention program.

Healthy Families Garrett County

Positive outcomes resulting from participation in HFGC were observed by examining the school readiness scores of children served by the program in comparison to the aggregate results for Garrett County and the State of Maryland (See Tables 15 and 16).

In addition, non-HFGC participant scores in Garrett County were analyzed by Case Consulting in 2005, for the Fall 2004 results and provided to HFGC, subsequent to this research project. In all areas, with the exception of social and personal competence, the HFGC sample has a higher percentage of children fully ready for kindergarten than the state. The composite score is slightly lower than the rate for non-HFGC children in Garrett County, or Garrett county altogether, reflecting the slightly lower scores in the same ways for the social and personal competencies subscale as well as the fact that the composite is computed via a range of scores which is not evidenced by the composite. Notably, HFGC children scored above the non-HFGC children for the majority of subscale scores, including the subscales not included in the multivariate analyses of this project. HFGC children did have substantially higher scores in the area of physical health and development.

Table 15

Percentage of HFGC, Garrett County, and Maryland Children “fully ready” Fall 2004

	Composite Score	Social and Personal	Language and Literacy	Mathematical Thinking	Physical Health and Development
HFGC Sample	62%	63%	60%	61%	80%
Non-HFGC in Garrett County	63%	64%	55%	57%	72%
Garrett County overall	63%	64%	57%	58%	75%
Maryland	58%	63%	48%	54%	72%

Note: Maryland and Garrett County results provided by Maryland Department of Education, 2005. Aggregated WSS results for HFGC vs. Non-HFGC children were provided by Case Consulting, LLC to the Garrett County Local Management Board in August, 2005.

Table 16

Percentage of HFGC, Garrett County, and Maryland Children “fully ready” Fall 2005

	Composite Score	Personal and Social	Language and Literacy	Mathematical Thinking	Physical Health and Development
HFGC Sample	68%	69%	93%	62%	88%
Garrett County	68%	67%	62%	65%	86%
Overall Maryland	60%	63%	50%	56%	74%

Note: Maryland and Garrett County results provided by Maryland Department of Education, 2006. Aggregated results for HFGC vs. Non-HFGC children were not yet available as of April, 2006.

Results from the Fall 2005 Work Sampling Scores demonstrate that HFGC participating children have higher scores than both Garrett County overall and the state of Maryland, with the exception of mathematical thinking. These observations are consistent with the results of the path analyses where mathematical thinking showed the smallest effect size; but physical health and development, which reveals substantially higher percentages of children fully ready in HFGC, as compared to state or county was the strongest path. Although language and literacy did not yield powerful effects from the participation in the home visiting program, the percentage of HFGC participants who are fully ready are considerably greater than for the county or state for both 2004 and 2005, as well as non-participants in 2004, suggesting that HFGC participation makes a difference for children’s school readiness.

Programmatic Implications

The current results suggest that long-term intervention is more effective than short term in furthering positive outcomes related to home safety for children and ultimately for school readiness. Home visiting programs seeking to make long-term impacts on

children and families must provide these services for years, not months, as the risks and stressors that drive families to need home visiting services do not disappear in the short term. Nurse visits or other home visits from birth until a child turns two are based on the assumption that home visiting duration will have positive results on both maternal behavior and child health (Currie, 2005). Supporting young families during this stressful time helps to build family relationships and integrate the new child into the family system. Early programs are not always funded for longer periods of time, nonetheless, long-term impact needs to be studied more intensively in the light of these findings. It is also possible that participation in PAT had an effect that was not measured by this model when considering that duration was significant, and the Lagrange Multiplier test showed an association between PAT participation and duration. It is conceivable that during these first few years of the program, parents might have been more likely to stay engaged in HFGC for longer periods of time, or that some parents might have enrolled in PAT after being encouraged by program staff even after HFGC entry. Finally, it is nearly impossible to effectively determine the influence of PAT when there is no true control group. In this sample, parents were still receiving home visiting services from staff who are trained in the PAT curriculum and understand the importance of supporting parents by teaching them effective ways to promote child well-being. Many parents did not participate in PAT because they did not sign up for a higher frequency of services. In fact, the LM test suggested a significant relationship between PAT participation and frequency ($r=.28, p<.05$). This does not preclude highly trained staff from teaching parents best practices that would be included in a PAT curriculum for long duration, even if at a lower frequency per year.

The importance of program duration is not only explained by the sheer passage of time, but also by enhanced opportunities for learning that naturally occur as families continue to receive services. As children get older in the program they are able to learn new skills or participate in more sophisticated activities associated with school readiness in conjunction with their parents. For example, children and families in a home visiting program the first year will benefit as parents learn about nurturing behaviors that improve parenting and family literacy activities such as reading board books. Children who are still enrolled in a home visiting program at three years may benefit when a home visitor encourages parents to work on alphabet recognition. Thus home visiting duration makes a difference not only because there is a longer period of time to support the family, but also because the child's increasing age enables program providers to scaffold the child's learning in ways that increasingly promote concrete school readiness objectives.

Additionally, it is conceivable that duration has an intangible effect of increasing parental awareness and attention that heightens the child's positive outcomes overall. Perhaps it is not only the type of attention that the child and family receive that promote achievement, but the presence of supportive engagement that promotes overall well-being for the family, and subsequently the child which manifests in many areas including school readiness. For these reasons, families who participate in home visiting programs should be encouraged to remain in the programs with comprehensive measures including home environment and children's progress tracked until school entry.

Recommendations

Duration

It can be tempting for program providers to provide short bursts of intensity with the hope of reaching maximum audience for minimal expenditure. In this sample, all families, including those who received lower levels of service benefited from long-term program participation. Perhaps when considering cost considerations, one must examine the possibility that long-term engagement creates opportunity to help families at different points in a child's growth and development. Certainly as related to school readiness, one can argue that a child's continued exposure to academic-related concepts as they approach school entry would be effective. In rural populations where there are unique risks such as isolation or historically low levels of educational attainment, it would make sense to surmise that longer-term intervention would provide a lasting buffer. This idea is consistent with current research suggesting that in order to make a difference for the long-term well being of a child, long-term program participation is required, as short term programs may not "inoculate" a child from the ongoing stresses faced in low-income environments (Zigler & Styfco, 2001). It is recommended, on the basis of this research that home visiting services be provided until school entry.

Collaboration

Collaboration is an important part of the home visiting process. Healthy Families Garrett County is funded with monies from the Family Preservation and Family Support Services portion of the Omnibus Budget Reconciliation Act of 1993 (P.L. 103-66). In these cases, home visiting is only one piece of a larger intervention where other services are expected to increase school readiness by providing access to health care and access to

early education. For example, home visitors often administer home safety checklists, and help families to enroll for various community services such as insurance enrollment.

Home visiting programs serve as a network to provide parents with developmental knowledge and social support when they are in the vulnerable stage of transition to a new family member. Many programs are focused on families at risk due to family structure, educational attainment, and poverty status (Olds, Henderson, Kitzman, Eckenrode, Cole, & Tatelbaum, 1999). Increasing collaboration between agencies providing early home visiting services may promote school readiness by increasing service accessibility and opportunities for families (Perroncel, 2000). These results suggest that a multi-tiered approach that accounts for home safety, family support, and infant development should promote optimum outcomes for school readiness.

Recommendations from Johnson and Knitzer, from the National Center for Children in Poverty specifically include promoting multiple prevention strategies targeted to all children, especially low-income children (2005). Among the many strategies endorsed, specific prevention measures included: (1) maternal depression screening, (2) developmental risk screenings, (3) training providers who work with low income families in promoting parenting skills in understanding their babies, and (4) access to Medicaid/SCHIP (Johnson & Knitzer, 2005). HFGC is a perfect example of a program that provides these types of services. Home visiting programs should also be aware of the importance of being proactive, as in the case of HFGC, where providing services includes using extensive networks of referrals to acquire and literally deliver what families need. Although education is empowering, it is the proactive approach, which

literally puts tools in the hands of families that was found, in this study to be the key predictor for families enrolled in the HFGC program.

Evaluation

When considering long-term intervention and the potential impact on school readiness, research-based evaluation tools are of crucial importance. Programs must implement protocols considered to be in wide usage in the early childhood field. Primary recommendations for the HFGC program center around program evaluation, as opposed to actual service delivery. The primary evaluation recommendation is to use a widely recognized home environment measure that effectively examines parental knowledge. Although the KIDI does look at parental knowledge, it is not in standard usage in the field of early childhood and family studies and it is self-administered. Additionally, for this sample the KIDI had been reduced from a 58-item scale to a 14-item scale, with no mechanism for identifying reliability and validity as the responses were not recorded by question. This is a substantial limitation in assessing the effectiveness of the program on enhancing parental knowledge, and tempers the importance of the significant path from duration to knowledge of infant development in this research. It would be advisable to use a scale where the home visiting worker can assess the family environment, using more recognizable instrumentation.

For example, the Infant/Toddler HOME scale (Caldwell & Bradley, 1984) is designed for use during infancy (birth to age three). It is comprised of 45 items arranged in six subscales including (1) parental responsiveness, (2) acceptance of the child, (3) organization of the environment, (4) learning materials, (5) parental involvement, and (6) variety in experience. The scale requires 45-90 minute home visit by a worker trained in

completion of the HOME scale to complete the assessment. The HOME has high test-retest reliability (.62 to .77 for total score) and high validity with HOME scores at 24 months correlating .72 with the 36-month Binet IQ scores (Bradley, 1982). In addition, HFGC should administer the HOME annually, and with the addition of each new child in the family. The HOME assessment may or may not take place during the same visit that home safety is assessed. Although many parents did not have KIDI scores due to low frequency, there was still contact with a home visiting worker. For every family where home visiting takes place, assessment of the parent-child relationship and the quality of home life should be monitored initially and in an ongoing fashion at regular intervals. Implementation of a more effective home measure on an ongoing basis strengthens the argument that HFGC makes a difference for increasing parental involvement and knowledge.

The family stress scale used at intake should be readministered at least once, possibly at one year after service delivery. In this way, the effect of HFGC for reducing family stress could be examined. Given that mothers' health and well-being is instrumental to the well-being of their children, the Center for Epidemiological Studies Depression Scale (CESD) should be administered to all mothers within three to six months after the birth of the child, or another depression scale should be implemented to screen for post-partum depression.

In terms of evaluating school readiness, HFGC should make every attempt to determine if the percentage differences for school readiness are significant when comparing HFGC children to non-HFGC children. Although approval was not given to examine the effect of a non-HFGC control-group for this project, HFGC has contracted

this information in the past. Looking at the differences between the treatment group and the children who are not in HFGC may result in compelling findings. In community settings, it is not always possible to access non-treatment populations, and it should be noted that observational studies are still useful when working with families. While these suggestions would be most useful for implementation with HFGC, it is recommended that all home visiting programs consider familiar instrumentation, implemented at intervals, and standardized across participants and cohorts.

Policy Implications

Several legislative initiatives have attempted to address concerns raised by this research study. For example, the School Readiness Act of 2005 (H.R. 2123, 2005), a reauthorization of Head Start funding, focuses on increasing accountability in the funding stream, teacher certification requirements, and strengthening the core components of Head Start and other child care and early childhood education programs. Also included in the provisions are preservation of outside the classroom services such as health and nutrition and increased emphasis on parent services. The parental service provision includes parenting skills training and training in basic child development. The bill specifically calls for increased service coordination in states and community programs to provide home-based, health, mental health, and family support services. This bill has been placed on the Senate legislative calendar for consideration. Additional legislation entitled the, “Education Begins at Home Act” introduced in the Senate in May of 2004 and March 2005 and referred to the Senate Committee on Health, Education, Labor, and Pensions (S. 2412, 2004), is to increase the service provision of home visitation programs, to improve Early Head Start, and to expand Parents as Teachers and other

early childhood home visitation programs. The bill specifically states that promoting parents' ability to support their children's optimal cognitive, language, socio-emotional, and physical development promotes parents' ability to prepare their children for school success (S. 2412, 2004). This bill is currently still in committee as of May, 2006. As these bills are debated in Congress and move through the legislative system, consideration must be given to continue to fund and implement programs addressing initiatives that support the home environment, and early learning for school readiness.

The current research has important implications for the macrosystem public policy directions introduced in the previous policy examples. Across disciplines there is general agreement on the fundamental goals of child related policies: promote health and physical comfort; provide care by consistent and loving adults; enhance cognitive and language skills, support emotional and mental well-being and health; and encourage positive relationships with adults and peers, along with a sense of responsibility and morality (Huston, 2002). With this in mind, consideration must be given to promotion of these goals, given the reality of limited funds available for programs.

The National Center for Children in Poverty recommends addressing the following risks by using many of the strategies already in place in HFGC, including: (1) connect babies and toddlers with necessary health and related services (Knitzer & Lefkowitz, 2006), (2) embed research-informed intensive interventions, such as parent therapies, into home visiting infant and toddler child development and family support programs, (3) organize services by level of family risk, (4) implement parenting curricula designed for higher-risk families, (5) use a community approach, and (6) develop effective outreach and engagement strategies to provide earlier interventions to those at greatest risk,

including connecting with families as early as possible such as during prenatal care. HFGC has implemented each recommendation in model form. All participants are connected to health services such as Maryland Child Health Insurance Program, vaccination information, lactation resources, and home visiting workers who help resolve the risks identified by the baseline Home Safety Scale. Research-based interventions are used, the most notable being Parents as Teachers in the home visiting program. Further this curricula was identified in the present research as particularly effective with low-income families and/or families exhibiting multiple risk factors (Wagner & Spiker, 2001). Families' level of risk is assessed at intake using two diagnostic measures and input from both partners where available. Services are then provided and organized for families on the basis of assessed initial risk and ongoing assessment by the home visiting workers regarding increased stress or other change of status.

HFGC uses a model community approach, cooperating with local agencies to ensure that all families have ample opportunity to enroll in the program. Indeed, many of Garrett County's families do enroll in HFGC as a result of this community cooperation. Finally, Garrett County's families are accessed early in the child's life. Program participation requires enrollment within the first twelve weeks post-partum. In this sample, 56% of cohort 1 families were enrolled prenatally, and 87% of cohort 2 families were enrolled prenatally, with the rest subsequently enrolled before the twelve-week cutoff point. HFGC is an ideal example of a program that uses all the National Center for Children in Poverty's recommendations, with the added component of length of time.

HFGC incorporates the objectives established by the National Education Goals Panel for promoting school readiness. The multi-faceted program addresses the good health of

children by implementing an extensive home safety checklist and by cooperating with other community agencies. Although rural children are historically underinsured (Bailey, 2004; Dunbar & Mueller, 1998; National Conference of State Legislatures, 2000); in this sample, 83.5% (n=137) were enrolled in the Maryland Child Health Insurance Program. HFGC children have the advantage of home enrichment that takes place through the home visiting program, and they have access to high quality early education as evidenced by the high participation rates in the county preschool program and Head Start. It is the comprehensive and collaborative approach of the HFGC program over a long period of time that made a positive difference for school readiness in this sample.

Ecological Theory

The ecological theoretical model was used in the current research because it addresses the contextual factors associated with low-income rural families and the stress and potential risk for all family members upon the birth of a baby. The ecological model emphasizes the interrelationships existing between individuals, families, the physical environment, community and the cultural norms and values of a society (Bronfenbrenner, 1979). The relationships: microsystem, mesosystem, exosystem, and the macrosystem interact and adapt to changes in each other in a reciprocal fashion. This reciprocity was observed in the direct effects and indirect effects in this current project. For example, home visiting duration in the HFGC program, which is a mesosystem level variable interacted with home safety, also in the mesosystem. Together these variables had an impact on the microsystem, or child as evidenced by higher Work Sampling System composite and subscale scores. Home visiting duration also facilitated enriching activities and parental knowledge as these variables in the mesosystem interacted with

one another. The interactions observed in this research lend support to the ecological model and the importance of considering multiple contexts.

The ecological model suggests that intervention with the family and physical environment of the home are influential for the development of the child. Intervention in the mesosystem is particularly salient for the child when considering the dimension of time as related to a child's environment, referred to in ecological theory as the chronosystem (Bronfenbrenner, 1979). Ecological systems theory focuses on the quality and context of a child's development and to this end, providing a program that enhances the quality and safety of a home and/or parenting relationships appeared in this research project to have a meaningful impact.

Bronfenbrenner charged researchers with conducting research that is "ecologically valid" (1974). By this, it is understood that children should be examined in their familiar settings, with familiar persons, objects, and experiences, and over longer periods of times. Additionally, researchers and practitioners must pay close attention to the importance of relations between systems, understanding that they are critical to the child's development. These relationships include the interaction between home and school, or in this case, program providers in their indirect influence on the child and direct influences on patterns of family life, and subsequently the nature and delivery of policies related to children and families (Bronfenbrenner, 1974). This research provides support for the ecological approach in addressing school readiness by meeting children's immediate health needs, improving the home environment and providing resources at the community level through funding at the national level.

Limitations

The findings and conclusions from the present study should be considered with caution, given that this study is limited in multiple ways. First, the data for the present study were collected at different points in time. Home visiting frequency and intensity were documented at or near intake, while duration was determined in September of each kindergarten year. KIDI scores were administered during a 20-month window, and the Home Safety Scale was administered at 12 months. The Work Sampling System was completed in the Fall of Kindergarten. Many different people collected and recorded different parts of the data and rater error, particularly in the case of the Work Sampling System, cannot be ruled out. While the WSS includes guidelines for determining readiness, it is ultimately a subjective measure and the children in the study were drawn from three different elementary schools. Additional paths were added to the model on the basis of post-hoc analysis and caution should always be used when post-hoc results are examined, as they were not included in the scope of the original hypotheses. In addition, a majority of the hypotheses in this model did not receive empirical support.

The knowledge of infant development index (KIDI) was modified and unable to be examined for internal consistency. Its administration did not follow the program-prescribed guidelines for use, and the time window was sufficiently wide as to call into question its use as a construct. In addition, this variable had a 50% missing data rate, which may have negatively impacted its predictive ability and its validity as a dependent variable.

This research was conducted with a group of families and children living in a unique demographic area. All children were living in a rural, low-income environment, and

were Caucasian, and none had limited English proficiency. This limitation may also be considered a strength when considering that it is useful for examining populations similar to those families served by the HFGC sample, nonetheless a cautionary approach should be used in implying external validity when considering the demographic attributes of participants in this study. While free and reduced meals were used as an income proxy, it would have been more effective to have access to specific income-level data.

Finally, this research design does not incorporate a comparison group. Work Sampling System scores were unable to be obtained for the children who did not participate in Healthy Families Garrett County. Within the sample, the participation/non-participation in Parents as Teachers did not truly reflect non-participation because all families received the treatment of home visiting. Though descriptive data reveal that HFGC might have positive outcomes as compared to non-participating families, this potential relationship could not be tested for statistical significance. It is possible that home visiting frequency would have been significant had there been a comparison group between families receiving a needed care dosage, and those receiving no care dosage.

Future Research

Further research that overcomes the limitations of the present study should test the final model presented in this project. In other words, this final model should be tested with data derived from rural populations in other geographic areas, more ethnically diverse rural populations, and non-rural populations. Ideally, a randomly assigned control group should be added to the model in order to comparatively examine the impact of a home visiting program such as HFGC on school readiness. While this is the gold standard for experimental research, it is not always feasible in a real-world environment.

When possible, a control group should be utilized to examine this issue, though it should be acknowledged that longitudinal study, even without a control group to examine school readiness is with merit. Further studies should examine the construct of parental knowledge and/or parental behavior by using two separate measures in this area, and these measures should be observational instead of self-report. Administration of parental measures should be undertaken within a much smaller timeframe to increase the reliability and validity of the results. Future studies should include measures of family literacy to determine if the home visiting program is directly furthering parental behaviors that are connected to educational achievement. Finally, further studies should examine the impact of family stress and take into account social support that might be impacting school readiness indirectly by improving family well-being overall.

Conclusion

This research has implications for funding programs similar to HFGC under the umbrella of any of the aforementioned policies. The principles recently suggested by the National Center for Children in Poverty clearly address the importance of developing a program model that connects with whole families across settings, using research-based practices, while simultaneously partnering with other agencies at multiple points. It is important to identify vulnerable families and provide quality services early (Knitzer & Lefkowitz, 2006). Additionally, a key point for helping at-risk families is finding ways to use existing funding efficiently, while creatively seeking new monies for service provision. As we think about promoting positive outcomes for the most vulnerable infants, toddlers, and families we must consider the efficiency of funding early programs over time with successful models such as Healthy Families Garrett County.

Appendix A: Healthy Families Garrett County Consent Form

Parent Consent to Participate in Program Evaluation

This consent form is for families who are participating in the Healthy Families Garrett County (HFGC) Program. As you may know, HFGC is a program in Garrett County Maryland that was modeled after a program in Hawaii and which has been very successful in many other states. The purpose of the program is to assist parents to access community resources and help with parenting skills and the best beginnings for families. As a part of the project, we need to learn about parents' ideas and attitudes about child rearing. Everyone agrees that raising children today is a difficult task, but people often disagree on how to do it. Your participation in completing the surveys will help us to learn what parents think about those issues and how the Healthy Families Program can best meet the families' needs.

Everything you answer in the surveys is *confidential*. Your answers will be used to help develop the HFGC program and will be put together with those of other parents so that our evaluator can count the number of times *all* people answered a question a certain way. The information will be kept confidential. Your name will never be attached to the surveys or the project results. The family support worker can assist you in completing the questions. Certain exceptions to confidentiality are legally required in cases of continuing child abuse investigations and specific court ordered disclosures.

Our staff will assist you in completion of the following surveys; (Home Safety), (KIDI), (CSQ-8), (The Oz.), (ASQ-SE), and (CES-D). We would like you to answer all the

questions, but if there is any question that you don't want to answer for any reason, just leave it blank. Participation in the project and the surveys is entirely voluntary. Should you decide not to participate in the completion of the surveys, this will *not* prevent you from receiving services or your child from participation in the program. If you agree to participate, please *print* and *sign* your full name below.

If you have any questions about the surveys or the evaluation of the project, please call HFGC staff or Earleen Beckman at (301) 334-7720. Thank you.

Earleen Beckman

Program Director

Signature: _____ Date: _____

Print Name: _____

Witness: _____ Date: _____

Print Name: _____

ID #: _____

Appendix B: Work Sampling System Release Form

CONSENT TO RELEASE
REBUS WORK SAMPLING RESULTS
to
HEALTHY FAMILIES GARRETT COUNTY

Child's Name:

(Last) (First) (MI)

Parent's/Guardian's Name:

(Last) (First) (MI)

Child's Address:

(Street) (City)

Child's Birthdate:

(Month) (Day)

(Year)

Telephone Numbers: Home: _____ Work:

AUTHORIZATION FOR RELEASE OF INFORMATION

I/We hereby request and authorize the Garrett County Community Action Head Start and the Garrett County Board of Education to release a copy of this document and all Rebus Work Sampling results to the Healthy Families Garrett County Program. I understand that this information will be used to gather information about school readiness of children. The results will be used to improve educational, social and health services to young children and their families. I/We also request and authorize the Garrett County Board of Education to release information on my child's progress through the third grade to Healthy Families Garrett County. I understand that Healthy Families Garrett County will use this information for statistical purposes only.

Signature:

Relationship to child:

HFGC Home Visitor: _____ Date:

Date Information Sent: _____ By Whom:

Appendix C: Kindergarten Work Sampling System

Total Composite Score

Developing Readiness: 30-49

Approaching Readiness: 50-70

Full Readiness: 71-90

I. Personal and Social Competence Subscale

A2. Shows initiative and self direction

B1. Follows classroom rules and routines

B2. Uses classroom materials purposefully and respectfully

D1. Interacts easily with one or more children

II. Language and Literacy Subscale

A1. Gains meaning by listening

A3. Demonstrates beginning phonemic awareness

B1. Speaks clearly and conveys ideas effectively

C2. Shows some understanding of concepts about print

C4. Comprehends and responds to fiction and non-fiction text

D2. Uses letter-like shapes, symbols, letters, and words to convey meaning

III. Mathematical Thinking Subscale

A1. Begins to use and explain strategies to solve mathematical problems

B1. Shows understanding of number and quantity

C2. Recognizes, duplicates, and extends patterns

D1. Recognizes and describes some attributes of shapes

VII. Physical Development and Health Subscale

A1. Moves with balance and control

B2. Uses eye-hand coordination to perform tasks effectively

C1. Performs self care tasks completely

C2. Shows beginning understanding of and follows health and safety rules

Appendix D: Home Safety Scale

HOME SAFETY SCREEN	SCORE
1. Phone number for poison control or poison control sticker located prominently by phone	2=Yes 0=No
2. Syrup of Ipecac on hand and worker reviewed instructions for use	2=Yes 0=No
3. Safety gates on stairs in working order as applicable	2=Yes, or not applicable 1=Have gates, need repairs 0=No, need gates
4. Safety guards on windows-especially upper stories-in working order (as applicable)	2=Yes 1=Have guards, need repairs 0=No, need safety guards
5. Electrical outlet covers on outlets child can reach	2=Yes 0=No, need outlet covers
6. Exposed to tobacco smoke in the home?	0=Yes 1=Yes, smoker goes outside 2=No
7. Smoke detectors are installed in the home, batteries checked	2=Yes 0=No, need detectors or not working
8. Home tested for radon and/or CO-and passed-or problem addressed?	2=Yes, passed, fixed or not indicated 1=scheduled for testing 0=No, testing indicated or failed test-no radon mitigation implemented or problem addressed?
9. Appropriate child auto restraint present?	2=Yes 0=No
10. Appropriate child auto restraint safety inspection	2=Yes, passed 1=Scheduled 2=No, never inspected

11. Spring or well water tested within the last year?
Or have city water?
- 2=Yes, or have city water
1=Scheduled for testing
0=No, never inspected
- Additional Items:
1. Documented counseling regarding unintentional injuries and safety precautions
- 2=Yes, voices understanding
1=scheduled for safety counseling
0=No, or refused safety counseling
-1=child had unintentional injury and no safety counseling
2. Video and/or discussion on safe handling perishable food
- 2=Yes, voices understanding
1=Scheduled for video
0=No, or refused info.
-1=Worker observed unsafe food handling in home

18-22= High Home Safety Rating (unless gate/guard are needed in #3 or #4)
13-17=Medium Safety Rating (unless gage/guard are needed in #3 or #4). Worker to engage in additional home safety interventions/instructions.
12 or lower or #3 or #4 has "0" score=Low Home Safety Rating. Worker to give priority attention to home safety interventions/instructions. If home needs a safety gate/window guard-#3 or #4, this is also a priority action step.

LEAD POISONING

Indicate if the answer is YES:

1. Has your child ever lived or stayed at:
 - A home that is more than 40 years old (your home, relative's home, or day care)
 - A home that has been remodeled in the past six months and is more than 20 years old?
2. Does your child sometimes put things that are not food like paint chips or dirt in his/her mouth?
3. Does your child have any brothers, sisters, or friends who have high blood lead levels?
4. Has your child ever lived in a country other than the United States?
5. Does your child live with someone who:
 - Fixes car radiators? Welds or torch-burns scrap metal? Spray paints boats, bridges, or tunnels? Tears down or fixes up old buildings? Removes or sand-blasts old paint? Makes fishing weights (sinkers) or stained glass? Makes bullets or uses indoor firing ranges? Refinishes old painted furniture?

Appendix E: Knowledge of Infant Development Index Abbreviated Scale

The following questions ask about babies' normal behavior. Each item describes what a typical infant might be like, or what could affect the infant's growth and behavior. Answer each item based on your knowledge of infants in general. We want to know how you think most babies act, how they grow and how to care for them. After you read each item, decide whether you AGREE, DISAGREE, or are NOT SURE. Then mark your answer in the circle.

1. Babies cannot see and hear at birth.
2. Babies may cry for 20-30 minutes at a time, no matter how much you try to comfort them.
3. Babies have little affect on how parents care for them, at least until they get older
4. Some normal kids do not enjoy being cuddled.
5. The more you soothe a crying baby by holding and talking to it, the more you spoil them.
6. A common cause of accidents for toddlers is pulling something like a frying pan, a tablecloth, or a lamp down on top of them.
7. A good way to teach your child not to bit is to bite back.
8. Six month olds will respond to someone differently if the person is happy or upset.
9. Babies are about 7 months old before they can reach for and grab things
10. One year olds know right from wrong.
11. Most children are ready to be toilet trained by one year of age.
12. Six month olds know what "no" means.
13. Eighteen month olds often cooperate and share when they play together.
14. Babies usually say their first real word at six months.

Appendix F: Fit Statistics for Each Subscale Model

Table F1

Personal and Social Competence Subscale Fit Statistics

Fit Indices		Model 1 (original model)	Model 2 (1 path added)	Model 3 (2 paths added)
Chi Square	$\chi^2=$	69.93	36.47	19.28
	df=	15	14	13
	p=	.00	<.01	.11
CFI=		.564	.822	.95
SRMR=		.11	.078	.062
RMSEA		.15	.10	.05
90% Confidence Interval		(.115, .185)	(.06, .14)	(.00, .102)

Table F2

Language and Literacy Subscale Fit Statistics

Fit Indices		Model 1 (original model)	Model 2 (1 path added)	Model 3 (2 paths added)
Chi Square	$\chi^2=$	69.93	36.47	19.28
	df=	15	14	13
	p=	.00	<.01	.11
CFI=		.566	.822	.95
SRMR=		.11	.078	.062
RMSEA		.15	.10	.05
90% Confidence Interval		(.115, .185)	(.06, .14)	(.00, .102)

Table F3

Mathematical Thinking Subscale Fit Statistics

Fit Indices		Model 1 (original model)	Model 2 (1 path added)	Model 3 (2 paths added)
Chi Square	$\chi^2=$	69.93	36.46	19.28
	df=	15	14	13
	p=	.00	<.01	.11
CFI=		.563	.821	.950
SRMR=		.109	.078	.062
RMSEA		.150	.099	.054
90% Confidence Interval		(.115, .185)	(.06, .14)	(.00, .102)

Table F4

Physical Health and Development Subscale Fit Statistics

Fit Indices		Model 1 (original model)	Model 2 (1 path added)	Model 3 (2 paths added)
Chi Square	$\chi^2=$	69.93	36.47	19.28
	df=	15	14	13
	p=	.00	<.01	.11
CFI=		.547	.815	.95
SRMR=		.108	.077	.061
RMSEA		.150	.099	.054
90% Confidence Interval		(.115, .185)	(.06, .14)	(.00, .102)

Appendix G: IRB Approval Letter



UNIVERSITY OF
MARYLAND

INSTITUTIONAL REVIEW BOARD

2100 Lee Building
College Park, Maryland 20742-5121
301.405.4212 TEL 301.314.1475 FAX

To: Elaine Anderson
Christine Pegorraro Schull
Department of Family Studies

From: Roslyn Edson, M.S., CIP *RSE*
IRB Manager
University of Maryland, College Park

Re: IRB Application # 05-0346
Title: Community Intervention Impact on Rural Children's School
Readiness

Approval Date: July 29, 2005

Expiration Date: July 29, 2008

Type of Application: Initial

Type of Research: Exempt

Type of Review: Exempt

The University of Maryland, College Park Institutional Review Board (IRB) Office approved your IRB application. The research was approved in accordance with the University's IRB policies and procedures and 45 CFR 46, the Federal Policy for the Protection of Human Subjects. Please reference the above-cited IRB application number in any future communications with our office regarding this research.

Recruitment/Consent: For research requiring written informed consent, the IRB-approved and stamped informed consent document is enclosed. The IRB approval expiration date has been stamped on the informed consent document. Please keep copies of the consent forms used for this research for three years after the completion of the research.

Continuing Review: If you want to continue to collect data from human subjects or analyze data from human subjects after the expiration date for this approval, you must submit a renewal application to the IRB Office at least 30 days before the approval expiration date.

Modifications: Any changes to the approved protocol must be approved by the IRB before the change is implemented except when a change is necessary to eliminate apparent immediate hazards to the subjects. If you would like to modify the approved protocol, please submit an addendum request to the IRB Office. The instructions for submitting an addendum request are posted on the IRB website at http://www.umresearch.umd.edu/IRB/irb_Addendum%20Protocol.htm.

Unanticipated Problems Involving Risks: You must promptly report any unanticipated problems involving risks to subjects or others to the IRB Manager at 301-405-0678 or redson@umresearch.umd.edu.

Student Researchers: Unless otherwise requested, this IRB approval document was sent to the Principal Investigator (PI). The PI should pass on the approval document or a copy to the student researchers. This IRB approval document may be a requirement for student researchers applying for graduation. The IRB may not be able to provide copies of the approval documents if several years have passed since the date of the original approval.

Additional Information: Please contact the IRB Office at 301-405-4212 if you have any IRB-related questions or concerns.

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