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OF SECOND GRADE CHILDREN BORN TO LOW-INCOME
ADOLESCENT MOTHERS

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Ph.D degree in Family and Child Ecology

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**FACTORS RELATED TO THE SCHOOL PERFORMANCE OF SECOND
GRADE CHILDREN BORN TO LOW-INCOME ADOLESCENT MOTHERS**

By

Kunlakarn Lekskul

A DISSERTATION

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ABSTRACT

FACTORS RELATED TO THE SCHOOL PERFORMANCE OF SECOND GRADE CHILDREN BORN TO LOW-INCOME ADOLESCENT MOTHERS

By

Kunlakarn Lekskul

The purpose of this study was to investigate factors which contribute to individual differences in the school performance of second grade children born to adolescent mothers. The sample for this study was 90 low-income adolescent mothers and their children who participated in the Family TIES (Trust, Information, Encouragement, Support) family support program in Flint, Michigan. Data were collected for the 5 years that the adolescent mothers and their children were in the program. In addition, follow-up data were collected when the children were in the first and second grade.

The children's school performance in second grade relative to their peers was rated by their teachers at the end of the year in 3 different areas: academic performance, academic motivation, and social adjustment. Academic performance, including reading, math, and overall academic performance, was rated using 5-point rating scales. Academic motivation was rated by using the Pupil Behavior Inventory (PBI) motivation scale. Social adjustment was measured with the Social Skills Rating Scale-Teacher (SSRS-T).

The preliminary analysis explored correlations between second grade school performance and other factors. Children who performed well in one aspect of school tended to do well in other areas at the end of second grade. Children who lived in a relatively supportive home environment and had mothers with high parenting skills in their early lives tended to have high scores on school performance in the second grade.

In general, children who had high competencies prior to school entry, including high scores on the Peabody Picture Vocabulary Test-Revised (PPVT-R) and the Vineland Adaptive Behaviors Scales, tended to have high scores on the Peabody Individual Achievement Test-Revised (PIAT-R) in first grade. Their teachers also rated them high on school performance at the end of first grade in all areas. They also did well in second grade on the various indicators of school performance.

Path analysis was used to analyze the relationships among early home environment/parenting skills, children's competencies during the preschool years, and children's school performance in second grade. Home environment and parenting skills during the first five years of children's lives predicted children's academic performance at the end of second grade through the PPVT-R at 54 months, and the PIAT-R and academic performance in first grade. Similar results were obtained when social adjustment and academic motivation were the outcome of interest. Surprisingly, maternal support for academic success in first grade did not predict school outcomes in second grade when earlier measures of home environment and parenting were controlled.

A structural equation model (SEM) was used to assess the relationships among five latent variables, including one exogenous latent variable, parenting, and four endogenous latent variables, children's competencies prior to school entry, maternal support for academic success in first grade, and school performance in first grade and second grade. As expected, children who lived in a more supportive home environment during the preschool years were more competent prior to school entry, which in turn, predicted school performance in first and second grade.

**To my beloved and wonderful parents, Veerasak and Somsong Lekskul,
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CHAPTER ONE

INTRODUCTION

Although the pregnancy and fertility rates of adolescents have generally declined since the early 1990s, the absolute number of children born to adolescents remains high. In 2000, there were almost 480,000 children born to females, under the age of 20. The majority of births to adolescents (almost 80% in 1999) occur outside of marriage (Child Trends, 2001). Adolescent pregnancy and childbearing is associated with adverse health and social consequences for the young women and their children. Many adolescent mothers and/or their children are at risk for a variety of developmental problems.

Adolescent mothers also tend to have less optimal parenting practices than adult parents. They are likely to have less knowledge of child development, have less appropriate interactions with their children, and show less sensitivity and be less responsive to their children than adult mothers (Sommer, Whitman, Borkowski, Schellenbach, Maxwell, & Keogh, 1993; Barratt & Roach, 1995). Children of adolescent parents are at greater risk of living in a disadvantaged environment than children of adult parents. For example, the children of adolescent parents tend to live in low-income families or be on welfare, live in crowded conditions, and live in unsafe neighborhoods (Luster & Brophy-Herb, 2000). As a result, children born to adolescent mothers are at greater risk for problems in development than their peers who were born to adult mothers. The slow development of children born to adolescent mothers could be detected as early as age three (Whitman, Borkowski, Keogh, & Weed, 2001) and continues through adolescence (Moore, Morrison, & Greene, 1997; Furstenberg, Brooks-Gunn, and Morgan 1987). Behavior problems of children born to adolescent mothers are detected

from the preschool years (Wadsworth, Osborn, & Butler, 1984) through adolescence (Furstenberg et al., 1987).

However, not all children born to adolescent mothers perform poorly in school. Some of them perform at average or above average levels compared with their peers (Vandenbelt, Luster, & Bates, 2001; Whitman et al., 2001). There is very little literature on why these children of adolescent mothers, who are considered at risk of school failure, perform as well as or better than their peers. More studies need to be conducted looking at what factors contribute to these children's school performance.

Purpose of the Study

The purpose of this study is to investigate factors which contribute to individual differences in school performance of second grade children born to adolescent mothers. This study focused on four sets of predictor variables: 1) the parenting practices of adolescent mothers during the first five years of the children's lives, 2) children's competencies during the preschool years, 3) children's school performance in first grade, and 4) maternal support for academic success in first grade.

Statement of the Problems

Recently, studies examined factors relating to the performance of children born to adolescent mothers and discovered that supportive home environments and the caregiving that adolescent mothers provided for their children in the first five years of life are important predictors of later development (Luster, Bates, Fitzgerald, Vandenbelt, & Key,

2000; Vandenberg et al., 2001). However, investigators usually focused on only one developmental outcome in most earlier research. For example, children's school performance usually was separately assessed in different areas such as academic achievement, social competence, or academic motivation. However, these factors could be considered all together, with each component viewed as important for school performance over the long term. In addition, the previous studies usually used one measurement to represent an independent variable of interest; in order to make the variable more valid and to correct for measurement errors, multiple measurements of each key construct are suggested (Byrne, 2001).

This study attempted to answer the primary research question: why do some children born to low-income adolescent mothers perform well in school? This longitudinal study allowed us to understand what experiences in the early childhood period (e.g., adolescent mothers' parenting and home environments) contributed to their performance in school at the end of second grade. How do these factors relate to the development of children prior to and after entering school? And finally, how do their experiences after entering school affect later school experience? This study investigated different aspects of the development of the children that are likely to influence school performance over time: academic performance, academic motivation, and social adjustment.

Research Questions

The main research question is: What factors are related to the school performance of second grade children born to adolescent mothers? This study addressed two specific questions:

1. How do parenting practices during the first five years relate to maternal support for academic success in first grade, and to children's school performance in second grade?
2. How do children's competencies (receptive vocabulary, performance of daily activities, and social skills) prior to school relate to their school performance in first and second grade?

Conceptual Framework

This study is based on Bronfenbrenner's (1979) ecology of human development model. The development of the individual is influenced by relationships between a developing person and the changing immediate environment in which he or she lives. The environment could be an immediate setting as well as the larger social context in which the setting is embedded. The developing person is defined as a growing dynamic entity, who is progressively moving into and restructuring the milieu in which he or she resides.

Bronfenbenner describes four dimensions of an individual's overall ecological system, which are useful for understanding behavior and development. The multiple

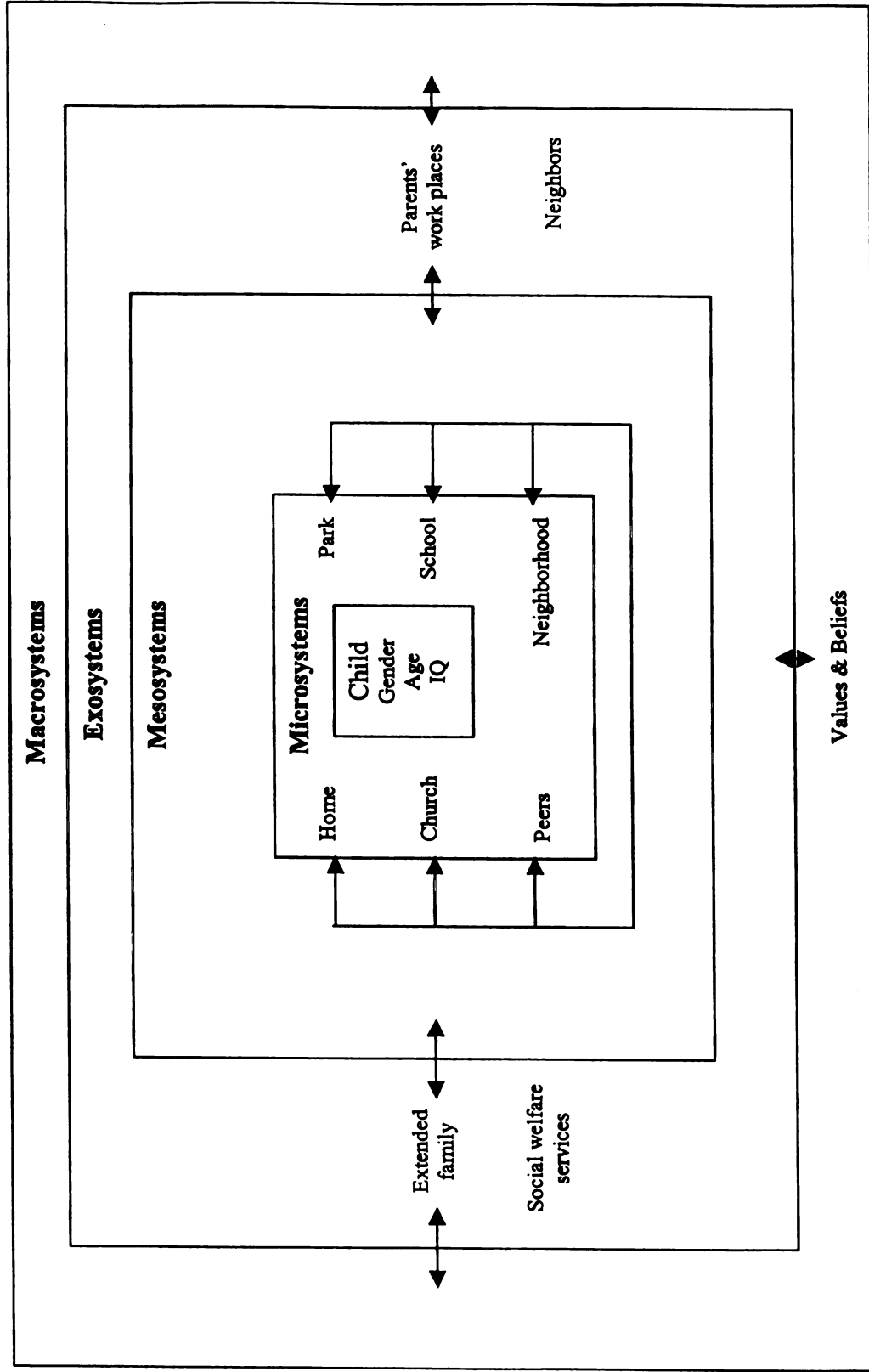


Figure 1. Diagrammatic Representation of Bronfenbrenner's Ecology of Human Development Model (1979)

interacting environmental systems include the micro-, meso-, exo-, and macrosystem (Figure 1). This study examined selected variables that represent aspects of individual micro and mesosystems of the individual, which were expected to influence the school performance of children born to adolescent mothers.

A **microsystem** is a pattern of activities, roles, and interrelationships between a developing individual in a setting, which contains that person. A setting is defined as a place with particular physical features in which the participants engage in particular activities in particular roles (Bronfenbrenner, 1979, p. 22). The home is one example which is viewed as an important microsystem for children. There are other microsystems for children such as the school, neighborhood, and peer group. However, the home is not defined solely by the physical setting, but by the transactions which occurs in the setting. One microsystem of the child in this study is the home of the adolescent mother and the parenting practice and home environment that adolescent mother provided for the child.

A **mesosystem** is an interrelationship between two or more microsystems which contain the developing individuals and is an extension of the microsystem; it is the interactions among settings containing the developing person. According to Bronfenbrenner, the child's development is facilitated by linkages between settings. For example, an adolescent mother's involvement in school activities, which is a link between two microsystems, home and school, could affect the teacher's perception of the child's academic competence, which in turn relates to the child's academic achievement. Therefore, adolescent mothers' support for school success and involvement in school are viewed as potentially important factors influencing the school performance of their children.

An exosystem refers to a microsystem that do not involve the developing person as an active participant but events in that context which can influence the developing person. In the current study, no selected variable directly represents an exosystem. An example of an exosystem is the environment of a school that the adolescent mother attends; teachers' expectations for the adolescent mother, may affect the adolescent mothers' school performance, which in turn affects the attitude of the mothers towards school and their support for children's academic success. Thus, the mother's school environment has an indirect effect on their children's school performance.

A macrosystem refers to the consistencies of the form and content of the lower-order systems (micro, meso, and exosystem), which exist or may exist at the level of subculture or culture, along with the belief systems that underlies such consistencies. Macrosystems are always changing. The macrosystem in one generation is different from that of the next generation. Most macrosystems are informal and are maintained through custom and practice in everyday life.

The effect of macrosystem dynamics on the school performance of the children was not examined in this study because relevant data were unavailable. However, an example of a macrosystem variable is cultural beliefs about the value of education, which could affect parenting behavior and the home environments they provide for their children. Thus, beliefs regarding the value of education may be indirectly related to their children's school performance.

Based on Bronfenbrenner's theory of human development and the findings from previous studies, the conceptual model for this study is illustrated in Figure 2. The major

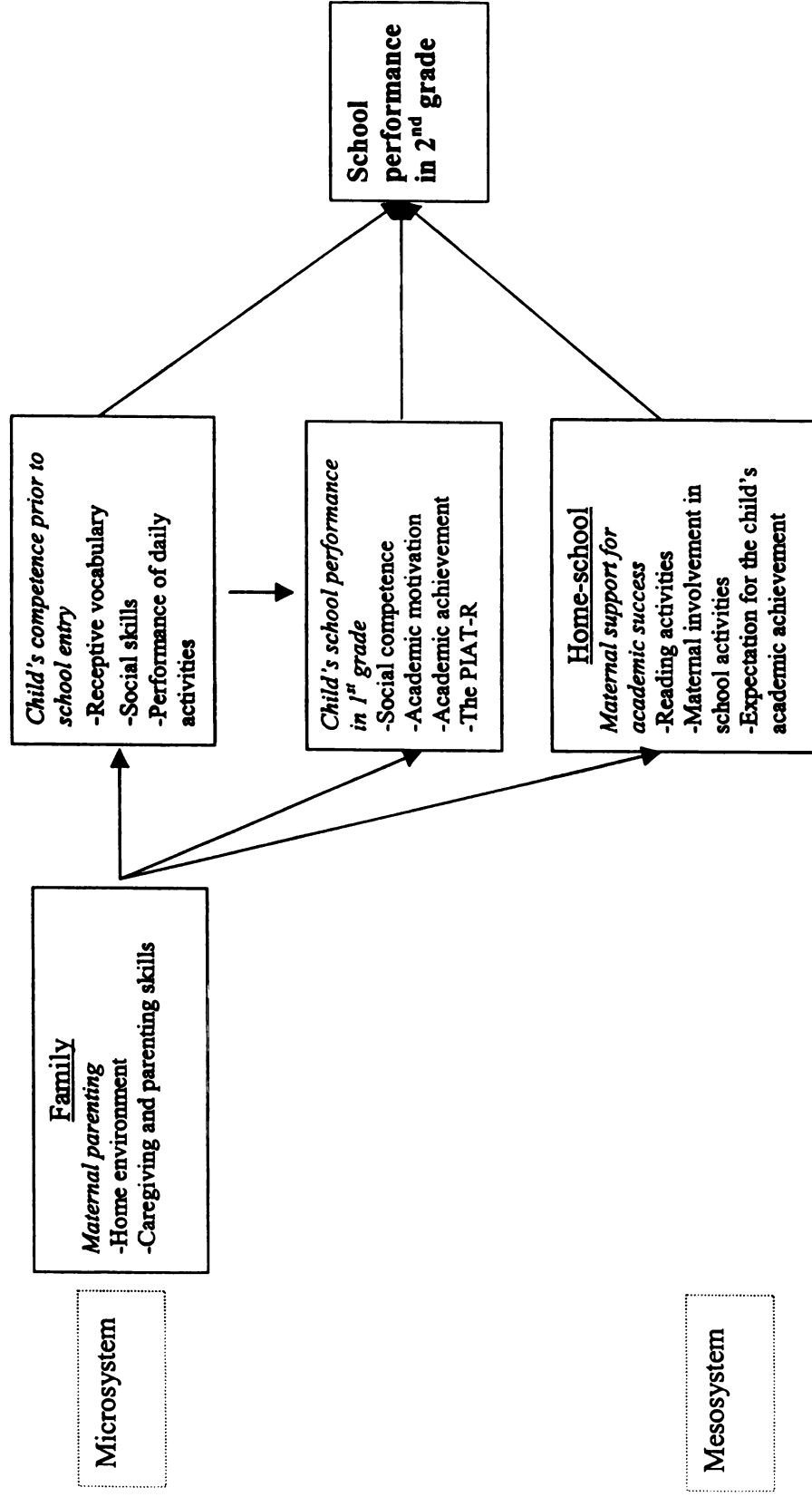


Figure 2. Conceptual Model: Micro- and Mesosystem Influences on the School Performance of Second Grade Children Born to Adolescent Mothers

exogenous and endogenous variables are: 1) Home/parenting, 2) Maternal support for academic success, 3) Children's competencies prior to school entry, and 4) Children's school performance in first grade. Home/parenting was assessed by observing the quality of home environment at 24 and 36 months and the mothers' parenting skills at 54 months. Maternal support for academic success in first grade was assessed by reading activities, maternal involvement in school activities, and expectations regarding the child's academic achievement. The children's competencies prior to school entry was assessed by the Peabody Picture Vocabulary Test-Revised (PPVT-R), the Social Skills Rating Scales- Parent Form (SSRS-P), and the Vineland Adaptive Behavior Scale (VABS). Children's school performance in first grade was measured by the Peabody Individual Academic Test-Revised (PIAT-R), and teachers' evaluations of academic performance, academic motivation, and social adjustment. The children's school performance in second grade, which was assessed by teachers' ratings of academic performance, academic motivation, and social adjustment.

Conceptual and Operational Definitions

The following section provides the conceptual and operational definitions for the variables in this study.

Home/parenting

Conceptual: Parenting refers to the caregivers' parenting skills and characteristics of the home environment that support the development of children.

Operational: Parenting was assessed by the Nursing Child Assessment Training (NCAT) HOME when the children were 24 months old, by the Home Observation for Measurement of the Environment (HOME) when the children were 36 months old, and by family advocates' ratings of maternal caregiving when the children were 54 months old.

Maternal support for academic success

Conceptual: This refers to the extent to which adolescent mothers involved themselves in school related activities, such as reading to the child, participating in school activities, and mothers' expectations for their children's academic achievement.

Operational: When their children were in first grade, the adolescent mothers were interviewed about reading activities (e.g., frequency of reading to the child and frequency of selecting books from the library), involvement in school activities (e.g., attending a school open house, serving on a parent-teacher council or advisory group), and maternal expectations for academic success, such as the grades they expect their children to obtain in school.

Children's competencies prior to school entry

Conceptual: Children's competencies refers to their ability to understand the meaning of spoken words, performance on age-appropriate adaptive behaviors (e.g., dressing themselves), and social skills when interacting with adults and peers.

Operational: Three instruments were used to assess children's performance prior to school entry when the children were 54 months old: the Peabody Picture Vocabulary Test-Revised (PPVT-R) (Dunn & Dunn, 1981), the Vineland Adaptive Behavioral Scales (VABS) (Sparrow, Balla, & Cicchetti, 1984), and an adapted version of the Social Skills

Rating System-Parent Form (SSRS-P) (Gresham & Elliott, 1990). The PPVT-R was assessed by experienced researchers. The VABS and the SSRS-P were completed by the adolescent mothers; typically the items were read to the young mothers by members of the research team.

Children's school performance in first and second grade

Conceptual: This refers to children's ability to know and interpret their environment, their ability to recall, reason, problem solve, think and learn, and their ability to adjust their behaviors in a school setting. The children's performance in school included academic performance, academic motivation, and social adjustment.

Operational: School performance in first grade was assessed by four instruments: the Peabody Individual Achievement Test-Revised (PIAT-R) (Markwardt, 1989), teachers' ratings of academic performance, the Pupil Behavior Index (PBI) (Vinter, Sarri, Vorwaller, & Shafer, 1966), and the Social Skills Rating System-Teacher Form (SSRS-T) (Gresham & Elliott, 1990).

The PIAT-R was administered in the fall semester of first grade. Teachers' ratings of academic performance, the PBI, and the SSRS-T were completed by the teachers at the end of first grade.

Children's school performance in second grade was assessed by teachers' ratings of academic performance, the Pupil Behavior Index (PBI), and the Social Skills Rating System-Teacher Form (SSRS-T) at the end of second grade.

CHAPTER TWO

REVIEW OF THE LITERATURE

The review of literature is divided into four main parts. The first part presents an overview of parenting differences between adolescent and adult mothers. The second part is an overview of the school performance of children born to adolescent mothers, compared to the school performance of children born to adult mothers. The third part summarizes research on the relationship between adolescent mothers' parenting and children's school performance. The last part reviews what is known about the relationships between child factors (e.g. language ability) and children's school performance.

Adolescent Mothers Parenting

The transition into parenting can be a stressful time for all parents, regardless of age and background. For adolescent mothers, this stress may be compounded by the likelihood that they have come from unfavorable backgrounds, as well as by the normative developments that occur during adolescence. The research on adolescent parental behaviors has focused on three main areas: knowledge about child development, attitudes toward the parenting role, and appropriate parenting practices (Sommer et al., 1993). Generally, adolescent mothers had lower levels of child development knowledge, less supportive parenting attitudes and less optimal parenting styles than adult mothers, both prenatally and postnatally (Sommer et al., 1993). Osofsky, Hann, and Peebles (1993) concluded from their review of research that adolescent mothers had a lack of knowledge of developmental milestones or imprecise knowledge concerning child

development, expected their children to reach developmental milestones earlier, had more punitive child-rearing attitudes, and perceived their infant's temperament as more difficult than it actually was. As a result, Whitman, Borkowski, Schellenbach, and Nath (1987) concluded that children of adolescent mothers were diagnosed as mentally retarded prior to adolescence more than children of adult mothers. Luster and Brophy-Herb (2000) reviewed literature and found that adolescent parents were less likely to indicate that they would intervene in harmful situations than would adult parents. As a result, children of adolescent mothers suffer from more accidents than children of adult parents.

Adolescent mothers scored significantly higher in authoritarian attitudes than adult mothers (Camp, 1995). They also had negative attitudes about parenting; for example, they were harsh in their response when faced with perceived or real inappropriate child behaviors (Whitman et al., 2001).

On average, teenage mothers demonstrated less favorable parenting practices than adult mothers. Adolescent mothers demonstrated less appropriate or less nurturing interactions than adult mothers. Adolescent mothers showed quiet interaction, smiled less, and were less positive in handling irritating infant behaviors (Barratt & Roach, 1995; Osofsky et al., 1993). The language of teenage mothers was less positive; they tended to give more commands and provided less reinforcement for their children's vocalization than adult mothers (Corcoran, 1998; Barratt & Roach, 1995). Adolescent mothers also provided less appropriate environments than adult mothers. Moore, Morrison, and Greene (1997) found that children born to younger adolescent mothers lived in substantially disadvantaged home environments compared to children born to

older mothers. For example, adolescent mothers tended to be less responsive; they provided fewer and less frequent cognitive activities in their home, such as offering or showing toys (Barratt & Roach, 1995). Adolescent parents had scores significantly lower than adult mothers on measures of parenting behavior, such as flexibility, verbal exchanges, and positiveness (Sommer et al., 1993). Adolescent mothers tended to have a higher rate of child abuse than adult mothers. Children of younger adolescent parents (age 17 and younger) are more than twice as likely to be referred for abuse and neglect than the children of mothers who delayed childbirth until age 20 or 21 (George & Lee, 1997).

School Performance of Children Born to Adolescent Mothers

Luster and Brophy-Herb (2000) reviewed the literature and concluded that the children of adolescent mothers tend to score below their peers on a variety of measures, including measures of cognitive competence and academic achievement. The cognitive development problems could be detected at an early age. The children of adolescent mothers had significantly lower scores on vocabulary tests measured with the English Picture Vocabulary Test (EPVT) at age 5 than children born to older mothers, after controlling for other risk factors (Wadsworth, Taylor, Osborn, & Butler, 1984). In one study, nearly half of the children of adolescent mothers at age 6 had general concepts scores, measured with the Bracket Basic Concept Scale, that were more than one standard deviation below the normative mean (Spieker, Larson, Lewis, White, & Gilchrist, 1997). Consistently, Whitman et al. (2001) found that the children of adolescent mothers

displayed receptive language delays at 3 and 5 years, when assessed with the Peabody Picture Vocabulary Test-Revised (PPVT-R). Around 60% of the children at age 3 and 5 had PPVT-R scores below the 10th percentile. Consistently, another study found that children from 4 to 11 whose mothers were 17 or younger at their births scored lower in mathematics, reading recognition, and reading comprehension measured with the Peabody Individual Achievement Tests (PIAT) than children born to older mothers (18-21 years old) (Moore et al., 1997).

The children of adolescent mothers performed at a lower level than children born to adult mothers not only on standardized tests but also on school performance and academic achievement. Youth born to adolescent mothers (age 17 or younger) are 70 percent less likely to be rated one of the best students in the class by their teachers at ages 12 to 16 after controlling for mother's background characteristics (Moore et al., 1997). They experienced pervasive school failure at the high school level. Among almost 300 adolescents who were born to teenage mothers in Baltimore area, 53% repeated at least one grade and 49% were suspended or expelled. When the children of adolescent mothers grew older, their educational goals were less clear than those of their peers who were born to adult mothers. Less than one third of students born to adolescent mothers were planning to attend college (Furstenberg et al., 1987).

Children of adolescent mothers are also at risk of intellectual decline relative to other children over time. Whitman et al. (2001) found that although the majority of infants of adolescent mothers fell within the normal range on the Bayley Scales of Infant Development in Mental and Motor skills at age 6 months and 1 year, they showed increasing evidence of intellectual delays at age 3 and 5 years, measured with the

Stanford-Binet Intelligence Scale. Almost half of the children (45%) at age 3 and 25% of children at age 5 had Stanford-Binet IQ scores at the clinical borderline category or lower.

Children of adolescent mothers are not only at risk of academic problems, but also behavioral problems. Luster and Brophy-Herb (2000) concluded that children of adolescent mothers exhibited greater emotional disturbances such as hostility and poor relationships with peers. Sommer, Whitman, Borkowski, and Gondoli (2000) studied 121 low-income adolescent mothers and their children from Indiana and South Carolina. They found that almost 30% of children born to adolescent mothers at age 3 displayed serious behavior problems measured with the Child Behavior Checklist (CBCL). Another study compared 1,031 children of adolescent mothers and 950 children of adult mothers born in the U.K. in 1970; the researchers found that children of adolescent mothers had more behavior problems rated by their mothers than the children of older mothers at age 5 (Wadsworth et al., 1984). Spieker, Larsen, Lewis, Killer and Gilchrist (1999) studied 183 children of low-income adolescent mothers whose mothers were recruited from prenatal clinics and service agencies in the Seattle area. They found that children of adolescent mothers had higher levels of disruptive behavior measured with the Child Behavior Checklist (CBCL) compared to the normative sample. More than twice as many children as expected exceeded the borderline clinical cutoff based on the normative sample.

When the children of adolescent mothers became youths, they showed “misbehavior,” such as school disciplinary problems, running away from home, and being stopped by the police (Furstenberg et al., 1987). Consistently, Moore et al. (1997)

found that among 1,150 children of adolescent mothers age 4 to 14, children of the youngest teen mothers had significantly more behavior problems with and without controls for the mothers' background than children whose mothers were older.

The lower school performance of the children born to adolescent mothers did not depend on a single factor but on multiple factors. Children of adolescent mothers who experienced multiple stressors may be at the greatest risk for low achievement and behavioral problems. Studies found that children exposed to several risk factors (e.g., were much more likely to perform poorly academically and behaviorally than children exposed to no risk factors (Dubow & Luster, 1990).

Effect of Adolescent Parenting on Children's School Performance

As mentioned earlier, children born to adolescent mothers are at greater risk for problems in cognitive development than their peers. However, not all of the children born to adolescent mothers perform poorly in school. Approximately 28% of 121 children born to adolescent mothers showed normal cognitive development, emotional functioning, and adaptive behavior at three years of age, as assessed using the Stanford-Binet, the Achenbach Child Behavior Checklist (CBCL) and The Vineland Adaptive Behavior Scales (VABS) (Sommer et al., 2000). Almost 40% of children had average or above average intelligence, which was assessed with the Stanford-Binet Intellectual Scales, and almost 10% of the children scored above the 50th percentile on the PPVT-R at 5 years (Whitman et al., 2001). Studies found that earlier caregiving, quality of home environment (Luster et al., 2000), and maternal support for academic achievement

(Vandenbelt et al., 2001) are important factors related to the school success of the children.

Home environment

Quality of home environment could be measured with several instruments such as The Home Observation for Measurement of the Environment (HOME), which was developed by Caldwell and Bradley (1984). Early home environment is related to children's early and later academic performance. Bradley, Caldwell, and Rock (1988) found that parental responsiveness, availability of stimulating play materials, and parental involvement assessed when the children were 2 years of age were strongly related to children's cognitive development at age 10, controlling for HOME scores at 6 months and 10 years.

Home environment is an important factor in predicting the academic achievement of children born to adolescent mothers. Dubow and Luster (1990) found that the positive home environment that adolescent mothers provided for their children, both in emotional support and cognitive stimulation, was associated with fewer academic problems for the children. In addition, Baydar, Brooks-Gunn, and Furstenberg (1993) found that the physical and emotional quality of the home environment in early childhood is a significant predictor of later literacy.

Among younger children of adolescent mothers, home environment measured in early childhood was associated with later academic achievement. Vandenbelt et al. (2001) found that the home environments that adolescent mothers provided for their children at 24 months, measured with the Nursing Child Assessment Training (NCAT) HOME, were significantly related to their children's academic achievement measured

with the Peabody Individual Achievement Test-Revised (PIAT-R) in the fall of the first grade. Home environment measured at 36 months was related to the PIAT-R and teacher rated reading and mathematics at the end of first grade. Moore and Snyder (1991) also found that adolescent mothers' HOME scores exhibited a strongly positive and robust influence on child's cognitive scores measured with the Peabody Picture Vocabulary Test (PPVT) at age three to seven.

Among older children, Baharudin and Luster (1998) found that children age 6-9 years who experienced supportive home environments as assessed by the HOME-SF had higher scores on achievement tests. Consistently, Wheeler (1997) found that those children of adolescent mothers between 13 and 17 years-old, with the highest HOME scores measured 4 years ago, were most likely to be in the highest achieving group, and those with the lowest HOME scores were most likely to be in the lowest achieving groups.

Home environment is related not only to children's academic achievement, but also to social competence. Children's behavioral problems may occur because the children are exposed to environmental factors that increase mental health risks. African American children who had many behavioral problems, assessed with the Behavioral Problems Index (BPI) at age six to nine, tended to have mothers who had low home environment scores (Luster & McAdoo, 1994). Studies have also found relationships between adolescent mothers' well-being and their children's behavioral problems. Adolescent mothers are more likely to be depressed than adult mothers. As a result, children of adolescent mothers are at higher risk of being exposed to depression and aggression (Osofsky et al., 1993). Consistently, Dubow and Luster (1990) found that the

emotional support subscale measured with the HOME, but not the cognitive stimulation subscale, was associated with reductions in behavior problems of eight to fifteen-year-old children of adolescent mothers.

Maternal caregiving and parenting skills

Quality of parenting is associated with the cognitive development of children. Cognitive readiness for parenting, which includes knowledge of infant and child development and parenting attitudes, is also related to children's academic achievement. Adolescent mothers who were less cognitively ready for parenting during the prenatal period had children who obtained lower levels of intelligence and language skills at 3 years of age (Miller, Miceli, Whitman, & Borkowski, 1996).

Quality of parent-child interaction, such as parental warmth or sensitivity to children's requests and feelings, has been significantly associated with academic achievement and cognitive growth (Christian, Bachnan, & Morrison, 2001). Estrada, Arsenio, Hess, and Holloway (1987) found relationships between quality of mother-child interactions and children's cognitive competence including school readiness skills at ages 5 and 6, IQ scores at age 6, and vocabulary and mathematics performance at age 12. The association between affective relationships and cognitive performance increased from nonsignificant (age-5-6 school readiness), to marginally significant (age-6 IQ), to clearly significant (age-12 school achievement).

Consistent with children of adult mothers, adolescent mothers who provided more supportive caregiving when their children were young tended to have children with higher academic performance later on. Children whose adolescent mothers initiated positive interactions with them averaged higher literacy scores than children whose

mothers had fewer interactions (Baydar et al., 1993). Hann, Osofsky, and Culp (1996) measured mother-child interaction in infancy, positive and negative hedonic tone, maternal positive and negative affect, dyadic verbal reciprocity and rated degree of infant engagement, maternal sensitivity, and dyadic interactive fit. They found that interactions between adolescent mothers and their children at 13 and 20 months were predictive of the receptive vocabulary scores at age 44 months.

In another study, mother-child interaction measured with the Maternal Interaction Scale when the children were a year old was the best predictor of the child's IQ, PPVT, and PIAT math and reading at age 5 (Whitman et al., 2001). In the study by Vandenberg et al. (2001), the quality of care that an adolescent mother provided for her child, such as warmth, setting limits for her child, and engaging in activities which enhance the child's intellectual development, was measured by family advocates when the child was 54 months. The researchers found that the quality of care that the adolescent mothers provided for their children was the most consistent predictor of PIAT-R scores in the fall and teachers' composite ratings of reading and math in the spring of the child's first grade year.

Effective parenting skills are also a protective factor for enhancing prosocial behavior among at-risk children (Huffman, Mehlinger, & Kerivan, 2000). Parent-child interactions have tremendous effects on children's behavior. Among London children age 9-12, mother-child and father-child relationships were viewed as strong protective factors against children's behavioral and emotional problems in at-risk children whose parents had marital problems (Jenkins & Smith, 1990). Consistently, among children from urban areas, parenting quality, including warmth and closeness, and high

expectation for child's achievement and prosocial behavior, was predictive of competencies in childhood and adolescence, even after cognitive functioning and socioeconomic status were controlled (Masten, Hubbard, Gest, Tellegen, Garnezy, & Ramirez, 1999).

Prenatal cognitive readiness of the parents is not only related to children's academic performance but also to behavioral outcomes. Miller et al. (1996) found that adolescent mothers who were less cognitively prepared for parenting reported that their children displayed more internalizing behaviors (e.g., depression and anxiety) and externalizing behaviors (e.g., aggression) at 3 years of age. Poor parenting techniques increased the risks of poor social development in children. Poor parenting and parent-child relationships during infancy and toddlerhood may lead to nonoptimal development later. Wakschlag and Hans (2000) concluded that among adolescent mothers, lack of dyadic engagement was related to insecure infant attachment. Conflict between young mothers and their toddlers was also related to behavior problems during the preschool years. Mothers' and grandmothers' competent parenting were negatively associated with children's externalizing and internalizing problems during preschool.

Brier (1995) found that parents who are harsh, disengaged, provide inconsistent guidelines, and are unable to monitor their children's behavior are more likely to have children with a higher risk for antisocial behavior. Egeland, Pianta, and O'Brien (1993) found that intrusive parenting observed during mother-child feeding and play interactions at 6 months predicted problems with emotional health and peer acceptance in first and second grade. Consistently, Spieker, Larson, Lewis, Keller, and Gilchrist (1999) found that children whose adolescent mothers reported the use of negative control strategies,

such as yelled, threw, smashed or kicked something, when the children were 5 ½ and 6 years, had significantly higher disruptive behavior problem scores at age 6. In addition, the increasing use of negative control practices of the adolescent mothers increased the children's disruptive behavior problems. In another study, adolescent mothers who had a high potential for child abuse, measured with the Child Abuse Potential Inventory-Short Form (CAPI-SF), had children who had more internalizing problems at ages 3 and 5 and had externalizing problems at age 5 (Dukewich, Borkowski, & Whitman, 1999).

Maternal involvement in education

Several studies found that maternal involvement in children's education when the children are young has benefits for academic achievement at an early age as well as later on. Griffin and Morrison (1997) found that the home literacy environment, such as frequency of using the library, number of child and adult magazine subscriptions, how often someone read to the child, and the number of books the child owned, uniquely predicted kindergarten scores in receptive vocabulary, reading recognition, and general knowledge and second grade scores in general knowledge and reading recognition. Hess et al. (1984) found that maternal behavior which was associated with children's aptitude for school-relevant tasks at ages 5 and 6, including teaching behavior, expectations, beliefs, and disciplinary strategies, was also related to children's school readiness and academic achievement scores at age 12.

When high-risk students succeed in school, their parents are likely to have influenced their academic achievement. High achieving students from economically disadvantaged homes in urban schools tended to have parents who were more likely to emphasize and encourage their academic learning (Wang, Haertel, & Walberg, 1994).

Children age 3-11, whose parents read or told stories to them or offered printed resources such as books, had average or above scores on measures of academic performance (Ebener, Lara-Alecio, & Irby, 1997). Luster and McAdoo (1996) found that maternal involvement in kindergarten, rated by teachers, was a significant predictor of the children's intelligence in kindergarten, measured with the Stanford-Binet. Maternal involvement in kindergarten was a consistent predictor of academic achievement in first grade and eighth grade, measured with the California Achievement Test (CAT), and educational attainment at age 27. Reynolds (1991) found that parent involvement in school activities, rated by teachers at the end of the first year, had relatively strong indirect effects on reading and mathematics achievement at the end of the second year through reading and mathematics achievement at the end of first year. Among adolescent mother families, Vandenberg et al. (2001) found that maternal support for education, such as reading activities, expectations for achievement, and maternal involvement in school activities, was related to PIAT-R scores in first grade.

Parental expectations for children's school success are related to children's academic achievement. Christian et al. (2001) found that the parents of high achievers had high educational expectations and fostered children's active participation in school. Consistently, adolescent mothers' high educational aspirations for their children in early childhood predicted high literacy scores for their offspring in young adulthood (Baydar et al., 1993).

Child Factors Related to Children's School Performance

Cognitive functioning and ability

One of the most important predictors of academic achievement of children is level of cognitive ability. Children with lower levels of cognitive ability, especially lower verbal skills, are more likely to experience school failure. They also may have negative school attitudes and decreased chances of recognizing the relationship between achievement in school and later success in life (Huffman et al., 2000). Children's cognitive ability could be measured with a variety of measurements such as the Bayley Mental Development Index for infants and toddlers, and the Stanford-Binet Intelligence Scale (SBIS) and Peabody Picture Vocabulary Test (PPVT) for preschool and first grade children.

Among children of adolescent mothers, an average or higher level of verbal skills measured with the PPVT was viewed as a protective factor, which reduced the risk of academic problems (Dubow & Luster, 1990). In another study, Whitman et al. (2001) found that cognitive ability at an early age predicted the level of later cognitive ability and academic achievement. Child's cognitive functioning at 1-year, measured with the Bayley Mental Development Index, was the best predictor of the child's cognitive development at age 3 (measured with the SBIS and the PPVT-R) and at age 5 (PIAT). The Vineland Adaptive behavior (VAB) scale, Stanford-Binet IQ, and language development (PPVT-R) at age 3 were the best predictors of intelligence scores and academic readiness (PIAT math and reading) at age 5.

Studies also found relationships between cognitive development and poor school outcomes in terms of behavioral problems. Children with lower levels of intelligence,

especially lower levels of verbal skills, are more likely to exhibit antisocial behaviors (Huffman et al., 2000). Among young children, language ability is related to the ability to recognize and interpret emotions, which in turn are related to self-regulation. Children who display deficits in language are less likely to remember and follow directions and more prone to “bump against” rules in situations that contain structure and require restraint (Brier, 1995). Among adolescents, early intellectual functioning is viewed as a vulnerability or protective factor for the development of antisocial behavior problems in high-risk group. Good verbal, learning, or problem solving aptitude could play a role in assessing threat, accessing resources, and seeking healthier environments or relationships for development; these qualities may also elicit positive reactions from teachers (Masten, Hubbard, Gest, Tellegen, Garnezy, & Ramirez, 1999).

Cognitive readiness and academic achievement at the beginning of school

Children who had more cognitive experiences at an early age, such as attending kindergarten prior to the transition to the first grade, performed better than children who had less experience in a school setting. Children who were good at letters and sounds during kindergarten learned to read more easily and performed well in first grade (Entwisle & Alexander, 1998). Also children who were well prepared before entering school were less likely to be placed in less advantageous academic tracks. Reynolds (1989, 1991) found that entering school readiness at kindergarten, in terms of listening, word analysis, vocabulary, language, and mathematics, measured by the Iowa Tests of Basic Skills (ITBS), directly affected the reading achievement of African-American children in first and second grade. Cognitive readiness also had an indirect effect on

reading achievement at second grade through reading achievement in kindergarten and first grade.

Children's academic skills at the beginning of school are highly predictive of long-term academic success. Stipek (2001) stated that prior skills limit a child's ability to learn new skills. Therefore, children with high skills at the beginning are able to take advantage of the instructional program more than are children with poorer skills. Many longitudinal studies found that good cognitive skills during the first few years of school predicted later academic performance (Stipek, 2001). Hess, Holloway, Dickson, and Price (1984) found that school readiness, such as knowledge of concepts, at age 5 and 6 was predictive of mathematics and vocabulary in Grade 6. In a similar study, Stevenson and Newman (1986) found that kindergarteners who had high scores on reading comprehension and mathematics had high scores on reading and math achievement in Grade 10. Cunningham and Stanovich (1997) concluded that reading achievement in first grade correlated very highly with reading comprehension, vocabulary, and general knowledge in the 11th grade when first grade cognitive ability was partialled out. Academic achievement as early as first grade predicts high school completion; lower school achievement and academic motivation in sixth grade was associated with a higher probability of dropping out of high school (Garnier, Stein, & Jacobs, 1997).

Among a high-risk sample, Luster and McAdoo (1996) found that the behavior of low-income kindergarteners rated by teachers, including academic motivation and child's personal behavior, were predictive of achievement measured by the California Achievement Test (CAT) in first and eighth grades. Another study found that among children of adolescent mothers, early childhood cognitive standardized assessments at

age 4-6 were highly predictive of literacy skills at age 19-21(Baydar et al., 1993). Earlier educational problems such as school suspensions or early grade failures are strongly associated with literacy levels in young adults.

However, some studies found that preschool experiences contributed significantly only for certain groups of children or depended on other factors, such as family background. Among the most at-risk children, who had less educated mothers and poorer home literacy environments, more time in child-care centers was significantly related to academic performance especially in mathematics scores (Christian, Morrison & Bryant, 1998). For other children in the same study, preschool experience did not play a significant role in academic performance.

Social competence

Social skills and problem behaviors have been considered less as important variables related to school success or failure. A few studies have focused on the relationship between social competence in kindergarten children and academic achievement. Christian et al. (2001) found that quality and maintenance of children's peer relations affect their schooling experiences. Similarly, kindergarteners' positive social skills, assessed with the Social Skills Rating Scale (SSRS) by their teachers, were related to first grade academic achievement measured with the Stanford Achievement Test (Agostin & Bain, 1997). On the other hand, negative relationships or conflicts with peers are viewed as a risk factor for poor school adjustment and decreasing school involvement. Ladd (1990) concluded that children who had fewer friends and more peer rejection may have negative perceptions of school, poor school attitudes, and low levels of achievement.

Personal maturity and the behavior of children are also related to children's success in school. Pallas, Entwisle, Alexander, and Cadigan (1987) found that personal maturity of the children in kindergarten, as rated by teachers, significantly predicted cognitive verbal growth from the fall semester to spring semester of first grade measured by the California Achievement Test (CAT). On the other hand, children's psychological well-being is related to their school performance. Affectively depressed children show evidence of functional cognitive impairment, with mild declines in verbal performance over time as the result of difficulties with concentration and less motivation to engage in learning tasks (Kovacs & Goldston, 1991). Children's interpersonal skills have also predicted early academic achievement. Normandeau and Guay (1998) found that preschool behaviors, such as aggressive, anxious-withdrawn, and prosocial behaviors, measured with the Preschool Social Behavior Questionnaire by their teachers, influenced cognitive self-control, which in turn was positively related to school achievement at the end of first grade measured with the Peabody Picture Vocabulary Test (PPVT).

Arnold (1997) found that there is bidirectional relationship between externalizing behaviors and academic achievement. Externalizing behaviors predicted academic skills, and academic skills predicted externalizing behaviors. Teachers are likely to provide fewer learning opportunities for children with conduct problems than for children with fewer conduct problems. Teachers are more likely to spend time on their behavior problems than instruction in academic tasks. In turn, these children are less likely to have high academic achievement. Peers are more likely to reject low-achievers; therefore, these children are more likely to have negative relationships with their classmates, which in turn could create negative attitudes toward learning and school (Stipek, 2001).

Children's academic motivation

Children who perceive that school activities are interesting will persist in finishing school tasks; this in turn, increases the likelihood of success in school. Academic motivation in the early grades had both direct and indirect effects on academic achievement later on. For children from low income families, academic motivation before entering school is related to academic achievement in mathematics, after entering school (Reynolds, 1989). Luster and McAdoo (1996) found that among low-income African-American children, academic motivation ratings by their kindergarten teachers with the Pupil Behavior Inventory (PBI) consistently predicted academic achievement in first and eighth grades. Consistent with Luster and McAdoo's finding, Reynolds (1991) found that among low-income children, academic motivation in kindergarten had an indirect influence on reading achievement in second grade through parent involvement in school and reading achievement during kindergarten and first grade.

Children's early performance in school may affect their perceptions of their academic competence and other motivational variables, which in turn affect their future performance. Studies found that children's motivation-related beliefs at the beginning of school are usually very positive, but the self-perceptions of children who perform poorly in school decline over the first few years in the elementary grades. Average scores on motivation measures begin to decline for children who perform poorly after they enter school. Decline in motivation could decrease effort in academic tasks, in turn, affecting children's academic achievement (Stipek, 2001).

Children's perception of their academic success was also related to their academic achievement. Pallas et al. (1987) found that children's academic self-image such as

“learning new things quickly” and “being a good student,” as self rated in the spring of first grade, significantly related to their verbal growth at the end of first grade.

Recently, researchers have focused on the relationship between social aspects of academic motivation and academic achievements. Wentzel and Wigfield (1998) reviewed studies and found that among school-age children, social aspects of academic motivation, such as displaying socially appropriate classroom behavior and focusing on academic activities, is strongly associated with academic achievement.

Among young children, teachers’ ratings of first graders’ learning-related behaviors, such as very enthusiastic, interested in a lot of different things, creative or imaginative, correlated significantly with children’s report card marks and the California Achievement Test scores (CAT). In addition, the learning-related behaviors in first grade had a stronger effect on standardized test scores in later years, in second and fourth grade, than teachers’ report card marks (Alexander, Entwisle, & Dauber, 1993). Researchers also found that children’s work-related skills, such as listening to instruction and directions, and compliance with teacher demands at the beginning of kindergarten, predicted reading and mathematics at the end of second grade, after the influence of kindergarten reading and mathematics skills had been controlled. Children with low work-related skills performed significantly worse than the overall sample on a number of early literacy measures (receptive vocabulary, reading recognition, general information, and mathematics) at the beginning of kindergarten and at the end of second grade (McClelland, Morrison, & Holmes, 2000).

Summary

It is evident that children born to adolescent mothers are at risk for school failure. Both academic and behavioral problems are based on multiple factors, especially unfavorable parenting by adolescent mothers. On the other hand, the literature suggests that various factors may influence children's school success. These factors are viewed as important for child's school performance. Within the microsystem in which a child develops, maternal behaviors especially during the first five years of the child's life contributed to school performance both early and later on. Studies (Hess et al., 1984 and Estrada et al. 1987) suggest that a major impact on later performance in school comes from early school performance, which is affected by the mothers' parenting skills. The current study provided additional information regarding the effects of home environment/parenting and child competencies prior to school entry, which related to the school performance of children born to adolescent mothers.

CHAPTER THREE

METHODS

The purpose of this study was to investigate factors which contribute to individual differences in school performance of second grade students born to adolescent mothers.

This chapter describes the methodology of the study in detail.

This study addresses two specific questions:

1. How do parenting practices during the early childhood period relate to maternal support for academic success in first grade and to children's school performance in second grade?
2. How do children's competencies (e.g., vocabulary and social skills) prior to school relate to their school performance in first and second grade?

Research Design and Procedure

This study is a secondary analysis of a longitudinal data set. The units of analyses were the adolescent mother and her child. The core data set consisted of one hundred and forty two pregnant adolescents who were enrolled in the Family TIES (Trust, Information, Encouragement and Support) family support program in 1991. Qualification for the program required that these females be expecting their first child, come from low income families (150% of the poverty line or less), have not completed high school, and be planning to live in the Flint area until 1996.

At enrollment the adolescent females ranged in age from 13 to 19 years, with a mean of 16 years. Over half of them were African American (58%) and one third were

Caucasian (33%). Many of the adolescents were considered “at risk,” based on their background. More than half of them (56%) had been retained in grade, 42% of them were abused (physically, sexually, or through domestic violence), and 57% had mothers who had also been teenage mothers.

The follow-up study was conducted when the children of the adolescent mothers were in the first and second grade. In the second-grade follow up study, data were collected on 90 second graders at the end of the school year from their teachers from 47 elementary schools.

Attrition

In the second grade follow-up study, second grade teachers rated children’s school performance at the end of the school year, including academic performance, academic motivation, and social adjustment. The families of children who were assessed in second grade were compared to the families of children who did not participate in the second grade follow-up study on data collected during the prenatal period. T-tests were used to compare the two groups on thirteen enrollment variables: age, race, educational aspirations, educational expectations, childrearing beliefs, education level of their mothers and of their fathers, age at first birth of their mothers, locus of control, self-esteem, self-reported grade point average (GPA), self-report of grade retention, and whether or not she was living with her mother. The results are presented in Table 1. The pregnant adolescents who participated in the follow-up study had higher self-reported grade point averages (GPA) than adolescents who did not participate in the follow-up study. There was a marginally significant difference in the child-rearing beliefs scores of the adolescents who participated and those who did not participate in the second grade

follow-up study. The pregnant adolescents who participated in the follow-up study had child-rearing beliefs scores less than adolescents who did not participate in the follow-up study. No other differences were found between participants and non-participants. Therefore, the follow-up participants were considered to be fairly representative of the original participants in the Family TIES program.

Table 1. The Effects of Attrition: A Comparison of Participants and Nonparticipants in the Second-Grade Follow-Up (School Performance) on Data Collected at Enrollment (Means and Standard Deviations).

Variable	Participants (n=90)	Nonparticipants (n=52)	t value
Age of teens	16.01 (1.46)	16.06 (1.38)	-.18
Educational aspirations	4.14 (1.40)	3.87 (1.51)	1.11
Educational expectations	3.58 (1.53)	3.35 (1.58)	.86
Self-reported GPA	2.54 (0.76)	2.11 (0.83)	3.11*
Adult Adolescent Parenting Inventory Total Score (childrearing beliefs)	104.92 (16.27)	110.11 (18.34)	-1.78 ⁺
Self-esteem	30.88 (4.16)	30.07 (4.54)	1.08
Locus of control orientation	8.86 (1.38)	9.15 (1.47)	-1.16
Mother's education	11.69 (1.62)	11.80 (1.60)	-.40
Father's education	11.42 (2.14)	11.39 (1.84)	.06
Teen's mother's age at first birth	19.43 (3.59)	18.47 (2.86)	1.55
African American	0.60 (0.49)	0.53 (0.50)	.71
Repeated a grade in school	0.56 (0.50)	0.54 (0.50)	.20
Living with mother	0.63 (0.48)	0.65 (0.48)	-.24

⁺ $p < .10$; * $p < .05$

Data collection

The first three years

Data were collected from the adolescent mothers and their first-born children every 6 months during the first three years after the children were born. The home environments that the mothers provided for their children were assessed in the family home by interviewers who all had experience working with young mothers when the children were 24 and 36 months.

At 54 months

At the end of the program, data were collected by interviewing the mothers. Children's receptive vocabulary was also assessed with the PPVT-R. In addition, family advocates who provided services to the families completed rating scales on maternal characteristics and caregiving practices.

In the first grade

The adolescent mothers were interviewed when the children were in the fall semester of first grade. Children's academic achievement was also assessed with the PIAT-R during the fall semester. The children were assessed by their teachers at the end of first grade. The teachers' questionnaires were mailed to teachers and were collected by members of the research team when they were completed. Teachers had an opportunity to discuss any question they had regarding the questions with the member of the research team (i.e., research manager or graduate assistant).

In the second grade

Children's teachers assessed the children at the end of the second grade.

Research Instruments

Exogenous variables

Home/parenting:

Parenting skills: The family advocates rated the young mothers' parenting skills at 54-months old by using a series of a 5-point rating scales. The parenting skills included a) maternal warmth; b) the mother's ability to set and enforce limits for the child; c) how frequently the mother engaged in activities to enhance the child's cognitive development; d) how often the mother praised and said positive things to the child; e) the mother's skills in communicating with the child about household rules and expectations; f) how child centered the mother was; and g) the overall quality of care the mother provided for the child. The mean total rating score was 3.40 with a standard deviation of .88 (range 1-5).

Home environment: The researchers assessed the home environments which the adolescent mothers provided for their children at 24-months by using the Nursing Child Assessment Training (NCAT) HOME (Barnard, 1978) and at 36-months by using the Home Observation for Measurement of the Environment (HOME)(Caldwell & Bradley, 1984). This instrument assessed various aspects of the home environment which were related to the cognitive competence of children. Each item is scored "yes" or "no" (indicating the presence or absence of a positive aspect of the environment); a total score was computed by counting the number of items scored "yes." For this sample, the mean (NCAT) HOME at 24 months was 33.19 (SD = 7.67) and the mean HOME score at 36 month was 33.84 (SD= 8.96).

Endogenous variables

Maternal support for academic success:

Maternal support for child school success was assessed in the fall semester in first grade in three areas: reading activities, maternal involvement in school activities, and maternal expectations for child academic success.

Reading activities: Reading activities were evaluated by asking four questions: “In typical weeks, how often do you read to your child?” “How often does someone else in your home read to your child?” “How often does your child read to you or to another adult?” “In the past 6 months, how often have you assisted your child in selecting books from a library?” Scores on the first three items ranged from 5-everyday to 1-hardly ever. Scores on the library use scale range from 5-more than once per month to 1-not at all. Scores on the five scales were summed to obtain a total reading score. The reliability coefficient for the reading scale was .53. The mean score for this sample was 10.24 (SD = 2.84)

Maternal involvement in school activities: There was a list of 15 possible school activities that adolescent mothers could be involved in which ranged from attending a school open house to serving on a parent-teacher council or advisory group. Mothers were asked about their participation in school-related activities during the child’s kindergarten year. Positive responses were summed to obtain a subscale score for maternal involvement in school activities ($M = 7.68$; SD = 2.40). The reliability coefficient for these items was .65.

Expectations for academic achievement: Adolescent mothers were asked two questions related to their expectations for their children’s academic achievement. The

first question was “Which of the following best describes what grades you expect your child to get in school?” Scores ranged from 5--excellent, more A’s than B’s to 1--below average, mostly D’s or below. The second question was “How far do you think your child will go in school?” Scores ranged from 6--take further training after college to 1--leave school before entering high school. Scores from these two questions were summed to obtain a total subscale score for the expectations for academic achievement scale. The reliability coefficient for these two items was .46. The mean was 8.84 (SD = 1.44).

Children’s competencies prior to school entry:

Receptive Vocabulary: The Peabody Picture Vocabulary Tests-Revised (PPVT-R) (Dunn & Dunn, 1981) was used to assess the receptive vocabulary of the children at 54-months. The examiner read each word aloud and the child was asked to choose which of four pictures best illustrates the word. The PPVT-R correlated strongly with other measures of intellectual functioning such as achievement test scores, and therefore, was viewed as a useful indicator of school readiness. Raw scores were converted to standard scores. The mean score for this sample was 76.71(SD= 17.04).

Performance of daily activities: The Vineland Adaptive Behavior Scales (Sparrow et al., 1984) were used to assess the skills and adaptive behavior of the children at 54 months. This measure was completed by the adolescent mothers. In this study, four subscales were used: communication, daily living skills, socialization, and motor skills. The possible ratings ranged from: 2 (yes or usually) to 0 (no or never). The standard scores were converted from raw scores. Standard scores for the four subtests were summed and converted to a total standard score. The mean score for this sample was 100.23 (SD=15.05).

Social skills: The children's social skills were assessed with an adaptation of the Social Skills Rating System-Parent Form (Gresham & Elliott, 1990). The measure was completed by the adolescent mothers when their children were 54 months old. There are 16 questions on positive social skills such as "my child follows my rules" and "my child makes friends easily." Cronbach's alpha for the social skills scale was .76. There are 11 questions on behavior problems such as "my child has temper tantrums" and "my child is mean to other children." The possible ratings were: 2-usually, 1-sometimes, and 0-never. Cronbach's Alpha for behavior problems was .69.

Children's school performance in first and second grade:

Children academic achievement: The academic achievement of the children was assessed by using the Peabody Individual Achievement Test- Revised (PIAT-R) (Markwardt, 1989) in the fall semester of first grade and the teachers' ratings of academic performance at the end of first and second grade. In this study, four subscales of the PIAT-R were used: general information, reading recognition, reading comprehension, and mathematics. Grade level standard scores for the four subtests were averaged to obtain a total achievement test score for each child. The mean score for this sample was 90.17 ($SD=11.00$) which is below the average score for the children this age in the population (i.e., 100). The range of scores was 61-119.75.

The teachers were asked to assess children's academic performance on children's reading, math, and overall academic performance relative to other children in the same grade at the end of first and second grade. Each rating was made on a 5-point rating scale. The possible ratings ranged from: 5-superior (highest 20%) to 1- much below average (lowest 20%).

Social competence and behavior problems: The children were assessed on social competence and behavior problems with the Social Skills Ratings System-Teacher Form (SSRS-T) (Gresham & Elliott, 1990). The measure was completed by teachers at the end of first and second grade. There are 30 items of positive social behaviors such as “attends to your instructions” and “controls temper in conflict situations with peers.” There is a 3-point rating scale. The possible ratings were: 2-very often, 1-sometimes, and 0-never. Cronbach’s alphas for social skills for this sample were .92 for both the first and second grade assessments. There are 18 behavior problems such as “fights with others” and “threatens or bullies others.” The teachers rated these behaviors by using the same rating scales used to rate positive social behaviors. Cronbach’s alphas for behavior problem were .91 for both the first and second grade assessments.

Children’s academic motivation: The teachers rated children’s academic motivation by using the Pupil Behavior Inventory (PBI) (Vinter et al., 1966) at the end of first grade. This measure consists of nine items measuring academic motivation such as “is motivated toward academic performance” and “positive concern for own education.” Items are scored on a 5-point rating scale. The possible ratings ranged from 5- very frequently to 1-very infrequently. Cronbach’s alpha for this sample in first grade and second grade were .93 and .94 respectively.

Conceptual Model and Hypotheses

Conceptual model

The conceptual model is presented in Figure 3 (p. 44). It shows the hypothesized relationships among the variables. In this study, parenting, children's competencies prior to school entry, maternal support for academic success, and children's school performance in first grade were expected to predict children's school performance in second grade.

Hypotheses

In this study, six hypotheses were tested to answer the question stated earlier regarding what factors relate to the school performance of the second grade children born to adolescent mothers.

Hypothesis 1: Adolescent mothers' supportive parenting during early childhood has a positive direct effect on their children's competencies prior to school entry.

Hypothesis 2: Adolescent mothers' supportive parenting during early childhood is predictive of maternal support for academic success in first grade.

Hypothesis 3: Children's competence prior to school entry has a positive direct effect on children's school performance in first grade.

Hypothesis 4: Maternal support for academic success has a positive direct effect on children's school performance in first grade.

Hypothesis 5: Children's school performance in first grade has a positive direct effect on children's school performance in second grade.

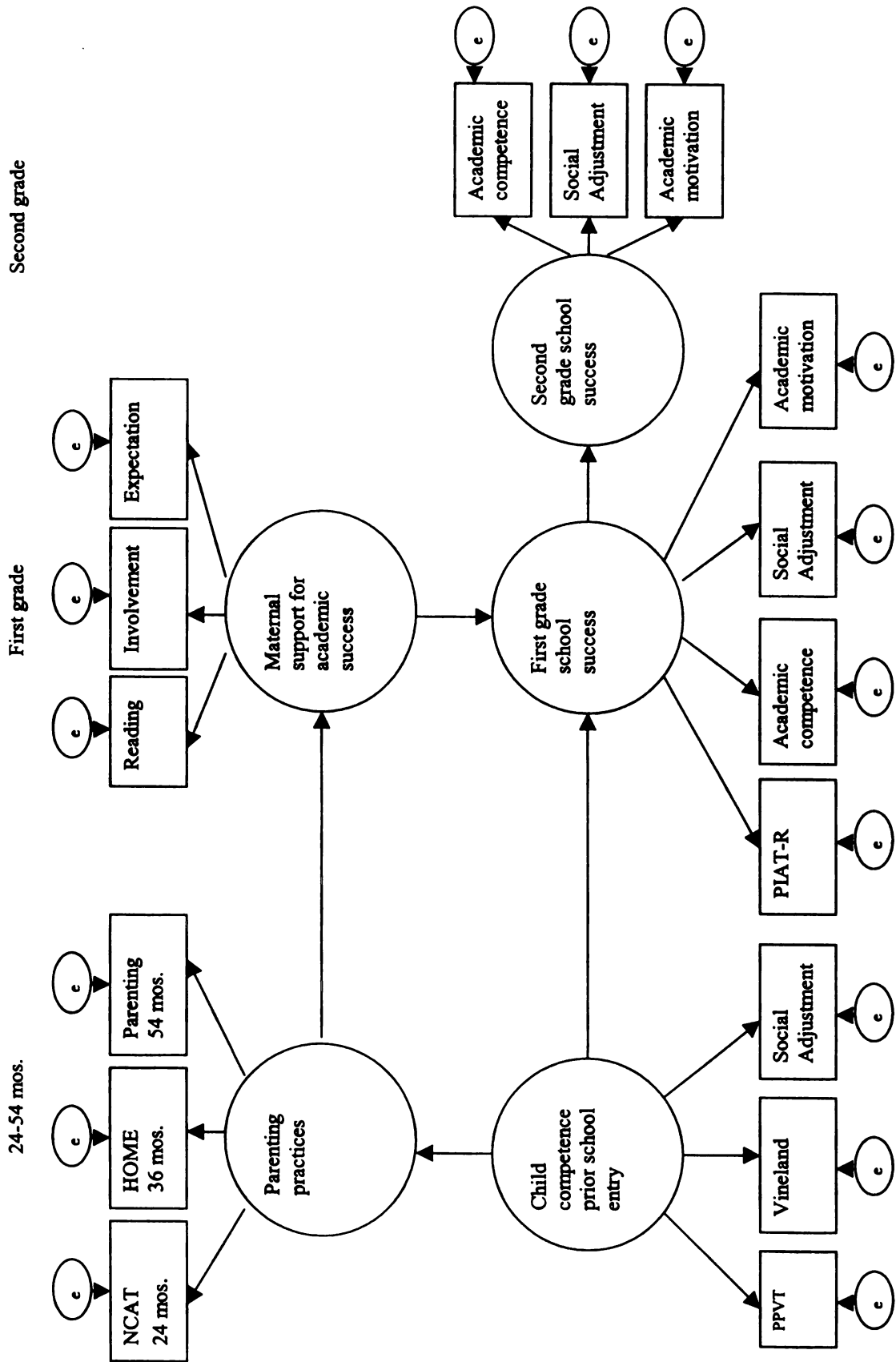


Figure 3. Conceptual Model (Hybrid Model)

Hypothesis 6: Adolescent mothers' parenting and maternal support for academic success have positive indirect effects on children's school performance in second grade through children's competencies prior to school entry and children's school performance in first grade.

Data Analyses

Overview of analyses

The analyses involved four main parts: descriptive statistics, correlations between the exogenous and endogenous variables, path analyses, and a structural equation model. The first step was to compute descriptive statistics (i.e., means and standard deviation) which were used to determine the distributional characteristics of each variable. The second part is an examination of the relationships among variables. Zero-order correlations were calculated to determine the extent of associations among the exogenous and endogenous variables. The third part is path analyses. A path analysis was used to analyze the relationships among variables and to determine which of the predictor variables had a direct or an indirect effect on the second grade outcome measure: social adjustment, academic performance, and academic motivation.

The last part is the structural equation model. The structural equation model specifies the direct and indirect relationships among the latent variables and is used to describe the amount of explained and unexplained variance (Schumacker & Lomax, 1996, p. 49-50). In general, structural equation models can be decomposed into two submodels: a measurement model and a structural model. *The measurement model*

defines relations between the observed and unobserved variables. In other word, it provides the link between scores on a measuring instrument (i.e., the observed indicator variables) and the underlying constructs they are designed to measure (i.e., the unobserved latent variables). In the case that a researcher has some knowledge of the theory and/or empirical research of the underlying latent variable structure, the measurement model could draw relations between the observed measures and the underlying factors a priori and then test this hypothesized structure statistically, which is categorized as confirmatory factor analysis (CFA) (Byrne, 2001). *The structural model* defines “relations among the latent variables. It specifies the manner by which particular latent variables directly or indirectly influence changes in the values of certain other latent variables in the model” (Byrne, 2001, p.12). The *Hybrid model* combines measurement and structural models: multiple exogenous and endogenous variables that can be either latent or observed (Kline, 1998, p.64).

In general, there are two steps of testing a structural equation model (measurement model and structural model): model assessment and model respecification.

1. Model assessment: After developing a hypothesized model, then the next logical step is to assesses how well the model adequately describe the sample data.

Ideally, evaluation of model fit should be based on several criteria that can assess model fit from a diversity of perspectives. In particular, one should focus on the adequacy of (a) the parameter estimates and (b) the model as a whole.

(a) The parameter estimates:

The fit of *individual parameters* in the model involves three aspects of concern:

- The feasibility of the parameter estimates: “The fit of individual parameters in a model is to determine the viability of their estimated values. Parameter estimates should exhibit the correct sign and size, and be consistent with the underlying theory” (Byrne, 2001, p.75). Examples of parameters exhibiting unreasonable estimates are correlations > 1.00 or signs which show the opposite direction that it should be.
- The appropriateness of the standard errors: Poor model fit shows standard errors that are excessively large or small. For example, if a standard error approaches zero, the test statistic for its related parameter cannot be defined. Likewise, standard errors that are extremely large indicate parameters that cannot be determined. However, because standard errors are influenced by the units of measurement in observed and/or latent variables, as well as the magnitude of the parameter estimate itself, no definitive criterion of “small” and “large” has been established (Byrne, 2001).
- The statistical significance of the parameter estimates: The test statistic here is the critical ratio (c.r.), which represents the parameter estimate divided by its standard error; as such it operates as a z-statistic in testing that the estimate is statistically different from zero. “Based on a level of .05, the test statistic needs to be $>\pm 1.96$ before the hypothesis (that the estimate equals 0.0) can be rejected. Nonsignificant parameters can be considered unimportant to the model” (Byrne, 2001, p.76). However,

nonsignificant parameters can also be indicative of a sample size that is too small.

(b) Model as a whole:

The important aspects of fitting hypothesized models are the goodness-of-fit statistics. There are a variety of measures which provide indicators of model fit.

However, the suggested measures are CMIN (χ^2), GFI, CFI, IFI, and RMSEA.

- Minimum discrepancy (CMIN), most commonly expressed as a chi-square statistic (χ^2), “represents the likelihood ratio test statistic or represents the discrepancy between the unrestricted sample covariance matrix S and the restricted covariance matrix $\Sigma(\theta)$. The probability value associated with χ^2 represents the likelihood of obtaining a χ^2 value that exceeds the χ^2 values when H_0 is true.” (Byrne, 2001, p.79). The null hypothesis being tested is that the postulated model holds in the population or specification of the factor loading, factor variance/covariances, and error variances for the model under study are valid [$H_0: \Sigma = \Sigma(\theta)$]. Thus, “the higher the probability associated with χ^2 , the closer is the fit between the hypothesized model (under H_0) and the perfect fit” (Byrne, 2001, p.79). If a probability is less than .05, it suggests that the fit of the data to the hypothesized model is not entirely adequate. The present data summarized in the model represents an unlikely event (occurring less than five times in a hundred under the null hypothesis) and should be rejected (Byrne, 2001).

However, the χ^2 is very sensitive to sample size; that is if the sample size is large, the index may be interpreted as a significant test. Therefore, some

researchers divided χ^2 values by degrees of freedom (χ^2/df), which results in a lower value. Although there is no clear-cut guideline about what value is minimally acceptable, a frequent suggestion is less than 3 (Kline, 1998, p.128).

- The goodness-of-fit index (GFI) is a measure of the relative amount of variance and covariance in S that is jointly explained by Σ . “The index ranges from zero to 1.00, with values close to 1.00 being indicative of good fit. A cutoff value of .95 was considered representative of a well-fitting model” (Byrne, 2001, p. 82).
- The comparative fit index (CFI): The CFI has shown a tendency to underestimate fit in small samples which take sample size into account. “The value of CFI range from zero to 1.00. A cutoff value close to .95 was considered representative of a well-fitting model” (Byrne, 2001, p. 83).
- The incremental index of fit (IFI) was developed to address the issues of parsimony and sample size which were known to be associated with the normed fit index (NFI). Its computation is basically the same as the NFI, except that degrees of freedom are taken into account. “Consistent with the CFI, it yields values ranging from zero to 1.00, with values close to .95 being indicative of good fit” (Byrne, 2001, p.83).
- The root mean square error of approximation (RMSEA) takes into account the error of approximation in the population and asks the question, “How well would the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available?” (p.83). This

discrepancy, as measured by the RMSEA, is expressed per degree of freedom, thus making the index sensitive to the number of estimated parameters in the model (i.e., the complexity of the model); “values less than .05 indicate good fit, and values as high as .08 represent reasonable errors of approximation in the population. Value greater than .10 indicate poor fit” (Byrne, 2001, p.85).

2. **Model respecification:** If given findings indicate an inadequate goodness of fit, the next logical step is to detect the source or areas of misfit in the model. There are two types of information that can be helpful in detecting model misspecification: the standardized residuals and the modification indices. After analyses of the information from modification indices, the researcher can decide whether or not to respecify the model.

In summary, the data analyses in this study were as follows.

1. **Descriptive statistics** (i.e., means, standard deviation) were calculated for each of the measures of the variables to determine the distributional characteristics of each variable.
2. **Zero-order correlations** were calculated to determine the extent of associations among the exogenous and endogenous variables.
3. **Path analyses** were used to examine the relationship between exogenous and endogenous variables.
4. **The measurement model (CFA)** of this study is depicted in Figure 4. The measurement model represents five one-factor models. The details of each model are as follows.

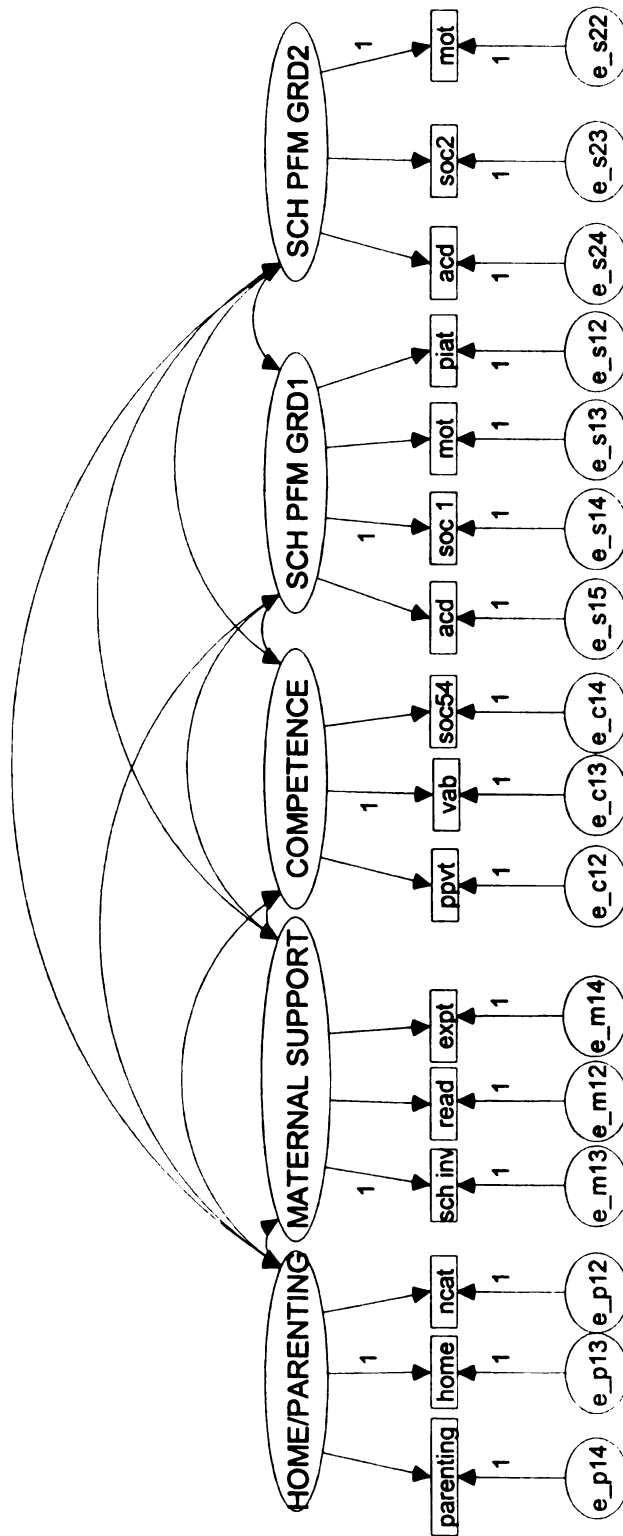


Figure 4. Measurement Model

- The first one-factor model is parenting which was measured by three observed variables: parenting skills at 54 months and quality of home environment at 24 and 36 months.
- The second one-factor model is children's competence prior to school entry, which was measured by the PPVT, the VABS, and social skills rated by the young mothers.
- The third one-factor model is maternal support for school success, which was measured by reading activities, maternal involvement in school activities, and expectations for academic achievement.
- The fourth one-factor model is children's school performance in first grade, which was measured by the PIAT, teachers' ratings of academic performance, the PBI, and the SSRS-T. Children's school performance in second grade is defined by teachers' ratings of academic performance, the PBI, and the SSRS-T.
- The fifth one-factor model is children's school success in second grade which was measured by teachers' ratings of academic performance, the PBI, and the SSRS-T.

The measurement model was analyzed based on the parameter estimates; if one of five models does not fit, then the modification of a particular part of the model is needed. After the measurement model is operating adequately, then the hypothesized structural model is assessed. The structural model in this study was comprised of parenting, children's competencies prior to school entry, maternal support for school success, and children's school performance in first grade as predictive and intervening latent variables.

The design of the hybrid model is depicted in Figure 3. After the measurement model has been approved, the evaluation of a hybrid model is processed. However, after the findings of the goodness of fit indexes identified that the structural models was not adequate, the next logical step was to detect the source or areas of misfit in the model. Then the process of respecification of the model was undertaken.

CHAPTER 4

RESULTS

This chapter is divided into 5 parts. The first part describes demographic characteristics of the sample. The second part presents descriptive statistics for each variable. The third part shows the correlations among the key variables used in the analysis. The fourth part presents a path analysis for each aspect of children's school performance assessed in this study, which includes academic achievement, academic motivation, and social adjustment. The last part is a structural equation model of multiple aspects of children's school performance.

Demographic Characteristics of the Sample

Demographic characteristics of the sample included child's age and gender; mother's age, education, and marital status; and family size. The total number of children in second grade whose school performance was rated by their teachers was 90. Fifty-nine percent were male and 41% were female. Sixty percent were African-American, 31% were Caucasian, 3% were Hispanic, and 6% were bi-racial. Age of children ranged from 88 months (7 years) to 107 months (8 years) with a mean age of 97 months.

There was no information collected on the adolescent mothers when their children were in the second grade. The latest information related to the adolescent mothers was obtained by interviewing them when their children were in the first grade. The age of the young mothers ranged from 20 to 26 years with a mean age of 23 years. The information

showed that most adolescent mothers were not married (74%). Eighty-four percent of mothers lived in their own home or apartment, 10% lived with their parents, 3% lived with their grandmothers, and 2% lived with their friends. Information about their education revealed that 66% of the adolescent mothers had graduated from high school when their children were in the first grade and 32% of all the mothers were in college or vocational school. The adolescent mothers had an average of 2 children, and 26% of the mothers had only one child.

Descriptive Statistics

Ninety children were rated by their teacher at the end of second grade on their school performance which included academic performance, academic motivation, and social adjustment. Academic performance, which included reading and mathematics, was rated by using a five-point rating scale ranging from lowest 20% (much below average) to highest 20% (superior). The percentage of children in each category for reading performance was: 14 (superior), 19 (above average), 26 (average), 28 (below average), and 13 (much below average). The percentage of children in each category for mathematics was: 9 (superior), 18 (above average), 28 (average), 32 (below average), and 13 (much below average). An overall teachers' rating of academic performance was obtained by summing their reading and mathematics ratings. The range for overall academic scores was 2-10 with a mean of 6.30 ($SD = 2.26$).

The second school performance measure was the Pupil Behavior Inventory (PBI), which assessed academic motivation. The range of possible scores on this 9-item scale

was from 5 to 45; the actual scores ranged from 9 to 45 with a mean of 31.70 (SD= 8.34). Overall academic motivation was also rated by teachers using a five-point rating scale ranging from lowest 20% (much below average) to highest 20% (superior). The percentage of children in each category of academic motivation was: 13 (superior), 26 (above average), 34 (average), 20 (below average), and 7 (much below average). The mean overall academic motivation scores was 3.19 (SD=1.11).

Social adjustment was measured with the Social Skills Ratings System-Teacher Form (SSRS-T). The total score was a combination of social skills and behavioral problems scores. The range of possible scores on this 48-item scale was from 0 to 96; the actual scores ranged from 21-93 with a mean of 63.54 (SD=17.32). Overall children's classroom behavior was rated by using a five-point rating scale ranging from lowest 20% (much below average) to highest 20% (superior). The percentage of children in each category was: 20 (superior), 22 (above average), 31 (average), 17 (below average), and 10 (much below average). The mean overall classroom behavior score was 3.26 (SD=1.24).

Correlations Among Measures

Correlations among parenting measures prior to school entry

Parenting and home environment during the first five years of children's lives were assessed by using different measures at different periods of time, and the correlations among these measures are presented in Table 2. Adolescent mothers who provided a positive home environment at 24 months tended to consistently provide a

positive home environment for their children at 36 months. Adolescent mothers who provided a positive home environment for the children at 24 and 36 months tended to receive high parenting skills ratings from the family advocates at 54 months.

Correlations among parenting support for academic success subscales in first grade

Different aspects of maternal support for academic success during first grade were measured, including maternal support for reading activities, maternal involvement in school activities, and maternal expectations for school success. Adolescent mothers who supported reading tended to have high level of school involvement and high expectations for their children's academic success (Table 2).

Adolescent mothers who provided a positive home environment at 36 months and who had high parenting skills ratings tended to have a high level of involvement in school and tended to participate more frequently in reading activities with their children in first grade.

Correlations among children's competencies prior to school entry and children's school performance in first and second grade

Children's competencies prior to school entry were assessed when the children were 54 months old with a variety of measures from different sources, which included the PPVT-R, the VABS performance in daily activities, and the SSRS-P social adjustment measure. Children who had high receptive vocabulary scores tended to have high Vineland Adaptive Behavior scores as rated by their mothers. However, counter to expectations, children's social adjustment rated by their mothers at 54 months did not relate to either children's receptive vocabulary or Vineland scores.

Table 2. Correlation among Parenting and Home Environment Measures and Children's Outcomes

Variable	Parenting			Competencies prior school entry			Maternal support for school success			1 st grade school performance			2 nd grade school performance			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Parenting																
1. NCAT HOME 24 mos.	1.00															
2. HOME 36 mos.	.36**	1.00														
3. Parenting 54 mos.	.36**	.64**	1.00													
Competencies prior school entry (54 mos.)																
4. VAB	.14	.43**	.41**	1.00												
5. PPVT-R	.27**	.64**	.58**	.51**	1.00											
6. Social adjustment	-.15	.18	.07	.05	.20	1.00										
Maternal support for school success																
7. Reading	.07	.31**	.23*	.33*	.15	.01	1.00									
8. School involvement	.08	.36**	.34**	.32**	.28*	.09	.24*	1.00								
9. Expectation	-.06	.20	.05	.36**	.21	.17	.21*	.06	1.00							
1 st grade school performance																
10. PIAT-R	.12	.44**	.48**	.41**	.61**	.09	.11	.21	.19	1.00						
11. Academic motivation	.26*	.31*	.30**	.39**	.39**	-.05	.03	.00	.17	.54**	1.00					
12. Social skills	.29**	.29**	.22	.34*	.34**	.15	-.01	.08	.17	.45*	.74*	1.00				
13. Academic performance	.12	.34**	.35**	.32**	.45**	.06	.05	.03	.23*	.63**	.78**	.52**	1.00			
2 nd grade school performance																
15. Academic motivation	.27*	.21	.41**	.28*	.25*	-.20	.13	.05	-.06	.44**	.50**	.33**	.49**	1.00		
14. Social skills	.24*	.18	.33**	.27*	.16	-.27*	.11	.06	-.06	.38**	.37*	.42**	.31*	.76**	1.00	
16. Academic performance	.19	.31**	.44**	.35**	.35**	.01	.08	.04	-.01	.57**	.50**	.32**	.63**	.71**	.48**	1.00
N	79	77	73	70	75	56	89	89	89	89	87	87	87	90	90	90

*p<.05; **p<.01

Children's first grade school performance was assessed in the areas of academic performance, PBI academic motivation, and SSRS-T social adjustment. Academic performance was assessed by using the Peabody Individual Achievement Test-Revised (PIAT-R) during the fall semester and teachers' ratings of academic performance at the end of the spring semester. Children who started school with high academic achievement in the first semester, tended to perform well academically at the end of the year. In addition, they were rated high on academic motivation and were viewed as well adjusted at the end of the year. Children who had good performance in one area tended to have good performance in other areas at the end of first grade (included in Table 2).

Consistent with the findings for first grade, children who performed well in one aspect of school tended to do well in other areas at the end of second grade. For example, children who had a high level of motivation tended to be rated high in academic performance and tended to be well adjusted.

In general, children who had high competencies prior to school entry, including high scores on receptive vocabulary and good performance in daily activities, tended to have high scores on the PIAT-R in first grade. Their teachers also rated them high on school performance at the end of first grade in all areas. They also did well in second grade on the various indicators of school performance.

However, children's social adjustment prior to school entry was not associated with first grade school performance. Interestingly, children who had high social adjustment scores prior to school entry had lower social skills and had higher behavior problems scores in school at the end of second grade.

Relations between home environment and parenting skills prior to and after school entry and children's competencies and school performance

As expected, children who lived in a positive home environment and had mothers with high parenting skills in their early lives tended to be relatively competent prior to school entry. This included receptive vocabulary and Vineland Adaptive Behavior scores at 54 months. They also tended to have high scores on academic performance, academic motivation, and social adjustment in the first and second grade. The correlations ranged from .24 to .64. Surprisingly, all aspects of maternal support for academic success were not related to children's school performance in first and second grade except for a relation between maternal expectations for children's school success and academic performance at the end of first grade.

Path Analyses

A path analysis was used to analyze the relationship between early home environment/ parenting skills, children's competencies at an early age, and children's school performance in second grade. In this study, different aspects of school performance were measured. Each school performance outcome was examined separately. Home environment at 24 and 36 months and advocates' ratings of parenting skills at 54 months were converted from raw scores to z scores and then averaged. Maternal support for academic success in first grade was a total score combining support for reading activities, school involvement, and maternal expectation for children's academic achievement.

In addition, a structural equation model was used to examine the model similar to the path analysis which focused on different aspects of school performance. However, home/parenting was viewed as an exogenous latent variable which included three observed variables: the quality of home environment that the adolescent mothers provided for their children at age 24 and 36 months and the parenting skills of adolescent mothers when the children are 54 months old. An endogenous latent variable was children's competence prior to school entry (54 months), which included two observed variables: the Peabody Picture Vocabulary Test-Revised (PPVT-R) and the Vineland Adaptive Behavior Scales (VABS). Three endogenous variables were the Peabody Individual Achievement Test (PIAT-R), and each aspect of school performance in first and second grade.

Social adjustment

The first outcome examined was social adjustment in second grade and the results of the path analysis are presented in Figure 5 and Table 3. As expected, the result showed that the PPVT-R and the VABS improved by .61 and .40 standard deviations given a change in the home environment/ parenting skills of one full standard deviation when other variables in the model were controlled. The PIAT-R improved .58 standard deviations given a change in the PPVT-R of one full standard deviation. Social adjustment in first grade improved .33 standard deviations given a change in the PIAT-R of one full standard deviation. Social adjustment in second grade was directly predicted to increase .24 and .34 standard deviations given a change of one standard deviation in social adjustment in first grade and the PIAT-R respectively. Overall, home environment

and parenting skills predicted children's social adjustment at the end of second grade through the PPVT-R at 54 months, the PIAT-R, and social adjustment in first grade.

Children who experienced a home environment that supported cognitive development and whose mothers had high parenting skills had higher scores on the measure of receptive vocabulary at 54 months, had higher social skills and had fewer behavior problems in first and second grade. Although home environment and maternal parenting skills had both direct effect and indirect effects on maternal support for academic success in first grade through the Vineland, maternal support for school success in first grade did not contribute to children's social adjustment in first and second grade. This model explained 16% of the variance in children's social adjustment in second grade.

In addition, a structural equation model was used to examine the model similar to path analysis model, focusing on social adjustment. Overall, the results were similar to the path analyses except that the PIAT-R had no direct effect on social adjustment in second grade. The results of these analyses are present in Figure 13 in Appendix A.

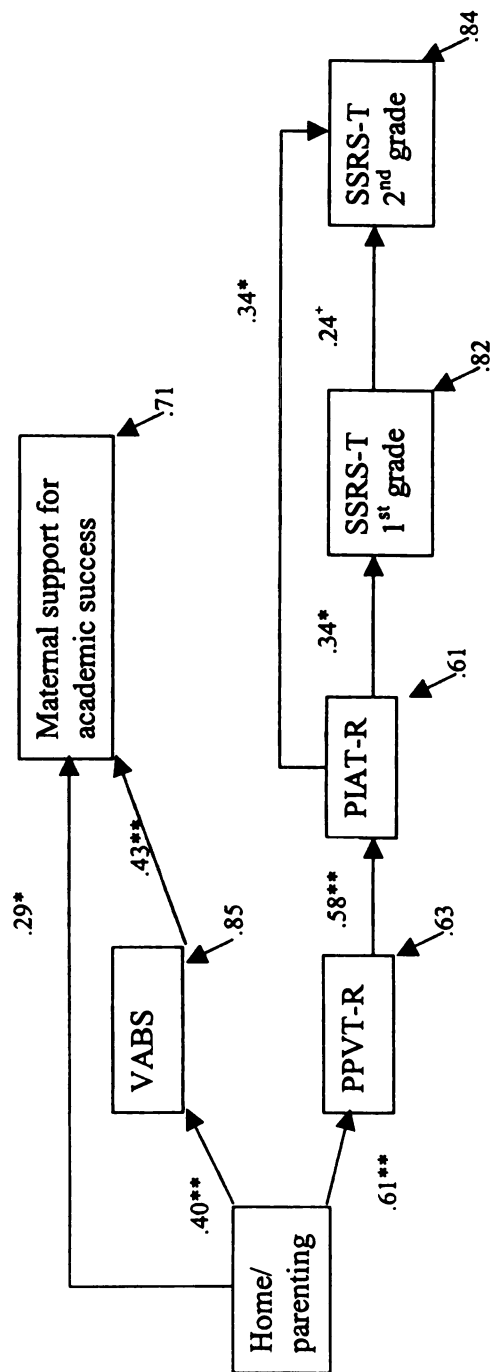


Figure 5. Model of Factors Predictive of Social Adjustment in Second Grade with Standardized Estimates

* $p < .10$; ** $p < .05$; *** $p < .01$

Table 3. Predictors of Social Adjustment Scores: Partial Regression Analysis to Generate Path Coefficients and Disturbance Variances

Criterion	Predictors	Regression coefficients		Adjusted R ²	(1-R ²)
		Unstandardized ^a	Standardized		
1. Vineland	HOME/parenting	8.10**(2.25)	.40	.15**	.85
2. PPVT-R	HOME/parenting	13.38**(2.12)	.61	.37**	.63
3. PIAT-R	HOME/parenting	-.18 (1.79)	-.01	.39**	.61
	Vineland	.09(.08)	.12		
	PPVT-R	.39**(.09)	.58		
4. Maternal support for academic success	HOME/parenting	.77* (.35)	.29	.29**	.71
	Vineland	.05**(.02)	.43		
	PPVT-R	-.01(.02)	-.10		
	PIAT-R	.01(.02)	.06		
6. Social adjustment 1 st grade	HOME/parenting	2.62(3.25)	.12	.18**	.82
	Vineland	.23(.15)	.21		
	PPVT-R	.00(.18)	.00		
	PIAT-R	.50*(.22)	.34		
	Maternal support for academic success	-.95(1.13)	-.12		
7. Social adjustment 2 nd grade	HOME/parenting	1.24 (3.09)	.06	.16**	.84
	Vineland	.19 (.15)	.18		
	PPVT-R	-.22 (.16)	-.24		
	PIAT-R	.48* (.22)	.34		
	Maternal support for academic success	.22 ⁺ (.12)	.24		
	Social adjustment 1 st grade	-.08 (1.07)	-.01		

^a The value in parentheses are standard errors

⁺ p<.10; *p<.05; **p<.01

Academic performance

The results presented in Table 4 and Figure 6 were obtained with academic performance in second grade as the outcome variable. Academic performance in second grade was directly predicted by the PIAT-R in the fall of first grade and academic performance at the end of first grade. The standardized betas were .27 for the PIAT-R and .38 for academic performance in first grade. This model is similar to the path analyses model for social adjustment in second grade. Academic performance in second grade was significantly predicted by home environment and parenting skills during the preschool years through the PPVT-R, the PIAT-R, and academic performance in first grade. Maternal support for academic success in first grade did not affect academic achievement in first and second grade. All variables explained 39% of the variance in academic achievement in second grade.

In addition, a structural equation model was used to examine the model similar to path analysis model, focusing on academic performance. Overall, the results were similar to the path analyses except that the PIAT-R had no direct effect on academic performance in second grade. The results of these analyses are present in Figure 14 in Appendix A.

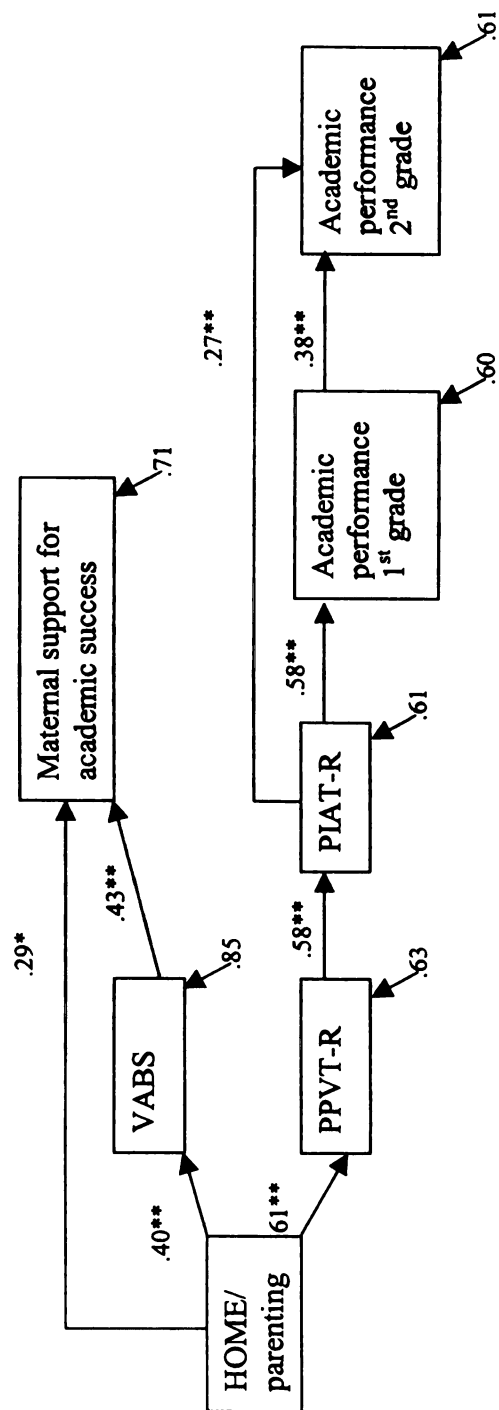


Figure 6. Model of Factors Predictive of Academic Performance in Second Grade

with Standardized Estimates

+ $p < .10$; * $p < .05$; ** $p < .01$

Table 4. Predictors of Academic Performance Scores: Partial Regression Analysis to Generate Path Coefficients and Disturbance Variances

Criterion	Predictors	Regression coefficients		Adjusted R ²	(1-R ²)
		Unstandardized ^a	Standardized		
1. Vineland	HOME/parenting	8.10**(2.25)	.40	.15**	.85
2. PPVT-R	HOME/parenting	13.38**(2.12)	.61	.37**	.63
3. PIAT-R	HOME/parenting	-.18 (1.79)	-.01	.39**	.61
	Vineland	.09(.08)	.12		
	PPVT-R	.39**(.09)	.58		
4. Maternal support for academic success	HOME/parenting	.77* (.35)	.29	.29**	.71
	Vineland	.05**(.01)	.43		
	PPVT-R	-.01(.02)	-.10		
	PIAT-R	.01(.02)	.06		
5. Academic performance 1 st grade	HOME/parenting	-.09(.44)	-.03	.40**	.60
	Vineland	.00(.02)	.01		
	PPVT-R	.02(.02)	.14		
	PIAT-R	.14**(.03)	.58		
	Maternal support for academic success	-.01(.15)	.01		
6. Academic performance 2 nd grade	HOME/parenting	.30(.37)	.11	.38**	.62
	Vineland	.02(.02)	.16		
	PPVT-R	-.01(.02)	-.04		
	PIAT-R	.05 ⁺ (.03)	.27		
	Maternal support for academic success	-.08(.13)	-.08		
	Academic performance 1 st grade	.31**(.11)	.38		

^a The value in parentheses are standard errors

⁺ p<.10; *p<.05; **p<.01

Academic motivation

The results of the path analysis presented in Table 5 and Figure 7 show that academic motivation of the children in second grade was directly predicted by the PIAT-R in the fall semester of first grade and academic motivation at the end of first grade. The standardized betas were .30 for the PIAT-R and .26 for academic motivation in first grade. Once again, the results for children's academic motivation were very similar to the path analyses for children's academic achievement and social adjustment in second grade. Children who experienced a supportive home environment and had mothers with high parenting skills had higher PPVT-R scores before entering school. They also had high academic achievement scores at the beginning of school. As a result, these children had higher motivation to learn in first and second grade. In the path analyses models for social adjustment and academic performance, the VABS did not predict either of the children's outcomes. In contrast, the VABS was related to children's academic motivation in first grade. The children who had high performance in daily living skills before entering school had high academic motivation to learn at the beginning of school, which in turn predicted high academic motivation at the end of second grade. All variables in this model explained 21% of the variance in motivation scores in second grade.

In addition, a structural equation model was used to examine the model similar to the path analysis model, focusing on social adjustment. Overall, the results were similar to path analyses except the direct effect of PIAT-R on academic motivation in second grade and direct effect of children's competencies prior to school entry (VABS) on first

grade academic motivation were not found in the SEM model. The results of these analyses are present in Figure 15 in Appendix A.

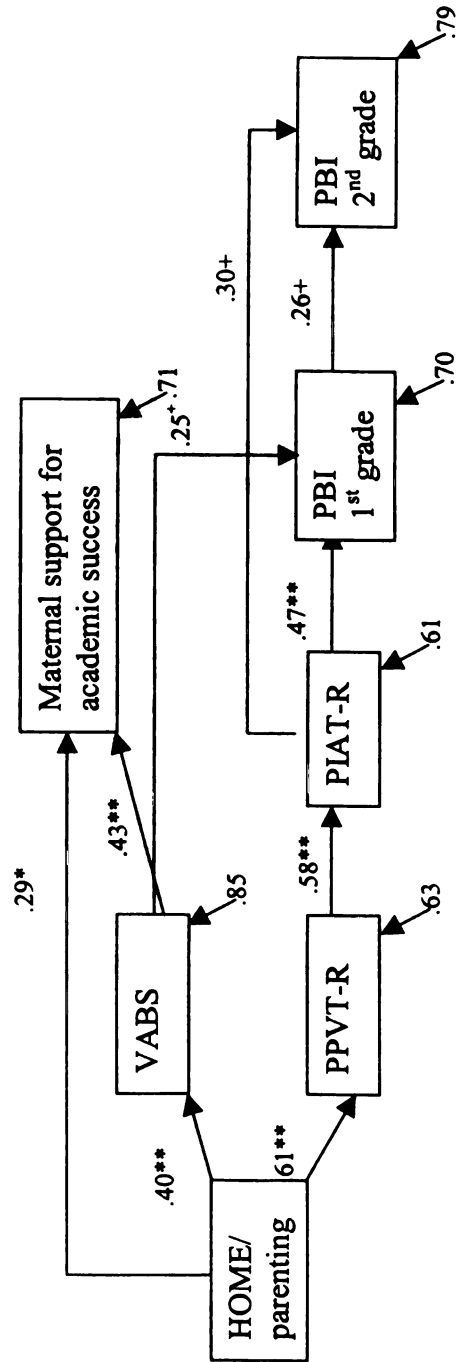


Figure 7. Model of Factors Predictive of Academic Motivation in Second Grade with Standardized Estimates
 + $p < .10$; * $p < .05$; ** $p < .01$

Table 5. Predictors of Academic Motivation Scores: Partial Regression Analysis to Generate Path Coefficients and Disturbance Variances

Criterion	Predictors	Regression coefficients		Adjusted R ²	(1-R ²)
		Unstandardized ^a	Standardized		
1. Vineland	HOME/parenting	8.10** (2.25)	.40	.15**	.85
2. PPVT-R	HOME/parenting	13.38** (2.12)	.61	.37**	.63
3. PIAT-R	HOME/parenting	-.18 (1.79)	-.01	.39**	.61
	Vineland	.09 (.08)	.12		
	PPVT-R	.39** (.09)	.58		
4. Maternal support for academic success	HOME/parenting	.77* (.35)	.29	.29**	.71
	Vineland	.05** (.02)	.43		
	PPVT-R	-.01 (.02)	-.10		
	PIAT-R	.01 (.02)	.06		
5. Academic motivation 1 st grade	HOME/parenting	.94 (1.56)	.08	.29**	.71
	Vineland	.14 ⁺ (.07)	.25		
	PPVT-R	-.02 (.08)	-.04		
	PIAT-R	.36** (.10)	.47		
	Maternal support for academic success	-.57 (.54)	-.13		
6. Academic motivation 2 nd grade	HOME/parenting	-.07 (1.47)	-.00	.21**	.79
	Vineland	.07 (.07)	.14		
	PPVT-R	-.01 (.08)	-.03		
	PIAT-R	.20 ⁺ (.11)	.30		
	Maternal support for academic success	-.20 (.52)	-.05		
	Academic motivation 1 st grade	.23 ⁺ (.12)	.26		

^a The value in parentheses are standard errors

⁺ p<.10; *p<.05; **p<.01

Structural Equation Modeling

A structural equation model (SEM) was used to assess the relationships among several latent variables. The proposed model (Figure 8) included one exogenous latent variable, parenting, with three observed variables: the quality of home environment that the adolescent mothers provided for their children at age 24 and 36 months and the parenting skills of the adolescent mothers when the children were 54 months old. The four endogenous latent variables were: children's competencies prior to school entry, maternal support for academic success in first grade, and school performance in first and second grade. Children's competencies prior to school entry included three observed variables: the Peabody Picture Vocabulary Test-Revised (PPVT-R), the Vineland Adaptive Behavior Scales (VABS), and the social adjustment of children based on ratings by the mothers. Maternal support for academic success included three observed variables: reading activities, maternal involvement in school activities, and maternal expectations for children's academic success. Children's school performance in first grade included teachers' ratings of academic performance, the Pupil Behavior Inventory (PBI) which assessed academic motivation, the Social Skills Ratings System (SSRS-T) which assessed social adjustment and the Peabody Individual Achievement Test-Revised (PIAT-R). Children's school performance in second grade included teachers' ratings of academic performance, the PBI, and the SSRS-T.

Home environment/ parenting skills of the adolescent mothers were expected to predict children's competencies prior to school entry and maternal support for academic success in first grade. Children's school performance in first grade was expected to be

predicted by children’s competencies prior to school entry and maternal support for academic success in first grade. Children’s school performance in first grade was expected to predict children’s school performance in second grade.

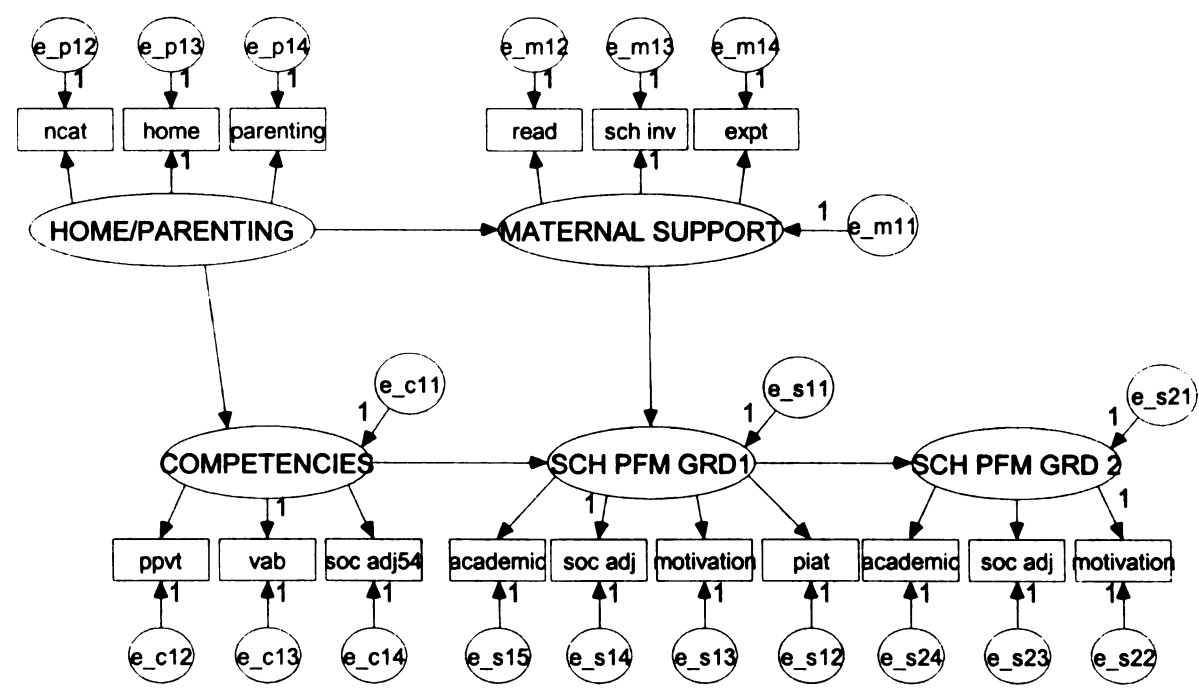


Figure 8. Hypothesized Model

Distribution and matrix to be analyzed

The sample in this study has missing data as expected in any longitudinal data set. In order to analyze data by using structural equation model, a complete data set is required. The estimation maximum (EM) method was employed to estimate missing data with the SYSTAT program (version 10). This procedure requests the EM algorithm to estimate covariance matrices. The data estimation was done at 2 separate times. If a subject was missing data in home/parenting or parent support for academic success categories, the data point was estimated using values from these two categories. On the other hand, if a subject was missing data in children's competencies prior to school entry or children's school performances in first grade, the data point was estimated using the values from these two categories. Missing values were not estimated if a subject was missing data for school performance in second grade. Table 6. presented a covariance matrix with standard deviations, means, skewness, and kurtosis for each variable which was obtained from data estimation. All variables have univariate normal distributions based on the standard that an absolute value of univariate skew indexes greater than 3.0 and an absolute value of the kurtosis index greater than 10.0 are serious problems (Kline, 1998). The estimation procedures that are widely used in SEM assume normal distributions; non-normality can violate the assumption, which may affect the fit of the model (Schumacker & Lomax, 1996).

Table 6. Covariance Matrix for the Estimate Data

Variable	Parenting			Competencies prior school entry		Maternal support for school success			1 st grade school performance					2 nd grade school performance		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Parenting																
1. NCAT HOME 24 mos.																
	52.835															
2. HOME 36 mos.	22.669	70.432														
3. Parenting 54 mos.	2.149	4.434	0.672													
Competencies prior school entry (54 mos.)																
4. VAB	18.631	51.505	4.282	202.402												
5. PPVT-R	29.767	81.271	6.359	126.574	261.987											
6. Social adjustment	-2.735	8.886	0.282	-1.347	25.031	30.149										
Maternal support for school success																
7. Reading	1.741	7.111	0.531	10.726	7.16	0.492	8.12									
8. School involvement	1.612	7.359	0.61	9.372	9.814	1.694	1.624	5.764								
9. Expectation	-0.603	2.246	0.029	5.465	4.2	0.915	0.869	0.234	2.089							
1 st grade school performance																
10. PIAT-R	10.608	38.301	4.126	68.754	114.332	10.471	3.336	5.499	3.014	121.134						
11. Academic motivation	16.289	19.783	2.157	54.092	54.421	-0.578	0.668	0.681	1.873	51.576	73.804					
12. Social skills	34.553	38.836	2.839	91.038	95.578	14.663	-0.789	4.148	3.604	86.934	108.508	288.032				
13. Academic achievement	2.777	6.679	0.733	11.271	17.801	1.835	0.321	0.38	0.765	17.834	17.186	22.719	6.403			
2 nd grade school performance																
14. Academic motivation	15.989	14.206	2.801	37.429	34.329	-10.748	3.022	1.045	-0.728	40.056	36.396	48.549	10.644	70.119		
15. Social skills	29.975	23.574	4.277	75.236	45.308	-33.369	5.331	2.55	-1.657	72.455	58.057	125.293	14.634	111.826	303.45	
16. Academic achievement	3.141	5.488	0.777	12.345	13.594	0.621	0.532	0.192	-0.023	14.345	10.009	12.71	3.665	13.432	18.993	5.159
M	33.097	34.08	3.416	99.815	76.763	39.603	10.247	7.685	8.842	90.17	31.885	62.705	6.281	31.64	63.584	6.28
SD	7.268	8.39	0.819	14.226	16.186	5.49	2.849	2.4	1.445	11.006	8.59	16.971	2.53	8.373	17.419	2.271

Method of estimation

The specified model was tested to obtain standardized coefficients by using the maximum likelihood (ML) method of estimation. The ML allowed analyzing all parameters at once rather than separately analyzing each endogenous variable (Kline, 1998, p.125). The ML also performs reasonably well under a variety of less-than-optimal analytic conditions such as a small sample size (Hoyle & Panter, 1995 p. 163).

Measurement model

The measurement model was examined to confirm convergent and discriminant validity. To test the measurement models (Confirmatory Factor Analyses), a structural equation modeling approach using AMOS 4 (Arbuckle, 1995) was employed.

Model 1 CFA

The hypothesized model (Figure 9) represented the associations among five factors: home environment/parenting, children's competencies prior to school entry, maternal support for academic success, children's school performance in first grade, and children's school performance in second grade. The first model has the following fit indices: chi-square (94, N=89) = 211.94, $p < .001$, chi-square/df = 2.25, CFI=.82, IFI=.83, GFI= .78, RMSEA= .12, indicating poor fit. Although the chi-square is significant, the chi-square/df ratio is somewhat low (less than 3) which is considered an acceptable fit (Kline, 1998, p. 128). However, the values of the fit indices were less than .90, indicating that the model was a poor fit. The RMSEA was over .10, indicating that this model is a poor fit (MacCallum, Browne, & Sugawara, 1996). Inspection of the standardized parameter estimates indicated that two factor loadings were very low; the loading of mother-rated social adjustment at 54 months on children's competencies prior

to school entry (.23) and the loading of mother-reported expectations for academic success on maternal support for academic success (.24), which suggested that these indicators have a high proportion of unique variances. Because each factor represented different constructs and different times, social adjustment at 54 months and maternal expectations could not be used as indicators of another factor. Although home environment/parenting was significantly correlated with maternal support for academic success in first grade (.73), the correlations between maternal support for academic success and school performance in first grade and second grade were not significant and very low (.18 and .14 respectively), which showed that maternal support for academic success did not relate to school performance in first and second grade.

The standardized residual values showed 4 large residual values, based on the cutpoint exceeding 2.58 (Joreskog & Sorbom, 1998), which were the covariance between social adjustment at 54 months and in second grade (-3.84), the covariance between social adjustment at 54 months and PBI academic motivation in second grade (-2.92), the PPVT-R and the PIAT-R (2.61), and the PIAT-R and academic performance in second grade (2.64).

Based on the reasons mentioned above, the measurement model was respecified by dropping an observed variable, which was social adjustment at 54 months and one factor, which was maternal support for academic success.

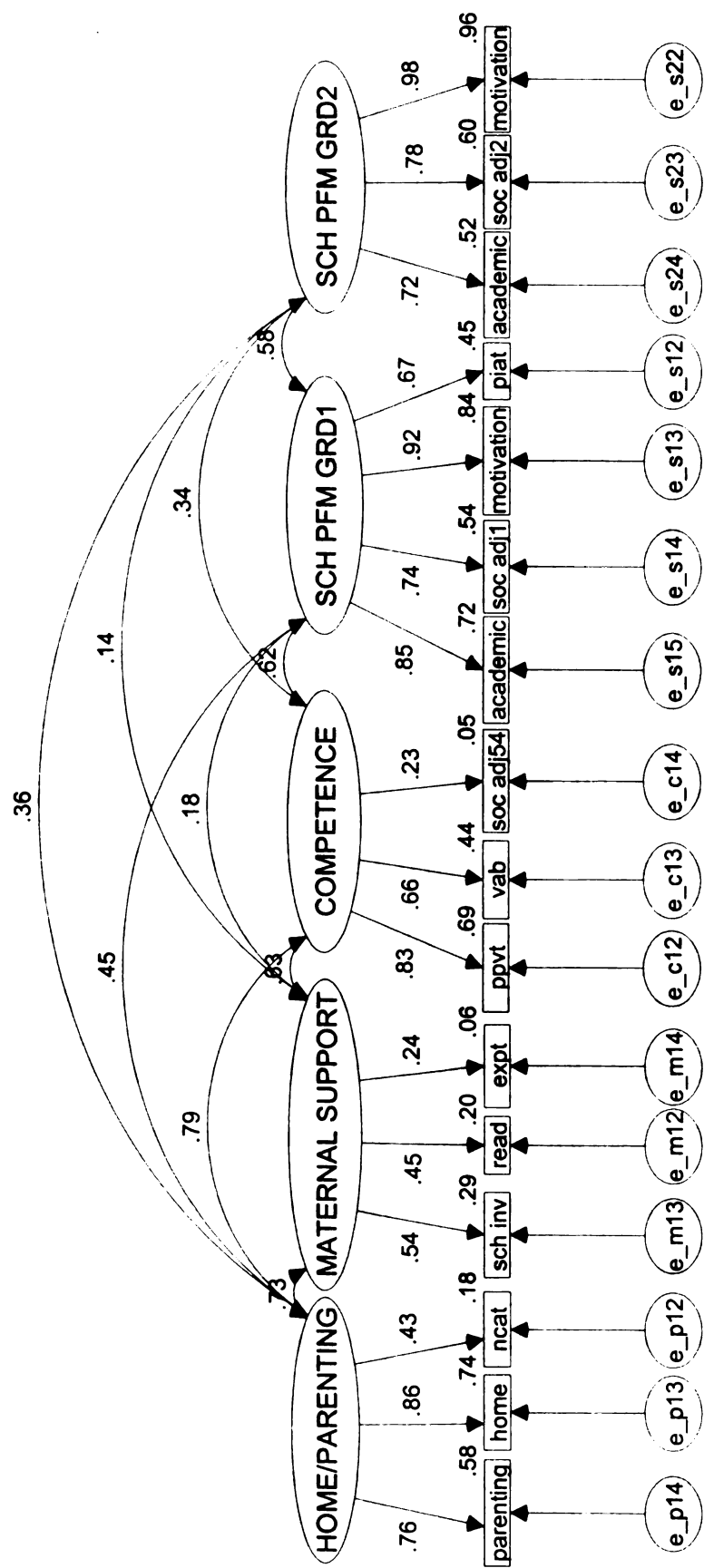


Figure 9. Five-Factor Measurement Model

Model 2 CFA

The respecified measurement model (Figure 10), a four-factor model, was analyzed with CFA. Its overall fit to the data did not improve. The fit indices were chi-square (48, N=89) = 133.73, $p < .001$, chi-square/df = 2.78, CFI=.85, IFI=.86, GFI= .80, RMSEA= .14, indicating poor fit. This model needed a respecification.

The inspection showed that all factor loadings were acceptably high and the correlations between factors were not excessively high or low. The inspection of the correlations residuals suggested that correlations residuals among variables were very high. The seven highest covariances among variables ranged from 8.94 to 15.08. The correlations included two sets of observed variables of first grade school performance: PBI motivation and social adjustment and PBI academic motivation and the PIAT-R. These patterns suggested that the measurement errors within the same period of time, measured by the same person may covary. There were correlations of the similar measure at different periods of time: social adjustment in first and second grade, academic performance in first and second grade, the PPVT-R and the PIAT-R, and the PIAT-R and academic achievement in second grade. Moreover, the measures, which have a similar pattern but were measured in different periods of time may also covary. Such measurement error correlations may reflect common method variance.

The measurement errors suggested to correlate the residuals included the VAB and academic achievement in first grade, the PPVT-R and the PIAT-R, teacher-rated academic motivation and teacher-rated social adjustment in first grade, the PIAT-R and academic motivation, the PIAT-R and academic achievement in second grade, academic achievement in first and second grade, and teacher-rated social adjustment in first and

second grade. Therefore, the measurement model was respecified by adding the correlation residuals between the seven pairs of variables as suggested.

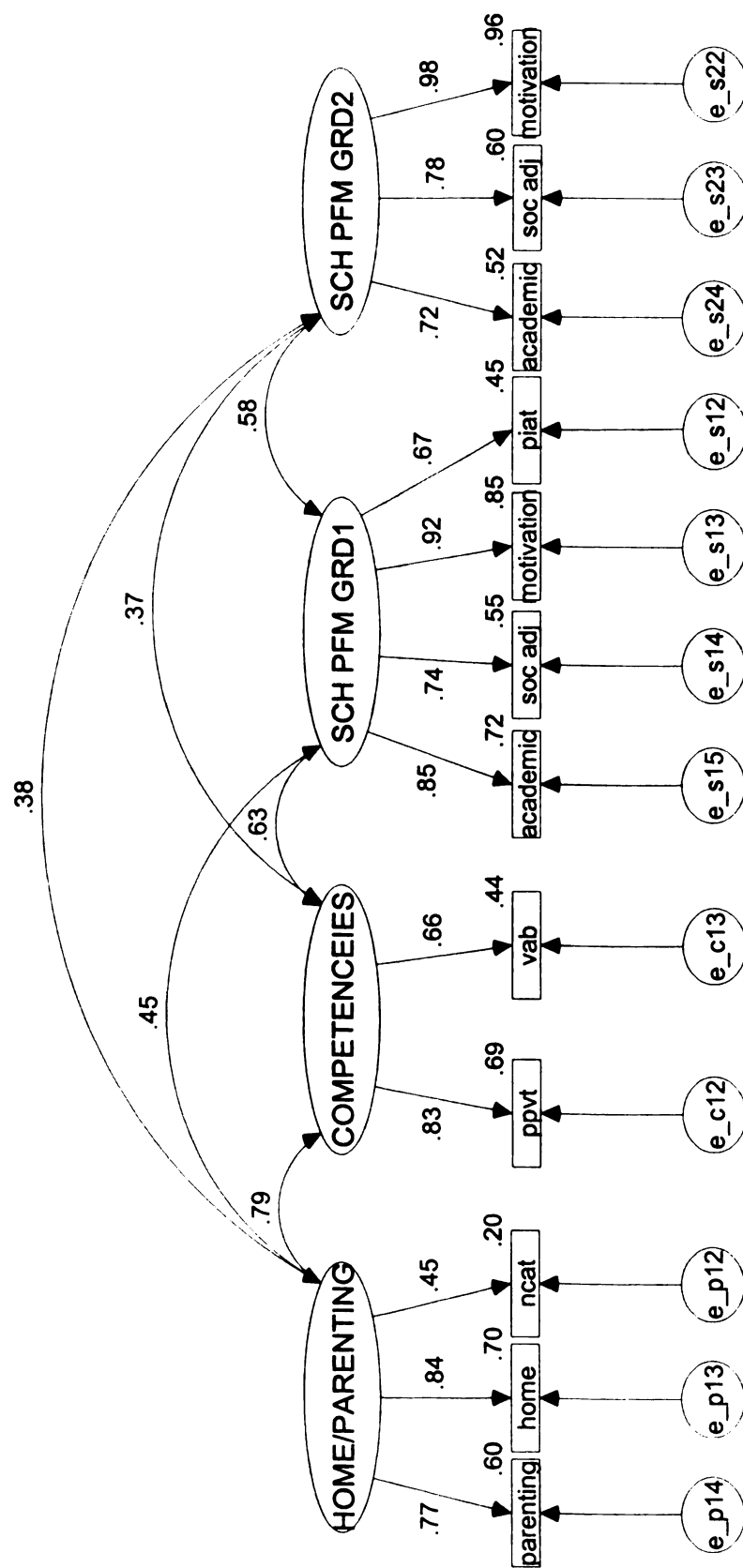


Figure 10. Four-Factor Measurement Model

Model 3 CFA

The respecified measurement model, a four-factor model adding correlations among residuals (Figure 11), was analyzed with CFA. Its overall fit to the data seems satisfactory. The fit indices were chi-square (41, N=89) = 54.56, $p > .05$, chi-square/df = 1.33, CFI=.98, IFI=.98, GFI= .91, RMSEA= .06, indicating an acceptable fit. In assessing the extent to which a respecified model exhibits improvements in fit, the two models (model 2 and model 3) were tested for statistical significance. Results presented in Table 7 are the chi-square difference test between the two models showing the comparison of model 2 (χ^2 [48]=133.73) with model 3 (χ^2 [40]=54.56). Model 3 is improved significantly from model 2 (χ^2 [8] = 79.17).

All of the standardized factor loadings were significant and exceeded .45. The values of the factor correlations were not excessively high and all of the correlations were significant at .05. Once the measurement model was satisfied, the evaluation of the structural model could proceed.

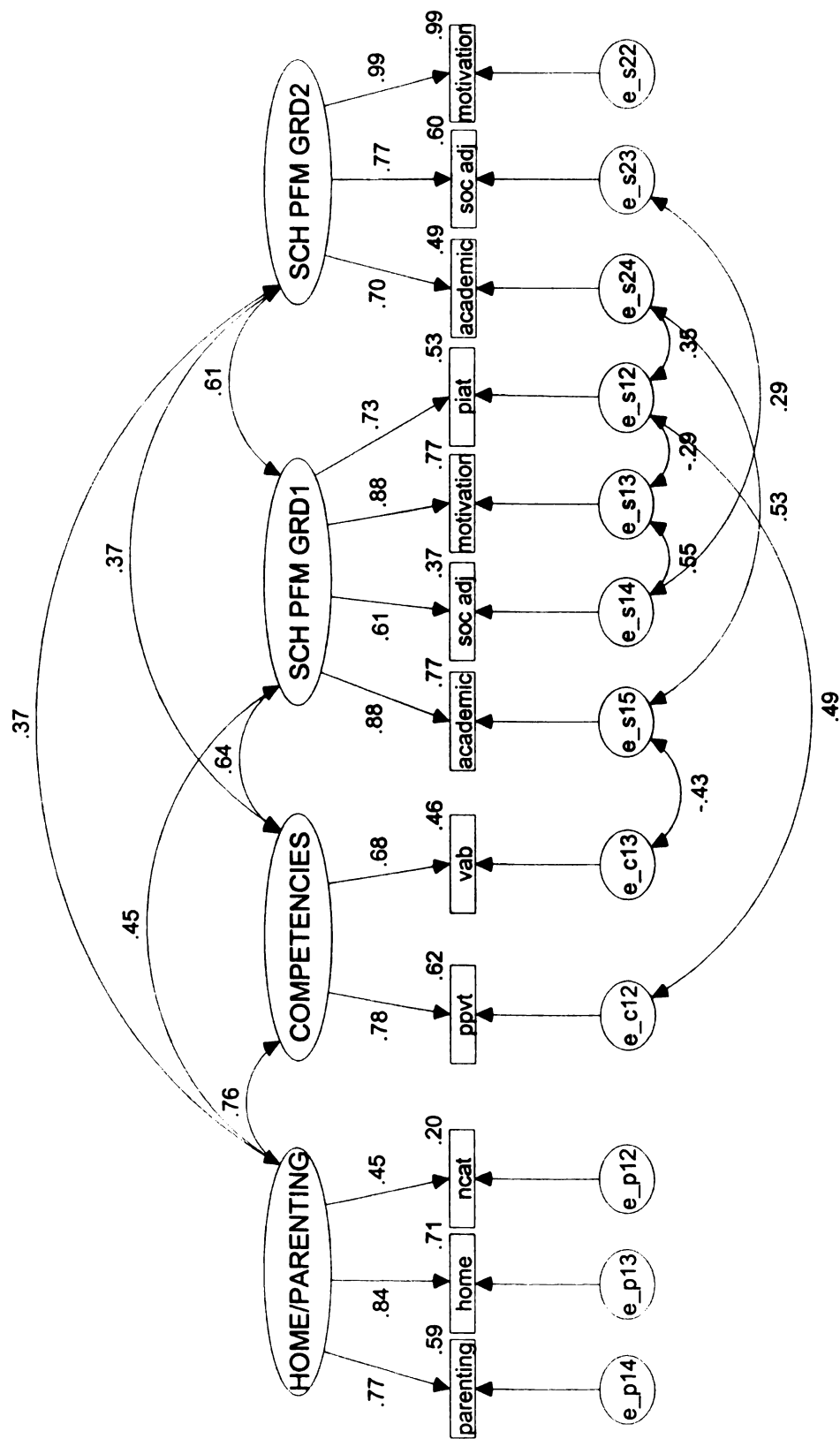


Figure 11. Four-Factor Measurement Model Adding Correlations among Residuals

Model testing

Model 4 Hybrid model

Measurement model 3 was respecified as a hybrid model in which home/parenting is an exogenous variable and the children's competencies prior to school entry, and school performance in first and second grade were endogenous variables (Figure 12). The hybrid model had adequate fit: chi-square (44, N= 89) = 56.28, $p > .05$, chi-square/df = 1.28, CFI = 0.98, IFI = .98, GFI = 0.91, RMSEA = 0.06. Comparing the baseline model with model 4, there was no significant difference between the 2 models ($\chi^2 [4] = 1.72$). This result indicated that the paths from home/parenting to school performance in first grade, from home/parenting to school performance in second grade and from children's competencies prior to school entry to school performance in second grade did not differ significantly from zero. Path coefficients that were statistically significant were the direct effect standardized path coefficients from home/parenting to children's competencies prior to school entry (.75), from children competencies prior to school entry to children's school performance in first grade (.62), and from school performance in first grade to second grade (.61). All factor loadings were statistically significant at .05. This model explained 37% of the variance of children's school performance in second grade. As expected, children who lived in a more supportive home environment and had mothers with higher parenting skills during the preschool years had higher competencies prior to school entry. In turn, they also had higher school performance at the beginning of school and in second grade.

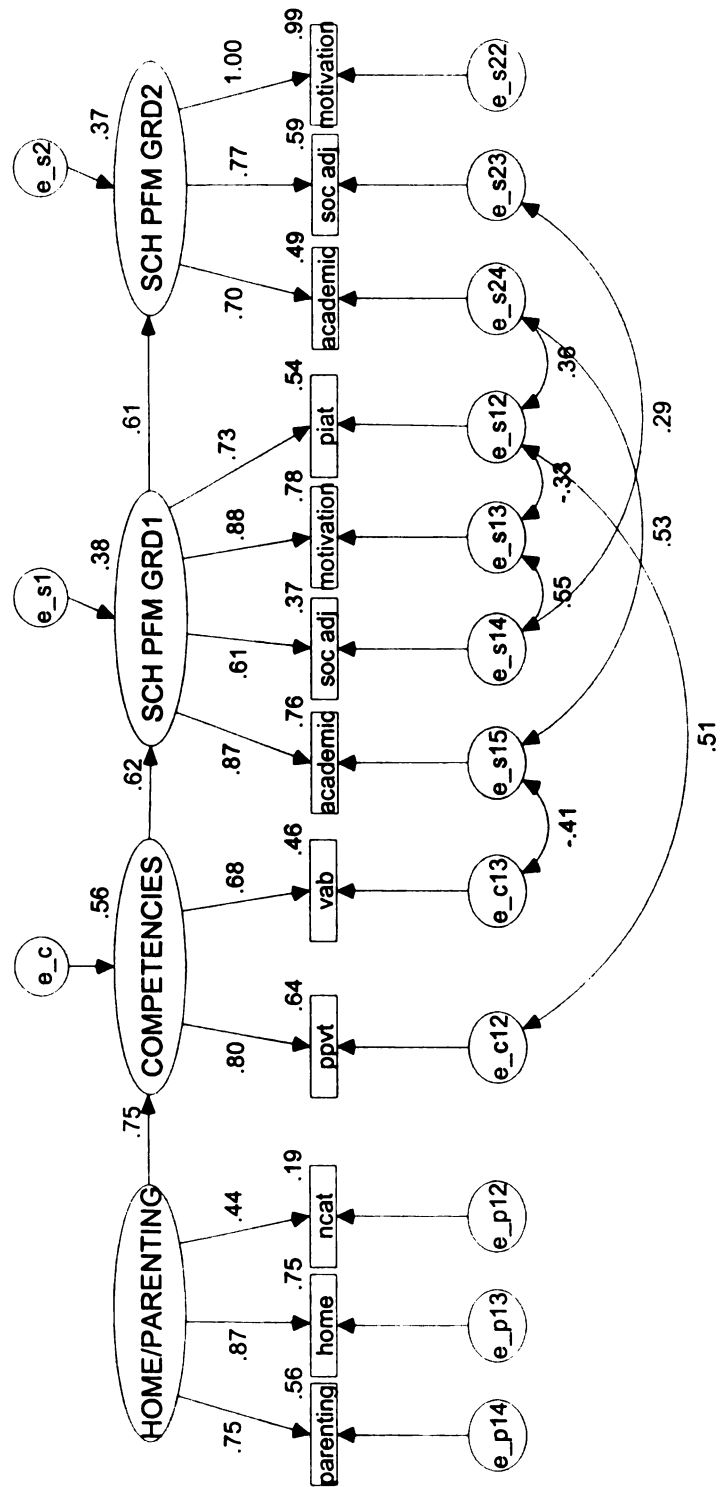


Figure 12. Hybrid Model

Table 7. Goodness of Fit Summary

Model	χ^2	df	P	CMIN /df	CFI	IFI	GFI	RMSEA	$\Delta\chi^2$	Δdf
Measurement model										
Model 1	211.94	94	<.001	2.25	.82	.83	.78	.12		
Five-factor model										
Model 2	133.73	48	<.001	2.78	.85	.86	.80	.14		
Four-factor model										
Model 3	54.56	40	>.05	1.33	.98	.98	.91	.06	79.17	8
Four-factor with adding correlations residuals										
Hybrid model										
Model 4	56.28	44	>.05	1.28	.98	.98	.91	.06	1.72	4
Hybrid model										

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter is divided into three parts. The first part presents a summary of the findings and discussions. The second part presents the limitation of this study. The last part presents recommendations for future research.

Summary of the Findings and Discussions

The main purpose of this study was to investigate factors which contribute to individual differences in the school performance of second grade children born to adolescent mothers. Two specific questions were addressed: (1) how do parenting practices during the first five years relate to maternal support for academic success in first grade and to children's school performance in second grade? And (2) how do children's competencies prior to school entry relate to their school performance in first and second grade?

In this first section, finding pertaining to the research questions and hypotheses are summarized and discussed. Six hypotheses were tested to answer the question stated earlier regarding what factors relate to the school performance of second grade children born to adolescent mothers.

Hypothesis 1

The first hypothesis was that adolescent mothers' supportive parenting during early childhood has a positive direct effect on their children's competence prior to school entry.

The results from the path analyses showed that children who experienced home environments that supported their cognitive development and had mothers with positive parenting skills had higher receptive vocabulary and Vineland Adaptive Behavior scores at 54 months. Consistently, the results from the structural equation model showed that home environment/parenting skills predicted children's competencies prior to school entry. Thus, hypothesis 1 was supported.

The results from this study are consistent with other studies which have shown that home environment in early childhood contributes to children's cognitive competencies at an early age (Dubow & Luster, 1990; Moore & Snyder, 1991). A number of researchers have found that quality of parent-child interactions, specifically, maternal positive interactions, sensitivity to children's requests and feelings, and warmth, are significantly associated with early academic achievement, cognitive development, and language development such as receptive vocabulary scores (Barratt, 1991; Hann et al., 1996; Hess et al., 1984; Miller et al., 1996). Maternal responsiveness and verbal reinforcement predicted vocabulary growth during the first 5 years of life (Morrison & Cooney, 2001).

Parental control, such as setting and maintaining rules, standards, and limits establishes parental authority and creates a supportive, structured context for children's cognitive development. Morrison and Cooney (2002) found that parental control had an

indirect relationship with children's academic achievement during the early school years through child's developing social skills (independence, responsibility, self-regulation, and cooperation).

Hypothesis 2

The second hypothesis was that adolescent mothers' supportive parenting during early childhood is predictive of maternal support for academic success in first grade.

The results showed that adolescent mothers who provided a positive home environment at 24 and 36 months and who had high parenting skills ratings from the advocates tended to have a high level of involvement in school. Moreover, mothers who provided a positive home environment at 36 months and who had high parenting skills ratings tended to participate more frequently in reading activities with their children in first grade. As expected, the results from the path analyses showed that home environment and maternal parenting skills had a positive effect on maternal support for academic success in first grade. Thus hypothesis 2 was supported.

Maternal support for academic success in early elementary school was viewed as a continuation of earlier positive parenting practices, which facilitated children's development, reinforced children's competence, and promoted learning.

Hypothesis 3

The third hypothesis was that children's competence prior to school entry has a positive direct effect on children's school performance in first grade.

In general, children who had high competencies prior to school entry, including high receptive vocabulary and adaptive behavior scores, tended to have high scores on the PIAT-R at the beginning of first grade. Their teachers also rated them high on school

performance in all areas at the end of first grade. The results from the path analyses showed that the children's receptive vocabulary assessed at 54 months predicted their academic achievement at the beginning of the first grade. Receptive vocabulary at 54 months had an indirect effect on school performance at the end of first grade through academic achievement at the beginning of first grade. The results from the structural equation model showed that children's competencies prior to school entry had a direct effect on the children's school performance in first grade. Thus, a hypothesis 3 was also supported.

These findings are consistent with other studies (e.g. Kastner, May, & Hildman, 2001; Bramlett, Rowell, & Mandenberg, 2000), which showed that recognizing letters and having verbal skills are predictors of academic achievement in first grade. Basic academic competencies (e.g. vocabulary and reading) are viewed as a foundation for later school performance. Children who entered first grade knowledgeable about letters and words were at a lower risk for difficulties in reading. They could comprehend the meaning of what they read. As a result, they had high academic achievement scores, which measure children's knowledge based on their reading and math skills (Torgesen, 2001).

Hypothesis 4

The fourth hypothesis was that maternal support for academic success has a positive direct effect on children's school performance in first grade.

The correlational results showed that no aspect of maternal support for academic success was related to children's school performance in first grade except for a relation between maternal expectations for children's school success and academic performance

at the end of first grade. Mothers with higher expectations had children with relatively high ratings of academic performance in math and reading at the end of first grade.

Contrary to expectations, the results from the path analysis showed that maternal support for school success in first grade did not contribute to any aspects of children's school performance in first grade, including social adjustment, academic performance, and academic motivation. Thus, hypothesis 4 was not supported in this study.

The results differ from other studies, which found relationships between early home environment-- such as home literacy activities and access to print (e.g., de Jong & Leseman, 2001; Griffin & Morrison, 1997), involvement in school activities, such as participating in school activities and serving as classroom volunteers (e.g., D'Agostino, Hedges, Wong, & Borman, 2001) and parental expectations of children's academic success (Alexander & Entwisle, 1988)-- and academic achievement. However, in this study, it is not clear why maternal support for academic success did not contribute to children's school performance. It could be that early positive parenting promotes children's school competence prior to school entry, which in turn has stronger effects on children's school performance in first grade than maternal support for academic success. The children's verbal and cognitive abilities prior to school are viewed as necessary skills for later school performance. In addition, this study focused only on the quantity of maternal involvement in school activities and reading activities but not the quality of their participation. It would be desirable for a future study to include both quantitative and qualitative measures. For example, future studies should explore the quality of parental involvement in school, such as the amount of time mothers participate in schools, as well as the quality of school related activities at home, such as the amount of

time spent helping with schoolwork and monitoring study time (Izzo, Weissberg, Kasrow, & Fendrich, 1999).

Hypothesis 5

The fifth hypothesis was that children's school performance in first grade has a positive direct effect on children's school performance in second grade.

The results from the path analyses showed that children's first grade school performance, including academic performance, PBI academic motivation, and SSRS-T social adjustment, had a direct effect on children's second grade school performance. Children who had good performance in an area in first grade tended to perform well in the same area at the end of second grade. In addition, academic achievement in first grade measured with the Peabody Individual Achievement Test-Revised (PIAT-R) during the fall semester indirectly predicted second grade teachers' ratings of school performance through first grade children's school performance. The results from the structural equation model also showed that children's school performance in first grade positively predicted school performance in second grade. Thus, hypothesis 5 was supported.

This is consistent with other studies (e.g. Alexander, Entwisle, & Dauber, 1993; Entwisle & Hayduk, 1988; Reynolds, 1991), which found that earlier academic achievement in elementary school predicted later academic achievement. For example, reading and mathematics scores in first grade predicted scores in second grade (Reynolds, 1991). Children who adjust easily into the student role in the first grade enhance their own development later. The first two grades were considered a critical period for the development of later school performance because children's cognitive skills are

increasing rapidly and the cumulative nature of the curriculum makes it hard for a child to achieve at a high level in later grades without achieving at a high level in earlier grades (Entwisle & Alexander, 1998). Therefore, children who get off to a good start have a competitive advantage from then on (Entwisle and Hayduk, 1988).

However, in addition to academic performance, children's behaviors in first grade also play an important role for later school performance. Alexander et al. (1993) found that classroom behaviors rated by teachers in the fall of first grade predicted both short-term and long-term standardized academic achievement test scores and classroom behaviors at the end of first grade and in fourth grade. Another study also found that there were bi-directional relationships between academic achievement and social competence over time from first grade through third grade (Welsh, Park, Widaman, & O'Neil, 2001). Positive social behaviors were directly related to later academic competence over time. Young children who were interested and involved in classroom activities, followed the rules of the classroom, paid attention and spent more time on tasks performed better academically than children who were uninterested or distracted. These qualities contributed to test score gains especially during the first year (Alexander et al., 1993).

Hypothesis 6

The last hypothesis was that adolescent mothers' parenting and maternal support for academic success have positive indirect effects on children's school performance in second grade through children's competence prior to school entry and children's school success in first grade.

The results from the path analyses showed that home environment and parenting skills predicted children's second grade school performance including social adjustment, academic performance, and academic motivation through the PPVT-R at 54 months, the PIAT-R and school performance in first grade. Although home environment and maternal parenting skills had both direct and indirect effects on maternal support for academic success in first grade through the Vineland, maternal support for school success in first grade did not contribute to children's school performance in first and second grade. Consistently, the results from structural equation model of each aspect of school performance were similar to the path analyses. The results from the structural equation model consistently showed that home environment/parenting skills had a positive effect on children's school performance in second grade through children's competencies prior to school entry and children's school performance in first grade. Thus, hypothesis 6 was partially support. Parenting during the preschool year had an indirect effect on second grade achievement via children's competencies prior to school entry and first grade. However, maternal support from academic success in first graded did not have an indirect effect on second grade achievement.

Supportive parenting and a high quality home environment in early childhood promote the development of abilities and skills that are needed for early school success, such as communication and interpersonal skills (Hess et al., 1984). Once a trajectory for verbal and cognitive abilities that are necessary for good communication skills is established prior to school entry, it strongly influences later literacy and school achievement. Unfavorable early childhood environments often continue through later childhood which are viewed as risk factors for their later development. On the other

hand, better quality home environments after the preschool years affect improvement in cognitive ability in later life (Baydar et al., 1993).

However, it seems likely that the relationships among home environment, early school experience, and school performance are likely to be more complex than the tested models which were limited by the availability of the data. The relation between home environment and early children's competence might not be viewed as unidirectional. A post hoc analysis revealed that children who had high cognitive ability when they were young, measured with the Bayley MDI at 18 months, tended to have mothers who provided higher quality home environment at 36 months and had high parenting skills at 54 months. Precocious children may elicit more stimulating care from their mothers.

Limitations

Several limitations of this study should be acknowledged. First, a small sample size of fewer than a hundred mothers and their children, as well as the attrition that is natural to any longitudinal study, limited the types of analyses that could be conducted and the power to detect relations among the variables. Second, the adolescent mothers recruited in this study were from low-income families and were part of a family support program. The findings of this study are only generalizable to similar populations. Third, because this study included a secondary data analysis of longitudinal data set, the analyses have been limited by the available data and the temporal order of when variables were assessed. This constrained the models that could be tested and the analytic techniques that could be used. For example, data on home environment after the children were in school were not available, which precluded studying the effect of later home

environment and the change of home environment over a period of time on children's school performance. Home environment at the elementary level may also contribute to children's school performance. Fourth, this study focused on the effects of home environment and the parenting practices of the adolescent mothers; thus only one microsystem of the child was studied intensively. However, when the children were young, they spent most of their time at home. Therefore, home environment and parenting practices of adolescent mothers were viewed as fundamental factors influencing the early competencies and later school performance of the children. After the children entered school, other microsystems may also influence children's school performance, such as the school system, which includes teachers, peers, and school quality. In this study, however, the children attended 47 different elementary schools. It was not feasible to study all of those school environments. These limitations suggest directions for future study.

Future Research

This study followed young adolescents mothers from pregnancy until their children were in second grade. Future studies should focus on the years after second grade in order to study the lasting effect of home environment, parenting, and early children's competencies on later children's school performance such as in middle school or high school.

Since this study focused on the microsystem of the children, which included home environment/parenting and child characteristics, future research might continue to explore other microsystems of the child such as the school, peers, and neighborhoods. For

example, research should explicate how the school environment, such as the instructional environment and relationships between teachers and children as well as peers relate to children's school performance. The relationship between the quality of neighborhood that the family resides in and children's school performance should be explored also. The quality of neighborhood may include perceptions of safety in the neighborhood, witnessing violence, and resources for children such as a library and playgrounds. In addition, future research should explore the effects of interactions between microsystems on children's school performance. For example, the interaction between home environment and neighborhood characteristics on children's school performance could be examined.

Conclusions

The findings of this study have demonstrated that some children born to low-income adolescent mothers could perform well in school, at least through second grade. Consistent with Bronfenbrenner's (1989) assumption that environments surrounding the children influence their developmental outcomes, this study found that the caregiving that these children received at an early age was an important factor, which contributed to their positive developmental trajectories. Contrary to stereotypes regarding adolescent mothers, some children lived in a positive home environment and had mothers with high parenting skills; as a result, they had high competencies prior to school entry. It seems likely that these differences in competencies at the beginning of school contributed to later individual differences in school performances, at the end of first and second grade.

APPENDIX A

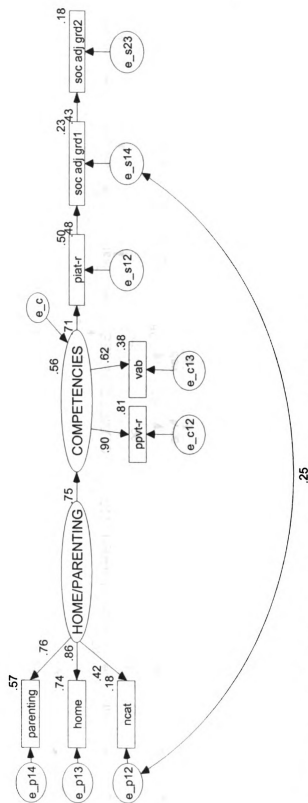
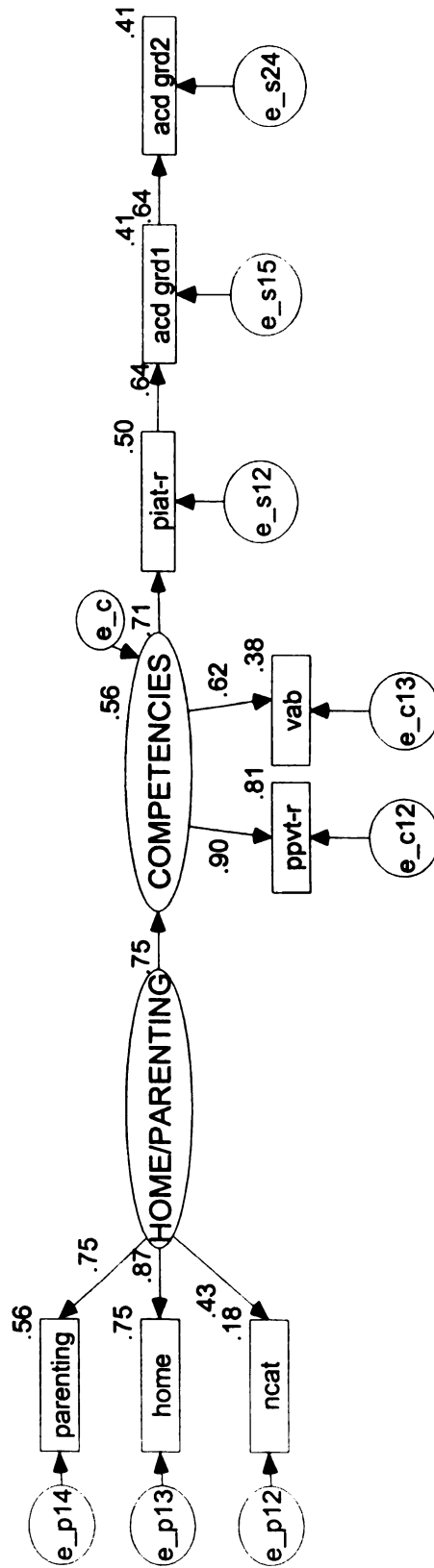
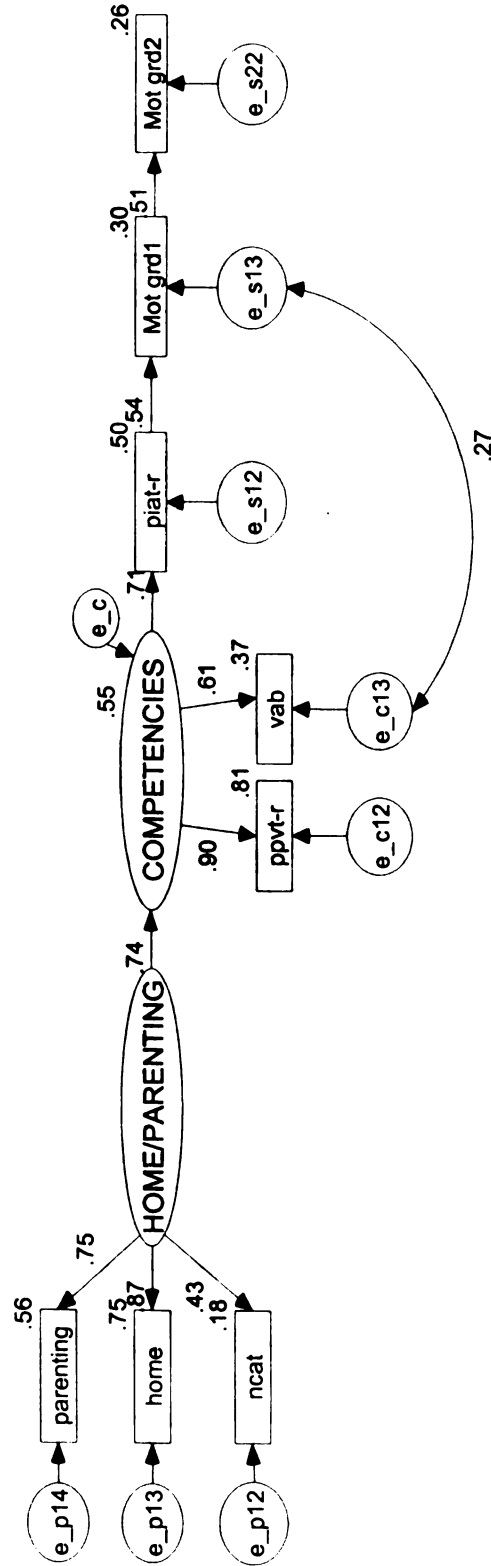


Figure 13. Hybrid Model of Factors Predicting Social Adjustment in Second Grade with Standardized Estimates



Chi-square (17, N = 89) = 21.97, $p = 0.28$, CFI = 0.98, IFI = 0.98, GFI = 0.94, RMSEA = 0.04. Maternal support for academic success was not included in the model because the standardized parameter estimate representing the path from maternal support for academic success to academic performance in first grade was nonsignificant.

Figure 14. Hybrid Model of Factors Predicting Academic Performance in Second Grade with Standardized Estimates



Chi-square (18, N= 89) = 26.62, $p = 0.86$, CFI = 0.96, IFI= 0.96, GFI = 0.93, RMSEA= 0.07.
 Maternal support for academic success was not included in the model because the standardized parameter estimate representing the path from maternal support for academic success to academic motivation in first grade was nonsignificant.

Figure 15. Hybrid Model of Factors Predicting Academic Motivation in Second Grade with Standardized Estimates

References

- Agostin, T. M. & Bain, S.K. (1997). Predicting early school success with developmental and social skills screeners. Psychology in the Schools, 34, 3, 219-228.
- Alexander, K. L. & Entwisle, D.R. (1988). Achievement in the first 2 years of school: Patterns and process. Monographs of the Society for Research in Child Development, 53 (2).
- Alexander, K.L. & Entwisle, D.R., & Dauber, S.L. (1993). First-grade classroom behavior: Its short and long-term consequence for school performance. Child development, 64, 801-814.
- Arnold, D. (1997). Co-occurrence of externalizing behavior problems and emergent academic difficulties in young high-risk boys: A preliminary evaluation of patterns and mechanisms. Journal of Applied Developmental Psychology, 18, 317-330.
- Baharudin, R. & Luster, T. (1998). Factors related to the quality of the home environment and children's achievement. Journal of Family Issues, 19(4), 375-403.
- Barratt, M. S. (1991). School-age offspring of adolescent mothers: environments and outcomes. Family Relations, 40, 442-447.
- Barratt, M. S. & Roach, M.A. (1995). Early interactive processes: Parenting by adolescent and adult single mothers. Infant Behavior and Development, 18, 97-109.
- Baydar, N., Brooks-Gunn, J. & Furstenberg, F. (1993). Early warning signs of functional illiteracy: Predictors in childhood and adolescence. Child Development, 64, 815-829.
- Bernard, K. (1978). Nursing Child Assessment Training: Instructors' s learning resource manual. Seattle, WA: NCATS Publications.
- Bradley, R. H., Caldwell, B. M., & Rock, S. (1988). Home environment and school performance: A ten-year follow-up and examination of three models of environmental action. Child Development, 59, 852-867.
- Bramlett, R.K., Rowell, R. K., and Mandenberg, K. (2000). Predicting first grade achievement from kindergarten screening measures: A comparison of child and family predictors. Research in the Schools, 7, 1-19.
- Brier, N. (1995). Predicting antisocial behavior in youngsters displaying poor academic achievement: A review of risk factors. Journal of Developmental Behavior Pediatric, 16(4), 271-276.

- Bronfenbrenner, U. (1979). The ecology of human development: Experiments by nature and design. Cambridge, MA: Harvard University Press.
- Byrne, B.M. (2001). Structural equation modeling with AMOS: Basic concepts, applications, and programming. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Caldwell, B. and Bradley, R. (1984). Home Observation for Measurement of the Environment. Little Rock: University of Arkansas at Little Rock.
- Camp, B.W. (1995). Maternal characteristics of adolescent mothers and older mothers of infants. Psychological Reports, 77, 1152-1154.
- Child Trends (2001). Facts at a glance. Retrieved December 19, 2001, from www.childtrends.org/pdf/faag2001.pdf.
- Christian, K., Bachman, H., and Morrison, F. (2001). Schooling and cognitive development. In R. Sternberg and E. Grigorenko (Eds.) Environmental effects on cognitive abilities (pp. 287-335). New Jersey: Lawrence Erlbaum Associates.
- Christian, M.K., Morrison, F.J. & Bryant, F. B. (1998). Predicting kindergarten academic skills: Interactions among child care, maternal education, and family literacy environments. Early Childhood Research Quarterly, 13, 501-521.
- Corcoran, J. (1998). Consequences of adolescent pregnancy/ parenting: A review of the literature. Social Work in Health Care, 27 (2), 49-67.
- Cunningham, A. & Stanovich, K. (1997). Early reading acquisition and its relation to reading experience and ability 10 years later. Developmental psychology, 33, 934-945.
- D'Agostino, J.V., Hedges, L.V., Wong, K.K., and Borman, G.D. (2001). Title I Parent-involvement programs: Effects on parenting practices and student achievement. In G. Borman, Stringfield, S, and Slavin, R. (Eds.), Title I compensatory education at the crossroads. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- de Jong, P. F. and Leseman, P. P.M. (2001). Lasting effects of home literacy on reading achievement in school. Journal of School Psychology, 39(5), 389-414.
- Dubow, E. F., & Luster, T. (1990). Adjustment of children born to teenage mothers: The contribution of risk and protective factors. Journal of Marriage and the Family, 52, 393-404.
- Dukewich, T.L., Borkowski, J.G., & Whitman, T.L. (1999). A longitudinal analysis of maternal abuse potential and developmental delays in children of adolescent mothers. Child Abuse and Neglect, 23(5), 405-420.

- Dunn, L. & Dunn, L. (1981). Peabody Picture Vocabulary Test-Revised. Circle Pines, MN: American Guidance Service.
- Eberner, R., Lara-Alecio, R., & Beverly, J. (1997). Supportive practices among low-income parents of academically successful elementary students in Even Start Programs. (ERIC Document Reproduction Service No. ED405111).
- Egeland, B., Pianta, R., & O'Brien, M.A. (1993). Maternal intrusiveness in infancy and child maladaptation in early school years. Developmental Psychopathology, 5, 359-370.
- Entwisle, D and Alexander, K. (1998). Facilitating the transition to first grade: The nature of transition an research on factors affecting it. The Elementary School Journal, 98(4), 351-364.
- Entwisle, D. and Hayduk, L. (1988). Lasting effects of elementary school. Sociology of Education, 61, 147-159.
- Estrada, P., Arsenio, W.F., Hess, R.D., & Holloway, S.D. (1987). Affective quality of the mother child relationship: Longitudinal consequences for children's school-relevant cognitive functioning. Developmental Psychology, 23, 210-215.
- Furstenberg, F. F., Brooks-Gunn, J., & Morgan, S. P. (1987). Adolescent mothers in later life. New York: Cambridge University Press.
- Garnier, H., Stein, J., & Jacobs, J. (1997). The process of dropping out of high school: A 19-year perspective. American Educational Research Journal, 34, 395-419.
- George, R.M. and Lee, B.J. (1997). Abuse and neglect of the children. In R. Maynard (ed.), Kids having kids. Washington, D.C: The Urban Institute Press.
- Gresham & Elliott. (1990). Social Skills Ratings System Manual. Circle Pines, MN: American Guidance Service.
- Griffin, E.A. & Morrison, F.J. (1997). The unique contribution of home literacy environment to differences in early literacy skills. Early Child Development and Care, 127-128, 233-243.
- Hann, D.M., Osofsky, J.D., & Culp, A.M. (1996). Relating the adolescent mother-child relationship to preschool outcomes. Infant Mental Health Journal, 17(4), 302-309.
- Hess, R.D., Holloway, S.D., Dickson, W.P., & Price, G.G. (1984). Maternal variables as predictors of children's school readiness and later achievement in vocabulary and mathematics in Sixth grade. Child Development, 55, 1902-1912.

- Huffman, L., Mehlinger, S., Kerivan, A. (2000). Risk factors for academic and behavioral problems. National Institute of Mental Health. Retrieved April 4, 2001, from <http://www.nimh.nih.gov/childhp/monograph.pdf>.
- Izzo, C., Weissberg, R. P., Kaspro, W. J., and Fendrich, M. (1999). A longitudinal assessment of teacher perceptions of parent involvement in children's education and school performance. *American Journal of Community Psychology*, 27(6), 817-823.
- Jenkins, J., & Smith, M. (1990). Factors protecting children living in disharmonious homes: Maternal reports. *Journal of the American Academy of Child and Adolescent Psychiatry*, 29, 60-69.
- Kastner, J. W., May, W., and Hildman, L. (2001). Relationship between language skills and academic achievement in first grade. *Perceptual and Motor Skills*, 92, 381-390.
- Kline, R.B. (1998). *Principles and practice of structural equation modeling*. New York: The Guilford Press.
- Kovacs, M., & Goldston, D. (1991). Cognitive and social cognitive development of depressed children and adolescents. *Journal of American Academic Child Adolescent Psychiatry*, 30(3), 388-92.
- Ladd, G. (1990). Having friends, keeping friends, making friends, and being liked by peers in the classroom: predictors of children's early school adjustment? *Child Development*, 61(4), 1081-1100.
- Ladd, G. W. & Price, J.M. (1987). Predicting children's social and school adjustment following the transition from preschool to kindergarten. *Child Development*, 58, 1168-1189.
- Luster, T., Bates, L., Fitzgerald, H. E., Vandenbelt, M., & Key, J. P. (2000). Factors related to successful outcomes among preschool children born to low-income, adolescent mothers. *Journal of Marriage and the Family*, 62, 133-146.
- Luster, T. & Brophy-Herb, H. (2000). Adolescent mothers and their children. In J.D. Osofsky and H.E. Fitzgerald, *WAIMH Handbook of infant mental health/ World association for infant mental health*. New York; John Wiley & Sons.
- Luster, T. & McAdoo, H. P. (1994). Factors related to the achievement and adjustment of young African American children. *Child Development*, 65, 1080-1094.
- Luster, T. and McAdoo, H. P. (1996). Family and child influences on educational attainment: A secondary analysis of the High/Scope Perry Preschool Data. *Developmental Psychology*, 32, 26-39.

- Markwardt, F.C., Jr. (1989). Peabody Individual Achievement Test-Revised Manual. Circle Pines, MN: American Guidance Service.
- Masten, A.S., Hubbard, J.J., Gest, S.D., Tellegen, A., Garmezy, N., & Ramirez, M. (1999). Competence in the context of adversity: Pathways to resilience and maladaptation from childhood to late adolescence. Development and Psychopathology, 11, 143-169.
- McClelland, M.M., Morrison, F.J., & Holmes, D.L. (2000). Children at risk for early academic problems: The role of learning-related social skills. Early Childhood Research Quarterly, 15(3), 307-329.
- Miller, C.L., Miceli, P.J., Whitman, T.L., & Borkowski, J.G. (1996). Cognitive readiness to parent and intellectual-emotional development in children of adolescent mothers. Developmental Psychology, 22(3), 533-541.
- Moore, K., Morrison, D., & Greene, A. (1997). Effects on the children born to adolescent mothers. In R. Maynard (ed.), Kids having kids. Washington, D.C: The Urban Institute Press.
- Moore, K.A. & Snyder, N.O. (1991). Cognitive attainment among firstborn children of adolescent mothers. American Sociological Review, 56, 612-624.
- Morrison, F.J. and Cooney, R. R. (2001). Parenting and Academic achievement: Multiple paths to early literacy. In J. Borkowski, S Ramey, and M. Bristol-Power (Eds.), Parenting and child's world: Influences on academic, intellectual, and social-emotional development (p. 141-160). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Normandeau, S. and Guay, F. (1998). Preschool behavior and first-grade school achievement: The mediational role of cognitive self-control. Journal of Educational Psychology, 90(1), 111-121.
- Osofsky, J.D., Hann, D.M., & Peebles, C. (1993). Adolescent parenthood: Risks and opportunities for mothers and infants. In C. Zeanah, Handbook of infant mental health. New York; The Guilford Press.
- Pallas, A. M., Entwisle, D. R., Alexander, K. L., and Cadigan, D. (1987). Children who do exceptionally well in first grade. Sociology of Education, 60, 257-271.
- Reynolds, A. (1989). A structural model of first-grade outcomes for an urban, low socioeconomic status, minority population. Journal of Educational Psychology, 81(4), 594-603. (p 597).
- Reynolds, A. (1991). Early schooling of children at risk. American Educational Research Journal, 28(2), 392-422.

- Schumacker, R. & Lomax, R. (1996). A beginner's guide to structural equation modeling. New Jersey: Lawrence Erlbaum Associates.
- Sommer, K.S, Whitman, T.L., Borkowski, J.G., & Gondoli, D.M. (2000). Prenatal maternal predictors of cognitive and emotional delays in children of adolescent mothers. Adolescence, 35(137), 87-112.
- Sommer, K., Whitman, T.L., Borkowski, J.G., Schellenbach, C.J., Maxwell, S.E., & Keogh, D. (1993). Cognitive readiness and adolescent parenting. Developmental Psychology, 29, 389-398.
- Sparrow, S.S., Balla, D.A., and Cicchetti, D.V. (1984). The Vineland adaptive behavior scales: Interview edition survey form manual. Minnesota: Circle Pines.
- Spieker, S.J., Larson, N.C., Lewis, S.M., White, R.D., & Gilchrist, L. (1997). Children of adolescent mothers: Cognitive behavior status at age six. Child and Adolescent Social Work Journal, 14(5), 335-364.
- Spieker, S.J., Larson, N.C., Lewis, S.M., Keller, T. E., & Gilchrist, L. (1999). Developmental trajectories of disruptive behavior problems in preschool children of adolescent mothers. Child Development, 70, 443-454.
- Stevenson, H. W. & Newman, R.S. (1986). Long-term prediction of achievement and attitudes in Mathematics and Reading. Child Development, 57, 646-659.
- Stipek, D.J. (2001). Pathways to constructive lives: The importance of early school success. In A. Bohart & D. Stipek (Eds.) Constructive and destructive behavior: implications for family, school, and society. Washington, DC; American Psychological Association.
- Torgesen, J.K. (2002). The prevention of reading difficulties. Journal of School Psychology, 40(1), 7-26.
- Vandenbelt, M., Luster, T., & Bates, L. (2001). Caregiving practices of low-income adolescent mothers and the academic competence of their first-grade children. Parenting: Science and Practice, 1(3), 185-215.
- Vinter, R. D., Sarri, R. S., Vorwalller, D. J., & Shafer, W. E. (1966). Pupil Behavior Inventory: A Manual of Administration and Scoring. Ann Arbor, MI: Campus.
- Wadsworth, J., Taylor, B., Osborn, A., & Butler, N. (1984). Teenage mothering: Child development at five years. Journal of Child Psychology and Psychiatry, 25, 305-313.

- Wakschlag, L. and Hans, S. (2001). Early parenthood in context: Implications for development and intervention. In C. Zeanah (Ed.), Handbook of infant mental health (2nd edition) (pp.129-144). New York, The Guilford Press.
- Wang, M.C., Haertel, G.D., & Walberg, H.J. (1994). Educational resilience in inner cities. In M. Wang and W. Gordon (Eds.), Educational resilience in inner-city America: Challenges and prospects. New Jersey; Lawrence Erlbaum Associates.
- Welsh, M., Parke, R.D., Widaman, K., and O'Neil, R. (2001). Linkages between children's social and academic competence: A longitudinal analysis. *Journal of School Psychology*, 39(6), 463-481.
- Wentzel, K. R. & Wigfield, A. (1998). Academic and social motivational influences on students' academic performance. *Educational Psychology Review*, 10, 155-175.
- Wheeler, E. (1997). Successful children of adolescent mothers: Identifying microsystem factors impacting the adjustment of children. Unpublished doctoral dissertation, Michigan State University, East Lansing.
- Whitman, T., Borkowski, J, Keogh, D. and Weed, K. (2001). Interwoven lives: Adolescent mothers and their children. Mahwah, New Jersey, Lawrence Erlbaum Associates.
- Whitman, T.L., Borkowski, J.G., Schellenbach, C.J. & Nath, P.S. (1987). Predicting and understanding developmental delay of children of adolescent mothers: A multi-dimension approach. *American Journal of Mental Deficiency*, 92(1),40-56.

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