PATHWAYS TO EARLY LITERACY:
THE COMPLEX INTERPLAY OF CHILD,
FAMILY, AND SOCIOCULTURAL FACTORS

Megan M. McClelland
DEPARTMENT OF HUMAN DEVELOPMENT AND
FAMILY SCIENCES, OREGON STATE UNIVERSITY
CORVALLIS, OREGON 97330

Maureen Kessenich
DEPARTMENT OF PEDIATRICS
PERINATAL CENTER/NEONATAL DEVELOPMENTAL
FOLLOW-UP CLINIC, LOYOLA UNIVERSITY MEDICAL CENTER
MAYWOOD, ILLINOIS 60153

Frederick J. Morrison
DEPARTMENT OF PSYCHOLOGY
UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN 48109

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ADVANCES IN CHILD DEVELOPMENT
AND BEHAVIOR, VOL. 31
I. Introduction

Modern conceptualizations in developmental science suggest that our understanding of children’s early growth and learning will be enhanced by viewing development from a dynamic, multilevel, and interactive framework (Cairns, Elder, & Costello, 1996; Gottlieb, Wahlsten, & Lickliter, 1998; Thelen & Smith, 1998). As a consequence, research has begun to move away from a focus on primarily microanalytic, laboratory-based methodologies to incorporate a more applied and dynamic ecological model of development.

This paradigm shift has stemmed, in part, from a growing appreciation of the complex relations that exist between many levels of influence that shape children’s development. As the need to see development from a multilevel, interactive framework has grown, researchers have sought ways to bring this perspective to life. This has led to advances in methodologies and analytic techniques, which have allowed researchers to examine complex relations among different factors affecting children’s development.

In the present chapter we use the ecological and dynamic system perspectives as a framework for describing the nature and sources of children’s early literacy development. We discuss important child, family, sociocultural, and schooling factors influencing children’s literacy acquisition.
such as children’s social skills and temperament, the family learning environment and aspects of parenting, socioeconomic status, and race/ethnicity, and the effect that classroom instruction has on children’s literacy skills. We outline the multiple pathways to literacy development as well as the dynamic relations among these factors. Finally, we provide examples of how the pathways to literacy can be described using a combination of variable-based and person-oriented analytic procedures.

A. VIEWING DEVELOPMENT FROM A DYNAMIC SYSTEMS PERSPECTIVE

At the end of the 20th century, the field of developmental psychology underwent a paradigm shift, moving away from a static view of human development and toward a dynamic, interactive, and multilevel framework (Bronfenbrenner, 1989; Gottlieb, Wahlsten, & Lickliter, 1998; Thelen & Smith, 1998). This change in conceptualization arose partly from limitations in seeing development as a set of universal and unchanging properties and from a growing appreciation of context and environmental influences shaping development (Cairns, Elder, & Costello, 1996; Morrison & Ornstein, 1996). For example, research focusing on aspects of children’s cognitive skills such as memory, literacy, and academic skills indicate that culture and context play a large role in the trajectory of children’s learning and that growth in these areas depends in part on being in a formalized educational setting (Ceci & Roazzi, 1994; Rogoff, 1998).

Moreover, environmental influences on children’s development are well documented. Researchers have demonstrated the importance for children’s early literacy development of family factors such as parenting and the family learning environment (Griffin & Morrison, 1997; Hart & Risley, 1995; McClelland, Morrison, & Holmes, 2000; Morrison & Cooney, 2002), sociocultural factors such as socioeconomic status (SES) and race/ethnicity (Bachman, Morrison, & Bryant, 2002; Jencks & Phillips, 1998), and schooling influences such as amount and type of instruction (Freese et al., 2002; McDonald Connor, Morrison, & Katch, 2002).

As theoretical perspectives have embraced dynamic and ecological views of development, researchers have focused on variables that interact on multiple levels to determine development. Appreciation of the complex relations among variables has challenged researchers to find ways to adequately capture the complexity of development that incorporates these multilevel relations.

In the remainder of the chapter we examine the nature and sources of early literacy acquisition as a way to illustrate the multiple child, family, and sociocultural factors influencing development. In addition, the focus on
literacy will illuminate some of the complex dynamic pathways shaping development that emerge from the application of recent variable-based and person-oriented strategies.

B. THE NATURE OF EARLY LITERACY DEVELOPMENT

It is clear that significant numbers of children and adults do not acquire the literacy and numeracy skills needed for success in school and in the workplace (Mullis & Jenkins, 1990; Rayner et al., 2001; Steinberg, 1996; US Department of Education, 1991). Moreover, substantial variability in children's early literacy skills emerges even before formal schooling begins (Alexander & Entwisle, 1988; Hart & Risley, 1995; Morrison, Griffith, & Williamson, 1993; Morrison et al., 1995; Shonkoff & Phillips, 2000; Stevenson et al., 1976; Weinert & Helmske, 1998). As a consequence, a solution to America's literacy problems must address the mosaic of interrelated forces in the child, family, school, and sociocultural environment that shape early literacy acquisition well before children enter kindergarten.

Accumulating evidence points to a number of characteristics of children that predict later academic achievements such as IQ (Morrison, Griffith, & Williamson, 1993; Seigel, 1981; Smith et al., 1972), language and phonological skills (Rayner et al., 2001), learning-related social skills (Agostin & Bain, 1997; Bronson, Tivnan, & Seppanen, 1995; Frosch et al., 1998; Green & Francis, 1988; McClelland et al., 2000) and temperament (Kagan, 1998; Rothbart & Bates, 1998). Furthermore, parenting factors such as cognitive stimulation and the family learning environment, parental warmth, sensitivity, and responsivity, as well as control and discipline are related to children's early cognitive and language growth and academic performance at school entry (Bradley & Caldwell, 1984; Coates & Lewis, 1984; Estrada et al., 1987; Gottfried, 1984; Hess et al., 1984; Kessenich & Morrison, 2002; Morrison & Cooney, 2002; Olson, Bates, & Bayles, 1984; Roberts, Burchinal, & Durham, 1999). Sociocultural factors such as socioeconomic status, race/ethnicity, as well as amount and quality of child care have also been linked to children's preschool cognitive and language skills (Bachman, Morrison, & Bryant, 2002; NICHD Early Child Care Research Network, 2000; Walker et al., 1994). Moreover, researchers have begun to demonstrate relations between the quality of early schooling and amount of direct instruction, and children's literacy outcomes (Freese et al., 2002). Emerging research indicates that it is the complex interactions among these sources of variability that combine to influence children's early literacy development (Molfese, DiLalla, & Lovelace, 1996; Morrison et al., 2002). The impact of child, family, schooling, and sociocultural factors on children's literacy skills is best understood within the context of each of the other
imposing factors. Once we identify the complex array of mediational and moderational relations among these various influences, we will have a more comprehensive appreciation of the origins of children's literacy development.

C. THE EARLYEmergence of Variation
IN CHILDREN'S LITERACY SKILLS

Early elementary school children vary considerably in their academic competence (Alexander & Entwisle, 1988; Morrison, Griffith, & Williamson, 1993; Shonkoff & Phillips, 2000; Stevenson, Chen, & Lee, 1993). By the time children complete first grade, they are already demonstrating a broad range of skills in subjects such as vocabulary, reading, general knowledge, and mathematics. Morrison, Griffith, and Williamson (1993) discovered that individual differences in children's early literacy skills either remain unchanged or are magnified as children progress through early elementary school.

Yet few researchers have focused on the degree of variability in early literacy skills prior to school entry. Morrison, Griffith, and Williamson (1993) also detected substantial individual differences in vocabulary comprehension at kindergarten entry, with age equivalencies on the Peabody Picture Vocabulary Test ranging from 2 to 11 years of age.

Using a large national sample of children from the NICHD Study of Early Child Care and Youth Development, Raviv, Kessenich, and Morrison (2002) found substantial individual differences in cognitive and language skills as early as 2 and 3 years of age. For example, at age 3, developmental age equivalencies on the Reynell Expressive Language and Vocabulary Comprehension subscales ranged from 1 to 5 years of age. Moreover, scores on the Bracken Basic Concepts Scale, which measures recognition of letters, numbers, shapes, and colors, also demonstrated a wide range of skill levels. Also notable was the stability in cognitive and language skills found between 2 and 3 years of age. Twenty-four-month Bayley and 36-month Bracken scores, which both measure cognitive skills, were strongly correlated ($r = .53, p < .0001$), as were 24-month MacArthur (a language measure) and the 36-month Reynell Developmental Language subscales ($r = .32$ for Expressive Language, and $r = .41$ for Receptive Language, $p < .0001$).

In summary, sizeable individual differences in children's early literacy skills emerge before school entry and are reasonably stable from 2 to 3 years (Shonkoff & Phillips, 2000). Clearly, the next important question centers on the sources of this early emerging variability. In fact, a growing body of research indicates a variety of characteristics in the child, family, school, and sociocultural environment that combine to shape children's early literacy outcomes (Morrison et al., 1995; Shonkoff & Phillips, 2000). It is important to explore both the individual and interactive influences that
II. Child Factors and Early Literacy Development

A child’s individual characteristics exhibit a large influence on his or her literacy development and help determine whether that child will make a successful transition to kindergarten. Historically, the discussion of child factors affecting early literacy development has focused on cognitive characteristics such as intelligence and IQ, as well as other factors such as language and phonological skills (Adams, 1990; Rayner et al., 2001). However, other factors such as temperament and social skills also contribute to literacy development (Kessenich & Morrison, 2002; McClelland & Morrison, 2003; Morrison et al., 2002).

A. IQ

A large body of evidence has documented the relation between child IQ and cognitive, literacy, and academic skills (Morrison, Griffith, & Williamson, 1993; Seigel, 1981; Smith et al., 1972). For example, Morrison, Griffith, and Williamson (1993) found that children’s IQ exhibited a strong influence on reading, vocabulary, general knowledge, and mathematics between kindergarten and second grade. In addition, IQ at 24 months (measured with the Bayley Scales of Infant Development—II) was significantly predictive of cognitive and language skills at 36 months (measured with the Bracken Basic Concept Scale and the Reynell Developmental Language Scales; Kessenich & Morrison, 2002).

B. LANGUAGE AND PHONOLOGICAL SKILLS

There is a substantial literature documenting the influence of children’s language and phonological skills in children’s reading and literacy acquisition (Adams, 1990; Hart & Risley, 1995; Rayner et al., 2001; Snow, Burns, & Griffin, 1998). As we have already noted, there are large individual differences in children’s language and vocabulary skills prior to school entry (Hart & Risley, 1995; Stipek & Ryan, 1997). This variability in language skills has important implications for children’s phonological awareness and, in turn, for learning to read: phonological awareness is the most important predictor of early reading skills (Adams, 1990; Rayner et al., 2001).

Phonological awareness is defined as the extent to which a child recognizes the internal structure of words and can perform tasks such as...
identifying the beginning or ending sounds of words. Children who have strong phonological skills have an easier time learning to read than children with weak phonological skills (Rayner et al., 2001). The relation between a child's phonological skill and reading ability is bidirectional. Children's phonological awareness enables them to learn to read more easily and as they are exposed to instructions in spelling and sound, they continue to refine their understanding of phonology. Moreover, reading programs that provide direct instruction in phonological skills can improve children's reading skills (Blachman, 1989; Wise, Ring, & Olson, 1999).

C. SOCIAL SKILLS

A growing body of research has indicated the importance of children's early social behavior on school adaptation and achievement (DeRosier, Kupersmidt, & Patterson, 1994; Dishion, 1990; Ladd, 1990; Ladd & Price, 1987). Children entering school with poor social behavior often have a plethora of problems including peer rejection, behavior problems, and low levels of academic achievement (Alexander, Entwisle, & Dauber, 1993; Cooper & Farran, 1988; McClelland, Morrison & Holmes, 2000). In addition, teachers report that children come into school with differing levels of social skills and that these skills are critical for early school success (Foulks & Morrow, 1989). For example, in one study some teachers reported at least 50% of children entering kindergarten did not have the basic social competencies needed to do well in school, such as following directions, working independently, and having adequate academic skills (Rimm-Kaufman, Pianta, & Cox, 2000).

Most research focusing on children's early social behavior and school achievement has concentrated on social behavior in general, without specifying the aspects of social behavior that are especially important in school performance. However, increasing evidence suggests that aspects of children's learning-related social skills, which tap the domains of independence, self-regulation, responsibility, and cooperation, are particularly important for early school performance and the transition to school (Bachman & Morrison, 2002a; Cooper & Farran, 1988; Cooper & Speece, 1988; McClelland, Morrison & Holmes, 2000).

D. LEARNING-RELATED SOCIAL SKILLS AND ACADEMIC ACHIEVEMENT

There has been an increased interest in how to define learning-related social skills with researchers from a number of theoretical perspectives labeling
these skills differently. For example, some of the terms used include executive functioning skills (Bronson, 2000; Kamiloff-Smith, 1993), self-regulation (Bronson, 2000; Shonkoff & Phillips, 2000), mastery skills (Bronson, 1994; Bronson, Tivnan, & Seppanen, 1995), and social competence (Rose-Krasnor, 1997; Wentzel, 1991, 1993). Although these terms come from a variety of perspectives, they reflect a similar constellation of skills and encompass a number of behaviors relating to attention, self-regulation, independence, organization, and cooperation. For simplicity, in the present chapter we use the term learning-related social skills to describe behaviors such as listening and following directions, participating appropriately in groups (such as taking turns), staying on task, and organizing work materials (Cooper & Farran, 1991; McClelland, Morrison & Holmes, 2000).

Existing research has pointed to the importance of children’s learning-related social skills for early school success and school adjustment. For example, Ladd, Birch, and Buhs (1999) found that children’s classroom participation and their ability to be cooperative and independent in kindergarten was an important predictor of early school achievement. In addition, Bronson, Tivnan, and Seppanen (1995) found that prekindergarten children who spent more time uninvolved in the classroom and had difficulty with rules or the teacher scored lower on a standardized cognitive achievement measure. These children also exhibited more risk indicators such as family problems, lower parental education, and behavioral or emotional problems.

Once children make the transition to school, learning-related social skills continue to be linked to a child’s academic success. These early skills can be said to “set the stage” for later social behavior and academic performance by providing the foundation for positive classroom behavior. In a study examining the relation between classroom behavior and school performance, Alexander, Entwisle, and Dauber (1993) found that children who were interested in classroom activities and were able to focus and pay attention performed significantly better on academic outcomes in the first grade and fourth grade.

In addition, McClelland, Morrison, and Holmes (2000) studied the unique contribution of learning-related social skills to children’s academic achievement at the beginning of kindergarten and at the end of second grade. They found that learning-related skills uniquely predicted literacy and academic outcomes at both time points after controlling for the effects of children’s IQ, age at school entrance, amount of preschool experience, ethnicity, parents’ education, and family learning environment.

These investigators also examined characteristics of those children with poor learning-related skills, and the relation of poor learning-related skills
Children with poor learning-related skills were found to differ from the overall sample on a number of child, family, and sociocultural variables including: significantly lower IQs, more behavior difficulties, poorer family learning environments, and more medical problems such as hearing and language problems. Finally, children with low learning-related skills scored lower on academic outcomes at the beginning of kindergarten and at the end of second grade, and learned at significantly slower rates than their peers between school entry and second grade on measures of reading recognition and mathematics (McClelland, Morrison & Holmes, 2000). They continued to perform poorly on reading and mathematics at the end of sixth grade and fell increasingly more behind their peers in reading and mathematics between kindergarten and sixth grade (McClelland & Hansen, 2001).

Children with poor learning-related skills evidently start formal schooling behind their peers on many literacy indices and continue to perform at lower levels in reading and mathematics between kindergarten and sixth grade. These results also support the importance of learning-related social skills at the beginning of school and continuing to sixth grade (McClelland, Morrison & Holmes, 2000; McClelland & Hansen, 2001).

Given evidence pointing to the importance of children’s learning-related social skills for early literacy and academic achievement, it is important to look at factors that influence the development of early social behavior. One factor that has emerged as being particularly salient for children’s social skills is child temperament.

E. TEMPERAMENT

Rothbart and Bates (1998) have defined temperament as a subset of personality that describes individual differences in self-regulation, emotionality, motor activity, attention, and reactivity, which are relatively stable over time. Most of the research in temperament has looked at the relations between children’s temperament and social behavior. The literature has not found much evidence for direct links between children’s temperament and early literacy skills, but instead has focused on support for indirect and interacting relations between temperament, social behavior, and literacy or academic achievement (e.g., Rothbart & Bates, 1998). To better understand how children’s temperament and social behavior may indirectly or interactively influence literacy skills, it is useful to examine the relation between temperament and social behavior.

Temperament is linked consistently to social behavior and adjustment (Kagan, 1998; Rothbart & Bates, 1998). In one study, Rothbart, Ahadi, and
Hershey (1994) examined relations between measures of temperament and social behaviors defined by empathy, guilt/shame, aggression, help-seeking, and negativity for 80 6- to 7-year-olds. Children scoring high on temperamental traits such as irritability, anger, and discomfort exhibited more antisocial behavior in elementary school (Rothbart, Ahadi, & Hershey, 1994). The results of this study and other research (see Rothbart & Bates, 1998) have linked temperament to children's social adjustment and have also demonstrated how aspects of temperament can be linked to children's social skills as they develop over the preschool and early school years.

One temperamental component, emotion regulation, is specifically related to the development of social skills (Kopp, 1989; Shonkoff & Phillips, 2000). Emotion regulation, defined as the ability to cope with high levels of positive and negative emotions (Kopp, 1989), is related to social adjustment (Rubin et al., 1995). In addition, researchers have argued that a child's self-regulation is an important aspect of social adjustment (Bronson, 2000; Kopp, 1982, 1989, 1991; Shonkoff & Phillips, 2000). Self-regulation has been identified as occurring when a child “goes along with the caregiver expectations in the absence of external monitors” (Kopp, 1989, p. 350).

The link between temperament and literacy skills is probably complex, and likely works through a child's social skills. For example, McClelland (2002) found that the effortful control temperament dimension (characterized by behaviors relating to inhibitory control, attention, and perceptual sensitivity) was related to early learning-related social skills in 3- to 5-year-olds, with the relation strengthening over time.

Taken together, the contribution of children's temperament and social skills to early literacy development is complex and most likely involves interacting and/or intervening relations. Although there are direct links between cognitive development and literacy skills, and between social skills and literacy skills, examining interacting and intervening relations as well as other factors such as temperament provides for a more complex, multilevel, and interactive framework describing children's literacy development.

III. Parenting and Early Literacy Development

Parenting comprises a constellation of factors such as parental style, warmth/sensitivity, control/discipline, cognitive stimulation, and the family learning environment that combine to shape academic growth through a variety of direct and indirect pathways (Collins et al., 2000; Morrison & Cooney, 2002). To better understand children's literacy development, it is necessary to explore the effects these parenting factors have on children's emerging skills.
A. FAMILY LEARNING ENVIRONMENT

The most obvious aspect of parenting to influence early literacy outcomes is the family learning environment. The family learning environment was originally defined in the literature by the frequency of parent–child book reading (Bus, van IJzendoorn, & Pellegrini, 1995), but it has been extended to include measures such as the number of reading materials at home (e.g., newspapers, child and adult magazines and books), frequency of library visits, parents’ independent reading, duration of parent–child shared book reading, and frequency of nonliteracy related activities such as TV viewing (Griffin & Morrison, 1997).

The family learning environment is predictive of children’s early literacy skills in preschool and early elementary school. For example, research by Morrison and colleagues found that the literacy environment (e.g., number of reading materials at home, frequency of library visits, parents’ independent reading and parent–child shared book reading, and frequency of nonliteracy related activities) predicts children’s reading and vocabulary skills, but not mathematics skills, at age 5 (Griffin & Morrison, 1997; Morrison & Cooney, 2002). In addition, Teale (1986) has documented an association between the family learning environment and children’s literacy development; and Payne, Whitehurst, and Angel (1994) found that the family learning environment explained 12–19% of the variance in children’s language skills.

Many researchers have documented the relation between one component of the family learning environment, namely parent–child book reading, and later literacy skills (Bus, van IJzendoorn, & Pellegrini, 1995; Haden, Reese, & Fivush, 1996; Havlik & Haden, 2002; Reznick, 1997; Whitehurst et al., 1994). During book reading, parents have the opportunity to engage in various behaviors that facilitate learning, such as labeling, open-ended questioning, and elaboration. Parents who engage in such activities foster better literacy development in their children (Haden, Reese, & Fivush, 1996; Havlik & Haden, 2002; Reznick, 1997; Whitehurst et al., 1994). During book reading, parents have the opportunity to engage in various behaviors that facilitate learning, such as labeling, open-ended questioning, and elaboration. Parents who engage in such activities foster better literacy development in their children (Haden, Reese, & Fivush, 1996; Havlik & Haden, 2002; Whitehurst et al., 1994). For example, in a study by Whitehurst et al. (1994), Head Start children whose parents participated in a book-reading intervention performed better in tests of emergent literacy skills. In a study of 3- to 5-year-olds, Haden, Reese, and Fivush (1996) identified three distinct maternal styles of reading—Describers, Comprehenders, and Collaborators—and these styles were related differentially to children’s later literacy skills at age 6 for unfamiliar books. “Describer mothers” emphasized descriptions of objects and characters in the story. “Comprehender mothers” embellished and expanded on indirectly specified information, linking the text to real world knowledge and experiences. “Collaborator mothers” combined frequent higher-level comments relating to inferences, predictions, and print knowledge with
some lower-level descriptive comments. Children with Comprehender mothers scored higher on a measure of story comprehension as compared to children of mothers who were Describers or Collaborators. Children with Collaborator mothers scored higher on the WRAT, which assesses letter and word recognition and pronunciation. And children with Describer mothers scored lower on measures of receptive vocabulary, word recognition, and story comprehension. Thus, different maternal styles during mother–child book reading apparently are associated with distinct literacy outcomes in young children.

B. COGNITIVE STIMULATION

Maternal cognitive stimulation is associated directly with children’s early cognitive, academic, and language abilities (Bornstein, 1985; Bradley & Caldwell, 1984; Coates & Lewis, 1984; Elardo, Bradley, & Caldwell, 1975; Hess et al., 1984; Kessenich & Morrison, 2002; Landry et al., 1997; Olson, Bates, & Bayles, 1984; Siegel, 1981; Tamis-LeMonda & Bornstein, 1989). Cognitive stimulation refers to activities such as labeling, scaffolding, and elaboration, and has been measured using tools such as the HOME Inventory checklist (Caldwell & Bradley, 1984) and observations of parent–child structured interactions.

Using the HOME Inventory, which measures the general cognitive environment in the home using a standard checklist, Bradley and Caldwell (1984) found that Total HOME scores at 6, 12, and 24 months correlated with IQ scores at age 3 ($r = .50, .58, \text{and} .71; p < .05$) and age 4½ years ($r = .44, .53, \text{and} .57; p < .05$). The association between the HOME Inventory and children’s cognitive and language competencies during the preschool years has been documented in numerous other studies. Furthermore, the HOME continues to predict developmental outcomes from first grade through age 10 (Bee et al., 1982; Bradley, Caldwell, & Rock, 1988; Elardo, Bradley, & Caldwell, 1975).

Whereas the HOME Inventory assesses components of the family learning environment other than direct parental cognitive stimulation (e.g., number of books and educational toys at home), a new structured interaction observation measure was used in the context of the NICHD Study of Early Child Care and Youth Development in order to evaluate cognitive stimulation independent of these other aspects of the family learning environment. Using data from the NICHD study, Kessenich and Morrison (2002) found that this observation measure of cognitive stimulation, which was based on a structured play interaction between mother and child at age 2, significantly predicted cognitive and language outcomes at age 3. Thus, measures of the home environment that assess behaviors such as parental
Involvement and stimulation demonstrate strong relations to both cognitive and language skills, even at 2 and 3 years of age.

In attempting to understand the relation between parenting practices and early literacy, researchers have focused almost exclusively on the family learning environment and cognitive stimulation as predictors of literacy outcomes. These are important influences, but children's academic outcomes are also affected by other parental factors that, on the surface, might not have such obvious links to literacy, such as parenting style.

C. PARENTING STYLE

The concept of parenting style was originally developed by Baumrind (1971) and comprised of three distinct types: authoritarian, authoritative, and permissive parenting. These dimensions were identified on the basis of varying degrees of parental warmth and control. Maccoby and Martin (1983) subsequently expanded this configuration by distinguishing between permissive parenting that was indulgent versus neglectful.

Most studies with Caucasian-American samples and ethnically diverse samples as a whole have demonstrated a positive relation between authoritative parenting and higher levels of academic achievement (Dornbusch et al., 1987; Glasgow et al., 1997; Lamborn et al., 1991; Steinberg et al., 1994). In contrast, in studies of Asian, Asian-American, and Black populations in isolation better school performance has been associated positively with more authoritarian parenting (Chao, 1994; Darling & Steinberg, 1993; Dornbusch et al., 1987).

Researchers have proposed several hypotheses regarding the source of these ethnic differences. One view is that more authoritarian parenting practices may be adopted by socioeconomically disadvantaged Black families living in unsafe neighborhoods in order for parents to better ensure the safety of their children by insisting on strict obedience and adherence to rules. With regard to Asian and Asian-American parenting, Chao (1994) pointed to the emphasis on authoritarian-like principles such as chiao shun and guan in the Chinese culture. The concept of chiao shun refers to “training” children in appropriate or expected behaviors, and the term guan means “to govern” as well as “to love.” Thus, parental control and authority appear to be synonymous with expressions of love and concern in Asian cultures (Chao, 1994). Furthermore, Darling and Steinberg (1993) hypothesized that differences in parenting style may be linked to cultural variations in the goals parents have toward socializing their children. There is much research to be done in order to fully understand the differences in effective parenting styles across cultures, as well as across various ages.
Little research has attempted to look at the effect of parenting style on early literacy prior to school entry. Such research might lead to interesting findings regarding the learning patterns that develop in early childhood as a result of various parenting styles and levels of control and responsivity.

The impact of parenting style on literacy can also be understood by examining the two components—warmth and control—separately.

1. Parental Warmth/Sensitivity/Responsivity

Parenting style is, in part, defined by various levels of warmth, sensitivity, and emotional responsivity, as measured by positive, affectionate, responsive, and nonintrusive behaviors of mothers toward their children. Such behaviors have emerged as salient influences on children's cognitive and language outcomes. Parenting behaviors have been reliably examined using structured measures such as the HOME Inventory checklist (Caldwell & Bradley, 1984) as well as through observed interactions between parents and children. Interaction patterns between mothers and children aged 12-48 months have been identified as significant predictors of concurrent cognitive and language skills as well as subsequent academic achievement (Estrada et al., 1987; Hess et al., 1984; Kessenich & Morrison, 2002; Murray & Hornbaker, 1997; Olson, Bates, & Kaskie, 1992). Coates and Lewis (1984) found that a mother's responsivity and sensitivity to the distress of her 3-month-old infant accounted for more than 25% of the variance in the child's verbal IQ score at 6 years of age.

In addition, Kessenich and Morrison (2002) determined that an observational measure of maternal warmth and sensitivity predicted equally significant amounts of variance in Bracken Basic Concept scores and Reynell Developmental Language scores at 3 years of age as compared to a measure of maternal cognitive stimulation. Both cognitive stimulation and warmth/sensitivity were assessed using qualitative ratings of explicit maternal behaviors (1 = Not at all characteristic, 4 = Highly characteristic) observed during a structured play interaction between mother and child. Cognitive stimulation was defined as behaviors such as describing, labeling, or asking questions about toys, objects, attributes of objects, or experiences; sensitivity was characterized in terms of positive emotional regard, lack of intrusive behavior, and awareness of the child's affect, interests, or response to stimulation.

In general, research suggests that parenting qualities such as warmth, sensitivity, and responsivity during the first few years of life are related to children's later cognitive and language development. In order to establish the mechanisms through which maternal warmth and sensitivity influence children's cognitive and language outcomes, it is necessary to investigate the
role of mediating factors. For example, warm, sensitive parenting may give young children a sense of security, stability, and self-assurance which in turn enables them to comfortably explore their world—providing them with a "secure base" from which to interact and learn from their environment (Ainsworth et al., 1978; Bowlby, 1988; Main & Solomon, 1986).

2. Parental Control and Discipline

Parental control is the second of two components incorporated within Baumrind's representation of parenting style. A large part of parenting has to do with the methods used to manage and discipline a child. Setting and maintaining consistent rules and limits helps to provide a supportive, structured environment in which children can develop. For example, Morrison and Cooney (2002) demonstrated an indirect relation between children's literacy skills and parental control/discipline by way of a child's learning-related social skills (e.g., listening and following directions, cooperation, independence, self-regulation). Thus, a child's ability to listen and follow directions, mediated the relation between parental control/discipline and a child's acquisition of literacy skills. It is posited that higher levels of consistent, authoritative parental control promote more cooperation, compliance, and independence in young children. These learning-related social behaviors, in turn, enable children to acquire the important literacy skills they need to succeed in the classroom (McClelland, 2002; McClelland, Morrison & Holmes, 2000).

D. THE IMPACT OF PARENTING ON EARLY LITERACY SKILLS: A COMPREHENSIVE MODEL

Several parenting factors have demonstrated significant direct or indirect associations with children's literacy skills. Yet evidence suggests that specific dimensions of parenting may be differentially related to various literacy skills. Morrison and Cooney (2002) used an *a priori* structural equation model to examine different aspects of parenting and their influence on children's literacy and social skills. Four aspects of parenting were assessed: Parental Warmth and Responsiveness, the Strength of Parental Beliefs about Child Qualities, Parental Control, and the Quality of the Family Learning Environment. Parenting factors were significantly associated with children's academic and social skills at the beginning of kindergarten. For example, the Quality of the Family Learning Environment was related to children's vocabulary, general knowledge, reading, and mathematics skills; Parental Warmth and Responsiveness was associated with children's vocabulary and general knowledge skills; and the Strength of Parental
Beliefs about Child Qualities was related to children’s learning-related social skills at the beginning of kindergarten.

These results suggest that multiple pathways simultaneously influence children’s literacy growth. For example, Parental Warmth and Responsiveness was related to children’s vocabulary and general knowledge skills, skills which are not directly taught in the classroom like reading and mathematics, but which are indirectly taught by parents. In addition, the Quality of the Family Learning Environment, which assesses characteristics of the home such as number of books owned, and hours of TV watched by the child, was related to all of the academic outcomes. Thus, a global conceptualization of parenting is useful for specifying how aspects of parenting affect literacy skills differentially, making it important to examine the dynamic and complex paths through which parenting impacts children’s early literacy development.

IV. Sociocultural Factors and Early Literacy Development

A. SOCIOECONOMIC STATUS

Socioeconomic status (SES) has long been considered an important background variable when conducting research on human development. Traditional indicators of SES, including income, education level, and occupational status, have continually demonstrated associations with children’s cognitive, language, and literacy development (Brooks-Gunn, Duncan, & Britto, 1999; Dodge, Petit, & Bates, 1994; Duncan, Brooks-Gunn, & Klebanov, 1994; Lempers, Clark-Lempers, & Simons, 1989; Smith & Dixon, 1995). For example, in a meta-analysis of over 100 studies, the average correlation between SES indices and children’s IQ scores was .40, and the average correlation between SES and verbal achievement was .31 (White, 1982).

When the focus is shifted to literacy skills per se, SES remains influential. In a study by Walker et al. (1994), SES indices such as maternal education, family income, and occupational status were significantly associated with expressive language at 36 months, and receptive language through third grade. Furthermore, a review of numerous longitudinal studies determined that income level predicted children’s verbal and intelligence test scores from age 2 to 5, even after controlling for other family characteristics such as parental education level and family structure (Brooks-Gunn, Duncan, & Britto, 1999). In addition, Duncan, Brooks-Gunn, and Klebanov (1994) found that income-to-needs ratio and maternal education level were significant predictors of children’s IQ at age 5. Hart and Risley (1995) discovered that the size and richness of children’s vocabularies at age 3
varied substantially as a function of their socioeconomic status. Finally, Stipek and Ryan (1997) found that economically advantaged preschoolers outperformed economically disadvantaged kindergartners on a number of cognitive tests.

Although the association between SES and developmental outcomes is well documented, the particular mechanism by which SES exerts its influence is less clear. A distal factor such as socioeconomic status may shape literacy outcomes by influencing more proximal factors at home or to the child, such as parental behaviors and children's learning-related social skills. Yet, research rarely integrates proximal child and parenting factors and distal socioeconomic variables into a comprehensive conceptual model. Such a model would better clarify the relations among child, parenting, and socioeconomic characteristics that combine to influence children's literacy development.

B. RACE/ETHNICITY

Significant racial differences in academic skills such as vocabulary, general knowledge, mathematics, and reading are evident among Black and White children at the elementary and high school levels (Applebee, Langer, & Mullis, 1989; Bachman, Morrison, & Bryant, 2002; Jencks & Phillips, 1998; Phillips, Crouse, & Ralph, 1998; Stevenson, Chen, & Uttal, 1990). Even at kindergarten entry, Black children demonstrate poorer literacy skills than White children, and this discrepancy is either maintained or magnified over the school year (Cooney, 1999). Yet after controlling for variables such as parental education, children's IQ, and the family learning environment, the unique effect of race on kindergarten reading, mathematics, and general knowledge scores disappears, which is consistent with research on school-aged children (Alexander & Entwisle, 1988; Stevenson, Chen, & Uttal, 1990). Thus, it is possible that socioeconomic factors and the family learning environment may mediate the effect of race on literacy outcomes.

However, Bachman, Morrison, and Bryant (2002) found that the family learning environment significantly mediated the effect of parental education on children's literacy skills for White families, but not for Black families. In Black families, the mediational relation broke down in terms of the weaker link between parental education level and the family learning environment. Whereas 79% of White parents with higher levels of education (more than 12 years) reported average or above average family learning environment scores, only 21% of Black parents with higher education levels scored average or above average on the family learning environment questionnaire.
Research comparing Asian and American schoolchildren has also demonstrated differences in academic outcomes, with Asian and Asian-American children outperforming their White and Black peers (Stevenson, Chen, & Lee, 1993; Stevenson, Lee, & Stigler, 1986). Again, this discrepancy is thought to be due, in part, to differences in parental behaviors and the home environment. For example, Asian and Asian-American parents exhibit greater control and involvement over their children's educational development than White or Black parents (Chao, 1994; Dornbusch et al., 1987; Jose et al., 1995; Steinberg, Dornbusch, & Brown, 1992).

In summary, significant differences in children's literacy skills clearly exist across various racial and ethnic groups (Cooney, 1999; Jencks & Phillips, 1998). What is not yet clear is whether these differences are the result of variations in socioeconomic factors, parenting behaviors, cultural beliefs, or a combination of these influences. Further research is needed in order to decipher the myriad of possible mediational and moderational relations among this complex array of factors.

C. CHILD CARE

The number of young children in child care settings increased dramatically at the end of the 20th century, with almost 75% of children involved in full or part-time care. In studies examining the effects of day care on children's outcomes, research has often focused on the amount of time spent in child care. However, quality of child care, as indicated by caregiver–child ratios, group size, resources, environment, and caregiver training, is likely to be more revealing. Several studies have investigated the impact of early child care on later literacy outcomes. Although some researchers have found no significant associations between quantity or quality of child care and later cognitive and academic outcomes (Chin-Quee & Scarr, 1994; Howes, 1988; Larsen, Hite, & Hart, 1983), others have found that involvement in child care can have a compensatory effect on the outcomes of at-risk children from disadvantaged families (Burchinal, Lee, & Ramey, 1989; Christian, Morrison, & Bryant, 1998; Desai, Chase-Lansdale, & Michael, 1989; Golden et al., 1978; McCartney, 1984; NICHD Early Child Care Research Network, 2000). For example, O'Brien Caughey, DiPietro, and Strobini (1994) found that children from impoverished environments who were involved in child care had higher mathematics and reading scores than impoverished children who were not involved in child care. After distinguishing between various types of child care (e.g., center-based, home-based, family care), O'Brien Caughey, DiPietro, and Strobini (1994) discovered that this compensatory effect was specific to
center-based care for children from impoverished homes. However, O'Brien Caughey, DiPietro, and Strobini (1994) also discovered that children from middle-class backgrounds who were enrolled in child care during infancy exhibited poorer reading skills in kindergarten than their home-reared peers. This discrepancy in the compensatory effects of child care is believed to be due to variations in the amount of cognitive stimulation and learning opportunities that children receive in child care, with impoverished children experiencing more than they would at home, and children from middle-class families receiving less than they would at home (Desai, Chase-Lansdale, & Michael, 1989).

Similar results were obtained by Christian, Morrison, and Bryant (1998): the amount of time spent in child care was positively associated with kindergarten mathematics skills, but only for children from low literacy environments with less educated mothers. Thus, the effect of child care on children's mathematics skills was moderated by the level of maternal education and the quality of the family learning environment. Unfortunately, information regarding the quality of the child care was not gathered for this study. In the NICHD Study of Early Child Care and Youth Development (2000), at-risk children from poor home environments who were enrolled in day care performed better on cognitive and language measures than children raised at home.

In addition to quantity of child care, quality of child care—based on characteristics such as caregiver–child ratios, group size, resources, environment, and caregiver training—has been shown to relate to children’s later cognitive, language, and social skills. McCartney (1984) found that children enrolled in child care programs with poorer environments and resources and fewer language learning opportunities demonstrated inferior language skills as compared with children from better child care environments. Ruopp et al. (1979) discovered that children from child care environments with better trained teachers were more cooperative and more persistent on assigned activities, and obtained higher scores on a standardized measure of preschool skills. Furthermore, Ruopp et al. (1979) ascertained that children from child care settings with smaller group sizes performed better on tests of kindergarten and first-grade readiness. Finally, Burchinal et al. (2000) found that higher quality child care was related to higher scores on measures of cognitive and language development, even after adjusting for important child and family factors. Specifically, child care settings with professionally recommended caregiver–child ratios had children with better language skills, and those that met recommendations regarding teacher education had girls with better cognitive and receptive language skills.

In summary, both the amount and the quality of child care influence children's cognitive, literacy, and language outcomes. Amount of child care
is associated with positive influences on later cognitive, academic, and literacy outcomes for children from disadvantaged homes, yet this positive influence is not as clear for children from more economically advantaged homes. Quality of child care, as measured by teacher training, group size, resources and environment, has also demonstrated significant relations with children's literacy-related outcomes.

V. Schooling Influences and Children's Early Literacy Development

Thus far, our discussion of pathways to early literacy acquisition has centered on relations between child, family, and sociocultural influences and children's literacy skills. However, given the large variability in children's literacy skills prior to formal schooling, it is important to document what happens to children's skills once they enter kindergarten. The influence that schooling and classroom instruction have on children's literacy development is another level of influence that must be examined within the ecological paradigm of early literacy development. For example, schooling may reduce, maintain, or increase the variability in children's literacy skills evident before children enter kindergarten. If schooling and classroom instruction exerts a positive influence on children's literacy development then it may be possible to decrease the amount of variability in children's skills and ensure that more children succeed academically.

Obviously, schooling exerts a strong effect on children's literacy skills. For example, classrooms differ substantially in the amount and type of time spent on instructional activities, which directly affects children's early literacy development (Pianta et al., 2002; Pressley et al., 1998). In addition, the type of instruction combined with the individual characteristics of a child exerts a strong impact on the development of children's literacy skills (McDonald Connor, Morrison, & Katch, 2002).

This variability across classrooms is evident in study by Freese et al. (2002) of 58 kindergarten and first-grade classrooms within a single school district. Classrooms—particularly those in kindergarten—differed substantially in the time spent on noninstructional activities. One kindergarten classroom was engaged in noninstructional activities for an average of 83 minutes per day, whereas another kindergarten classroom spent an average of 167 minutes in noninstructional activities. Differences in time spent on noninstructional activities were smaller in first grade, although still apparent.

In addition, substantial variability was found for time spent on language arts and mathematical instruction across kindergarten and first grade. For
example, one kindergarten teacher spent an average of 20 minutes per day teaching language arts while another kindergarten teacher spent an average of 90 minutes per day on language arts instruction. In the first grade, one teacher spent an average of 57 minutes per day teaching language arts while another teacher spent an average of 134 minutes teaching language arts (Freese et al., 2002).

These findings suggest that kindergarten and first grade students in the same school district were receiving quite different educational experiences. While some children were spending more time engaged in instructional activities, particularly language arts activities, other children were spending considerably more time in noninstructional activities such as transition time and behavior management. These results demonstrate that in addition to other important child, family, and sociocultural factors, children's developmental trajectories in literacy skills may differ based on the amount and type of instruction given in kindergarten and first grade.

VI. Dynamic Relations Between Child, Family, and Sociocultural Factors, Schooling Influences and Early Literacy Skills

In general, research has primarily focused on separate links between child, family, and sociocultural factors and children's literacy acquisition (Kessenich & Morrison, 2002; Morrison et al., 2002). However, to describe and explain pathways in children's early literacy development, researchers must examine complex relations between child, family, and sociocultural factors and children's literacy skills. A growing body of evidence indicates that children's literacy acquisition is the result of dynamic direct, indirect, and interacting relations between these variables. Moreover, advances in analytic tools such as structural equation modeling (SEM) and hierarchical linear modeling (HLM) allow researchers to better examine multiple factors influencing literacy skills and the complex relations among them. Thus, research that incorporates a dynamic systems perspective with new analytic tools furthers the understanding of literacy development and the processes underlying children's academic trajectories.

A. A COMPLEX MODEL OF CHILD LITERACY ACQUISITION

Bachman and Morrison (2002a) identified important child, family, and sociocultural factors in order to develop a complex model of child literacy acquisition using a sample of 382 kindergarten children (see Figure 1). They
found that seven core child, family, and sociocultural variables accounted for a large portion of the variance across four literacy outcomes of reading recognition, receptive vocabulary, general knowledge, and mathematics. These variables included three child factors (IQ, school entrance age, and learning-related social skills), one family factor (family learning environment), and three sociocultural factors (race/ethnicity, amount of preschool experience and parents' education). Specifically, at the beginning of kindergarten, these seven variables accounted for 64% of the variance in children's receptive vocabulary skills, 55% of the variance in general knowledge skills, 34% of the variance in reading recognition skills, and 49% of the variance in mathematics skills.

Using these seven variables, Bachman and Morrison (2002a) used SEM to test a model predicting children's literacy skills at the beginning of kindergarten (see Figure 1). SEM is a family of statistical techniques that define and estimate general models of variables including charting cause and effect relations (Klem, 2000). When examining direct effects between predictors and outcomes, using SEM is analogous to conducting a series of simultaneous multiple regressions and allows researchers to directly estimate measurement error and increase the power of the analysis compared with more basic regression techniques (Kline, 1998).
In addition, SEM allows for examination of indirect (mediator) and interactive (moderator) relations among variables in the model.

Results of the Bachman and Morrison (2002a) study revealed that the seven variables had both direct and indirect influences on children's literacy skills at kindergarten (see Figure 1). For example, direct relations were found between parents' education, children's IQ, learning-related social skills, entrance age, and the four literacy outcomes of receptive vocabulary, general knowledge, reading, and mathematics. Direct links were also found between race/ethnicity and receptive vocabulary and general knowledge; between the family learning environment and all literacy skills except mathematics; and between the amount of preschool experience and mathematics skills. All relations were positive with the exception of race/ethnicity, where being African-American was related to lower receptive vocabulary and general knowledge scores.

In addition to direct effects, race/ethnicity and parents' education influenced child literacy skills indirectly through other variables (see Figure 1). For example, race/ethnicity operated indirectly through the family learning environment, child's IQ, and children's learning-related social skills to influence children's literacy skills. In addition, parents' education operated through children's IQ and the family learning environment to influence literacy skills. Together, the results from this study demonstrate that the pathways to child literacy skills are complex and involve multiple variables (Bachman & Morrison, 2002a).

**B. INTERACTIONS BETWEEN CHILD, FAMILY, AND SOCIOCULTURAL FACTORS, AND EARLY LITERACY SKILLS**

Researchers have also found evidence for complex interacting relations between child, family, and sociocultural factors and children's early literacy skills. For example, McClelland, Morrison, and Bryant (2000) found that parents' education interacted with children's learning-related skills to increase children's vocabulary and general knowledge skills at kindergarten. In addition, a child factor, IQ, interacted with children's learning-related skills to influence reading skills at the fall of kindergarten.

These interactions were found to have an augmenting effect in which high learning-related skills were associated with stronger academic performance when combined with high levels of IQ and parents' education. Further analysis of the interactions between parents' education, learning-related skills, and literacy outcomes suggested that high learning-related skills helped children in academic areas such as vocabulary and general knowledge, which are not directly focused on in the school environment,
but are learned in the home environment and are affected by parents' education.

Less firm interpretations could be made about the interaction between IQ and learning-related skills and reading because there was little actual difference in the reading scores of children with high or low learning-related skills and a high or low IQ. In addition, children's age equivalents between the groups for reading scores were similar. Having high learning-related skills and a high IQ may help children listen and sit still when learning about reading more than just having a high IQ. However, the interaction also showed that children with high learning-related skills and a low IQ did similarly to children with low learning-related skills, and a high IQ. Having a high IQ may help children even if they have low learning-related social skills, but if children had a lower IQ, having strong learning-related skills helped them perform better on reading in kindergarten.

This study found that high learning-related skills and parents' education were associated with stronger vocabulary and general knowledge skills in kindergarten. The interaction between learning-related social skills and children's IQ on reading skills in kindergarten indicated that having either a high IQ or strong learning-related social skills helped children perform better on reading. Overall, results from this study add to our understanding of variables influencing literacy skills and help to characterize the relations between child and family factors and early literacy acquisition.

C. INTERVENING RELATIONS BETWEEN CHILD, FAMILY, AND SOCIOCULTURAL FACTORS AND EARLY LITERACY SKILLS

Although some research has documented interactions, or moderational relations, among child, family, and sociocultural variables, other studies have demonstrated mediational, or intervening, relations between such variables and children's early literacy-related skills. Raviv, Kessenich, and Morrison (2002) found that the influence of socioeconomic factors such as income-to-needs ratio and maternal education on children's expressive and receptive language skills at 3 years of age was partially mediated by parenting behaviors such as cognitive stimulation and sensitivity. Furthermore, cognitive skills at age 3 partly mediated the relation between parental behaviors (i.e., cognitive stimulation and sensitivity) and 3-year-old expressive and receptive language skills. This study provides additional evidence of the complex and indirect relations linking parenting, sociocultural factors and children's early literacy development.
D. THE INTERPLAY BETWEEN CHILD TEMPERAMENT, PARENTING, AND LEARNING-RELATED SOCIAL SKILLS

In addition to studying the complex factors contributing to literacy development, research has found evidence for dynamic relations between child and family factors and children's social skills. As discussed previously, children's learning-related social skills are significant predictors of children's academic and literacy outcomes (McClelland, Morrison & Holmes, 2000). For example, McClelland (2002) examined the emergence of children's early learning-related social skills in preschool and found that the relation between aspects of parenting, child temperament, and child social skills is complex and changes over time. In the study, the effortful control dimension of temperament, which comprises of behaviors relating to inhibitory control, attention, and perceptual sensitivity, moderated, or interacted with, parental warmth to influence children's learning-related skills. When parental warmth was high, a child's temperament was not related to his or her learning-related skills, but when parental warmth was low, effortful control became an important indicator of learning-related skills at 3–4 years of age.

The longitudinal nature of the study highlighted how the relation between child temperament, parenting, and children's learning-related social skills changed with age. The moderating interaction between child temperament and parenting found when children were 3–4 years old changed to a mediated or indirect effect when children and their families were studied again one year later, when children were 4–5 years of age. A child's effortful control significantly mediated the relation between the parental warmth and learning-related skills at 4–5 years of age after controlling for background characteristics such as child age, parents' education, preschool experience, and ethnicity. Specifically, at ages 4 and 5, higher levels of parental warmth were related to higher levels of effortful control in children, which were then related to higher learning-related skills in children (McClelland, 2002).

These results demonstrate how characteristics of children and parenting are part of dynamic and complex pathways of development. Although a moderational interaction between child temperament and parental warmth on children's learning-related skills was found when children were 3–4 years old, this relation changed to be mediational when children and their families were studied one year later. Taken together, the complex relations between child and family factors suggest that the pathways to children's early social and literacy development are dynamic and change over time.
In addition to links between child, family, and sociocultural factors and literacy skills, different instructional practices benefit children in differing ways depending on their entering language and reading skills. For example, in a study of growth in word-decoding in first grade, McDonald Connor, Morrison, and Katch (2002) examined the impact of three instructional dimensions: teacher-managed versus child-managed, explicit versus implicit, and changes in instruction over the school year. Different instructional variables were most effective for children with specific combinations of skills upon entering first grade. Specifically, for children with low vocabulary and low word-decoding skills, the more teacher-managed explicit instruction they received in first grade, the higher their spring scores. Conversely, the more child-managed explicit instruction they received, the worse they performed. Finally, teachers who started with low amounts of child-managed implicit instruction in the fall but increased steadily in winter and spring produced higher performance in their low vocabulary, low word-decoding children.

A contrasting pattern emerged for children who started first grade with high vocabulary and high word-decoding skills. For these children, increasing amounts of teacher-managed explicit instruction had no discernible effect, but increasing amounts of child-managed implicit instruction yielded higher spring first grade scores. Finally, steady amounts of child-managed implicit instruction produced greater spring word-decoding scores.

Thus, children’s growth in word-decoding skills in first grade apparently depends on the match between the child’s level of beginning skill and the type of instruction presented by their teacher. One interpretation is that the teacher’s change in instruction is in response to the child’s progress, but the reverse may also be true and children are responding to changes in teacher’s instruction. Regardless of the direction of the association, this finding is consistent with the view that children’s pathways to early literacy acquisition may depend on a “goodness-of-fit” match of children’s characteristics with the type and amount of instruction provided by the teacher (Foorman et al., 1998; Juel & Minden-Cupp, 2000). Although the concept of goodness-of-fit has historically been used to describe the fit between a child’s temperament or characteristics and a parent’s characteristics (e.g., Rothbart & Bates, 1998), it is also relevant in describing children’s literacy skills trajectories. For example, children who started first grade with low vocabulary and word-decoding skills benefited the most over the year when paired with teachers who used
more teacher-managed explicit instruction. In contrast, children who came to first grade with strong vocabulary and word-decoding skills showed more growth in word-decoding when allowed more child-managed implicit instruction. Thus, classroom instruction that can better match the needs of children and that takes into account children’s entering vocabulary and word-decoding skill level can optimize children’s learning over the course of the year.

F. COMBINING VARIABLE-BASED AND PERSON-ORIENTED ANALYTIC METHODS IN EARLY LITERACY DEVELOPMENT

Advances in statistics have allowed researchers to increasingly rely on analytic strategies that combine variable-based and person-oriented procedures to better examine the dynamic relations between child, family, and sociocultural factors and how they influence early literacy skills. Variable-based procedures are correlational methods that attribute significant associations between variables to a general linear model for all individuals in a sample (Bachman & Morrison, 2002b; Magnusson & Bergman, 1988). Examples of variable-based analytic procedures are regression analyses, discriminant analysis, SEM, and growth curve analyses using hierarchical linear modeling.

A limit of variable-based procedures is that significant relations may be due to extreme individual scores rather than reflecting a general pattern for the sample as a whole. Consequently, many researchers advocate the use of person-oriented approaches in addition to variable-based procedures (e.g., Bachman & Morrison, 2002b; Magnusson & Bergman, 1988; Roesner, Eccles, & Sameroff, 1998). Person-oriented procedures focus on locating meaningful subgroups of individuals and examining relations among individuals. Examples of person-oriented procedures include clustering methods, latent class analysis, and the homogeneous grouping strategy.

A particularly useful strategy is to combine variable-based procedures with person-oriented methods. For example, Morrison et al. (2002) used the homogeneous grouping strategy, a person-oriented procedure, and HLM, a variable-based method, to examine the unique and interactive influences of child and family variables on children’s literacy development. The homogeneous grouping strategy is a person-oriented procedure that creates subgroups or clusters of individuals prior to data analysis based on theoretically driven questions. In contrast, HLM is a variable-based method that incorporates multiple levels of analysis, modeling individual growth curves at the first level, and variations in individual’s growth curves using other predictor variables at the second level.
When combining the homogeneous grouping strategy with HLM, individuals are divided into similar subgroups on the basis of theoretically driven questions and the growth curves of those subgroups on outcome variables are then charted (Morrison et al., 2002).

In Morrison et al.'s (2002) study, the influences of children's IQ and family learning environment scores were examined to determine their effect on children's early literacy skills from kindergarten through the end of second grade. Using the homogeneous grouping strategy, two similar groups of children with higher and lower IQ scores were created and then divided again on the basis of high versus low family learning environment scores. This strategy was then combined with growth curve analysis using HLM to examine the independent and combined influence of children's IQ and family learning environment on the growth of reading recognition, mathematics, receptive vocabulary, and general knowledge skills between kindergarten and second grade.

Morrison et al. (2002) found that children's literacy skills followed specific developmental pathways. For example, although children's IQ and family learning environment exerted strong influences on child literacy skills, the pattern of influence was not the same. There was an additive effect of child's IQ and family learning environment on children's vocabulary and reading, but an interactive effect between children's IQ and family learning environment on children's general knowledge skills at kindergarten. In this interaction, the effect of a higher family learning environment on children's general knowledge skills was stronger for higher IQ children than for lower IQ children at kindergarten.

In addition, different relations were found for the influence of children's IQ and family learning environment on children's literacy growth over the first 3 years of schooling. For general knowledge, only a child's family learning environment affected growth rates, with children in higher family learning environments growing more rapidly in general knowledge than children in lower family learning environments. In contrast, a distinct pattern emerged for children's growth in vocabulary where only children's IQ affected growth rates. Lower IQ children grew faster in receptive vocabulary between kindergarten and second grade compared with higher IQ children, whereas the influence of the family learning environment was maintained over time but did not predict growth rates. As a result, vocabulary in the higher and lower IQ children had converged slightly by the end of second grade.

A separate pattern of results also emerged for growth in children's reading skills. Both IQ and family learning environment affected growth rates: children with higher IQs grew more in reading than children with lower IQs,
and children from higher family learning environments experienced more growth in reading than children from lower family learning environments. Finally, for mathematics, only IQ affected growth rates during the first 3 years of school, where children with higher IQs grew at a faster rate in mathematics than children with lower IQs.

The results of the Morrison et al.'s (2002) study point to the specific and complex influence of child and family factors on the growth of children's early literacy skills. Both children's IQ and the family learning environment strongly influenced children's literacy skills, but the pattern of the influence on children's growth differed across the literacy skills. For reading, both IQ and family learning environment influenced growth, whereas for general knowledge, growth rates were due mostly to the family learning environment. In addition, for mathematics, only child IQ affected growth rates between kindergarten and second grade.

These findings point to the high degree of specificity present in the developmental trajectories of children's early literacy skills, which were influenced by children's IQ and the family learning environment. This pattern of results would not have been uncovered if the data were analyzed from just a person-oriented procedure such as the homogeneous grouping strategy, or solely from a variable-based method such as growth curve analyses.

VII. Conclusion

Children's early literacy development is not a static or one-dimensional process but instead involves complex relations between multiple levels of influence. At one level, child, family, sociocultural factors influence literacy skills directly as well as more complex ways involving interacting and intervening variables. At another level, aspects of instructional influences such as the amount and type of instruction influence literacy development. Specifically, pathways to early literacy acquisition differ based on a child's characteristics such as IQ, language, social skills, and temperament; family characteristics such as the quality of the family learning environment and parenting; sociocultural factors such as parents' education and ethnicity; and instructional dimensions such as teacher-managed versus child-managed, explicit versus implicit, and changes in instruction over the school year. Furthermore, the optimal literacy development may involve a match between child, family, and sociocultural characteristics, and the type of instruction provided by the teacher.

Research must utilize advances in analytic techniques that reflect variable-based approaches such as SEM and growth curve analyses (HLM), as
well as person-oriented procedures such as the homogeneous grouping strategy. Moreover, the analytic techniques that show the most promise are those that combine variable-based and person-oriented procedures such as the homogeneous grouping strategy combined with HLM. Together, these methodological and analytic techniques are important tools that can help disentangle the multiple layers of influence in literacy development.

ACKNOWLEDGMENT

The research presented in this chapter was completed with funding from grants NICHD R01-HD27176 and NSF BCS-0111754 to Frederick J. Morrison.

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