Friendship Patterns and School Adjustment in the Mixed-Age Context

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While friendship patterns and the relationship between friendship status and school adjustment have been studied in same-age classrooms, little is known about friendship patterns and the contribution of friendship status to school adjustment in mixed-age classrooms. The purposes of the present study were to investigate friendship patterns in a large sample of mixed-age (ungraded) primary classrooms and to examine the contribution of friendship status to school adjustment in a smaller subsample of ungraded primary children.

Peer acceptance level and age relative to classmates both had a significant impact on the number of reciprocated friends children had, and on the relative age of their friends. High-accepted and relatively old children had more reciprocated friends than did less accepted and relatively young children. Also, high-accepted children had more relatively old, and intermediate age friends than did than average- and low-accepted children, and average-accepted children had more friends at all relative ages than did low-accepted children. Children who were older in relative age had more friends who were also older in relative age than did children who were intermediate and young in relative age. Intermediate age children had more relatively old friends than did relatively young children. Chi square tests of independence revealed that low-accepted
children had more friends who were young in relative age, and high-accepted children had more relatively old friends than expected by random pairing, and that relatively young children had more relatively young friends and relatively old children had more relatively old friends than expected by random pairing.

There were some similarities in friendship patterns between the larger data sample and the school adjustment subsample. Peer acceptance influenced friendship patterns in a similar manner, however, there was no significant effect of relative age. Also, high- and average-accepted children had more friends who were young and intermediate in relative age than did relatively young children. High-accepted children also had more relatively old friends than did average- and low-accepted children, and average-accepted children had more relatively old friends than did low-accepted children. Chi-square analysis revealed patterns similar to those in the larger sample; high-accepted children had more relatively old friends and low-accepted children had more relatively young friends than expected. There was no significant of relative age on the relative age of children’s friends. In the school adjustment subsample, children’s attitudes toward math, reading, and science were positively related to math, reading, and science achievement scores. Friendship status was significantly related to children’s attitudes toward math and achievement scores. Specifically, if children had at least one friend, they had more positive attitudes toward math and higher average achievement scores. Also, females had more positive attitudes toward math, but not other subjects.
Chapter I
Introduction

Ladd and Kochenderfer (1996) suggested that children’s classroom peer relations can be studied at different levels of analysis. At the dyadic level, there are friendships which are relationships children form with individual peers. The second level views the individual as a member of a larger social unit and looks at the child’s standing in the peer group. The individual’s social status within the group and his/her overall likability are two ways peer group standing has been identified. It is important to differentiate between peer group standing and friendship. Ladd and Kochenderfer (1996) identified two important ways in which these constructs differ from one another. First, peer group standing and friendship refer to different levels of social context. Peer group standing is a “collective index of the quality of a child’s relations with members of a peer group; evidence of consensual liking or disliking is typically used to define a child’s social standing in the group” (Ladd & Kochenderfer, 1996, p. 327), whereas friendship concerns dyadic relationships. Second, peer group standing differs from friendship in that classroom groups are predetermined; children do not have a choice regarding participation in classroom groups.

Peer group standing has been assessed with two different techniques, overall peer acceptance and social status. Peer acceptance is derived by having children rate all classmates on likability; the mean of the ratings received from
peers constitutes a child’s overall peer acceptance (Asher & Hymel, 1981). In contrast, to determine social status, children nominate most liked and most disliked peers. Each child’s social status is determined by the number of positive and negative nominations received in comparison to peers. For example, popular children receive many positive nominations and few negative nominations, whereas rejected children receive many negative nominations and few positive ones (Coie, Dodge, & Coppotelli, 1982).

In contrast to group based measures of peer relations, friendship is defined dyadically; children must nominate each other to be considered friends. Further, friendship is different from group-based measures of peer relations in that it is a voluntary and a mutually regulated relationship (Ladd & Kochenderfer, 1996). An important aspect of friendship is the evidence of reciprocity of affection, which shows that both children are active members of the dyad (Asher, Parker, & Walker, 1996). Friendship also has been defined as “the specific attachments carrying expectations that ‘best’ friends spend more time with one another than ‘ordinary friends’ or acquaintances; that cost / benefit balances in one’s social exchanges with a friend are favorable; and, among older children and adolescents, that friends are loyal, trusting, and intimate with one another” (Bukowski, Newcomb, & Hartup, 1996, p. 1). Therefore, the construct of friendship can be seen as involving a reciprocated emotional or affiliative bond between two children, whereas peer group acceptance and social status refer to the child’s peer relations across the entire group. For example, the concept of peer acceptance is defined as the degree to which a specific child is liked or accepted by all the members of his or her peer group (Asher et al., 1996). Thus, it is possible for a child to have a friend, but have relatively low standing in the
peer group or to have no friends and high standing in the peer group (Parker & Asher, 1993). Peer acceptance and friendship are “nonoverlapping, albeit not wholly independent, dimensions of individual differences” (Asher et al., 1996, p. 369).

Children’s friendships are believed to provide a context in which social, emotional, and cognitive skills and competencies can be developed. Newcomb and Bagwell (1996) argue that friendship relations provide unique contexts for development that are not duplicated in other relationships. Theorists as diverse as Sullivan (1953) and Piaget (1965) would agree. Sullivan (1953) proposed that the experience of a mutual collaboration in friendship allows children to acquire important social skills that would otherwise not develop. Similarly, Piaget (1965) proposed that equal status interactions with peers afforded a unique context to challenge egocentric views and stimulate moral reasoning. Friendships can compensate for difficulties children may have in other aspects of life. In this manner, friendships play a vital role in the development and improvement of deficient social skills. Sullivan (1953) also suggested that without the experience of a collaborative friendship in childhood and adolescence, a child’s developmental success and potential is limited. Hartup and Sancilio (1986) have suggested that friendships provide children with the tools necessary to develop and learn social, emotional, and cognitive skills, and act as points of reference for later relationships. Finally, friendships provide a source of social support for children, helping to ease the transition from dependence on family to independent functioning within the peer group (Hartup, 1983). Peers’ significance for development is supported by the finding that children who are actively rejected by peers are more likely to experience adjustment problems,
both concurrently and later (Kupersmidt & Coie, 1990; Parker & Asher, 1993). Despite theoretical agreement concerning the importance of friendship to children’s development, there has been much less empirical research on friendship than on group-based measures of peer relations.

Friendship has mostly been studied in the context of the classroom environment. Gersham and Hayes (1983) investigated the stability of reciprocated friendships among preschool children. Reciprocated friendships were identified by using two criteria: (a) children named each other as best friends; and (b) friends were observed spending 55% to 72% of their time interacting with each other during free play. Friendship nominations that were not reciprocated were referred to as unilateral friendships. The results indicated that reciprocated friendships were more often maintained across the 6-month period than were unilateral relationships. These results demonstrate that, even among preschoolers, actual friendships do last across extended time periods and verify that only a particular type of relationship shows temporal stability.

Rizzo (1988) defined friendships in a sample of nursery school children as playmates who reciprocally nominated each other in response to the question “Who are your best friends?” Social status with peers was determined with the Coie et al. (1982) methodology. The study demonstrated that friendship is an important factor in sociometric judgments. The classification of children as popular, average, and rejected in peer evaluations reflected to a large degree their number of friendships. The results indicated that children who have many friends are classified as popular, children who have few friends are classified as rejected. The suggestion is that there is a link between friendship and social status. However, this study used the same nomination data to determine both
social status and friendship, so these measures were not independent.

Parker and Asher (1993) performed a study in which social standing was differentiated from friendship by using ratings to define peer acceptance and positive nominations to define friendship. The participants were in third through fifth grade. Children were classified as highly-accepted if they received a rating z-score that was greater than or equal to 1. Children were classified as low-accepted if their rating z-score was less than or equal to -1. The remaining children were classified average-accepted. Children's friendships were identified by reciprocity of positive nominations. In this sample, 77.6% of the children had at least one friend. The relationship between peer acceptance and friendship was similar to the findings reported by Rizzo (1988). Low-accepted children had significantly fewer friends than did average-accepted children, who in turn had significantly fewer friendships than high-accepted children. However, not all low-accepted children were without friends; not all high-accepted children had friends. They also found that girls had significantly more friends than boys. This study demonstrated that peer acceptance influenced friendship without confounding the two constructs.

The level of peer acceptance of the partners involved in friendships also was assessed by Parker and Asher (1993). The results of a one-sample chi-square test revealed that the observed distribution of configurations departed significantly from its expected distribution. The main finding was that low-accepted children's friendships were not restricted to other low-accepted partners, but that number of dyads involving a low-accepted child with either an average-accepted or high-accepted partner was considerably less than the number expected through random pairing (Parker & Asher, 1993). The majority
of the dyads involving low-accepted children included an average-accepted partner.

The studies reviewed up to this point have focused on the role of peer acceptance and friendship in same-age classrooms. However, children also function in mixed-age contexts. Both same-age and mixed-age peer relationships are thought to provide children with important, though distinct sources of social support (Hartup, 1983). Piaget (1965) has argued that same-age peer relationships make a unique contribution to development by creating a context in which the relationship is characterized as being equal in knowledge and control. This context allows children to engage more freely in conflicts with other children. Through the process of negotiation, children see positions from the other child's point of view, thus contributing to a decline in egocentrism. In contrast, Vygotsky (1934/1986) suggested that interactions with more skilled individuals (adults and older peers) also stimulate cognitive and social development. Vygotsky believed that younger children are guided by the knowledge and tools passed on by older peers. Moreover, this social interaction is an active process in which older, more knowledgeable peers help younger children perform tasks they cannot accomplish on their own. From this point of view, mixed-age peer interactions can provide an important context for acquiring new skills, both cognitive and social.

Hartup (1983) suggested that both same-age and mixed-age socialization are important for the development of social skills. The social interaction that takes place between same-age peers stimulates a cooperative learning environment, in which both prosocial (giving) and antisocial (taking) behaviors are learned. Mixed-age peer interactions allow older children to develop
leadership, nurturant, and prosocial behaviors and allow younger children to seek assistance and observe older and more skilled peer role models. Through observation and reinforcement, important social skills may be developed, assisting the child in social interactions. These relationships can make it possible for the child to refine his or her social skills, and further increase the probability of future success in peer interactions.

Despite the acknowledged theoretical importance of mixed-age peer relations, they have been studied less frequently. In part, the reason is that mixed-age classrooms are less common and, therefore, less studied in elementary and middle schools. Ladd (1983), however, did study mixed-age playground friendships of third and fourth graders attending same-age classes. He found that rejected children’s interactions were more negative and conflictual, and their companions were younger and less popular. Popular and average children engaged in more cooperative and prosocial play, and popular children played with older and more well liked peers. These results suggest that the function of mixed-age friendships may depend on children’s social status. The friendships of popular children with older, well-liked peers provide both the opportunity to learn socially competent behaviors and prestige in the peer group (Ladd & Price, 1993). Rejected children’s friendships with younger, less liked children may not be as likely to promote prestige in the peer group, but these friendships may buffer them from the negative effects of rejection (Asher, Parkhurst, Hymel, & Williams, 1990).

Ricard, Heffer, Miller, and Campisi (1995) conducted research with children in mixed-age (kindergarten through grade 2) classrooms. Children were rated by classmates and teachers on leadership, bossiness, and tendency to
help. Children rated peers on friendship; teachers listed each child’s three best classroom friends. Correlations between children’s and teachers’ ratings were significant though modest (rs ranged from 0.21 to 0.36); only teacher-based results were reported. Mixed-age friendships were common (76% of all child-defined and teacher confirmed friendships). Helping ability was more important to mixed-age friendship, whereas leadership was related to both mixed- and same-age friendship. These results support the idea that mixed- and same-age friendships fulfill different functions. Age differences were not reported for friendship or peer acceptance. Friendships were identified partially by teachers’ rating which may serve as an inaccurate measure of friendships between children.

The function of mixed-age friendships may vary across settings and contexts. Allen (1989) studied 702 students at a middle school that was organized into three “houses,” one of which was mixed-age. Children completed a self-concept measure and named their “best” friends and ”regular” friends. There were more mixed-age friendships in the mixed-age setting; most were the less intense, “regular” friendships. Higher percentages of mixed-age friendships were associated with lower perceived cognitive and general competence for sixth graders in the mixed-age setting and with lower perceived general competence, fewer opposite sex friendships, and being less popular for eighth graders in the mixed-age setting. In the same-age setting, mixed-age friendships were not related to any social or emotional variables. Thus, it appears that mixed-age settings can provide friendship opportunities for less competent children, results which parallel those of Ladd (1983). However, the function of mixed-age friendships for more competent children appears to be different in the middle
school and elementary settings (Allen, 1989; Ladd, 1983).

Recent research has investigated individual differences in peer relations in the mixed-age classroom as a function of age relative to classmates. Lemerise (1997) identified preschool and ungraded primary children's peer acceptance, social status, social reputation, and children's age relative to classmates. Peer acceptance was assessed by calculating the mean of all classmates' ratings and then standardizing these values using z-scores. Using a combination of rating and nomination techniques, the following social status categories were identified: rejected, neglected, controversial, popular, and average. Social reputation was assessed by having children nominate classmates for "who fights a lot," "who is shy," and "who is easy to get along with." These values were tallied and standardized to yield measures of social reputation. Finally, in order to compare across mixed-age classrooms, children's ages (years, months, days) were calculated and standardized within class (z-scores) to yield age relative to classmates. These standardized values were used to define three groups: a) "young": relative age z-scores < -0.5; b) "intermediate": relative age z-scores > -0.5 and < +0.5; and c) "old": relative age z-scores > +0.5.

Results suggested that relatively young children, compared with intermediate and relatively old groups of children, were less accepted by their peers and were more likely to be rejected by their peers. In addition, relatively young children were less likely to be popular and were more likely to be nominated by their peers as being shy (Lemerise, 1997). Thus, mixed-age classrooms appear to be associated with social advantages for relatively older children, whereas children who are young relative to their classmates seem to be
at a social disadvantage. These findings do not allow the examination of friendship patterns. It is unknown whether children who are younger in relative age have friendships which may serve as a buffer against social problems.

School adjustment is an area in which friendships may offer a buffer for rejected and younger children. As mentioned above, children who are actively rejected by peers are more likely to experience adjustment problems (Kupersmidt & Coie, 1990; Parker & Asher, 1987). Early peer rejection is associated with poor school adjustment and poor academic performance in kindergartners (Ladd, 1990; Ladd & Price, 1987). Among sixth and seventh graders, children who are aggressive and rejected by peers have the poorest academic profiles (Wentzel & Asher, 1995). Peer rejection in elementary school raises children's risks for truancy, high school dropout, and other problems (Kupersmidt & Coie, 1990). Very little is known about the correlates of school adjustment in mixed-age classrooms. Given data that indicate children who are young in relative age are at a social disadvantage in mixed-age classrooms, it may be that relatively young children will also have more difficulty with school adjustment. It is important to examine peer relationships and friendships in mixed-age school settings because so little is known about mixed-age peer relations, in general, and because of the relationship between peer relations and academic adjustment and performance demonstrated in same-age school settings.

School Adjustment

School adjustment has been referred to as the outcome associated with the demands of adapting to the school environment (Ladd, 1990). Ladd (1990) and Ladd and Price (1987) believe that this outcome is affected by the level of
academic success and also the degree of comfort and involvement demonstrated by the child in his/her classroom setting. Researchers have measured two general aspects of school adjustment: attitudes toward school and school performance. These are reviewed in the following sections.

**Measuring Attitudes Toward School**

One approach toward measuring school attitudes uses standardized Likert-type scales, which yield scores representing children’s liking for math, reading, and science (Estes Attitudes Scales, EAS, Estes, Estes, Richards, & Roettger, 1981). The scales have been shown to be internally consistent with alpha reliabilities ranging from .77 to .88 (Estes et al., 1981). The School Sentiment Inventory-Primary Level (Frith & Narikawa, 1972) measures children’s general attitudes toward school and has been used by Bogat, Jones, and Jason (1980), Ladd (1990), and Ladd and Price (1987). Each of the 37 items is read aloud to the child by interviewers, and the child provides a response of yes or no. There are five subscales (attitudes toward teachers, school subjects, school climate and structure, and peers) and a general estimate of school attitudes; test-retest reliability is .87 (Bogat et al., 1980).

**Measuring School Performance**

Children’s performance in school has been assessed using various techniques such as the student’s composite grade point averages in reading, math, and science; total grade point average at the end of the school year (Richards, Gaver, & Golicz, 1984); and teacher and peer ratings of performance levels (Wentzel, 1991). Standardized tests of achievement, such as the Comprehensive Tests of Basic Skills (1991) which yield individual test scores for specific school subjects, also have been used. This instrument was designed to
provide a valid measurement of basic academic skills in reading and math, in addition to other school subjects.

**Relationship Between Attitudes and Performance**

Researchers have approached the relationship between children's attitudes toward school and school performance using two general methods. Some have focused on general attitudes and performance (Ladd, 1990). Others have examined the relationship between attitudes toward specific school subjects and performance (Richards & Bear, 1987; Richards et al., 1984; Schoefield, 1982).

Schoefield (1982) investigated the relationship between math attitudes and achievement in 1,896 Australian third, fourth, fifth, and sixth grade students across one school year. A significant relationship between math attitudes and achievement was found, but this relationship was mediated by the gender of the participant and whether the test was administered early or late in the school year. Boys at all grade levels had significantly stronger correlations between math attitudes and math achievement than did girls. Also, for boys, the relationship between math attitudes and math achievement was significantly stronger late in the school year. For girls, this relationship was found to be insignificant.

Richards and colleagues (1984) investigated the relationship between math, science, and reading attitudes and performance in these subjects. The Elementary Form of the Estes Attitudes Scales (Estes et al., 1981) was administered to assess fourth grade children's attitudes toward reading, math, and science. School performance was measured by obtaining grades in math, reading, and science. The grades were based on teachers’ best estimates of
academic performance near the middle of the spring semester of the school year. Results demonstrated that reading grades were significantly correlated with reading attitudes, science attitudes and general attitudes. However, math and science grades were not significantly correlated with their respective attitudes or the general attitude composite.

Other research has examined the predictive relationship between attitudes and school performance. Richards and Bear (1987) assessed the stability and criterion related validity of the Estes Attitude Scales (Estes et al., 1981). Their sample consisted of 161 fifth and sixth grade students attending two elementary schools. School performance measures consisted of the Educational Ability Series (EAS) quotients (Science Research Associates, 1979), participants’ grades in math, science, and reading, and overall grade point average. The EAS quotients served as an estimate of the child’s predicted ability and are similar to an IQ score. The data were assessed using four stepwise regression procedures and correlations. The intercorrelations between course grades in reading, math, and science and their respective attitudes ranged from .44 to .59. Intercorrelations between course grades in reading, math, and science and the EAS quotients ranged from .50 to .60. Children’s attitudes significantly incremented the prediction of grade point average and grades in math, reading and science.

A significant relationship between attitudes and performance has been established for older elementary children. Less is known about this relationship in younger children. The relationship with older children is correlational, and therefore the causal direction is unclear. It is important to point out that children who do well academically may develop better attitudes toward school, or children
who have positive attitudes toward school may achieve better academically. It is also possible that a third factor underlies this relationship. For example, other research has examined the contributions of peer relations variables to school adjustment. That body of research has found that children's social relationships also are related to their perceptions of and performance in school.

Children's Peer Relationships and School Adjustment

Peer relationships are an important component of children’s experience at school. There are several ways in which peer relationships may be related to children's perceptions of and performance in school. The availability of friends may make school a pleasant experience for children. Further, friendships may offer a social support network to rely upon when school becomes stressful. Friends may offer assistance in the completion of school work, and the ability to get along with others may facilitate the group work that is a feature of many elementary curricula. The following sections review the findings on group-based measures of peer relations and friendship and their influences on school adjustment.

Group Based Measures of Peer Relations and School Adjustment

Ladd (1990) considered the contribution that kindergartners’ classroom peer relations made to school adjustment during the beginning of school, the first two months of kindergarten, and during the rest of the school year. Peer relations were assessed using nomination and rating sociometric techniques. Negative nominations were subtracted from positive nominations and standardized within each class to define social preference, a measure of overall likability. Social impact, a measure of how much the child was noticed, was calculated by adding positive nominations to negative nominations and
standardized within each class. Ladd used the School Sentiment Inventory-
Primary Level (Frith & Narikawa, 1972) to assess kindergartners’ general
attitudes toward school. School performance was assessed using two
measures: academic behavior and academic achievement. Academic behavior
was defined as children’s attention and task mastery. Teachers and classmates
used two behavioral subscales and rated children’s academic behavior. The
Metropolitan Readiness Test Form P (MRT - Harcourt Brace Jovanovich, 1986;
cited in Ladd, 1990) was used to measure the child’s school readiness or
achievement. The number of absences and requests to see the school nurse
were tallied to represent the level of school avoidance.

Ladd (1990) found, in general, social preference (a group-based measure
of likability) was a significant predictor of child’s school perceptions, school
performance, and school avoidance. Specifically, children identified as having
lower social preference had lower school perceptions, higher levels of school
avoidance, and lower levels of school performance. Peer acceptance also was
measured; however, these results were not reported. Children were classified
into one of four social status categories using social preference and social
impact scores to define social status (Coie et al., 1982); there were 22 popular,
34 average, 15 neglected, and 18 rejected children. Children who were rejected
by their peers, compared to popular, average, and neglected children, had
negative school perceptions, higher levels of school avoidance, and lower levels
of school performance. Ladd (1990) suggested that these findings support the
idea that peer rejection, or “being disliked by your peers” early in the school year,
acts as a stressor and interferes with later school adjustment.
Additional research has focused on the contribution peer relations make to school adjustment in later grades. Wentzel (1991) studied the relationship between academic performance, socially responsible behavior, self regulatory processes, and peer status in a sample of 423 sixth and seventh grade students. Total grade point average was used to assess academic performance. Socially responsible behavior was measured by both teacher ratings and peer nominations for noncompliant and prosocial characteristics. Self regulatory processes were described in terms of three dimensions: socially responsible goals, interpersonal trust, and interpersonal problem solving. The social responsibility of goals was assessed using two self-report scales designed to measure how often students are prosocial when other peers are in the room. Interpersonal trust scores were assessed by asking classmates to nominate other students for “who keeps promises and is someone you can trust” (Wentzel, 1991, p. 1070). Interpersonal problem solving was assessed by presenting children with a random list of 25 names and asking them to nominate peers on two problem solving dimensions: “tries hard and solves disagreements with other kids” and “gets upset when others disagree with him/her or gets in arguments” (Wentzel, 1991, p. 1070). Peer status was assessed by gathering positive and negative nomination data and classifying subjects as in Coie et al. (1982). The sociometric status groups consisted of 66 popular, 64 rejected, 65 neglected, 40 controversial, and 80 average children.

The relations between socially responsible behaviors, self regulatory processes, peer status, and academic achievement were assessed. Socially responsible behavior, problem solving style (a dimension of self regulatory processes), and social status were significantly related to school performance. It
was also found that popular and neglected children’s school performance was higher and rejected children’s school performance was significantly lower than that of average status children. Further analyses were conducted to explore the relationship between these variables and grade point average. Grade point average was regressed on to socially responsible behavior, self regulatory processes, and levels of peer status. Socially responsible behaviors accounted for 13%, self regulatory processes accounted for 11%, and peer status accounted for 4% of the unique variance in grade point average. More specifically, membership in the neglected status group made an independent contribution to the prediction of grade point average.

Wentzel and Asher (1995) further investigated the relationship between group status and academic profiles in this sample. Average children were compared with rejected, neglected, popular, and controversial status groups. Each child’s academic profile consisted of student and teacher ratings of the child’s performance, as well as students’ scores on school motivation scales. The results demonstrated that children who were rejected by their peers had poor academic profiles compared to average children. Also neglected and popular children were shown to have better academic profiles than did average children. Popular children were different from average students on two variables; they were perceived as more helpful to others by teachers, and more often nominated by classmates as being good students. The neglected children differed significantly from average students on almost every academic characteristic examined. Specifically, when compared to average children, neglected children reported higher levels of school motivation, were perceived by teachers to be more independent, less impulsive, more appropriate with respect
to classroom behavior and were preferred more by teachers. It was also demonstrated that neglected children, who receive few friendship nominations but are not actively disliked by their peers, showed the highest levels of school motivation. Here, the suggestion is that being liked by one’s peers does not necessarily influence school motivation in a consistent manner. Children belonging to the rejected group were further divided into two subgroups: submissive - rejected and aggressive - rejected. Results from this analysis demonstrated that aggressive - rejected students were less likely to be nominated as good students and were less preferred by their teachers. Aggressive-rejected children differed from average students on academic characteristics, whereas submissive-rejected children did not -- again suggesting that only aggressive - rejected children have academic difficulties.

Research has shown that children’s social status is related to both attitudes toward school and school performance (Ladd, 1990; Wentzel, 1991; Wentzel & Asher, 1995). This relationship has been demonstrated for younger and older groups of children. Ladd (1990) demonstrated that kindergartners who were rejected by their peers, compared to popular, average, and neglected children, had negative attitudes toward school and lower levels of school performance. It has also been shown that rejected children in upper grades have problematic academic profiles, whereas neglected and popular children did very well academically (Wentzel, 1991; Wentzel & Asher, 1995). Another finding was that aggressive - rejected children had more problematic academic profiles than did submissive - rejected children (Wentzel & Asher, 1995). Taken together these results suggest that children’s social status contributes to children’s adjustment in school. Popular and average children showed better
school adjustment than aggressive-rejected children. However, popularity is not a requirement of good school adjustment; neglected children had more favorable academic profiles than did popular children. Children who were actively rejected and aggressive demonstrated the most problematic profiles (Wentzel & Asher, 1995).

Friendship and School Adjustment

Friendships can be measured by using mutual “like most” nominations, teacher report, or parent report. Mutual nominations consist of totaling the number of mutual (reciprocal) “like most” nominations the children received (e.g., if child A picked child B as his/her best friend, and child B picked child A as his/her best friend). Teacher report requires that the teacher read through the class roll and pair children based on observations of the children’s friendships. Parents also have been asked to identify both close friends and other friendships that their child has experienced (Ladd, 1990). These three techniques have been used in combination and separately to determine the relationship between children’s friendships and school adjustment.

The transition from preschool to kindergarten was examined by Ladd and Price (1987). The study’s purpose was to identify factors predicting children’s social and school adjustment in the new classroom setting. School adjustment was defined as the amount of discomfort and school avoidance expressed in the new classroom environment. Measures used to assess school adjustment were as follows: (a) children’s attitudes toward kindergarten, (b) classroom anxiety, (c) number of school absences, and (d) requests to see the school nurse. These measures were obtained both at the start and end of the kindergarten year. Only factors associated with school adjustment and friendship will be discussed. The
sample consisted of 58 preschool children who were followed longitudinally into kindergarten. One of the variables used to predict school adjustment was the presence of familiar peers in kindergarten classrooms. Children who retained a large number of friendships outside the school environment had more positive attitudes during the first part of kindergarten. It was also found that children who attended class with familiar peers displayed less anxiety and had a positive outlook toward school.

In another sample of 125 kindergartners, Ladd (1990) demonstrated that children who had one or more friends at the start of school had better school perceptions and school performance. Parent report was used to identify friendships prior to school entrance. In addition, children who had a large number of classroom friends at the beginning of school developed more favorable perceptions, and those who maintained their friendships during the first two months liked school more as the year progressed.

Ladd, Kochenderfer, and Coleman (1996) examined how the quality of kindergartner’s peer relationships related to aspects of school adjustment. Children’s friendship quality was assessed in an interview designed to measure six friendship processes (companionship, validation, aid, self disclosure, conflict, and exclusivity). These were defined as follows: “companionship” referred to common activities shared with friends; “validation” was described as positive support received from a friend; “aid” referred to assistance received from a friend when dealing with problems; “self disclosure” was defined as sharing of secrets with a friend; “conflict” referred to arguments with a friend; and “exclusivity” was described as the selective association of friends (Ladd et al., 1996). Friendships were defined by the following criteria: (a) mutual “best friend” nominations and
(b) the children remained friends for two months prior to the interview.

School adjustment was assessed with multiple measures. Measures of school affect assessed children's loneliness in school and the influence of friends toward children's feelings about school. School perception measures included children's school liking and perceived social support received from classmates. School involvement was assessed by children's desire to avoid school and teacher ratings of children's classroom involvement. School performance was measured using the Metropolitan Readiness Test (MRT, Harcourt Brace Jovanovich, 1986; cited in Ladd et al., 1996).

The results suggested that friendship quality was a predictor of school adjustment. Gains in perceived peer support for both girls and boys were predicted by the friendship processes of validation and aid. Aid was also found to be a predictor of children's positive attitudes toward school. Also, children who perceived their friendships as exclusive reported lower levels of school performance. Boys who perceived conflict in their friendships had higher levels of school loneliness and school avoidance and lower levels of school liking (attitudes) and engagement. Ladd and colleagues (1996) concluded that the quality of children's friendship affects subsequent development and school adjustment.

**Summary and Critique**

Peers play an important role in social and cognitive development and contribute significantly to a child's ability to cope with his/her surrounding environment by offering support and the opportunity to develop further social skills. Both same-age and mixed-age peer interactions are important. Same-age peer relationships offer a relationship in which the children may be equal in
knowledge and control (Piaget, 1965), whereas mixed-age relationships offer opportunities to rehearse and/or observe leadership and nurturance. The literature review has demonstrated that friendship, social status, and peer acceptance can be differentiated from one another (Asher et al., 1996; Bukowski et al., 1996). Friendships offer the opportunity for young children to develop social skills that can not be gained through group interactions. Further, they may compensate for lower levels of overall acceptance by the larger group.

The majority of the research reviewed considered the impact of peer relations in the same-age classroom (Parker & Asher, 1993; Rizzo, 1988). Little is known about mixed-age peer relations, especially friendship. The literature does provide descriptive data regarding friendships in same-age classrooms (Gersham & Hayes, 1983; Parker & Asher, 1993; Rizzo, 1988). However this basic information for friendship patterns in the mixed-age classroom needs to be studied.

Among children making the transition to kindergarten, the literature supports the idea that peer relationships contribute to children’s success in this new environment. Children with higher levels of peer acceptance have better school adjustment (Ladd, 1990; Wentzel, 1991). Also, children with friends or who make and maintain friends within a new classroom have better school adjustment than children who do not have friends (Ladd 1990; Ladd & Price, 1987). Having a friend may help to ease the transition to school by providing a support network to deal with the new experiences. Thus, the literature on young children offers support to the hypothesis that good peer relationships and friendship enhance development and coping. However, research on middle school children suggests that what is more important is avoiding peer rejection.
due to aggression. Wentzel and Asher (1995) divided rejected children in their sample into two subgroups based on peer nominations for aggressive and submissive behavior and found that aggressive-rejected children had more academic difficulties than did submissive-rejected children. The academic profiles of submissive-rejected children did not deviate significantly from those of average children (Wentzel & Asher, 1995). These results suggest that popularity may not be a requirement for school adjustment.

Although the research offers support for the importance of peer relationships to adjustment in same-age classrooms, little is known regarding the mixed-age context. It is important to discover the basic friendship patterns of children in the mixed-age setting. It is unknown whether older children have friends of the same age or friendships are formed between children of various ages. Another interesting possibility concerns the social disadvantage of children who are young relative to their classmates. Lemerise (1997) demonstrated that children who were classified as relatively “young” in comparison to their classmates were at a social disadvantage in the area of peer acceptance. However, it is unknown whether the relatively “young” children also have difficulties forming friendships. Finally, the impact of peer acceptance and friendship on school adjustment in mixed-age settings is another question which needs to be addressed. The classroom structure in Kentucky’s ungraded primary offers a unique context to investigate these questions.

Statement of Purposes and Hypotheses

The classroom structure provided by recent school reform measures (e.g., Kentucky Department of Education, 1993) offers a context for studying friendship patterns in a mixed-age setting and their effects on school adjustment.
Therefore, the purpose of the present study will be to examine friendship patterns and school adjustment in mixed-age classrooms. Specifically, the aims will be to investigate the effects of peer acceptance and age relative to classmates on friendship patterns, as well as to consider the contribution made by friendship to children’s attitudes toward school and achievement.

The first hypothesis considers the relationship between group-based peer acceptance measures and friendship. It has been shown in same-age classrooms that children who are highly accepted by peers also have more friends (Parker & Asher, 1993). Therefore, it is hypothesized that ungraded primary children who are high in peer acceptance will have more reciprocated friendships than will children who are average-accepted or low-accepted.

A second hypothesis focuses on the relationship between peer acceptance and the relative age of children’s reciprocated friends. Research performed by Ladd (1983) has demonstrated that highly accepted children have older, more popular friends and low-accepted children have younger, less popular friends. Therefore, it is hypothesized that children with higher levels of peer acceptance will have a significantly higher number of reciprocated friendships with children who are older in relative age. It is also hypothesized that children with a low level of acceptance will have significantly more reciprocated friendships with children who are younger in relative age.

A third hypothesis concerns the relationship between relative age and the number of friends a child has within the classroom. It has been shown that children in mixed-age classrooms, who are older in relative age, are more highly accepted by peers than are children younger in relative age (Lemerise, 1997). Research also has shown that in same-age classrooms children with a higher
level of peer acceptance have more reciprocated friendships than do children with lower levels of peer acceptance (Parker & Asher, 1993). Based on these results, it is hypothesized that ungraded primary children who are young in relative age will have fewer reciprocated friendships than will children who are old in relative age.

The fourth hypothesis examines the relationship between the relative age of the child and the relative age of the child’s reciprocated friend(s). It has been shown in same-age classrooms that children who are highly accepted by peers also have more friends within the classroom (Parker & Asher, 1993) and that children in mixed-age classrooms who are older in relative age have a higher level of peer acceptance than do children young in relative age (Lemerise, 1997). Further, research on friendship selection has shown that similarity, particularly in age, is an important factor (Aboud & Mendelson, 1996). Therefore, it is hypothesized that within the mixed-age classroom children who are old in relative age will have more reciprocated friends who are also relatively old.

Hypotheses one through four will be tested on the large friendship sample (N=1255) as well as on the smaller school adjustment subsample (N=269) to assess whether the subsample is representative of the larger sample. Hypotheses five and six deal with the school adjustment subsample only.

The fifth hypothesis considers the relationship between school adjustment variables. Research using a large sample size has found a positive relationship between attitudes toward school and school achievement (Richards & Bear, 1987). Therefore, it is hypothesized that math, reading, and science attitudes will be positively related to math, reading, and science achievement scores, respectively.
A sixth hypothesis is based on a model of friendship and school
adjustment. Children's attitudes toward school have been shown to be positively
related to school achievement (Richards & Bear, 1987), and friendship has been
said to be an important precursor of both attitudes and achievement (Ladd,
1990). Therefore, it is hypothesized that friendship will be related to both
attitudes toward school and achievement. Specifically, children with at least one
reciprocated friend will have better school adjustment definable by higher
achievement scores and more positive attitudes toward school.
Chapter II

Method

Archival data from two separate studies served as the data base for the present study. A large sample of children participated in peer assessments during the 1992-93, 93-94, 94-95 and 95-96 academic years. During the 94-95 academic year, for a subset of this sample, measures of children's attitudes towards school and their school performance were available. Data from the subsample were matched by participants' names and birth dates and combined to create a data set containing peer assessment, school attitude, and school performance measures. The participants and procedures for each phase of the study are described separately.

Peer Assessment

Participants

Data from peer assessments were available for 1255 ungraded primary students. Participants were from five elementary schools drawn from two school districts in a small southern city. The schools serve a broad range of socioeconomic backgrounds. All participants attended mixed-age classrooms which consisted of a combination of two grade levels (grades 1 and 2, or 2 and 3). Permission forms were distributed to students, and only children returning permission forms participated in the peer assessment interviews. Participation
averaged 82.5% across classrooms (SD = 8.5%, range 64 - 100%). Participants rated all classmates.

Materials

Materials used to conduct the peer assessment interview varied according to the age of the youngest participants in the classroom. Children in ungraded primary classes that included first graders used a 5-point scale and printed name tags as stimuli. The 5-point scale measured how much children liked to play and work with other classmates: 1 = “not much”; 2 = “a little bit”; 3 = “O.K.”; 4 = “pretty good”; 5 = “best or most of all.” Classmates’ names and identification numbers were printed in block letters on name cards (1” by 4”). Children in ungraded primary classes composed of second and third graders were presented with a copy of the five-point scale, prepared answer sheets (see below), and typed class rosters containing classmates’ names and identification numbers. Opposite each classmate’s name on the roster was a Likert scale ranging from 1 to 5 which corresponded to the 5-point scale described above.

Procedure

Following meetings with both principals and teachers, permission forms were sent out to the parents of all children in the primary classrooms. When at least 60% of the children in a classroom returned permission forms, interviewing began. A combination of rating and nomination sociometric procedures, as described by Asher and Dodge (1986), was used. Beginning primary children were interviewed individually, and upper primary grade children received a group interview (e.g., Coie & Dodge, 1983). The procedures used for the individual and group interviews are outlined below.
Individual sociometric interview. Beginning primary grade children were escorted by trained experimenters to a location outside of the classroom (hallway, corner of the library, or a private room). Participants were briefed as to the general nature of the interview and told they could quit at any time. The reasons and need for confidentiality on the part of both the interviewer and participant were explained to participants both before and after the interview. Following a description of the interview, children were presented with the 5-point scale and instructed on its use. Children were asked to select their favorite and least favorite foods and identify where they would be located on the 5-point scale, to check for understanding. They also were asked to show where on the scale they would rate someone who was a "best friend," an "okay friend" and "not a friend." Printed name tags were presented one at a time, and children were asked whose name was written on the card. Participants were then asked how much they liked to play and work with that person according to the 5-point scale; their responses were recorded by the interviewer.

Following the rating procedure, the name tags were spread out on a table, and children were asked to nominate up to three classmates for each of the following: (a) "Children you like to play with or work with the most;" (b) "children who start fights, hit, push, kick, and say mean things to other children;" (c) "children who are shy and bashful; they don't talk or play with others much;" and (d) "children who are easy to get along with and are really easygoing." Children were asked to define shy, and the experimenter made sure that the child understood the definition. Participants indicated their responses by pointing to name tags and/or identifying children by name; the interviewer recorded the identification number corresponding to the child's name on a prepared answer
Finally, children were asked “what do you want to be when you grow up?” This question was meant as a distractor from the peer assessment task. Following the sociometric interview, children were debriefed as to the nature of the task and reminded of the need for confidentiality.

**Group sociometric interview.** Children in upper primary grades participated in group interviews (e.g., Coie & Dodge, 1983). The group format consisted of one trained group leader who was accompanied by two to four trained research assistants, depending on class size. The leader guided the class through the interview and instructed the participants on the use of the 5-point scale. While the leader was instructing the group, trained assistants circulated throughout the room to help any children who were experiencing difficulties with the interview and ensure children did not look at each other’s answers. The procedure for the administration of the group interview was similar to the procedure used in the individual interview.

Children who returned permission slips were given three sheets of paper: (a) the 5-point scale, (b) the class roster containing classmates’ names and identification numbers, and (c) a prepared answer sheet to record responses to the four nomination questions. Children who did not have parental permission were given activity sheets (word searches, crosswords, etc.) As in the individual interview, the need for confidentiality was stressed at the beginning and end of the sociometric interview. Children were asked either to place folders around their answer sheets or use cover sheets to ensure confidentiality.

First, children were briefed on the general nature of the interview. Then participants were trained by the leader to use the same 5-point scale described in the individual interview. Next, children were presented with a class roster and
asked to rate each classmate on how much they like to “play with” and “work with” him/her using the 5-point scale described above. Participants indicated their responses by circling a number from one to five located to the right of classmates’ names on the roster. After the ratings were completed, children were asked to select up to three classmates for each of the nomination questions described above. The final sheet had space to record responses for the nomination questions. In order to ensure confidentiality, the leader instructed the participants to record “secret code” numbers instead of classmates’ names. Participants indicated their responses by writing the code numbers found to the left of classmates’ names on the roster. As in the individual interview, at the end of the procedure, children were asked what they wanted to be when they grew up. Following the group sociometric interview, children were debriefed as to the general nature of the interview and reminded of the need for confidentiality.

Deriving Peer Assessment Variables

**Peer acceptance.** An overall measure of peer acceptance was derived by calculating the mean of all classmates’ ratings for each child and standardizing those values within classroom using z-scores. Peer acceptance level was determined as in Parker and Asher (1993). Children were classified as low-accepted if the standardized mean rating ≤ -1.0. Average-accepted children had a standardized mean rating > -1.0 and < 1.0. High peer acceptance was defined as a standardized mean rating > 1.0.

**Friendship variables.** Children’s reciprocated friendships were identified by responses to the nomination question, “who do you like to play or work with the most.” Two types of friendships were considered: unilateral and reciprocated. Unilateral friendships occur when the child nominates a peer but is
not nominated by that peer. Reciprocated friendships are when both children nominate each other, forming a dyad. Unilateral and reciprocated friendships were identified with the Sociometricks program developed by Parker and Seal (1994). This program identified nominations given and received by each child, placing them into a matrix. It also located the reciprocated friendships within each classroom and identified them. The program provided a printout containing the matrix, a list of reciprocated friendships, and a list of nomination information for each child. The number of reciprocated friendships was tallied for each child. Also, each child was classified as having (a) no friends or (b) one or more friends. The Sociometricks program also identified each child’s gender and relative age. The total number of cross-gender reciprocated friendships were tallied for each child as well as the following: (a) total number of reciprocated friendships with relatively “young” children, (b) total number of reciprocated friendships with children who were intermediate in age relative to classmates, and (c) total number of reciprocated friendships with relatively “old” children (see below for information on relative age groups). Only reciprocated friendships were considered in analyses. All references to friends or friendship refer to reciprocated relationships.

**Defining Age Relative to Classmates**

Children’s exact ages calculated in years, months, and days were standardized within classroom (z-score) to obtain a measure of age relative to classmates (relative age, Lemerise, 1997). From the relative age z-scores, three groups were defined: a) “young”; b) “intermediate”; and c) “old”. The “young” group had relative age z-scores ≤ -0.5 (large sample n = 440, and school adjustment subsample n = 102). Children in the “intermediate” group had
relative age $z$-scores $>-0.5$ and $<+0.5$ ($n = 413$, and $n = 83$). The “old” group had relative age $z$-scores $>+0.5$ ($n = 402$, and $n = 84$). Since relative age is defined in the same way as in previous work on mixed-age classes, the results from the present study can be compared with these studies (Lemerise, 1997; Lemerise, Harper, Caverly, & Howes, 1997).

**School Adjustment**

**Participants**

The school adjustment subsample included 269 ungraded primary students for whom there were data on some combination of attitudes toward school (math $n = 232$, reading $n = 233$ and science $n = 233$), achievement ($n = 267$) and peer assessments ($N = 269$). Complete data, which included peer assessments, attitudes toward school, and achievement test scores were available for 230 participants. Participants were drawn from one elementary school serving a broad range of socioeconomic backgrounds. Permission forms were distributed to students; only those students who returned permission forms participated in the study. Ninety-three percent of the students participated in the attitudes assessment; 98% participated in the achievement tests.

**Measures**

**Estes Attitude Scales (EAS).** The Elementary Form of the Estes Attitude Scales (Estes et al., 1981) was used. This measure consisted of three 14-item Likert-type scales, which yielded scores for attitudes toward mathematics, reading, and science. Items had positive (“Math is fun”) and negative (“Books are a bore”) wordings. These scales tend to be internally consistent (alpha reliabilities range from .77 to .88) and have been shown to be valid (Estes et al., 1981).
Comprehensive Test of Basic Skills (CTBS). The CTBS (1991) is designed to measure students' understanding and basic skills in specific school subjects. The three content areas measured were mathematics, reading, and science. The CTBS reading test includes comprehension, vocabulary, and writing. The CTBS mathematics test includes traditional computational problems (e.g., decimals, fraction, and integers), as well as concept and application tests focusing on problem solving. The content of the CTBS science test includes material found in traditional science classes (e.g., plant and animal biology and earth/space sciences).

The test-retest reliability coefficients reported in the CTBS Technical report (1991) for primary students are as follows: total reading reliability coefficients ranged from .91 to .92; total mathematics reliability coefficients ranged from .79 to .88; science reliability coefficients ranged from .74 to .85. The tests have been proven to be valid (CTBS, 1991).

Procedure

The Elementary Form of the Estes Attitude Scales (Estes et al., 1981) was administered by a group leader accompanied by trained assistants and given to participants by classroom. Participants included those children for whom parental permission was obtained. The group leader began by explaining the general nature of the scales and provided appropriate instructions. Participants were instructed to rate each sentence on a 3-point scale (A = "agree;" ? = "don't know;" and D = "disagree"). They were instructed to mark "A" if they agreed with the sentence and mark "D" if they disagreed with the sentence. If they did not know, they were instructed to mark the box containing the "?". These instructions were read to the participants and presented visually.
through the use of an overhead projector. Participants were asked to be as honest as possible and were informed that their responses would not affect their grades. Following the completion of the scales, participants were debriefed and reminded that the results of the test were confidential and would have no affect on their grades. Scoring of the Estes Attitude Scales was done according to instructions in the manual for administration and interpretation (Estes et al., 1981). Items worded positively were scored from 0 to 2 (0 = disagree; 1 = don’t know; 2 = agree). Items worded negatively were scored in reverse order.

Achievement was measured using both percentile ranks and the normal curve equivalent scores from the reading, mathematics, and science portions of the Comprehensive Test of Basic Skills (1991). In May 1995, teachers administered the tests according to directions in the administrator’s manual (CTBS, 1991). Percentile ranks and normal curve equivalent scores on this measure were collected from school records. A composite achievement score was created by summing across normal curve equivalent scores.
Chapter III

Results

General factorial analyses of variance (ANOVA) were used to assess the effect of level of peer acceptance, relative age, and gender on the total number of reciprocated friendships for both samples. Multivariate analyses of variance (MANOVA) were used to investigate hypothesized friendship patterns for both samples and the effect of relative age, level of peer acceptance, and gender on school adjustment variables for the subsample. Correlational analyses were used to test the hypothesized relationships among the school adjustment variables. Some analyses were performed to determine if the school adjustment subsample was representative of the large data set.

Descriptive Information

Children could have from zero to three reciprocated friendships. There were 838 children (384 boys, 454 girls) with at least one reciprocated friendship; 417 children (232 boys, 185 girls) had no friends. Among children with friends, 406 had one reciprocated friendship, 298 had two reciprocated friendships, and 134 had three reciprocated friendships. There were 91 (13%) cross gender reciprocated friendships out of 702 total friendships.

A series of chi-square tests of independence were performed in order to assess the relationships between gender and the following variables: peer acceptance level, relative age, and friendship status. A significant relationship
between gender and peer acceptance level was found, $\chi^2 (2, N = 1255) = 13.39, p < .01$. Z-tests were performed to determine which cells differed significantly from expected values; all probability values reported below are two-tailed unless otherwise noted. There were more low-accepted males, $z = -3.21, p < .01$, and fewer low-accepted girls than expected, $z = 3.21, p < .01$. Also, there were more high-accepted girls, $z = -1.73, p < .05$, one-tailed, and fewer high-accepted boys than expected, $z = 1.73, p < .05$, one-tailed. No significant relationship was found between gender and relative age, $\chi^2 (2, N = 1255) = 1.79, p < .409$, but there was a significant relationship between gender and friendship status, $\chi^2 (1, N = 1255) = 10.73, p < .001$. There were significantly more boys without friends than expected, $z = -2.23, p < .05$, and significantly fewer boys with at least one friend, $z = 1.75, p < .05$, one-tailed. Also, there were significantly fewer females without friends, $z = 2.37, p < .05$, and significantly more girls with at least one friend, $z = -2.37, p < .05$, than expected.

Additional chi-square analyses and follow-up z-tests examined the relationship of peer acceptance level and relative age with whether children had friends or not. A significant relationship between peer acceptance level and friendship status was found, $\chi^2 (2, N = 1255) = 163.75, p < .0001$. There were significantly more low-accepted children without a friend, $z = -10.28, p < .001$, and more high-accepted children had at least one friend, $z = -12.26, p < .001$. There was also a significant relationship between relative age and friendship status, $\chi^2 (2, N = 1255) = 25.93, p < .0001$. More children who were young in relative age had no friends, $z = -3.29, p < .01$, and more older children had at least one friend than expected, $z = -4.12, p < .001$. 
For the school adjustment subsample, 168 children (89 boys, 79 girls) had at least one reciprocated friendship; 101 children (62 boys, 39 girls) had no friends. Among children with friends, 75 had one reciprocated friend, 68 had two reciprocated friends, and 25 had three reciprocated friends. Out of the 168 friendships, 10 (5.95%) were cross-gender in their composition. Chi-square tests of independence revealed no significant relations between gender and friendship status, $\chi^2(1, N = 269) = 1.41, p < .24$; peer acceptance level, $\chi^2(1, N = 269) = .59, p < .74$; and relative age, $\chi^2(2, N = 269) = .77, p < .68$. Chi-square tests of independence and follow-up $z$-tests examined the relations of peer acceptance level and relative age with friendship status. A significant relationship between peer acceptance level and friendship status was found, $\chi^2(2, N = 269) = 44.12, p < .001$. More low-accepted children had no friends, $z = -5.62, p < .001$, and more high-accepted children had at least one friend than expected, $z = -7.48, p < .001$. A significant relationship between relative age and friendship status also was found, $\chi^2(2, N = 269) = 11.19, p < .01$; more older children had at least one friend than expected, $z = -3.17, p < .01$.

### Relative Age, Peer Acceptance, and Reciprocated Friendship

It was hypothesized that children who are high in peer acceptance have more reciprocated friendships than children who are average-accepted or low-accepted and that children who are young in relative age have significantly fewer reciprocated friendships than children who are intermediate or old in relative age. In order to test these hypotheses, a 3 (relative age; young, intermediate, old) x 3 (peer acceptance level; low, average, high) x 2 (gender; male, female) ANOVA with the number of reciprocated friendships as the dependent variable was
performed for each sample. Since there were no significant interactions or main
effects of gender for either sample, this variable was dropped, and a 3 (relative
age; young, intermediate, and old) x 3 (peer acceptance level; low, average, and
high) ANOVA with number of reciprocated friendships as the dependent variable
was performed for each sample.

Significant main effects of relative age, $F(2, 1246) = 5.63, p < .004$ and
peer acceptance level, $F(2, 1246) = 93.32, p < .001$, were found for the large
sample; there were no significant interactions. Tukey’s HSD analyses were
performed to determine mean differences. High-accepted children had
significantly more reciprocated friendships than did children who were average-
or low-accepted ($p < .05$). Children who were average-accepted had
significantly more reciprocated friends than did low-accepted children ($p < .05$).
Means and standard deviations are presented in Table 1. Also, for the large
sample, children who were old in relative age had significantly more reciprocated
friendships than did children intermediate or young in relative age ($p < .05$).
Children who were intermediate in relative age had significantly more
reciprocated friends than did relatively young children ($p < .05$). Means and
standard deviations are presented in Table 2.

For the school adjustment subsample, a significant main effect of peer
acceptance level was found, $F(2, 260) = 25.01, p < .001$. The follow-up analysis
revealed that children who were high-accepted had significantly more
reciprocated friends than did either average- or low-accepted children ($p < .05$),
and children who were average-accepted had significantly more reciprocated
friends than low-accepted children ($p < .05$). Means and standard deviations
are presented in Table 3.
Although there was no significant main effect of relative age in the school adjustment subsample, $F(2, 260) = .44, p < .644$, a follow up univariate ANOVA and Tukey’s HSD was performed. This analysis was performed in order to determine whether relative age had an effect on the total number of reciprocated friendships that was similar to the effect found in the larger sample. It could be that there was no significant main effect found in the factorial ANOVA because of the smaller $N$ in the subsample. A significant effect of relative age was found $F(2, 266) = 3.45, p < .05$. Children who were relatively older than their classmates had significantly more reciprocated friendships than did children who were young in relative age ($p < .05$). Means and standard deviations are presented in Table 4.

**Effects of Relative Age and Peer Acceptance on Relative Age of Friends**

Both peer acceptance and relative age were predicted to influence the relative age of children’s friends. It was hypothesized that high-accepted children have more reciprocated friends who are old in relative age, whereas low-accepted children have more reciprocated friends who are young in relative age. Also children who are old in relative age were predicted to have significantly more friends who are also old in relative age, while children who are young in relative age were predicted to have more relatively younger friends.

In order to test these hypotheses MANOVAs were performed for each sample. The total number of reciprocated friends who were young, intermediate, and old in relative age were the dependent variables and relative age, gender, and peer acceptance level were the independent variables. No significant interactions or main effects for gender were found in both samples, so this variable was dropped, and two 3 (relative age) x 3 (peer acceptance level)
MANOVAs were performed.

For the large sample, significant multivariate effects of peer acceptance level, $F(6, 2488) = 30.58, p < .001$, and relative age, $F(6, 2488) = 4.05, p < .001$ were found; there were no significant interactions. In order to assess the relationships further, $3 \times 3$ ANOVAs were performed individually for each dependent variable. This method was selected to assist in determining specific relationships between the independent variables and each dependent variable. While some statisticians recommend MANOVAs can be followed by calculation of univariate $F$'s for each dependent variable, such an approach does ignore the possible correlations among the dependent variables. Main effects of peer acceptance level were found for the number of relatively young friends, $F(2, 1246) = 8.47, p < .0001$; number of intermediate age friends, $F(2, 1246) = 24.75, p < .0001$; and number of relatively old friends, $F(2, 1246) = 42.93, p < .0001$. A main effect of relative age also was found for the number of relatively old friends, $F(2, 1246) = 9.81, p < .0001$. Tukey's HSD analyses were performed to determine mean differences.

High- and average-accepted children had more reciprocated friends who were relatively young than did children who were low-accepted ($p < .05$). High-accepted children had more reciprocated friends who were intermediate and old in relative age than did average- and low-accepted children, and average-accepted children had more intermediate and relatively old friends than did low-accepted children ($p < .05$). Means and standard deviations are presented in Table 5. It also was found that children who were old in relative age had significantly more reciprocated friends who were also old in relative age compared to children who were intermediate and young in relative age ($p < .05$),
and children intermediate in relative age had more friends who were old in relative age than did relatively young children \( (p < .05) \). Also children who were old and intermediate had more reciprocated friends who were intermediate in relative age than did relatively young children. Means and standard deviations are presented in Table 6.

For the school adjustment subsample, there was a significant multivariate effect of peer acceptance level, \( F(6, 216) = 10.02, p < .0001 \). There was no effect of relative age and no significant interactions. In order to assess further the relationship between peer acceptance level and the dependent variables, 3 (relative age) X 3 (peer acceptance level) ANOVAs were performed on each dependent variable. Main effects of peer acceptance level were found for the number of relatively young friends, \( F(2, 260) = 6.79, p < .001 \); number of intermediate age friends, \( F(2,260) = 4.53, p < .01 \); and number of relatively old friends, \( F(2,260) = 15.99, p < .0001 \). There were no main effects for relative age; there were no significant interactions. Tukey's HSD analyses were performed to determine mean differences. High- and average-accepted children had more reciprocated friends who were young and intermediate in relative age than did children who were low-accepted \( (p < .05) \). Also, high-accepted children had more friends who were old in relative age than did average- and low-accepted children, and average-accepted children had more relatively old friends than did low-accepted children \( (p < .05) \). Means and standard deviations are presented in Table 7.

These hypotheses were also tested using chi-square tests of independence to examine whether the distribution of friends of different relative ages departed from that expected by random pairing. A significant relationship
between peer acceptance level and relative age of friend(s) was found in the large sample, $\chi^2 (4, N = 1255) = 13.31, p < .01$. $Z$-tests were performed to determine which cells differed significantly from expected values; all probability values reported below are two-tailed unless otherwise noted. There were significantly more low-accepted children with friends who were young in relative age, $z = -2.06, p < .05$, and significantly fewer high-accepted children with relatively young friends, $z = 2.20, p < .05$ than expected. Also, there were significantly fewer low-accepted children with relatively old friends, $z = 1.67, p < .05$, one tailed, and more high-accepted children with relatively old friends, $z = -1.67, p < .05$, one tailed, than expected. The chi-square analysis performed to assess the relationship between peer acceptance level and relative age of friends in the school adjustment subsample approached significance, $\chi^2 (4, N = 269) = 8.23, p < .10$. $Z$-tests were performed in order to determine if the pattern of friendships was similar to that in the larger sample. It was found that there were significantly more average-accepted children with relatively young friends, $z = -1.89, p < .05$, one tailed, and fewer high-accepted children with relatively young friends, $z = 1.66, p < .05$, one tailed, than expected. Both average- and high-accepted children had more relatively old friends than expected, $z = 2.047, p < .05$, and $z = -1.885, p < .05$, one tailed, respectively.

Additional chi-square analyses and follow-up $z$-tests examined the relationship of relative age and relative age of friends in the larger sample. A significant relationship between relative age and the relative age of friends was found, $\chi^2 (4, N = 1255) = 28.79, p < .01$. There were significantly more relatively young children with friends who were also young in relative age, $z = -$...
3.57, \( p < .001 \), and fewer relatively old children with friends who were relatively young, \( z = 3.52, p < .001 \), than expected. Also, relatively young children had fewer relatively old friends, \( z = 2.75, p < .01 \), and relatively old children had more friends who were also relatively old, \( z = -2.92, p < .01 \), than expected.

**Relationships Between Attitudes and Achievement**

Math, reading, and science attitudes were predicted to be positively related to math, reading, and science achievement scores, respectively. Correlations between children's attitudes and achievement test scores in math, reading, and science were determined in order to test this relationship. The intercorrelations between attitudes toward math, reading, science, and their respective achievement scores were modest and ranged from .25 to .30 (\( p < .001 \)). These results are presented in Table 8.

The intercorrelations between math, reading, and science attitudes ranged from .34 to .37 (\( p < .001 \)). Given the modest intercorrelations between math, reading, and science attitudes, subsequent analyses treated these variables as separate dependent measures, rather than retaining the attitudes composite. However, the intercorrelations between math, reading, and science achievement scores ranged from .70 to .73 (\( p < .001 \)) so the achievement composite was retained. All correlations are presented in Table 8.

**Individual Differences in School Adjustment**

Hypothesis 6 stated that children with at least one reciprocated friend have better school adjustment, as measured by attitudes toward school and average achievement scores. In order to test this hypothesis a 2 (gender; male, female) \( \times \) 3 (relative age; young, intermediate, old) \( \times \) 2 (friendship status; no friends, at least one friend) between subjects MANOVA was performed with
reading, math, and science attitudes, and the achievement composite as dependent variables. A significant main effect was found for friendship status, $F(4, 215) = 5.48, p < .001$, but not gender or relative age. Also a significant 3 way interaction between gender, relative age, and friendship status was found, $F(8, 430) = 2.08, p < .05$.

A series of 3 (relative age) x 2 (friendship status) x 2 (gender) ANOVAs were performed individually on each of the dependent variables (math, reading, science attitudes and achievement). Main effects of friendship status were found for achievement, $F(1, 255) = 18.24, p < .0001$, and for math attitudes, $F(1, 220) = 8.53, p < .004$. Main effects of gender also were found for math attitudes, $F(1, 220) = 4.27, p < .05$. A significant interaction of gender and relative age, $F(2, 221) = 3.51, p < .05$ was found for science attitudes. However, when the interaction was tested with a test of simple effects, no significant effects were found. Main effects were tested with Tukey’s HSD analyses. Children who had at least one reciprocated friend had significantly higher average achievement scores and more positive attitudes toward math ($p < .05$) than did children with no reciprocated friendships. Means and standard deviations are presented in Table 9. Girls had more positive attitudes toward mathematics than did boys ($p < .05$). Means and standard deviations are presented in Table 10.
Chapter IV
Discussion

Previous research in same-age settings found significant relationships between group-based measures of peer relations and friendship and between friendship status and school adjustment. The present study extended this research by examining these relationships in a mixed-age setting. In general, the results of the study were similar to previous research on same-age classrooms (Parker & Asher, 1993; Rizzo, 1988). High-accepted children were shown to have more reciprocated friendships, and low-accepted children had fewer friendships than average- and high-accepted children. Although these findings are similar to results based on same-age classrooms, additional findings were specific to mixed-age classrooms. Children’s ages relative to classmates were associated with the total number of reciprocated friends. Specifically, children who were young in relative age had fewer reciprocated friendships than did children who were intermediate or old in relative age, and children who were relatively old had more reciprocated friendships than did children intermediate in relative age.

Another aspect of friendship which was mediated by peer acceptance level and relative age was the relative age of the child’s friend(s). Children who were high- and average-accepted had more friendships with younger children than low-accepted children. Also high-accepted children had more friends who
were intermediate and older in relative age than did average- and low-accepted children, and average-accepted children had more intermediate and relatively old friends than did low-accepted children. Children who were old and intermediate in relative age had more reciprocated friendships with intermediate children than did younger children. Relatively old children also had more friendships with relatively old children than did intermediate and relatively young children, and intermediate age children had more intermediate friends than did relatively young children. The effect of relative age on friendship was found for the large sample but not for the school adjustment subsample.

The present researcher also examined the relationship between friendship status, relative age, and school adjustment. In general, the results of the study were similar to previous research in same-age classrooms (Ladd, 1990; Richards & Bear, 1987; Wentzel, 1991). Children's attitudes toward school were shown to be positively related to their performance on achievement tests. In addition, friendship status was shown to be related to children's attitudes toward school and to composite achievement scores. Children who had at least one reciprocated friend in their class had better attitudes towards mathematics and higher composite achievement scores.

The following discussion outlines possible explanations for these findings while integrating them with past literature. Implications of the study are then addressed, followed by a discussion of possible limitations. Finally, directions for future research are discussed.

Peer Acceptance and Reciprocated Friendship in Mixed-Age Classrooms

The hypothesis that ungraded primary children who were high in peer acceptance would have more reciprocated friendships than would children who
are average- or low-accepted was supported by analyses on the large sample and the smaller school adjustment subsample. High-accepted children had more reciprocated friendships than either average- or low-accepted children, in both samples. Similar results have been found in research in same-age classrooms (Parker & Asher, 1993). Also, both the present study and Parker and Asher (1993) found that some low-accepted children did have friends and some high-accepted children did not. Although most high-accepted children had reciprocated friendships (90.27%, N = 1255, and 91.80%, n = 269) and fewer had no reciprocated friends (9.73%, N = 1255, and 8.20%, N = 269); 66.51% (N = 1255) and 73.9% (n = 269) of low-accepted children had friends. This finding suggests that a child may not be socially successful at the group level, but at the level of the dyad he/she can have some success which may serve to buffer the stress of lower acceptance by the group as a whole. Thus, aspects of friendship show similarity in the same-age and mixed-age settings.

It was hypothesized that peer acceptance level also would affect the relative ages of children’s friends. Specifically, children with higher levels of peer acceptance were predicted to have more reciprocated friends who were older in relative age, and children who were low-accepted would have more reciprocated friends who were younger in relative age. The analyses performed provided partial support for this hypothesis. High-accepted children did have more reciprocated friends who were old, intermediate, and young in relative age than did both average- and low-accepted children; average-accepted children had more relatively old and intermediate age friends than did low-accepted children. It also was demonstrated that high-accepted children had more friendships with older children and low-accepted children had more friendships with young
children than would be expected by random pairing. For the school adjustment subsample, results were comparable. These results suggest that not only did high-accepted children have more friends in all of the relative age categories but they also had more older friends than expected, as hypothesized.

This relationship can be explained in several ways. Children who are high-accepted may be more socially skilled, allowing them to form and maintain friendships more easily than less-accepted children. This explanation could be tested by placing low-accepted children into a social skills training program and evaluating whether the training results in improvements. Another possibility is that children who are high-accepted receive more nominations, giving them a greater probability that their friendship nominations will be reciprocated. An ANOVA examining the relationship between the number of nominations received and peer acceptance level revealed that peer acceptance level was associated with the number of nominations a child received, $F(2, 1252) = 263.88, p > .001$. Tukey’s HSD analyses were performed to determine mean differences. High-accepted children received more nominations ($M = 4.48, SD = 2.11$) than either average- ($M = 2.53, SD = 1.76$) and low-accepted ($M = .72, SD = .88$), and average-accepted received significantly more nominations than low-accepted children. For the school adjustment subsample, high-accepted children received more nominations ($M = 4.53, SD = 2.18$) than either average- ($M = 2.56, SD = 1.81$) or low-accepted ($M = .63, SD = .90$), and average-accepted children received significantly more nominations than low-accepted children.

Relative Age and Reciprocated Friendships in Mixed-Age Classrooms

Relative age was predicated to affect friendship in the mixed-age classroom. It was hypothesized that children who are young in relative age have
fewer reciprocated friendships than children who are old in relative age. Results based on the large sample indicated that relatively old children had more reciprocated friendships than did either intermediate age or relatively young children, and that children intermediate in relative age had more reciprocated friendships than did children young in relative age. A similar pattern was observed in the school adjustment subsample. Also, in the large sample, relatively young children were more likely to have no friends than expected by random pairing.

The child’s relative age also was predicted to affect the relative age of his/her friends. This hypothesis stated that within the mixed-age classroom, children who are old in relative age have more reciprocated friends who are also old in relative age. In other words, the children form friendships with children who are similar to them in relative age. This hypothesis was supported in the large sample, but not in the smaller school adjustment subsample. For the large sample it was found that relatively old children had more reciprocated friendships with children who were also relatively old than did children who were intermediate or young in relative age; intermediate age children had more relatively old friends than did relatively young children. It also was shown that children who were old and intermediate in relative age had more friendships with children who were intermediate in relative age than did relatively young children. Additional support for the hypothesis was revealed by chi-square analyses. Relatively old children were found to have more friendships with children who were also relatively old, and relatively young children had more friendships with relatively young children than expected by random pairing. Thus, results indicate that children’s ages relative to classmates influence both whether they have
friends and the relative age of their friends.

These findings extend research performed in the mixed-age classroom. Lemerise (1997) found that mixed-age classrooms appear to be associated with social advantages for relatively old children, whereas children who are young relative to their classmates seem to be at a social disadvantage, in terms of the group-based measures of peer acceptance. Relatively young children were less likely to be well liked by their peers as assessed by multiple, group-based peer-assessment measures, and they were seen as being shy and withdrawn. The present study suggests that the social disadvantage for relatively young children also exists at the dyadic level.

The present study indicates children are more likely to form friendships with children who are similar in age. This type of relationship offers more opportunities for reciprocity and equality, which are important features of friendship. Children belonging to the same relative age group may offer more support and understanding than children belonging to other relative age groups, and their interactions may be more cooperative. In contrast, mixed-age interaction is more asymmetrical with older children acting as leaders and teachers and younger children as followers and students. For these reasons, children may prefer to form friendships with peers who are equals and offer a reciprocal relationship.

School Adjustment Variables in a Mixed-Age Setting

As hypothesized, analyses revealed a positive, though modest, relationship between attitudes toward math, reading, and science, and their respective achievement scores. However, given the correlational nature of this relationship, these findings can be interpreted in different ways. Children who
have a positive attitude toward school may have higher achievement scores because they simply like and value school more. For example, a positive attitude may lead to better class attendance, study habits, and class participation, which increase school performance. An alternative explanation suggests that children who score high on achievement tests develop attitudes that parallel their performance; they like school because they do well in school. Since no causal inferences can be made concerning the relationship between attitudes and performance, it is important to consider these alternative explanations when interpreting the nature of this association. The significance of these findings becomes clearer when discussed in light of past research.

Consistent with the literature on school adjustment in same-age classrooms, a positive relationship was found between attitudes toward school and performance on achievement tests. While some studies reported higher correlations between these variables (e.g., r = .44 to .59; Richards & Bear, 1987), the correlations in the present study were modest (e.g., r = .21 to .30). The difference in the magnitude of this relationship could be due to the different samples used. For example, Richards and Bear (1987) studied fifth and sixth grade students attending same-age classrooms, whereas the present study used primary-age children (first, second, and third grades) attending mixed-age classrooms. It may be that during the early years of school children have not developed stable perceptions of specific school subjects. However, when children become older and are more accustomed to the school environment, they may develop attitudes that are more closely related to their academic achievement. Children who perform well on achievement tests could receive more positive feedback, leading them to develop better attitudes toward school.
Individual Differences in School Adjustment: Gender

Because previous research found gender differences in school adjustment (Schoefield, 1982), the present study also examined this relationship. Findings from the present study indicated that during the primary years (first, second, and third grade), females have better attitudes toward math, but not reading, and science. There were no gender differences on achievement test scores.

The results of the present study are not consistent with previous research which suggests that during the elementary years, females have higher academic performance than males in all areas except science (Sadker, Sadker, Fox, & Salata, 1993). Research reported with older children also finds gender differences, but they are not consistent with the gender differences found for the primary years. Sadker et al. (1993) reported that by middle school through college, females scored lower than males on achievement tests. Literature focusing on gender and mathematical performance demonstrates these differences. Schoefield (1982) studied 3 to 8 year olds and found that the relationship between math attitudes and math performance was stronger for males than females. One possible explanation for the difference between the present findings and past findings is the small size of the school adjustment subsample in the present study. Also, it is possible that the make-up of the ungraded primary classrooms may minimize the gender differences found in graded primary classrooms in past research. One way in which the gender differences may be minimized is by allowing relatively older girls to be aware of their success related to math in comparison to their relatively younger peers. This comparison is not available to females in same-age classrooms. Because
of this opportunity girls may develop and maintain a more positive attitude toward math in mixed-age classrooms than do their peers attending same-age classrooms.

**Individual Differences in School Adjustment: Friendship Status**

It was predicted that children who had at least one reciprocated friendship would have more positive attitudes toward math, reading, and science, as well as higher achievement scores. Analyses revealed that children with at least one friend had better attitudes toward mathematics and higher average achievement scores, but no differences were found for reading and science attitudes.

Having friends may influence school adjustment in a number of ways. It may be that friends offer social support which eases adjustment to school. Researchers have suggested that peer relationships provide children with an important source of social support (Hartup, 1983; Ladd, 1990; Ladd et al., 1996; Ladd & Price, 1987). Children who do not have at least one reciprocated friend may lack the support that children with friends experience. As a result, they do not have someone with similar experiences to turn to when difficulties occur in school or elsewhere. Not having at least one friend may lead to the development of negative attitudes towards school and poorer academic performance. Also having a friend might make children look forward to and value the school experience. There also are many skills learned in friendship that may facilitate learning in cooperative groups. Friendship, as suggested by Piaget (1965), is a relationship that is characterized as being equal in knowledge and control. In this manner, friendships allow children to engage more freely in conflicts with other children; and through the process of negotiation see positions from the other child’s point of view - thus contributing to a decline in egocentrism. By
generating cognitive growth, friendships may help to develop a child’s academic potential.

Summary and Integration of Findings

Research has suggested a relationship between children's friendship patterns and their level of peer acceptance (Parker & Asher, 1993; Rizzo, 1988). However, most of this research has been performed in same-age classrooms. The present study has found results similar to past studies and has extended this research by examining these relationships in the mixed-age (ungraded primary) classroom.

There also were findings that were specific to mixed-age classrooms. Compared to relatively old children, relatively young children had fewer reciprocated friendships on average and were more likely to have no friends. Moreover, children who were relatively old had more friendships with children who were also relatively old. Although there was no direct relationship between relative age and school adjustment, children’s age relative to peers may be indirectly related to school adjustment through friendship status since relatively younger children were more likely to be friendless. Given these findings, it was suggested that children who are young relative to their classmates may lack the necessary social skills to interact effectively with older peers, and/or they may have not yet established their presence in the classroom compared to the older, more competent peers. Together with results of Lemerise (1997), these findings suggest that children who are young relative to their classmates may be at a social disadvantage compared to their older classmates.

Consistent with the literature on school adjustment in same-age classrooms (Richards & Bear, 1987; Richards et al., 1984; Schoefield, 1982),
this study has found a positive relationship between attitudes toward school and performance. Gender was found to influence children's attitudes toward math, but not reading and science. There were no gender differences on achievement test scores. Compared to previous research (Sadker et al., 1993; Schoefield, 1982) there were fewer gender differences.

Studies of same-age classrooms have shown that peer acceptance, social status, and friendships are related to children's attitudes toward school and performance in school (Ladd, 1990; Ladd et al., 1996; Ladd & Price, 1987; Wentzel, 1991; Wentzel & Asher, 1995). Similar findings were shown in the present study using ungraded primary children. Children who were identified as having at least one reciprocated friend had more positive attitudes towards math and higher school performance compared to children with no friends. Together with results from previous studies, evidence indicates that positive school adjustment is facilitated by having at least one friend in the classroom. The present study extended this research by including ungraded primary children. The implications of these findings are discussed further below.

**Implications of Findings**

Overall, the present study has shown that aspects of children's friendships are related to their school adjustment. These findings will be discussed in light of their implications for research and application.

The present sample consisted of primary age children attending mixed-age classrooms. Because past research has been limited to same-age settings and has not addressed these relationships using primary-age children, this study has provided an important foundation for future research on ungraded primary to build upon. The present study also has used a large sample size (N = 1255) to
analyze friendship patterns in the mixed-age classroom. However, school adjustment data were available for much fewer children; school adjustment in ungraded primary needs to be studied in larger, more geographically diverse samples. Also replications of the present study should be performed in order to determine the generalizability of the results.

The present study has practical implications for both parents and educators. Given the relationship between attitudes and school performance, it would be beneficial for educators to design school curricula that promote children’s interests. This type of environment may stimulate positive attitudes about school by making the learning process more enjoyable. Also, encouraging freedom and creativity in students may be beneficial for improving attitudes toward school. For example, teachers could structure activities around children’s common experiences during their everyday lives.

Although subject to replication, the finding that younger children have fewer reciprocated friendships may provide important implications for educators. One implication has its basis in theoretical orientations. Hartup (1983) suggests that mixed-age interactions allow older children to develop leadership, nurturant, and prosocial behaviors and allow younger children to seek assistance and observe older and more skilled peer role models. Through observation and reinforcement, important social skills may be developed, assisting the child in social interactions. These relationships can make it possible for the child to develop his or her social skills and increase further the probability of future success in peer interactions. Based on this principle, it may be beneficial for younger children within mixed-age classrooms to be assigned to an older, more competent peer. This grouping would allow the older classmates to serve as a
“big brother/sister” and help the relatively young child adjust to the new classroom environment. The relatively old child could aid the younger in meeting classmates and in forming a friendship network for support. This program may be helpful in the development of social skills; however, it may not lead to the development of friendship between the relatively young and old children. As demonstrated by the results, friendships between children who are old and young in relative age did not occur frequently. This intervention offers a means for younger children to develop the appropriate social skills to form friendships with children who are also young in relative age.

The present study found that aspects of children’s friendships contribute to school adjustment in mixed-age classrooms; other studies have shown this same pattern in same-age classrooms (Ladd, 1990; Ladd & Price, 1987). Together, these studies may provide important implications for educators. If children’s friendships help in their adjustment to school, then children would benefit from having more friends in the classroom. Ladd (1990) has shown that attending classes with familiar peers helps to ease the transition into school. These findings suggest that classroom assignments should take friendship patterns into consideration by grouping children with familiar peers. Taking friendships into consideration when assigning children to classrooms is an intervention that can be easily carried out by schools. No outside assistance would be necessary. Also, teachers may help children develop friendships by assigning group activities and switching the composition of the groups periodically. While working in the groups, children will have a chance to interact with other peers. The diversity of this interaction may help children without friends to develop more competent social skills, helping them make friends.
Another possible intervention strategy would be to place children without friends in a social skills training program. These interventions may help children form friendships which serve as a buffer against the stresses of the new school experience.

In sum, there are a number of implications within the present study that serve to support theory, research, and practical applications. Because these findings are subject to replication, the generalizability of these results is cautioned. Therefore, when generalizing these findings to larger populations, it is important to discuss these results in light of the limitations of the study.

**Limitations**

Although the researchers attempted to control for potential confounds, there are certain aspects of the present study that may limit its generalizability. The following sections will discuss these limitations in light of three content areas: design and statistics, external validity, and measurement issues.

The design of the study was intended to identify friendship patterns within the mixed-age classroom and the contribution these friendships made to school adjustment. Multivariate, correlational, and factorial analyses were used to test these relationships. Although significant relationships among these variables were established, given the design and the analyses used, it was not possible to draw causal inferences based on the findings. Correlational or quasi-experimental designs, such as used in the present study, do not allow the independent variable to be systematically manipulated, as well as random assignment to take place. Consequently, any significant effects concerning the dependent measures cannot be readily attributed to the effects of the independent variables, because of the lack of manipulation; therefore, when
making inferences based on these findings, alternative hypotheses regarding the patterns of mixed-age friendships and their relationship to school adjustment were considered. Also, because there were no significant interactions found between the independent variables, the use of different analytical techniques could also be considered (e.g., regression).

A second limitation concerns the external validity of the present study, or the extent to which the results are generalizable to other populations of interest. The large data set (N = 1255) was composed of children from several different elementary schools drawn from two school districts located in a small city. A state-wide curriculum for ungraded primary was being implemented at each school's discretion (Kentucky Department of Education, 1993), but the extent to which components of the curriculum were implemented probably varied across classrooms. It is not known whether these results would generalize to other mixed-age classrooms in Kentucky or to programs using a different curriculum model. However, information regarding demographic criteria (e.g., ethnicity and socioeconomic status) were available for some of the schools, but not for all schools forming the sample pool. There appears to be a wide range of characteristics within the large sample which suggests that it is generalizable to other mixed-age classroom settings.

The smaller subsample used to assess the relationship between friendship status and school adjustment used subjects drawn from a single school located in a small city. Information regarding demographics was available for this particular school at the time of data collection. Also, this school represents only one of the many schools implementing, at their discretion, the statewide curriculum for ungraded primary classroom, as mentioned earlier.
(Kentucky Department of Education, 1993). The sample appeared to be fairly representative of the larger sample and did contain variability, based on the results obtained and discussed earlier. The similarity of the samples allows for the possible generalization of the results to other mixed-age settings.

Further limitations of the present study concern the measurement of children's attitudes toward school and achievement. These constructs were measured using the Estes Attitude Scales (Estes et al., 1981) and the comprehensive Tests of Basic Skills (CTBS, 1991). Although the reliability and validity of these measures have been established (CTBS, 1991; Estes et al., 1981; Richards & Bear, 1987), measures of internal consistency and validity were not obtained for the present study.

Another issue of measurement is the limitation placed on the number of friends a child could nominate. Children were limited to nominating 3 children for the category of "children you like to play with or work with the most". This method could have underestimated the number of reciprocated friendships a child actually had.

In addition to the above measurement issues, there also were missing data for a number of the participants for a number of reasons. First, permission was not available for all children, in both the large sample and the school adjustment subsample. Despite efforts on the part of the researchers, these children either failed to return consent forms or chose not to participate in the study. In addition, data also was missing because information was collected on separate days for the school adjustment subsample. Consequently, participants who were available during the first data collection were not available during the second time data was obtained. Because of missing data, the sample size for
school adjustment was limited.

In sum, limitations of the study concerning issues of design and statistics, external validity, and measurement should all be considered when generalizing the findings from the present study to a larger population. However, despite these limitations, results of this research have provided information about relationships between a child’s peer acceptance level and his/her friendships, as well as the relationship between friendship status and school adjustment. These general findings suggest important questions that future research should consider.

**Directions for Future Research**

Although this research has identified aspects of children’s friendships and their influence on school adjustment, the results of the present study provide a small piece of a much larger puzzle. Therefore, there are a number of questions that future researchers should address.

One question that remains unanswered concerns the influence of friendship quality. Findings in the present study suggest that children who are high-accepted, as well as children who are old in relative age, have more reciprocated friendships. However, the design of the study does not allow for the examination of other features of the friendship. For example, Parker and Asher (1993) found that friendship quality varied between low-accepted, average-accepted, and high-accepted children’s friendships with respect to validation and caring, help and guidance, conflict resolution, intimate exchange, and conflict and betrayal; and Ladd et al. (1995) found friendship quality influenced school adjustment. However, these studies were limited to children in same-age classrooms. Therefore, it would be important to know whether peer acceptance
level and/or relative age influence friendship quality in mixed-age classrooms and whether friendship quality has similar effects on school adjustment.

The present study also established that in the mixed-age classroom, relatively old children had more reciprocated friends who were also old in relative age, thus suggesting the possibility of children forming friendships with children with similar traits. This researcher did not examine the similarity of friends with regard to their peer acceptance. This relationship should be examined in future research.

Also with regard to the school adjustment subsample, the present study suggested that friendship status is related to aspects of children's school adjustment. However, other variables, such as I.Q., socioeconomic status, and school structure, should be taken into consideration to examine their influence on both friendship status and school adjustment in the mixed-age setting.

The present study examined friendship patterns and school adjustment in the mixed-age classrooms for only one school year. It would be interesting to perform a longitudinal study investigating friendship patterns and their contribution to school adjustment. Another influence that was not considered in the present study was the influence of the school's structure. For example, does the time spent in a mixed-age setting have different effects on peer relationships. Another possibility may be the impact that teachers have on children in the mixed-age setting. These variables should be taken into consideration for future research.

Conclusion

Children's friendships are believed to provide a context in which social, emotional and cognitive skills and competencies can be developed. Newcomb
and Bagwell (1996) argue that friendship relations provide unique contexts for development that are not duplicated in other relationships. Since most of the research related to friendship and school adjustment has been conducted in same-age classrooms, the purpose of the present study was to extend this research using a mixed-age primary sample.

In light of the limitations discussed earlier, the results of this study indicate that children’s friendships in the mixed-age setting are influenced by peer acceptance level and relative age. It also was found that attitudes toward and achievement in school are influenced by a child’s friendship status. Together with past literature, these findings have offered important implications for theory, research and applied areas, and have generated new questions that future research should address.
References


Table 1

Effect of Peer Acceptance Level on Number of Reciprocated Friendships
(N = 1255)

<table>
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<th>Peer Acceptance Level</th>
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<th>SD</th>
<th>n</th>
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<td>Average-Accepted</td>
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</tr>
<tr>
<td>Low-Accepted</td>
<td></td>
<td>0.43</td>
<td>.68</td>
<td>212</td>
</tr>
</tbody>
</table>

Note. All groups differ significantly from one another at p < .05.
Table 10

Effect of Relative Age on Number of Reciprocated Friendships (N = 1255)

<table>
<thead>
<tr>
<th>Relative Age</th>
<th>Number of Reciprocated Friendships</th>
<th>mean</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old</td>
<td></td>
<td>1.33*</td>
<td>0.99</td>
<td>402</td>
</tr>
<tr>
<td>Intermediate</td>
<td></td>
<td>1.13*</td>
<td>1.02</td>
<td>413</td>
</tr>
<tr>
<td>Young</td>
<td></td>
<td>0.91*</td>
<td>0.92</td>
<td>440</td>
</tr>
</tbody>
</table>

Note. Relative age refers to age, standardized within classroom (z-scores):
“young” = age z-score < -0.5; “intermediate” = age z-score > -0.05; and < +0.5;
“old” = age z-score > +0.5.

*All groups differ significantly from one another at p < .05.
### Table 3

**Effect of Peer Acceptance Level on Number of Reciprocated Friendships**

*(N = 269)*

<table>
<thead>
<tr>
<th>Peer Acceptance Level</th>
<th>Number of Reciprocated Friendships</th>
<th>Mean</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-Accepted</td>
<td></td>
<td>1.63</td>
<td>0.81</td>
<td>49</td>
</tr>
<tr>
<td>Average-Accepted</td>
<td></td>
<td>1.11</td>
<td>1.02</td>
<td>174</td>
</tr>
<tr>
<td>Low-Accepted</td>
<td></td>
<td>0.28</td>
<td>0.50</td>
<td>46</td>
</tr>
</tbody>
</table>

**Note.** All groups differ significantly from one another at $p < .05$. 
Table 4
Effect of Relative Age on Number of Reciprocated Friendships (N = 269)

<table>
<thead>
<tr>
<th>Relative Age</th>
<th>Number of Reciprocated Friendships</th>
<th>mean</th>
<th>SD</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Old</td>
<td></td>
<td>1.30*</td>
<td>0.89</td>
<td>84</td>
</tr>
<tr>
<td>Intermediate</td>
<td></td>
<td>0.98</td>
<td>1.04</td>
<td>83</td>
</tr>
<tr>
<td>Young</td>
<td></td>
<td>0.94*</td>
<td>1.03</td>
<td>102</td>
</tr>
</tbody>
</table>

Note: Relative age refers to age, standardized within classroom (z-scores):
"young" = age z-score ≤ -0.5; "intermediate" = age z-score > -.05; and < +0.5;
"old" = age z-score ≥ +0.5.

*Young group significantly differs from old group at p < .05.
Table 5

Effect of Peer Acceptance Level on Number of Friends at Different Relative Ages (N = 1255)

<table>
<thead>
<tr>
<th>Relative Age of Friend</th>
<th>Low-Accepted</th>
<th>Average-Accepted</th>
<th>High-Accepted</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Young</td>
<td>.179</td>
<td>.442</td>
<td>.335</td>
<td>.537</td>
</tr>
<tr>
<td>Intermediate</td>
<td>.127</td>
<td>.399</td>
<td>.379</td>
<td>.625</td>
</tr>
<tr>
<td>Old</td>
<td>.127</td>
<td>.348</td>
<td>.429</td>
<td>.663</td>
</tr>
</tbody>
</table>

Note. Relative age refers to age, standardized within classroom (z-scores): “young” = age z-score ≤ -0.5; “intermediate” = age z-score > -.05; and < +0.5; “old” = age z-scores ≥ +0.5.

* p < .05.
Table 6

Effect of Relative Age on Number of Friends at Different Relative Ages (N = 1255)

<table>
<thead>
<tr>
<th>Relative Age of Friends</th>
<th>Young</th>
<th>Intermediate</th>
<th>Old</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Young</td>
<td>.336</td>
<td>.557</td>
<td>.319</td>
</tr>
<tr>
<td>Intermediate</td>
<td>.279</td>
<td>.524</td>
<td>.395</td>
</tr>
<tr>
<td>Old</td>
<td>.286</td>
<td>.552</td>
<td>.421</td>
</tr>
</tbody>
</table>

Note. Relative age refers to age, standardized within classroom (z-scores): "young" = age z-score ≤ -0.5; "intermediate" = age z-score > -.05; and < +0.5; "old" = age z-score ≥ +0.5.

* p < .05.
Table 7

Effect of Peer Acceptance Level on Number of Friends at Different Relative Ages (N = 269)

<table>
<thead>
<tr>
<th>Peer Acceptance Level</th>
<th>Low-Accepted</th>
<th>Average-Accepted</th>
<th>High-Accepted</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Age of Friend</td>
<td>M  SD</td>
<td>M  SD</td>
<td>M  SD</td>
<td></td>
</tr>
<tr>
<td>Young</td>
<td>.065 .249</td>
<td>.414 .628</td>
<td>.408 .609</td>
<td>H, A &gt; L*</td>
</tr>
<tr>
<td>Intermediate</td>
<td>.087 .285</td>
<td>.333 .630</td>
<td>.408 .574</td>
<td>H, A &gt; L*</td>
</tr>
<tr>
<td>Old</td>
<td>.130 .341</td>
<td>.362 .580</td>
<td>.816 .782</td>
<td>H &gt; A*, L*; A &gt; L*</td>
</tr>
</tbody>
</table>

Note. Relative age refers to age, standardized within classroom (z-scores): “young” = age z-score ≤ -0.5; “intermediate” = age z-score > -.05; and < +0.5; “old” = age z-score ≥ +0.5.

* p < .05.
Table 8

Intercorrelations Between Attitude and Achievement Measures (N = 269)

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Math Attitude</td>
<td>1.00</td>
<td>0.34</td>
<td>0.37</td>
<td>0.75</td>
<td>0.28</td>
<td>0.27</td>
<td>0.26</td>
<td>0.30</td>
</tr>
<tr>
<td>2. Reading Attitude</td>
<td>1.00</td>
<td>0.36</td>
<td>0.77</td>
<td>0.21</td>
<td>0.30</td>
<td>0.26</td>
<td>0.28</td>
<td></td>
</tr>
<tr>
<td>3. Science Attitude</td>
<td>1.00</td>
<td>0.75</td>
<td>0.20</td>
<td>0.25</td>
<td>0.25</td>
<td>0.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Attitudes Composite</td>
<td>1.00</td>
<td>0.30</td>
<td>0.36</td>
<td>0.34</td>
<td>0.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Math Achievement</td>
<td>1.00</td>
<td>0.73</td>
<td>0.70</td>
<td>0.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Reading Achievement</td>
<td>1.00</td>
<td>0.73</td>
<td>0.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Science Achievement</td>
<td>1.00</td>
<td>0.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Achievement Composite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. All values significant at p < .001.
Table 9

 Effect of Friendship Status on Attitudes and Composite Achievement Scores (N = 230)

<table>
<thead>
<tr>
<th>Friendship Status</th>
<th>No Friends</th>
<th>At Least One Friend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variables</td>
<td>mean</td>
<td>SD</td>
</tr>
<tr>
<td>Math Attitude</td>
<td>16.4*</td>
<td>5.77</td>
</tr>
<tr>
<td>Reading Attitude</td>
<td>18.78</td>
<td>5.96</td>
</tr>
<tr>
<td>Science Attitude</td>
<td>19.17</td>
<td>5.59</td>
</tr>
<tr>
<td>Achievement Composite</td>
<td>38.70*</td>
<td>18.95</td>
</tr>
</tbody>
</table>

* means are significantly different at $p < .05$. 
Table 10

Effect of Gender on Attitudes and Composite Achievement Scores (N = 230)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mean</td>
<td>SD</td>
</tr>
<tr>
<td>Math Attitude</td>
<td></td>
<td>16.86*</td>
<td>5.37</td>
</tr>
<tr>
<td>Reading Attitude</td>
<td></td>
<td>18.65</td>
<td>6.55</td>
</tr>
<tr>
<td>Science Attitude</td>
<td></td>
<td>19.62</td>
<td>5.78</td>
</tr>
<tr>
<td>Achievement Score</td>
<td></td>
<td>43.98</td>
<td>21.99</td>
</tr>
</tbody>
</table>

* means are significantly different at p < .05.