

PEER RELATIONS AND ACADEMIC ACHIEVEMENT
IN EARLY ELEMENTARY SCHOOL

A Thesis

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ABSTRACT

The primary focus of the current study was to examine the relations between children's peer relationships and academic performance. This study involved a secondary analysis of data provided by children, parents, and teachers. In all, 585 families participated in the study. The sample is predominately middle class, generally representative of the geographical regions, and demographically diverse; 52% of the children were male, 19% were of a minority or ethnic background, and 26% lived with single parents. The current study analyzed data collected over a four year period beginning when the children were enrolled in kindergarten. Data were obtained using classroom-based sociometric interviews and teacher questionnaires. Three hypotheses were tested. The first hypothesis stated that there are concurrent associations between peer relationship experiences and academic performance. The second hypothesis stated that associations between peer relationships and academic performance also will be found when averaging across kindergarten through third grade. Analyses computed in this study indicate that better academic performance was associated with greater peer acceptance, more friends, and less rejection by peers in each grade and when averaging over the four-year period. The third hypothesis stated that there are positive associations between yearly changes in peer relationships and academic performance and a research question asked if the associations described in the hypotheses generalized to boys and girls. Results indicate that girls, but not boys, perform better academically in the years in which they have more friends and are not rejected by their classmates.

CHAPTER 1

INTRODUCTION

Researchers have long acknowledged that peer relationships form an important developmental context for children (Cillessen & Mayeux, 2004). Piaget (1932) suggested that children's relationships with peers were different, in both form and function, from their relationships with adults. Piaget argued that children interact more openly and spontaneously with their peers than with adults. Thus, it is possible to view peer relationships as unique and important with regards to general human development.

Research has established a significant link between peer relationships and children's academic performance, providing further support of the importance of these relationships. According to Vygotsky (1978), cognitive growth and development are a function, in large part, of interpersonal exchange. Current research supporting this theory reveals that children who are accepted by peers have been found to be more academically successful than children who are rejected or not highly accepted by their peers (DeRosier, Kupersmidt, & Patterson, 1994). Azmitia and Montgomery (1993) suggest that the quality of the relationship between peers who are interacting with each other may contribute to cognitive growth and development. For example, these researchers argue that friends may challenge and debate with each other without much hesitation. Given that friends are more sensitive to each others' needs and more supportive of each others' thoughts and well-being than non-friends, it may be that children are more likely to talk openly and challenge each others' thoughts and feelings in the company of friends than non-friends. These researchers suggest that if this is the case, one would expect children who have friends to interact with their peers in a way that is more likely to promote

cognitive growth compared to children who do not have friends. Combining the theories of Piaget and Vygotsky, and the empirical research supporting their ideas, it is reasonable to state that children form unique relationships with their peers and that positive collaboration within these relationships may lead to cognitive growth outcomes that may be manifest through academic performance in the classroom.

Statement of Problem

Although research exists linking peer relationships and academic performance (Wentzel & Watkins, 2002), few studies have examined these links longitudinally (Wentzel, 2003). Furthermore, no study has examined the yearly changes elementary school children experience in peer relationships and the impact that these changes have on academic performance. The current study will determine whether yearly changes in classroom peer relationships are associated with yearly changes in academic performance.

Hypothesis and Research Questions

The purpose of the current study is to further investigate the relations between children's peer relationships and academic performance. The first hypothesis for this study is that there are concurrent, positive associations between peer relationships and academic performance within a given year (i.e. kindergarten peer acceptance is expected to be positively linked to kindergarten academic performance), that occur in all years. The second hypothesis is that positive associations between peer relationships and academic performance are expected to be found when averaging the peer relationship variables and grade variable across all years (i.e. overall, children are expected to do better in school when they are more accepted by their peers). The third hypothesis is that

positive associations between yearly changes in peer relationships and academic performance are expected to occur when taking into account overall positive associations (i.e., children are expected to perform better academically in the years in which they have more positive peer relationships). Finally, an additional research question asks whether the associations described above generalize to boys and girls.

Assumptions

There are several assumptions that guide the proposed study:

1. It is assumed that children's peers can provide valuable information regarding their social relations; and that sociometric interviews are a reliable and valid means of obtaining this information.
2. It is assumed that teachers can provide valuable information regarding children's academic performance; and that teacher questionnaires are a reliable and valid means of obtaining this information.
3. It is assumed that (a) peer relationships have relevance for children's academic performance; however, it is assumed that (b) there is not a direct or causal link between peer relationships and academics performance. Other unspecified processes are assumed to account for the link. Finally, it is assumed that (c) understanding the nature of this link is the first step to understanding the processes.

Definitions

1. Peers- are children's classmates.
1. Peer acceptance- describes the level of liking or disliking a peer group expresses regarding an individual child (Bagwell, 2004).

2. Friendships- a voluntary, reciprocal relationship between individuals that is affirmed or recognized by both parties (Rubin, Bukowski, & Parker, 1998.)

3. Peer Rejection- sociometrically rejected children are those who are rarely nominated as someone's best friend and who are actively disliked by their peers (Wentzel & Asher, 1995).

4. Academic Performance- evaluation of students' expected performance on academic activities in the classroom.

CHAPTER 2

REVIEW OF LITERATURE

The following review first offers a conceptual and operational definition of friendship and peer rejection during the elementary school years. This section is followed by a review of empirical literature that provides evidence of how school performance is related to both peer rejection and friendship. The focus then shifts to a discussion of factors that may underlie the link between peer relationships and academic performance. The chapter concludes with a summary and an explanation of the unresolved issues regarding the association between peer relationships and academic performance in childhood.

Research has shown that most children who have positive peer relationships (i.e., have friends and/or are liked by classmates) also do well academically (Fantuzzo, Sekino, & Cohen, 2004; Ladd, Birch & Buhs, 1999; Ladd, Kochenderfer, and Coleman, 1996; Ladd & Price, 1987; Wentzel & Caldwell, 1997); and that children who are rejected by peers early on tend to encounter more academic difficulties in later years (Coie, 1984; Ladd, 1990; Wentzel and Caldwell, 1997). However, it remains unclear if children perform better academically during the years they have more positive peer experiences versus the years they have more negative peer experiences. The purpose of this study is to examine concurrent and longitudinal links between peer relationships and academic performance and to determine whether these associations are moderated by gender.

Friendship and Peer Rejection in Elementary School Years

Childhood peer experiences have been a source of empirical study for several decades (see Rubin, Bukowski, & Parker, 1998 for a review). For many young children,

entry into formal schooling provides the first opportunity to form attachments and relationships with other children their own age (Rubin et al., 1998). As children get older, their peer interactions increase even more. One reason for this is that children's elementary class size is often larger than that of preschool. Researchers have studied many features of children's peer relationships, but the current review will focus on friendships and group acceptance, two specific aspects of school-related peer experiences.

Friendships

Friendships are the form of dyadic relationships that have received the most attention from those studying children's peer encounters (Rubin et al., 1998) "Friendships represent strong affective ties between two individuals who view themselves as equals" (Bagwell, 2004, p.39). A dyadic friendship is held between two individuals and is considered to be particularly vulnerable because the loss of one member results in the termination of the relationship. In past research, friendships have been defined "as having an attraction to someone who is attracted in return" (Hartup & Stevens, 1997, p.355). Accordingly, voluntary reciprocity is widely agreed to be a defining feature of friendship (Rubin, et al., 1998). In other words, both parties must willingly participate and acknowledge the relationship in order for it to be considered a friendship. Reciprocity is the defining feature of friendship and distinguishes this relationship from any other type of interpersonal attraction.

Group Relationships

In contrast to friendships, a group is "a collection of interacting individuals who have some degree of reciprocal influence over one another (Rubin et al., 1998)." Groups

often form naturally based on the common interest or situations of the members. Certain groups, however, are formally established. One common example of this type of group is an elementary school class. As children advance through elementary school, they become increasingly more concerned with being accepted by their peer group (Rubin, et al., 1998). Popularity or acceptance by the peer group refers to the reports of liking or disliking the members of a group expressed toward an individual child. Peer acceptance and friendship are similar in that they both require a sense of liking from the members involved. However, whereas unilateral or one-sided liking is sufficient for peer acceptance, mutual liking is required for the relationship to be considered a friendship. Although being popular with, or accepted by peers, does not guarantee that children will have a mutual friend, children who are well-liked have more opportunities to establish a friendship than children who are disliked. Certain properties of groups have the potential to shape the experiences of individuals within the group. For example, children who are labeled (either positively or negatively) by a peer group may be reluctant to explore new identities. Additionally, the hierarchies established within a group may impact an individual's formation of new friendships. With this in mind, the group can be seen as having an influence on its individual members (Rubin, et al., 1998). Thus it is appropriate to consider both friendships and levels of peer acceptance as they relate to academic performance.

Assessing Peer Relations

Although friendships and peer acceptance differ conceptually, they are measured in similar ways. Sociometric interview methods are often used to examine both children's status within a peer group and their involvement in reciprocal friendships (Ladd, Price &

Hart, 1988). Collecting positive or negative sociometric nominations from classroom peers is a common method of obtaining these measures. This technique, for example, would involve asking children to specify three classmates they like most and three classmates they like least, or to name three children they consider their best friends and three children they would not want as a friend. Generally, children are asked to indicate their nominations by circling the names of peers on a class or grade-level roster. Pictures of classmates are often used during individual interviews with preschool and early elementary school children who do not yet read (Asher, 1990; Rubin, et al., 1998). Reciprocated nominations are usually considered to be the criteria for a friendship. For example, if a child were to nominate a peer as being one of their best friends and that peer nominated the child in return, then the two would be considered to have a mutual friendship.

Rating-scale measures are another approach to obtaining data regarding peer acceptance and friendships (Ladd, Price, & Hart 1988). This technique involves children rating classmates on a Likert-type scale based on how much they like to play with, or be involved in activities with, specific classmates. Often, children are shown a class or grade-level roster and asked to indicate how much they like each classmate. A 1-5 scale is typically used with older elementary school children and a 1-3 scale is used for preschool and lower elementary aged children. In order to illustrate the meaning of the points on the rating scale, cartoon drawings of faces ranging from smiling to frowning are frequently used. As with the sociometric peer nominations, photographs of classmates and individual interviews are often used with younger children (Asher, 1990; Rubin, et al., 1998). Peer ratings also have been used as a means for determining friendships, with

reciprocated high peer ratings indicating mutual friendships among peers (Rubin, et al., 1998). Typically, ratings and nominations are used to create two types of measures of group belonging (Rubin, et al., 1998). Peer acceptance is a continuous measure of liking based on liking nominations or ratings and peer rejection is a categorical classification based on low levels of liking or high levels of disliking.

Stability of Peer Relationships

Considering that many children begin each school year with a new teacher and a different set of classmates, it is important to consider the stability of early peer relationships. Understanding the general stability of peer relationships may provide insight into how friendship and peer acceptance influence school performance. Recent studies support the idea that early peer relationships are subject to change over time. For instance, evidence suggests that the experience of peer rejection can fluctuate over time (Coie & Dodge, 1983; Ladd, Kochenderfer, & Coleman, 1996; Ladd, Price & Hart, 1988). For example, a five-year longitudinal study conducted by Coie and Dodge (1983) tracked the year-to-year sociometric status of third and fifth graders. Findings show a low level of long-term stability in status for children who were rejected. Put another way, less than half of the rejected children in the sample remained rejected over a 5 year period. This finding indicates that children's peer status may experience a limited amount of stability and is likely to change over time.

Consistent with the theme of instability, children's behaviors seem to have a short-term impact on their level of peer acceptance. Ladd, Price and Hart (1988) conducted a study of the development of sociometric status in preschool children and found that that children who participated in more cooperative play at the beginning of the

school year not only engaged in more cooperative play at the end of the school year but also experienced a gain in peer acceptance. Interestingly, children who displayed argumentative and disagreeable behavior at the beginning of the school year, regardless of if the behavior persisted or not, experienced a decline in their social-preference score at mid-year. These findings indicate that children's behaviors contribute to their social standing among peers. As well as indicating that peer status can change over the course of a school year (and presumably from one year to the next), these early behaviors can be potentially costly or beneficial to a child's social standing and can have an impact on the reputation of the child demonstrating the behavior.

In a similar study regarding kindergartener's friendship features and school adjustment, Ladd, Kochenderfer, and Coleman (1996) concluded that perceived validation and conflict within a peer relationship were predictors of the relationship's longevity. Put another way, the longevity or stability of peer relationships is partially determined by the effort the participants make in maintaining the relationship. For example, a young child would likely strive to maintain a relationship that they feel is exclusive, reasonably fulfilling and free of frequent conflicts.

To summarize, children become increasingly more involved with peers as they enter and progress through elementary school. Two aspects of peer relationships, peer acceptance and friendship, were discussed. Peer acceptance refers to the feelings of liking that members of a group hold toward an individual. Friendship refers to a relationship that requires mutual or reciprocal liking between the individuals involved. Both peer acceptance and friendships are often measured using sociometric interviews, which include ratings and/or nominations. Research indicates that children's behaviors

contribute to their social standing among peers, and in fact, these behaviors influence the stability of relationships among peers. Additionally, children are more likely to maintain a friendship that they view as being rewarding and peaceful. However, peer relationships appear to be somewhat stable over short-term periods of time, but are subject to change over longer lengths of time. In particular, peer relationships may be vulnerable to the year-to-year transitions children experience as they move through school.

Thus far, the conceptual and operational definition peer acceptance/rejection and friendships have been provided and some of the main characteristics of these relationships in childhood have been highlighted. The following section will provide a review of literature connecting peer relationships to academic performance. First, evidence that peer relationships and school performance are related will be reviewed. Next, studies seeking to understand why and how peer relationships and school performance are related will be reviewed.

How Academic Performance Relates to Peer Rejection and Friendship

Although it is reasonable to argue that peer relationship experiences and academic performance may be associated, relatively few empirical studies have tested this association. In fact, only two research teams have reported on studies that focused extensively on this topic (Ladd, 1990; Ladd, Kochenderfer & Coleman, 1996.) Both research teams considered both dyadic and group peer relationship experiences, although the researchers focused on different age groups.

Young Children

Ladd and colleagues (1990; 1996) presented research on peer relationships and academic performance during the transition to kindergarten and the early elementary

school years. Attempting to understand the development and maintenance of peer relationships is important, particularly when considering that children who encounter peer rejection are at a greater risk of experiencing immediate and long-term negative consequences (Coie & Cillessen, 1993). Ladd (1990) tested the hypothesis that children who experience greater levels of peer rejection by the second month of kindergarten are more likely to display lower levels of academic performance. Data were collected from 125 kindergarten children and their teachers during the first two months of school and again at the end of the school year. Questionnaires were administered to teachers during both data collection sessions to measure children's school adjustment. Teachers also indicated children's level of academic and behavioral achievement. Additionally, academic performance was measured using a standardized test of academic readiness. Information regarding classroom friendships and peer status was collected from parents, children, and teachers. In order to identify friendships prior to kindergarten, a questionnaire was distributed to parents at the beginning of the school year. Parents were asked to indicate, using a class roster, what kind of relationship their child had with each classmate prior to school entrance (i.e., close friend, friend, acquaintance, unfamiliar peer). During the first two months of school, trained interviewers conducted individual friendship and sociometric interviews with the children. During these interviews, children viewed a pictorial class roster and nominated three children in their class they liked to play with and three children they did not like to play with. The children also indicated who their best friends in the class were.

Results indicate that later school adjustment is a reflection of early classroom peer relations. Developing new friendships throughout the kindergarten year was found to

contribute to a more positive attitude toward school and those students who maintained new friendships experienced greater gains in academic performance over the course of the kindergarten year. On the other hand, those children who experienced peer rejection developed more negative attitudes toward school, displayed greater levels of school avoidance, and demonstrated lower levels of academic performance over the course of the kindergarten year. Having access to close friendships at the start of the school year may be of some comfort to children in that those children who entered school with familiar peers initially displayed more positive attitudes toward school. However, prior friendships may not be enough to ensure the preservation of positive school attitudes. Prior friendships were found to be beneficial only to those children who maintained the friendship over the course of the year. This finding is important when considering that the maintenance of friendships was associated with gains in academic performance. These findings indicate that children's peer relationships are related not only to school adjustment during the early weeks of the school year but also to changes in adjustment as the year progresses. These results lend support to the argument that children's peer relationships prior to the start of school and the development of peer relationships during the school year have an effect on various school related issues and that these consequences can change over course of one school year. Gender differences were not tested so it is unclear if these results generalize to boys and girls.

In addition to peer rejection, Ladd, Kochenderfer, and Coleman (1996) provide evidence that highly exclusive friendships may have a negative impact on children's academic performance. These researchers studied 82 kindergarten children who were known to have a stable and reciprocated best friendship with a peer in their classroom.

The purpose of the study was to explore children's friendship processes, friendship satisfaction, and friendship stability. Academic progress was assessed using a standardized test of academic readiness. Gender differences regarding academic performance were not tested. Additionally, teachers were asked to rate children's academic progress during kindergarten and their readiness for first grade. Results indicate that friendships perceived by children to be highly exclusive were negatively correlated to children's academic progress. Exclusivity correlated negatively with the visual, language, and quantitative subscales of the measures. The researchers suggest that friendships which are highly exclusive are possibly more intense and possessive and therefore more likely to interfere or distract children from learning and academic activities in the classroom.

To summarize, Ladd (1990), and Ladd, Kochenderfer, and Coleman (1996), have studied peer relationships and academic performance during the transition to kindergarten and the early elementary school years. Results indicate that early classroom peer relations can influence later school adjustment. Developing and maintaining friendships throughout the kindergarten year was associated with greater gains in academic performance over the course to the year whereas peer rejection throughout the kindergarten year was associated with lower levels of academic performance over the course of the year. Additionally, highly exclusive peer friendships were also associated with lower levels of academic progress over the course of the kindergarten academic school year.

Adolescents

Wentzel and Caldwell (1997; Wentzel, 2003), conducted a similar line of research on peer relationships and academic performance, but focused on the middle school years. Given the limited research on younger children, it seemed reasonable to include research on adolescents in this review. Empirical research conducted by Wentzel and Caldwell (1997) provide support of the linkage between peer relationships and academic performance. In the second portion of their two-part, longitudinal study, these researchers followed 404 children from the beginning of sixth-grade to eighth-grade in order to explore peer relations and academic performance. An index of academic performance was based on end of the year GPAs (averaged english, science, social studies and math final grades). Final grades were obtained from school records at the end of the sixth-grade and eighth-grade academic years and were coded (0=failing grade, 1= D, 2=C, 3=B and 4=A). Reciprocated friendships were measured by obtaining best friend nominations. Children were given a list of same-sex classmates and were asked to circle their three best friends. Students' nominations were matched with peers' nominations in order to see which friendships were reciprocated. Peer acceptance was measured by using a rating system in which children indicated how much they liked to participate in school activities with particular peers by rating them on a 5-point scale (1=not at all, 5=very much). Results suggest that reciprocated friendships, peer acceptance and group membership are significantly related to academic performance. Findings indicate that there are longitudinal links between sixth-grade peer acceptance and sixth-grade academic performance. Findings also indicate that there are longitudinal links between peer acceptance and academic performance. Because of its significance both concurrently and

longitudinally, peer acceptance seems to be a stronger predictor of academic performance than reciprocated friendships.

Further evidence supporting the relation between sociometric status and school adjustment suggest that being a member of a particular status group predicts changes in academic adjustment over time. Wentzel (2003) further examined the relation between sociometric status and school adjustment concurrently and over time with a sample of 204 sixth-grade students. This sample was part of the previous study conducted by Wentzel and Caldwell (1997). Academic performance was assessed using three measures. First, learning effort was assessed by asking students how often they paid attention during each of their math, English, science and social studies classes. End of the year grades were obtained from school records at the end of sixth-grade and eighth-grade academic year and coded (0=failing grade, 4= A). In both sixth and eighth grades, girls had significantly higher grades than boys. Results indicate that compared to students of average sociometric status, children who were classified as being rejected in sixth-grade earned lower grades in sixth and eighth-grade. Although membership in the rejected sociometric status group predicted grades, it became non-significant when sixth-grade grades were entered into the equation. This indicates that there are cross-sectional and longitudinal links between sociometric status and grades but that rejection did not predict changes in children's academic performance.

In summary, the research Wentzel and Caldwell (1997; Wentzel, 2003), conducted on peer relations and academic performance during the middle school years provides supporting evidence that students' relationships with peers are potentially important for understanding their levels of scholastic achievement. Results indicate that

peer acceptance (for girls and boys) was associated with grades in both sixth and eighth-grade. Additionally, students who were rejected in sixth-grade were found maintain lower academic performance levels in eighth-grade when compared to students of average sociometric status.

Additional Evidence

Two additional research studies have reported data relevant to the linkage of peer relationships and academic performance. Although these studies had a different primary focus, their results support the hypothesis that yearly changes can influence children's academic performance and peer relationships.

Children's harmony with the classroom environment has been hypothesized as being a critical factor for academic success. Longitudinal research conducted by DiLalla, Marcus, and Wright-Phillips (2004) found that children who experienced a poor student-teacher relationship (i.e., a conflictive and dependent relationship with the teacher) were more likely to earn lower grades. Although this study revolves around the student-teacher relationship, it emphasizes the role that the classroom environment can have on a child's academic success. These findings suggest that the yearly changes children experiences as they are assigned to new classrooms (i.e. changes in classroom peers) may also result in changes in academic performance.

Evidence supports the notion that an intervention in academic situations may also lead to changes in peer acceptance. Coie and Krebiel (1984) found that providing academic skills training to fourth-grade children who were identified as having social and academic problems yielded academic as well as social benefits. Of the 40 socially-rejected and low-achieving students who participated in the study, 20 received academic

skills training. These 45 minute training sessions occurred twice a week and continued for seven months. The 20 children in the control group did not receive academic skills training and continued with the regular educational activities provided by their teachers. Results indicate that children participating in the academic training displayed greater changes in classroom behavior rather than in social behavior. These children spent more time actively working on assignments at their desks and less time displaying disruptive behaviors away from their desk. Although this intervention did not result in the children altering the nature of their social interactions, improvements in the children's social status were observed. Children receiving academic skills training were more likely to be viewed by their peers as equals after receiving training. The children went from being extremely rejected by their peers to average status among their peers. This finding may be a result of classroom peers holding less negative feelings toward the children as their disruptive behavior decreased.

Summary

To summarize, empirical evidence shows a link between peer relations and academic performance. Positive peer relationships such as reciprocated friendships, peer acceptance and group membership have been associated with higher levels of academic performance whereas negative peer relationships such as peer rejection and highly exclusive/possessive friendships have been associated with lower levels of academic performance and progress. Additionally, children's fit or match with the classroom environment (i.e., teacher/student relationship) has been associated with academic success lending support to the hypothesis that year-to-year changes in classroom environment may have an impact on children's social and academic situations. Finally,

evidence shows that improvements in academic performance may encourage more positive peer relationships among children who are rejected.

Links Between Peer Relationships and Academic Performances

Although empirical evidence indicates a link between peer relationships and academic performance, there are many possible explanations as to why they are related. The following section will review research that studied the mediating factors (i.e., school adjustment and classroom participation) between peer relationships and academic performance.

Ladd and Price (1987) examined peer relationships and school adjustment by studying the transition of 63 children from preschool to kindergarten. Although the majority of the children's preschool classmates did not accompany them to kindergarten, the presence of a familiar peer had a positive influence on a child's outlook toward school. Following the transition from preschool to kindergarten, children who were familiar with a high number of peers were likely to have a more positive attitude toward kindergarten than their classmates who did not have a number of familiar peers. These researchers concluded that children entering kindergarten with a larger number of familiar peers experienced less school-related anxiety. Results indicated that children with a larger number of familiar peers made fewer requests to see the school nurse, a behavior associated with anxiety, than their classmates with fewer familiar peers. The findings revealed in this study suggest that the presence of familiar peers may not only increase the likelihood of a more positive attitude toward school but may also decrease the likelihood that a child will experience classroom anxiety.

Additionally, the level of satisfaction children perceive within a peer relationship may also impact a child's adjustment and attitude toward school. Ladd, Kochenderfer and Coleman (1996) found that children expressed more satisfaction toward relationships that were perceived as highly validating and minimally conflictive. This study of kindergarteners revealed that children who perceived higher levels of conflict within peer relationships experienced greater difficulties adjusting to school. Within the sample, this phenomenon occurred more often for boys than girls. Boys who reported higher levels of conflict within their friendship displayed various difficulties adjusting to school. The boys who perceived higher levels of conflict within their peer relationships also expressed higher levels of school avoidance, and lower levels of classroom participation. As the year progressed, these boys expressed continued feelings of loneliness and a decreasing level of school liking.

Understanding the contributing factors of classroom-related anxiety and children's attitude toward school may also provide valuable insight into children's motivation to participate in classroom activities. Participation in classroom activities is of particular interest in light of research supporting classroom participation as a mediating factor in determining the influence of peer relationships on academic performance. In other words, children who experience more positive classroom peer relationships are more likely to participate in classroom activities and therefore achieve higher levels of school performance. Ladd, Birch, and Buhs (1999) hypothesized that kindergarten classroom participation (including cooperative and independent behaviors) would predict early academic performance. Their study of nearly 500 kindergarten students revealed that children's peer relationships predicted classroom participation and classroom

participation predicted academic performance. In this sample, the children who developed higher levels of supportive relationships, such as friendships or teacher/child relationships were more likely to participate in classroom activities and discussions. This higher level of participation was found to be associated with higher levels of academic performance.

The mediating nature of class participation between peer relationship and academic performance is further supported by recent research conducted by Fantuzzo, Sekino, and Cohen (2004). While studying nearly 1000 children enrolled in Head Start programs, these researchers found that children who participated in more interactive peer-play were more likely to participate in classroom activities without prompting from the teacher. Consistent with previous findings, results indicate that children who took part in more interactive play with peers also willingly took part in classroom activities and displayed higher academic skills than those who avoided participation in class activities. Academic performance for this sample of Head Start children was assessed by measuring the children's receptive vocabulary skills. Findings indicated that children who took part in more interactive peer-play showed higher levels of receptive vocabulary skills; whereas children who did not take part in interactive peer-play showed lower receptive vocabulary skills.

Summarizing thus far, children who are among familiar peers, and who develop higher levels of supportive friendships within their classroom, exhibit lower levels of school related anxiety, a more positive attitude toward school, and display a higher level of willingness to participate in classroom activities and discussions. Furthermore, higher levels of classroom participation, as well as higher levels of interactive peer-play, have

been linked to higher levels of academic performance. These findings provide evidence supporting the linkage between peer relationships and academic performance.

Overall Summary and Explanation of Unresolved Issues

Empirical evidence shows links between peer relationships and academic performance (Ladd, 1990; Ladd, Kochenderfer, & Coleman 1996). Peer relationships have been linked with academic performance concurrently and longitudinally (Wentzel, 2003; Wentzel & Caldwell, 1997). Research also suggests that peer relationships are modestly stable (Wentzel & Caldwell, 1997). However, studies that have explored the link of peer relationships have focused only on assessment of peer relationships conducted at one time. Finally, evidence exists that there are processes (i.e., school anxiety) that link peer relationships and academic performance (DiLalla, Marcus, & Write-Phillips, 2004; Coie & Krebiel, 1984).

Although a small amount of research linking peer relationships and academic performance is starting to accumulate (Ladd, 1990; Ladd, Kochenderfer, & Coleman, 1996; Wentzel, 2003; Wentzel & Caldwell, 1997), many important questions are left unanswered. First, further evidence is needed to determine if there are concurrent, positive associations between peer relationships and academic performance in a given school year. For example, will children who have positive peer relationships in first grade also demonstrate higher academic performance in first grade. Second, further evidence is needed to determine if there are concurrent, positive associations between peer relationships and academic performance over the course of many years. For example, will children who are more accepted over the course of elementary school perform better academically over the course of elementary school. Finally, it remains unclear whether

year-to-year changes in children's peer relationships will be linked to academic performance concurrently or over time. For example, it is possible that children's grades may suffer if they are in a class where they are rejected by their peers, but that their grades may improve the next year if they are in a class of peers who do not reject them.

The purpose of this investigation will be to further explore the relation between children's peer relationships and academic performance. The current study will test the hypothesis that there are concurrent, positive associations between peer relationships and academic performance in a given year. Additionally, the current study will test the hypothesis that there are positive associations between peer relationships and academic performance when averaging across all years. The final hypothesis the current study will address is that changes in peer relationships will be positively associated with yearly changes in academic performance. Analyses also will be conducted to determine whether the proposed associations generalize to boys and girls.

CHAPTER 3

METHOD

Participants

This study involved a secondary analysis of data provided by children and families participating in the ongoing Child Development Project, a multi-site, longitudinal study of the social, behavioral, and academic development of children (Dodge, Bates & Pettit, 1990). Participating families were recruited in two cohorts (1987 & 1988) from three sites: Nashville and Knoxville, TN, and Bloomington, IN. Parents were approached by research staff at kindergarten pre-registration and asked to participate in a longitudinal study of child development. Approximately 75% of the parents agreed to participate. Because 15% of children were not pre-registered for kindergarten, those families were recruited on the first day of kindergarten either by a phone call or a letter sent home.

In all, 585 families participated in the first year. The sample is generally representative of the geographical regions and is demographically diverse. At the time of the first assessment prior to kindergarten, 52% of the children were male, 19% were of a minority or ethnic background, and 26% lived with single parents. The Hollingshead (1975) Four-Factor Index of Social Status indicated a predominantly middle-class sample ($M=40.4$, $SD=14$, $range=8-66$). The current study analyzed data collected during the first 4 years of the project.

Procedures and Measures

Procedure

Following IRB approval at each of the 3 research sites, informed consent was obtained from parents on a yearly basis. This consent allowed researchers to contact the families and children as well as to obtain information from the children's teachers and schools. Information regarding peer acceptance and friendship was acquired through sociometric interviews conducted in the children's kindergarten through third-grade classrooms. Questionnaires, administered to the participant's classroom teachers, were used to obtain information regarding the participant's school performance during kindergarten through third-grade.

Peer Relationship Measures

Sociometric interviews were conducted during the winter of each school year. In order for a classroom to participate in these interviews, 70% of the parents of students in the class must have given consent. The procedure for the interviews generally followed that described by Coie, Dodge, and Coppotelli (1982). Interviews were conducted either on a one-on-one basis (children in kindergarten) or in the whole-class setting (for children in first through third-grade). Children were asked to indicate, through the use of a class roster or photographs, the three children in their class they liked most and the three children they liked least. Frequencies of liking (liked most) and disliking (liked least) were summed for each individual and standardized ($M=0$, $SD=1$) within the classrooms. Peer rejection classification was based on the standardized difference between the liking and disliking nomination scores (Coie, et al., 1982). Children were classified as rejected if they received a social preference score of less than -1, a

standardized liking score less than zero, and a standardized disliking score greater than zero. Children were classified as rejected or not rejected in kindergarten, first, second, and third grade. In addition to the yearly rejection measures, a composite rejection variable was computed as the mean of the yearly rejection variables. Following the nomination procedure, children were asked to rate each of their classmates a 5 point scale (3 point scale for children in kindergarten which was later converted to a 5-point scale by multiplying by 5/3) with higher ratings indicating a higher level of liking and lower ratings indicating higher levels of disliking. Yearly peer acceptance was computed as the average rating received from classmates in each of grades K – 3. A composite peer acceptance score was computed as the mean of the yearly scores. The rating data also were used to identify friendships. Children were considered mutual friends if they reciprocally nominated each other and if they gave each other the highest rating possible (i.e., “5” for older children, “3” for younger children). The number of reciprocated friendships was calculated for each school year and a composite friendships variable was calculated as the mean of the yearly scores.

Academic Performance

Teacher questionnaires were the primary method used for obtaining information about school performance. Beginning in kindergarten and continuing through fourth-grade, teachers filled out a questionnaire indicating children’s grades in reading, language, and math (0=failing, 1=below average, 2=average, 3= above average, 8=not applicable). These three teacher grades were averaged to provide a school grades score each year (alphas = .91, .88, .83, .83), for grades K – 3, respectively. Teacher-reported grades correlated with both final grades ($r_s = .44$ to $.71$, all $p_s < .001$) and composite

standardized tests scores ($r_s = .52$ to $.67$, all $p_s < .001$) obtained from official school records for grades 1 through 3. A large number of participants were not assigned final grades or administered standardized tests in kindergarten, therefore, teacher-reported grades were used.

CHAPTER 4

RESULTS

Four sets of analyses were conducted to test the proposed hypotheses and answer the research question. The first step in the analysis of the data was to compute descriptive statistics for all variables (peer rejection classification, nomination friendships, ratings friendships, and grades). Next, a correlation analysis was conducted. The correlations addressed the hypothesis that more positive peer relations will be associated with higher academic performance in each grade. For example, a positive and significant (i.e., $p < .05$) correlation between nomination friendships and grades would indicate children with friends make better grades. Within year correlations provided evidence of positive associations between peer relationships and academic performance. A second set of analyses was conducted to assess whether changes in peer relationships correspond to changes in academic performance. To assess the hypothesis that changes in peer relationships were linked to changes in academic performance, the peer relationship variables (friends, peer rejection, peer ratings) were tested as time-varying covariates of school performance controlling for the overall association between peer relationship and school performance (i.e., hypothesis 2). A significant and positive coefficient for the peer relationship variables would indicate that positive peer experiences in a given year were associated with higher than anticipated academic performance in that year for a given child. To address the research question, gender interactions were included in the final set of analyses to determine whether findings generalized to boys and girls.

Descriptive Statistics

Descriptive statistics (means and standard deviations) for gender and the peer acceptance, peer rejection, friends, and school grades variables for each grade are presented in Table 1. Results show that the average child received a mid-range rating from their peers in kindergarten and that rating increased slightly in the later grades. Seventeen percent of children were rejected in kindergarten and this percentage dropped slightly in the following years. On average, children had about one reciprocated friendship and this number was stable from year to year. From year to year, grades averaged 2.2 out of a possible 3 indicating that children's grades did not change much from year to year. Overall, the results show little change in peer relationships or grade mean levels from one year to the next.

Table 1. Means and Standard Deviations for all Variables

Variables	<u>n</u>	<u>M</u>	<u>SD</u>	<u>Range</u>
Gender	585	48% female		
Peer Acceptance				
K	566	3.02	.79	1.0 – 4.87
1	467	3.39	.86	1.25 – 5.0
2	483	3.58	.69	1.53 – 4.91
3	442	3.42	.69	1.0 – 4.78
Peer Rejected				
K	566	.17	.32	0 – 1
1	482	.09	.29	0 – 1
2	514	.10	.30	0 – 1
3	452	.12	.33	0 – 1
Friendships				
K	568	.82	.87	0 – 3
1	470	.99	.90	0 – 3
2 3	483	.74	.89	0 – 3
	452	1.01	.98	0 – 3
School Grades				
K	550	2.19	.70	0 – 3
1	535	2.17	.69	0 – 3
2	511	2.22	.62	0 – 3
3	499	2.20	.63	0 – 3

Peer Relationships and Academic Performance

Correlations were computed between all variables in order to address the hypothesis that there are concurrent, positive associations between peer relationships and academic performance (see Table 2). Analyses revealed that peer ratings, peer rejection, and friendships are reasonably stable ($r_s = .20$ to $.40$) from year to year. Grades appear to be more stable than the sociometric variables ($r_s = .40$ to $.60$.) Correlations also show that girls received higher peer ratings and higher grades than boys. Correlations revealed that children who received higher peer acceptance ratings were less rejected by their peers and had more friends than children who did not receive high peer acceptance ratings. Children who were rejected by their peers were found to have fewer friends than those not rejected. Finally, these analyses revealed that better grades were associated with higher peer acceptance, more friends, and less rejection by peers.

Year-to-Year Changes in Peer Relationships and Academic Performance

Descriptive statistics (see Table 1) revealed that on average there was little change in children's academic performance (grades) from year to year and correlations indicated that both peer relationship variables and grades are fairly stable from year to year. Preliminary tests confirmed that there were no time effects, thus time was not included in the final model. Nonetheless it is still possible that year-to-year fluctuations in peer relationships are linked with year-to-year fluctuations in grades. Analyses with time varying covariates were used to determine whether children received better grades during the years in which their peer experiences were better than average for that child (i.e., when children receive more positive peer ratings, have more friends, and are less

rejection by their peers), and worse grades when peer relationship experiences were worse than average.

Table 2: Correlations among Peer and Academic Variables

Variables	1.	2.	3.	4.	5.	6.	7.	8.
1. Gender								
Composite Peer Acceptance								
2. K	.07							
3. 1	.11*	.01						
4. 2	.10*	.24***	.31***					
5. 3	.21***	.26***	.35**	.59***				
Rejected								
6. K	-.10*	-.26***	-.28***	-.31***	-.30***			
7. 1	-.02	-.12*	-.41***	-.36***	-.31***	.33***		
8. 2	-.02	-.07	-.23***	-.48***	-.32***	.25***	.33***	
9. 3	-.08	-.17***	-.24***	-.37***	-.56***	.27***	.22**	.34***
Friends								
10. K	.04	.15***	.19***	.21***	.24***	-.23***	-.18***	.12**
11. 1	.03	.19***	.24***	.30***	.32***	-.17***	-.26***	.13**
12. 2	.05	.36***	.03	.36***	.30***	-.16***	-.08	-.25***
13. 3	.09	.04	.24***	.21***	.36***	-.09**	-.14**	-.17***
Grades								
14. 1	.09*	.16***	.27***	.18***	.22***	-.20***	-.15**	-.13**
15. 2	.11*	.15**	.26***	.25***	.31***	-.16***	-.21***	-.17***
16. 3	.10*	.15**	.27***	.28***	.29***	-.17***	-.15**	-.15**
17. 4	.14**	.13**	.26***	.25***	.31***	-.15**	-.16**	-.12**
Variables	9.	10.	11.	12.	13.	14.	15.	16.
Friends								
10. K	-.13**							
11. 1	-.23***	.13**						
12. 2	-.22***	.08	.20***					
13. 3	-.25***	.21***	.26***	.26***				
Grades								
14. K	-.21***	.22***	.22***	.14**	.16**			
15. 1	-.18***	.18***	.29***	.21***	.20***	.52***		
16. 2	-.18***	.22***	.21***	.18***	.19***	.46***	.52***	
17. 3	-.23***	.19***	.28***	.19***	.24***	.48***	.54***	.66***

* $p < .05$, ** $p < .01$, *** $p < .001$. ns = 368 to 452.

A series of 2-level hierarchical linear regression models were employed for this purpose. Analyses were conducted using HLM 5.04 (Raudenbush, Bryk, Cheong, &

Congdon, 2001). This analysis technique and software package is ideally suited for the multi-level data used to address hypotheses 2 and 3. Each peer relationship construct was tested in a separate model. The friendship model will be used as an example. Level 1 of the model included individuals at specific time points (e.g., kindergarten). Level 2 of the model included the individual child and averaged across time points. Level 2 predictors were time-invariant and included gender, composite friends, and the gender X composite friends interaction. Yearly friends scores and the gender X year friends interaction served as the Level 1 predictors and were time-varying. The composite friends effect indicates whether children who have more friends in early elementary school perform better academically in early elementary school. This effect indexes the average association over multiple years. When controlling for the composite friends variables the yearly friends effect indicates whether yearly changes in the number of friends were related to yearly changes in academic performance. The combined level 1 and level 2 models are written as Equation 1 where Y_{ij} is the academic performance score at time i for child j , $(\text{friends})_{ij}$ is the number of friends at time i for child j , $(\text{gender})_j$ is the gender of that child, $(\text{comp. friends})_j$ is the composite friends score for that child, and $(\text{gender X comp. friends})_j$ is the product (i.e., interaction term) of gender and composite friends for that child. γ_{00} is the regression intercept and γ_{01} , γ_{10} , γ_{11} , β_{2j} , and β_{3j} are regression coefficients for the friends main effect, the gender main effect, the friends X year interaction, the composite friends main effect, and the gender X composite friends interaction, respectively. μ_{0j} , μ_{1j} and r_{ij} are error terms.

$$Y_{ij} = \gamma_{00} + \gamma_{01} (\text{friends})_{ij} + \gamma_{10} (\text{gender})_j + \gamma_{11} (\text{friends})_{ij} * (\text{gender})_j + \beta_{2j} (\text{comp. friends})_j + \beta_{3j} (\text{gender X comp. friends})_j + \mu_{0j} + \mu_{1j} (\text{gender})_j + r_{ij}. \quad (1)$$

Analyses for peer ratings and rejection were identical with the peer ratings or rejection variables replacing the friends variables. In each analysis, the peer relationship variables were centered prior to the analysis to aid in the interpretation (Bryk & Raudenbush, 1992). Centering adjusts the mean, but not the distributions. The composite peer relationships variables were grand mean centered so that the sample mean was zero (i.e. the sample mean was subtracted from each person's score). Yearly peer relationship variables were group mean centered so that the mean of each individual's set of variables is zero (i.e., each individual's mean was subtracted from each of their scores).

Table 3. Multi-Level Analysis Summary for Peer Ratings

Predictor	Coefficient	SE	p
Gender (0=boys, 1=girls)	.08	.04	.056
Composite Peer Acceptance	.34	.04	<.001
Gender X Composite Acceptance	.02	.08	.85
Boys	.34	.06	<.001
Girls	.35	.06	<.001
Yearly Peer Rating	.03	.02	.086
Gender X Yearly Peer Rating	.03	.04	.40
Boys	.02	.03	.53
Girls	.05	.03	.072

The results of the analysis of peer ratings are shown in Table 3. The gender effect shows that girls receive marginally better grades than boys. The significant composite peer ratings effect indicates that children who receive higher peer ratings also receive higher grades and the non-significant gender X composite peer rating effect indicates that this does not differ for boys and girls. The yearly peer rating effect shows that children do

marginally better in the years they receive higher peer ratings. The gender x yearly peer rating effect is not significant, indicating that the yearly peer rating effect does not differ for boys and girls.

The results of the analysis of peer rejection are presented in Table 4. The significant gender effect indicates that girls receive better grades than boys. The significant composite rejection effect indicates that children who are rejected by their peers receive lower grades than children who are not rejected and the non-significant gender X composite rejection effect indicates that this does not differ for boys and girls. The yearly rejection effect indicates that children do marginally worse in the years they are rejected. However, the gender x yearly effect is significant indicating that girls receive significantly worse grades in the years they are rejected as compared to the years in which they are not rejected, but boys do not. Put another way, yearly changes in peer rejection were linked with yearly changes in grades for girls, but not for boys.

Table 4. Multi-Level Analysis Summary for Peer Rejection

Predictor	Coefficient	SE	p
Gender (0=boys, 1=girls)	.11	.04	.01
Composite Rejection	-.07	.10	<.001
Gender X Composite Rejection	-.24	.20	.24
Boys	-.60	.14	<.001
Girls	-.84	.15	<.001
Yearly Rejection	-.10	.05	.06
Gender X Yearly Rejection	-.24	.11	.02
Boys	-.01	.06	.97
Girls	-.24	.09	.005

The results of the analysis of friends are presented in Table 5. The significant gender effect indicates that girls receive better grades than boys. The significant composite friends effect indicates that children who have more friends receive higher grades than children who have fewer friends and the non-significant gender x composite

friends effect shows that this does not differ for boys and girls. The yearly friends effect shows that children receive marginally better grades during the years they more have friends and the gender x yearly friends effect shows that this differs marginally for boys and girls. This analysis indicates that girls, but not boys, receive significantly better grades during the years they have more friends compared to the years they have fewer friends.

Table 5. Multi-Level Analysis Summary for Friends

Predictor	Coefficient	SE	p
Gender (0=boys, 1=girls)	.11	.04	.01
Composite Friends	.32	.03	<.001
Gender X Composite Friends	.02	.07	.73
Boys	.31	.04	<.001
Girls	.33	.05	<.001
Yearly Friends	.03	.01	.054
Gender X Yearly Friends	.05	.03	.08
Boys	.01	.02	.94
Girls	.05	.02	.006

CHAPTER 5

DISCUSSION

The purpose of the current study was to further investigate the association between children's peer relationships and academic performance and to examine the effect that yearly changes in peer relationships have on academic performance. Three hypotheses were addressed. The first hypothesis stated that there are concurrent, positive associations between peer relationships and academic performance within a given year. Within year correlations computed in this study provide evidence of positive associations between peer relationships and academic performance. The second hypothesis stated that positive associations between peer relationships and academic performance will be found when averaging across all years. Results indicate that better academic performance (grades) was associated with higher peer acceptance, more friends, and less rejection by peers when averaging across all years. The third hypothesis stated that there are positive associations between yearly changes in peer relationships and academic performance. The research question asked if the associations described in the hypotheses generalized to boys and girls. The research question asked if the associations described in the hypothesis generalized to boys and girls. Results indicate that there are positive associations between yearly changes in peer relationships and academic performance for girls but not for boys.

Results from the current study provide further evidence that there is an association between peer relationships and academic performance. As anticipated, results indicate that more positive peer relationships are associated with higher grades during each year and with the average grades received in early elementary school. Averaging over all of the years, boys and girls alike were found to receive significantly higher grades when

they were more accepted and less rejected by their peers and when they had more friends. These findings are consistent with prior research. Ladd (1990) found that young children who maintained friendships over the course of a school year experienced greater gains in academic performance, and children who were rejected by peers over the course of the school year demonstrated lower levels of academic performance. Wentzel and Caldwell (1997) provide further evidence that students' relationships with peers are an important influence on their scholastic achievement. Furthermore, Wentzel and Caldwell (1997) found that peer acceptance was associated with students' grade point average both concurrently (over the 6th grade year) and over time (6th and 8th grade.) Specifically, results of the current study indicate that higher grades are associated with less peer rejected, more friends, and higher peer acceptance.

The current study also examined year-to-year changes in children's peer relationships and how these changes were associated with academic performance. Overall, it was found that changes in peer relationships do have an impact on academic performance. Specifically, children receive marginally better grades during the years they receive higher peer acceptance ratings. Findings from this study also indicate that girls, but not boys, receive significantly lower grades in school during the years they are rejected by their peers. Finally, girls, but not boys, were found to receive significantly better grades in school during the years they had more reciprocated friendships among their classroom peers. These findings provide evidence that gender may influence the way peer relationships impact academic performance and specifically the role gender plays in the relation between academic performance and yearly changes in peer relationships. The results indicate that girls' academic performance is more susceptible to

yearly changes in peer relationships. Girls, more than boys, were found to receive significantly worse grades in the years they were rejected.

One interpretation of these findings is that boys and girls interact differently with peers. Research suggests that, girls and boys may employ different techniques when resolving conflict. For example, Ladd, Kochenderfer, and Coleman (1996) suggest that boys attempt to resolve conflict using physical aggression, Crick, Bigbee, and Howes (1996), suggest that girls often attempt to resolve conflict by damaging or manipulating peers' relationships. The way boys and girls resolve conflict may explain why girls' academic performance is more susceptible to yearly changes in peer relationships. If girls tend to resolve conflict by damaging or manipulating peer relationships, it seems reasonable to argue that the manipulation would be an ongoing process that would fluctuate depending on specific circumstances. Keeping in mind that results from the current study suggest that children perform better academically when they experience positive peer relationships and perform worse academically when they experience negative peer relationships, it seems reasonable that due, in part, to their conflict resolution techniques, girls' peer relationships are likely to fluctuate yearly, and these fluctuations are reflected in their academic performance.

Another possible explanation of why yearly changes in peer relationships affect girls but not boys may be the way girls interact with their peers. Previous research suggests that girls are generally more fearful, manifest higher levels of anxiety and have lower levels of confidence than boys (see Block, 1983, for a review). It is possible that this heightened level of anxiety, fearfulness and low-self confidence may influence the way girls interact with one another. For instance, girls who experience low self-

confidence may have a harder time making friends. Girls' peer relationships may be more affected by yearly changes because this difficulty may re-occur each new school year, as classroom peers change.

Results from this study did not link academic performance to friendships or group acceptance exclusively. Rather, it was found that positive peer relationships in general were associated with higher academic performance. As proposed by Ladd and Price (1987), it is likely that the presence of a familiar peer may reduce children's level of school-related anxiety. If this is the case, the general acceptance and familiarity with peers may provide enough comfort for a child to absorb academic information more readily and would explain why general peer acceptance was associated with higher academic performance in this study. Moreover, prior research has linked classroom participation with higher levels of academic performance (Fantuzzo, Sekino, Cohen, 2004). Ladd, Birch, and Buhs (1999) found that kindergarten children who developed positive peer relationships were more likely to participate in classroom activities and discussion. Children who feel they are involved in positive peer relationships may not only feel more comfortable within the classroom learning environment, but may also feel more comfortable participating in classroom activities. Because higher classroom involvement has been linked with higher academic performance (Ladd, Birch, and Buhs, 1999), this may account for the association between positive peer relationships and higher academic performance.

Theorists such as Piaget (1932), Vygotsky (1978), and Azmitia and Montgomery (1993), suggest that not only are children's peer relationships unique, but that certain aspects of cognitive growth and development are associated with peer interactions. Piaget

(1932) argued that children interact with one another more openly than they would with adults and Vygotsky (1978) argued that cognitive development revolved largely around interpersonal exchange. More currently, Asmitia and Montgomery (1993) expand further on Piaget's suggestion by arguing that friends not only talk more openly with one another but challenge and debate with one another. More, these researchers argue that children are supportive of and sensitive toward each others' thoughts and feelings when they are among friends.

Consistent with previous research, this study found that more positive peer relationships were associated with higher levels of academic performance. Specifically, better grades were associated with less peer rejection, more peer acceptance and more friends. These findings lend support to the theories proposed by Piaget and Vygotsky. As Asmitia and Montgomery argue, one possible explanation as to why positive peer experiences and higher academic performance are associated is that friends may experience a certain level of comfort among one another. Feeling at ease among peers may enable children to support and challenge one another academically. Further evidence that peer relationships and cognitive development was found is this study. Specifically, girls' academic performance was found to fluctuate according to yearly changes in their peer relationships. This finding not only lends support to the above mentioned theories, but also raises questions for future research regarding the changes that can occur in peer relationships, how these changes can impact cognitive development, and how these changes may differ for boys and girls.

Limitations

The strengths of the study include the longitudinal design, relatively large sample size, and comprehensive peer relationship assessment. However, the study also has limitations. First, because this study was conducted in only 3 cities with families with children in public schools, the results might not be applicable to other geographic locations or school systems across the country. Second, it was assumed that there is not a direct or causal link between peer relationships and academic performance, however, aside from gender, this study did not explore any other possible links. Because one purpose of this study was to examine changes in peer relationships, a third limitation is that measures were only taken once a year. Measures taken once at the beginning of the year, again in the middle, and finally at the end may have provided more complete information regarding changes in peer relationships.

Implications for Future Research

This study provides supporting evidence of the relation between peer relationships and academic performance by focusing on early elementary school years (grades K-3). Because there are few studies focusing on peer relationships and academic performance, it is recommended that this topic be further examined. Additionally, results indicate that gender may play a role in the way academic performance and peer relationships are associated. However, few studies have looked at this association and it is suggested that future studies look further at the impact that yearly changes in peer relationships have on the academic performance of boys and girls separately. Girls were found to be more susceptible to yearly changes in peer relationships. Future studies could further examine

the dynamics of male and female peer relationships in order to learn more about the role gender plays in yearly changes that occur in peer relationships.

Implications for Practice

This study provides information that may be useful to school teachers, principals and school policy makers. The findings from this study suggest that girls are more susceptible to yearly changes in peer relationships and that girls perform better in school during the years they have friends in their classroom. Because this study revealed that changes in peer relationships, particularly for girls, can impact children's academic performance, policy makers, principals, and teachers may consider the negative impact that separating friends may have on children's academic performance. For example, teachers rearrange children as they assign them to classes for the following year. This may be done to reduce conduct issues (such as disruptive behaviors) displayed by some students. Teachers may also do this in an attempt to introduce children to a new set of classmates. While reassigning children new peer groups each year may help reduce some conduct issues and expose children to new classmates, findings from this study reveal that teachers may reconsider this practice. According to the results of this study, keeping children who have already established friendships together may result in higher academic achievement, particularly in girls.

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