The Impact of Preschool Quality on Peer Relationships at First Grade with Teacher- Child
Relationships as a Mediator

by

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Abstract

Previous research has documented associations between preschool quality and children's peer relationships as well as the effect of teacher-child relationship quality on peer relationships. Multiple regression models were fit to determine the effects that three domains of preschool quality - structural, process and physical - had on two domains of peer relationships - peer acceptance and friendship quality. Additionally, teacher-child relationship quality was examined as a possible mediator of this association. Finally, interaction terms were created to determine the moderating effect of child gender and teacher-child relationship quality on these associations. Group size, caregiver years of experience, and physical quality had significant effects on peer acceptance, and years of experience was mediated by teacher-child relationship quality. There were no associations between preschool quality and friendship quality. Importantly, teacher-child relationship quality significantly predicted peer acceptance but not friendship quality. Finally, neither teacher-child relationship quality nor child gender were significant moderators of these associations.

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Introduction

Currently, approximately sixty percent of children ages 3 to 5 are enrolled in some type of early education or childcare program (National KIDS COUNT Program, 2008); nearly one million four-year-olds attended a state-funded preschool in 2008 (National Institute for Early Education Research [NIEER], State of Preschool). These early experiences have a profound effect on children's social development in general and on their peer relationships in particular (Mashburn, 2008). For example, research indicates that high quality early education programs are associated with better social functioning, more positive peer relationships and greater language ability, as well as fewer problem behaviors (Mashburn, 2008; Peisner-Feinberg et al., 2001). Social outcomes during early childhood, including peer relationships, are especially imperative because they set the stage for skills and relationships later in life and are related to academic achievement throughout school (Howes, Hamilton, & Matheson, 1994; Wood, 2007). Relationships with others are also imperative to an individual's experience with emotions throughout life, suggesting that children's peer relationships in early childhood may be related to their later emotional experiences and relationships (Walden, Lemerise, & Smith, 1999). Healthy teacher-child relationships are also associated with healthy peer relationships in early childhood, as the relationship with the teacher serves as an example for the formation of other relationships. However, we know little about which specific aspects of the preschool experience, including structural, process or physical features, most powerfully predict aspects of children's peer relationships or how the teacher-child relationship is predicted by the quality domains (Garner & Waajid, 2008). Given that so many children are involved in settings that can either help or hurt their future, it is important to understand which aspects of these

experiences affect children's development. Thus, the purpose of the present study was to determine how structural, process and physical features of the preschool environment are associated with children's peer relationships, to investigate whether the quality of the teacher-child relationship mediates this association, and to determine if child gender moderates this association.

Peer relationships are imperative for healthy social, behavioral and cognitive development (Howes et al., 1994; Howes, 2000). Children learn how to be involved in a relationship and develop skills with their peers while in preschool (Howes et al., 1994; Walden, et al., 1999). Peer relationships in early childhood serve as a means to learn emotion regulation as well as conflict resolution skills (Walden et al., 1999). These first relationships are important because they set a standard for future relationships (Howes et al., 1994; Lindsey, 2002) and are related to children's social competency later in elementary school (Howes, 2000; Howes & Phillipsen, 1998). Children who are socially competent are better able to form relationships as adults compared to children who are not competent (Howes et al., 1994). Additionally, children who have more emotion regulation skills have higher quality relationships with their friends (Walden et al., 1999). Healthy relationships with peers in early childhood have also been found to predict increased academic achievement in elementary school (Ladd, 1990).

Research has been conducted on two positive aspects of peer relationships, peer acceptance and friendship quality, as well as two negative aspects, peer victimization and rejection (Sebanc, 2003; Walden et al., 1999). For the purpose of this research I have focused only on the positive domains, peer acceptance and friendship quality. Although the two indicators are similar in that they are related to positive aspects of peer relationships, they

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encompass different levels of the construct. Peer acceptance simply involves a child being liked by his or her peers (Lindsey, 2002; Hartup; 1989) while friendship quality requires affection as well as some form of intimacy (Howes, 1996; Sebanc, 2003). Based on the differences between the indicators of peer relationships, I examined them separately to determine whether various aspects of preschool quality uniquely affected each construct. Clearly peer relationships are important for later adjustment and success but we know little about how children's early preschool experiences might affect the relationships they form in early elementary school.

A large body of research suggests that high quality preschool environments are crucial for the development of social skills. Peisner-Feinberg and colleagues (2001) determined that children in high-quality environments showed better social skills, marked by increased sociability and decreased behavior problems, as compared to children in low-quality schools. Preschool quality can be divided into three broad categories: structural, process and physical quality. Structural quality involves features of the classroom or school that can be regulated such as group size, teacher-child ratios, and teachers experience and education (Hestenes, Cassidy, Shim, & Hegde, 2008; Mashburn, 2008).

Smaller group sizes enable children to have more one-on-one interactions with their teachers, which in turn is related to higher achievement scores (Blatchford, Moariarty, Edmonds, & Martin, 2002; Nye, Hedges, & Konstantopoulos, 1999). Furthermore, research indicates that the ratio of teachers to children is important for later social and academic outcomes such that smaller teacher-child ratios are associated with less grade retention and increased high school graduation (Pianta, La Paro, Payne, Cox, & Bradley, 2002). Group size and teacher-child ratios are both related to social outcomes for children. Classrooms with smaller

group sizes and larger teacher-child ratios are associated with fewer behavior problems, increased cooperative behaviors, less hostility, lower rates of delinquency, and fewer arrests (NIEER, Resources). Further, large group size is associated with time spent in child care and externalizing behaviors. That is, children who spent more time in child care exhibited more externalizing behaviors when in a large group as compared to a smaller one (McCartney et al., 2010). Although the evidence is mixed, there is some data to support the idea that teachers with higher levels of education better facilitate quality interactions with children in their classrooms, show them healthy emotional functioning and run a more effective classroom as compared to teachers with lower levels education (Howes, 2000; Mashburn et al., 2008). Additionally, research suggests that caregiver years of experience is correlated, albeit weakly, with positive child outcomes (Pianta et al., 2005).

Process quality involves the general climate of a classroom and features of the program that children experience directly, including the sensitivity of teachers and emotional support in a classroom (Hamre & Pianta, 2005; Hestenes et al., 2008; Mashburn, 2008). Classrooms considered emotionally supportive include those with teachers who model healthy social interactions while guiding children in developing their own social skills. Emotionally supportive classrooms typically produce children with fewer behavioral problems and more advanced social skills as compared to classrooms that are not emotionally supportive (Bub, 2009).

Physical quality includes the quality of play space available both indoors and out, classroom layout, developmentally appropriate toys and equipment, and accessibility to materials. Research by Read, Sugawara and Brandt (1999) indicates that physical characteristics such as wall color and ceiling height affect children's social behavior. Additionally, physical

quality has been found to be positively related to academic achievement among low SES children (Mashburn, 2008). Despite all we know about the effects of preschool quality on individual child outcomes, it is not clear how these domains of preschool quality predict peer acceptance and friendship quality or whether the same features matter for each peer construct.

Research also suggests that early teacher-child relationships are related to the types of relationships children have with peers and adults later on as these relationships serve as models for situations children may encounter throughout life (Howes et al., 1994; Rudasill, Rimm-Kaufman, Justice, & Pence 2006). Children learn communication skills through relationships with their teachers that transform into skills they can use with their peers. Children involved in high-quality teacher-child relationships, marked by high levels of closeness and low levels of conflict, possess increased sensitivity to others' emotions. They also display more prosocial behaviors over time, show more positive social interactions with peers as they grow older, and have higher work ethics and grades than those with unhealthy teacher-child relationships (Garner & Waajid, 2008; Rudasill et al., 2006). Although we know that positive teacher-child relationships are associated with more positive child outcomes across a variety of domains, it is not entirely clear whether preschool quality is a necessary precursor to positive teacher-child relationships or whether these relationships can develop in the absence of a high-quality setting. Thus, I also examined the direct effect that preschool quality has on the teacher-child relationship and the indirect effect on children's peer relationships.

The present study aimed to determine the direct effects of structural, process and physical quality on children's peer acceptance and friendship quality at first grade. Additionally,

I examined the possibility that teacher-child relationships mediate the association between preschool quality and subsequent peer relationships. Finally, I investigated whether these associations differed by child gender. In the remainder of this paper, I 1) introduce the relevant literature on peer acceptance and friendship quality, preschool quality, and teacher-child relationships; 2) establish the sample population; 3) describe the measures; 4) outline an analysis plan; 5) execute the analyses and report the results; 6) discuss possible explanations for the findings; and 7) examine limitations of the study and discuss future directions.

Literature Review

Peer Relationships

Peer relationships during early childhood are vital for positive social, behavioral and cognitive development. Young children typically form relationships with peers of the same sex and age; as they get older they may form both same-sex and mixed-sex peer groups (Walden et al., 1999). Peer relationships in early childhood are related to outcomes later in life including improved social functioning and academic achievement (Howes, 2000; Ladd, 1990). The early school years are often the first time children are around others their age for long periods of time. Children tend to "practice" their relationships beginning with their peers in early childhood. They develop patterns of interactions, whether positive or negative, that mould their future skills and relationships with others (Howes et al., 1994; Walden et al., 1999). Children also learn to regulate their emotions through relationships with their peers during this period. More specifically, they have more emotionally involved interactions with friends as compared with non-friends. Therefore children with friends have more opportunities to practice emotion regulation skills than do children with no friends (Walden et al., 1999). Relationships with peers also serve as a means for children to develop conflict resolution skills. As children develop relationships with others their age, they begin to experience differences among one another and must learn the skills to resolve them (Walden et al., 1999). Empirical research has been conducted on both the positive aspects of peer relationships, including friendship and peer acceptance, as well as the negative aspects, including peer victimization and rejection. The current study focused on positive aspects of peer relationships.

Peer acceptance. Peer acceptance involves a child being well liked by his/her peers (Hartup, 1989; Lindsey, 2002). A child may be accepted by many peers but lack close friendships with them. It is easier for a child to be accepted by peers than to develop friendships because peer acceptance involves only moderate social interactions as compared to friendship, which is far more emotionally involved (Walden et al., 1999). However, even acceptance can prove to be a challenging task for some children. For example, children must display behavior patterns similar to their peers to be accepted. Those who vary greatly from their peers' social behaviors are at greater risk of being rejected by their peers. Additionally, children who are highly aggressive are unlikely to be accepted and very unlikely to develop friendships (Hartup, 1989; Lindsey, 2002).

Friendship quality. Friendship involves a close dyadic relationship between peers (Peisner-Feinberg et al., 2001). Quality friendships are marked by mutual caring and validation (supporting and showing interest in the others' activities), companionship and recreation (spending time together outside of school), help and guidance (assisting one another), intimate exchange (feeling comfortable enough to share secrets), and conflict resolution skills (ability to solve disagreements together) (Parker & Asher, 1993). Research also suggests that friendships among children in early childhood involve some form of intimacy and companionship (Sebanc, 2003). Hartup (1992) classified friendship as having four functions: 1) as a context for learning, 2) as a model for relationship skills for the future, 3) as a means for learning about selves, and 4) as an emotional and cognitive resource upon which children can draw (Sebanc, 2003). For example, Shulman (1993) found that pairs of friends were better able to work and solve problems together as compared to children who were not friends. This coincides with Hartup's

point that friendship is a context for learning, as children solve problems better when working with friends (Hartup, 1989). Friendship in early childhood occurs in the majority of children. Research by Walden et al. (1999) found that nearly three-fourths of children have at least one reciprocated friend (a child who considers the other to be their friend as well). Finally, both peers and teachers view children with friends as more competent than children without friends (Lindsey, 2002).

Children's first relationships with their peers are vastly important because they set the stage for future peer relationships (Howes et al., 1994; Lindsey, 2002; Sebanc, 2003). Children in unhealthy peer relationships in early childhood have no comparison later in life for what a healthy relationship looks like. Therefore, they are likely to develop additional bad patterns for relationships formed later in school. Additionally, the relationships children form in early childhood are related to their social competence later in elementary school (Howes, 2000, Howes & Phillipsen, 1998). Children learn to regulate their emotions and act appropriately in social situations through their friendships (Parker & Gottman, 1989; Sebanc, 2003; Walden et al., 1999). They feel more secure testing out how to regulate emotions in the context of a close friendship as compared to with a stranger. Children who do not have healthy peer relationships in early childhood are not provided the same opportunity to learn affect regulation skills as are their peers who do have healthy peer relationships (Parker & Gottman, 1989).

Positive peer relationships in early childhood may also serve many other purposes. For example, research suggests that relationships among children may foster language skills (Wood, 2007). When children are engaged in relationships with others they are introduced to new words and ideas on a daily basis. Additionally, peer relationships are associated with the

transition from preschool to kindergarten (Sebanc, 2003). This may be because some children attend the same kindergarten as their friends and are able to maintain that friendship, making them feel more comfortable in kindergarten and helping them adjust to the new environment. Alternatively, children may use the relationship-building skills they learned in early childhood to develop new relationships in kindergarten. Ladd (1990) found that children who formed friendships with new children in kindergarten improved in school performance over the course of the year. This may be because the friendships the children developed served as resources for them to access and learn with.

Predictors of peer relationships. A variety of factors may influence the formation of peer relationships. For example, children who are socially competent (i.e. social and emotional skills children need in order to adapt to their environment) form positive relationships with peers and adults more easily than do children who are not socially competent (Howes et al., 1994). Furthermore, emotion regulation is a predictor of children's later friendships. Children that have more highly developed emotion regulation skills have higher-quality relationships with their friends later on (Walden et al., 1999). This is likely because children who are able to control their emotions appear more stable and reliable as friends and therefore are accepted and develop friendships more often than children who do not posses emotion regulation skills. Children's attachment status may also predict the formation of peer relationships. More specifically, children who are securely attached to their caregiver are more likely to develop secure attachments with their peers than children who are insecurely attached to caregivers (Bowlby, 1969). Young children may form internal working models of relationships based upon their early attachment relationships that they then apply to other relationships in their lives.

This may be because children who have secure attachments have similar expectations for their peer relationships. Alternatively, children who are insecurely attached may come to expect rejection from their peers and fail to form close relationships with them (Bowlby, 1969). Secure attachment has been found to be a predictor of more socially competent behavior among peers and thus may indirectly impact peer relationships through the child's own social behavior (Howes et al., 1994).

The type of instruction within a classroom may also be related to the development of peer relationships. Teacher-directed versus child-directed classrooms also affect the development of peer relationships. The majority of peer interactions occur when there is little involvement from the teacher, such as center time or outside time, thereby providing children with more opportunities to build relationships with one another. In contrast, the least amount of interaction among peers occurs during a teacher-led activity such as group work, thereby limiting the number of opportunities children have to build peer relationships (Innocenti et al., 1986).

Demographic differences in peer relationships. Researchers have noted several demographic characteristics that have an impact on the development of peer relationships among children in early school years. Children typically discriminate their friendship based on the sex of their peer, choosing friends who are the same sex as themselves more often than peers of the opposite sex (Walden et al., 1999). Children are able to better relate to and identify with others of their same sex. Children also tend to choose friends based on age. They generally develop relationships with peers who are close to their age (Walden et al., 1999). This may be because the majority of the time children have to interact with peers is during early

childhood when they are in classes with like-aged children. However, research suggests that three year-olds show a desire for developing friendships with older four year-olds. These bids for friendship are not usually reciprocated by the four year-old children (Guralnick & Groom, 1988).

Measurement of peer relationships. Mothers and/or teachers typically complete questionnaires regarding their child's playmates including questions about who their best friends are, how they met, how often they play, and how well they play together (NICHD). Child self-report is also used among older children, though less often among young children. In general, data gathered via questionnaires are analyzed by demographic information to gain a better understanding of how gender, race/ethnicity and family SES relate to children's peer relationships. In this study, I used questionnaires completed by both mothers and teachers to assess multiple domains of children's peer relationships. Specifically, I used two separate measures of peer relationships: friendship quality and peer acceptance based on the previous evidence that the two constructs are different and should be accounted for separately. The use of multiple informants and multiple measures to assess peer relationships in early childhood is rare. Thus, findings from this study will provide a more comprehensive picture of what children's peer relationships look like during early childhood.

Preschool Quality

The quality of interactions and surroundings in a preschool setting serve as the means through which children learn (Mashburn et al., 2008). Therefore one would hypothesize that high quality programs are related to an increased ability for children to learn and develop positive interaction skills. Indeed, research indicates that high-quality preschool programs

positively affect children's social and cognitive functioning as well as their academic advancement in elementary school. For example, children who attended high quality preschools showed increased sociability, decreased problem behavior, and increased cognitive and attention skills over a five-year period (NICHD ECCRN, 2005; Peisner-Feinberg et al., 2001). Additionally, McCartney and colleagues (2010) determined that high-quality preschool programs moderated the relationship between time spent in child care and externalizing behaviors. That is, high-quality programs served as a protective factor for externalizing behaviors against spending long hours in childcare (McCartney et al., 2010). Quality of the preschool setting has been defined in terms of a variety of features, including structural, process and physical. Each of these domains is discussed in more detail below.

Structural quality. Structural quality involves aspects of the classroom or school that can be regulated by administration and includes group size, teacher-child ratio, teacher credentials, education, and level of training and experience (Hestenes et al., 2008; Mashburn, 2008). Research suggests that structural quality is related to child outcomes. For example, McCartney and colleagues (2010) determined that group size was related to externalizing behaviors in children. They found that when children spent more time in child care, those who were in large group sizes (four or more children at 24 months, seven or more at 36 months, eight or more at 54 months) displayed more behavior problems such as aggressiveness, assertiveness, disruption, and noncompliant behaviors, than children in smaller group sizes. (McCartney et al., 2010). Additionally, Nye and colleagues (1999) determined that small group sizes were associated with higher achievement in both reading and math. They also reported that children in smaller group sizes in early childhood retained benefits of the smaller group (higher levels of

achievement) five years later. Blatchford and colleagues (2002) reported that in smaller group sizes children had more one-on-one interactions with their teachers, more individual focus was placed on each child by the teacher, and children became more involved in the classroom.

Research indicates that classrooms with smaller teacher-child ratios are associated with less grade retention and increased high school graduation. Teachers in classrooms that had lower teacher-child ratios were often more sensitive and responsive as compared to teachers in classrooms with higher teacher-child ratios and thus better able to provide higher-quality care to children (Shim, Hestenes, & Cassidy, 2004). Importantly, teachers with higher levels of education and credentials are better able to facilitate quality interactions with children and model healthy emotional functioning in their classrooms (Mashburn et al., 2008). Pianta et al. (2005) reported an association between teachers' experience and education and high quality outcomes for children such that teachers with more training and/or education were more likely to run a high quality classroom than teachers with less training/education. This study indicated that classrooms in which teachers had less than a bachelor's degree scored lower on overall quality ratings than classrooms in which teachers had more than a bachelor's degree (Pianta et al., 2005).

Accreditation programs such as the National Association for the Development of Young Children (NAEYC) as well as entities such as the American Academy of Pediatrics and the American Public Health Association have established structural quality regulations that are appropriate for children of various ages in preschool. For example, NAEYC suggests teachers should be required to maintain current knowledge on child development through participation in training sessions and conferences (Copple & Bredekamp, 2008). Additionally, NAEYC

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guidelines suggest that a classroom with two teachers should have no more than twenty four- to five-year-olds. The American Academy of Pediatrics suggests group sizes for 3 and 4 year olds should not exceed twenty children and there should be no fewer than one teacher per ten children.

Process quality. Process quality includes the overall climate of a school or classroom and features of the program that children experience directly, such as sensitivity of teachers, emotional support in a classroom, how the school is run, support provided by staff, quality of interactions between children, and classroom management (Hamre & Pianta, 2005; Hestenes et al., 2008; Mashburn, 2008; Pianta et al., 2002). Emotionally supportive classrooms are classified as those with teachers who both model healthy social skills and guide children in developing their own. In general, an emotionally supportive classroom climate is associated with higher levels of frustration tolerance, greater self-regulation, better peer social skills, and fewer problem behaviors (Burchinal et al., 2005; Hamre & Pianta, 2005; Pianta et al., 2002). Importantly, teachers who provide emotional support in their classrooms are less likely to solve dilemmas in an aggressive way and more likely to model for children healthy strategies for solving problems (Howes, 2000). Therefore, children may be less fearful of getting in trouble and be more likely to relax, open up, learn, and interact with their peers because of the emotionally supportive climate. Teachers who provide an emotionally supportive classroom also aid children by modeling healthy relationship skills they will build on later in their lives (Bub, 2009; Howes, 2000; Mashburn, 2008;). Classrooms that are more emotionally supportive produce children with fewer behavioral problems and more advanced social skills. Research indicates that children from programs that had high process quality achieved better scores in

math and exhibited fewer behavioral problems than children from programs with low process quality (Hestenes et al., 2008).

The benefits of emotionally supportive classrooms appear to have lasting effects on children's development. For example, children are more likely to display better social skills and fewer behavior problems later on in school if they were in emotionally supportive classrooms in preschool (Bub, 2009). Importantly, children in emotionally supportive preschool classrooms are more likely to have positive experiences later on in school. More specifically, schools that facilitate high-quality emotional interactions among children aid in those children's ability to develop social competencies. In contrast, a poor emotional climate in preschool was associated higher levels of social withdrawal among second grade children (Mashburn et al., 2008).

Developmentally appropriate practice is a term used to describe practices that promote the most advantageous learning environments for children in preschool. Developmentally appropriate practices vary based on children's age and maturity levels, but serve as a guideline for preschool programs to develop their curricula (Copple & Bredekamp, 2008). NAEYC acknowledges several aspects of process quality in their guidelines. For example, they suggest that children have the best opportunity for development when they have relationships with teachers that are secure and reliable (Copple & Bredekamp, 2008). This guideline is consistent with the evidence that emotionally supportive classrooms are related to better child outcomes and highlights the need to emphasize process quality in research investigating children's early childhood classroom experiences (Howes, 2000).

Physical quality. A third vastly understudied index of quality is physical quality. Physical quality consists of play space available both indoors and out, classroom layout, structurally

sound, age-appropriate toys and equipment, and accessibility to materials. Mashburn (2008) suggested creating a high-quality physical environment by having adequate space, plenty of materials, and making the materials easily accessible to the children, which promotes children's independence. Physical quality may be important for making a child feel comfortable in the classroom setting which in turn could affect their ability to develop peer relationships. For example, a classroom that has enough materials for all of the children will better foster play activities among those children as compared to a school that does not have sufficient materials.

Of the little research conducted on physical quality, Read et al. (1999) suggested that the physical characteristics of the surroundings (namely the ceiling height and wall color) have an effect on children's social behavior. This research was conducted by observation and coding of young children's behavior in four separate laboratory settings, each with varying ceiling heights and wall colors. The authors determined that children were more likely to play cooperatively in a space that had varying ceiling heights, as compared to one-level ceiling height. Furthermore, Read and colleagues (1999) reported classrooms that had at least one wall that was a different color of the others as opposed to all the same colors influenced children to play more cooperatively with one another. Cool colors such as blue, green and purple should be used to create quite areas (i.e., a reading corner) while warm colors like red, yellow and orange are better for high-activity areas (i.e., a block area) (Read et al., 1999). Additional research by Mashburn (2008) found that the quality of the physical environment was positively related to academic achievement among low SES children. Perhaps children from low-income families live in spaces that are over-crowded and have poor quality ventilation, thus their enrollment in a preschool program that has a high-quality physical environment may provide them with the

opportunity to experience a less chaotic, unhealthy, and overcrowded space and be able to focus more on social and academic skill building (Evans, 2004; Evans, Gonnella, Marcynyszyn, Gentile, & Salekarall, 2005). However if children from low SES homes are enrolled in low-quality schools with poor learning materials, and unhealthy conditions, they lose the opportunity to enrich their academic skills (Mashburn, 2008).

NAEYC's Developmentally Appropriate Practice (Copple & Bredekamp, 2008) recommends that pictures be hung at children's eye levels and materials be stored on low, easy to access shelves. This not only allows them the opportunity to see and reach the materials more easily, but makes them feel as if the classroom is their size, rather than an adult size room where many things are out of reach. Furthermore, bathroom facilities should be on children's level with low toilets and sinks. NAEYC also recommends 35 square-feet of space for each child in a classroom which allows adequate space for each child's play activities. Adequate space for children to play may assist in fostering cooperative skills among children. Children may feel confined if not provided with sufficient play space, decreasing their likelihood to play cooperatively with their peers. Finally, NAEYC suggests outdoor play equipment that varies in degree of difficulty and skill level required. That is, there should be equipment that requires little to no balance or coordination as well as equipment that challenges children's physical abilities (Copple & Bredekamp, 2008).

Much of the research conducted on physical quality involves organizational qualities such as aesthetics, room arrangement, and material quality (Read et al., 1999; Mashburn, 2008; Copple & Bredekamp, 2008). In addition to these aspects of physical quality, the current study also examined health (e.g., hand-washing, bathrooms are clean and accessible, sick children are

kept isolated, etc.), and safety (e.g., play surfaces are safe, adults supervise gross motor activities, furniture and equipment are safe and secure, etc.) qualities of the environment, as these are not as often examined. NAEYC's policies indicate that caregivers and children should follow clearly written sanitation procedures to limit the spread of infectious disease and germs. These procedures are posted not only to help remind caregivers and staff to follow through consistently, but to teach children about sanitation (Copple & Bredekamp, 2008). By encouraging sanitation among teachers and children, those individuals are less likely to become ill. Children who are sick either stay home or lack the energy to interact with peers at school, decreasing their likelihood of developing relationships. In terms of safety, children often begin engaging in gross motor activities for the first time in preschool but lack the coordination and judgment to play without supervision. Therefore, NAEYC recommends direct adult supervision during such activities. By allowing children to push their boundaries while under adult supervision, children learn what they can and cannot do, and eventually develop new gross motor skills (Copple & Bredekamp, 2008).

Overlap between quality indicators. Evidence suggests that there may be a significant overlap between structural and process quality (Hestenes et al., 2008). For example, Hestenes et al. (2008) indicated that structural quality including wages, ratio and enrollment were strong predictors of process quality. Teachers who are paid higher wages have better incentives to promote healthy socio-emotional climates in their classrooms than teachers receiving lower wages. Furthermore, classrooms with high teacher-child ratios (more children to fewer teachers) are less likely to provide emotional support to children than classrooms with low teacher-child ratios because they simply do not have the ability to provide one-on-one

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attention to all children in the classroom. Research conducted by the NICHD ECCRN (2002a)

concurred, suggesting that structural quality does indeed affect process quality, which in turn

affects children's outcomes. It is also worth noting that researchers often group physical quality

with process quality, as it is part of the program that directly affects the children (Mashburn,

2008; Hestenes et al., 2008).

Although structural and process quality are well studied, their differential effects on

child outcomes, and especially on peer relationships requires further study. Importantly, very

little is known about the role that the physical environment plays in the development of

positive peer relationships or whether it uniquely contributes to child outcomes, above and

beyond structural and process quality. Thus, one goal of this study was to separate out aspects

of the structural, process and physical environment and study their independent and combined

effects on children's peer acceptance and friendship quality in first grade.

Teacher-Child Relationship Quality

As children enter the school setting, they begin to form critical relationships with their

teachers. The relationship a child has with his/her teacher involves many domains, including

trust, respect and communication. Positive teacher-child relationships are marked by high

levels of closeness and low levels of conflict and dependency (Hamre & Pianta, 2001; Pianta,

1992; Rudasill et al., 2006). A healthy teacher-child relationship also involves mutual trust and

respect between the teacher and the child. Finally, relationships with teachers, as with parents,

include a degree of attachment and security (Pianta, 1992). In general, children who experience

positive teacher-child relationships in early childhood have better attention skills, are more

socially competent, and exhibit fewer problem behaviors than their peers with poor teacher-child relationships (Birch & Ladd, 1997; NICHD ECCRN, 1998).

A high-quality teacher-child relationship is important for many different reasons. First, teachers serve as examples to children of how healthy, trusting relationships can be formed with individuals outside the child's family. The type of relationship and security a child has with his/her teacher is associated with the types of relationships that child has with peers and adults later in life (Howes et al., 1994). A secure attachment with a teacher allows a child to feel safe enough to explore within the classroom, giving them ample opportunities to grow and learn (Howes et al., 1994; Pianta, 1992). High-quality relationships with teachers are associated with a child's ability to be sensitive to others' emotions, thereby training children how to behave in future peer relationships. Securely attached children and teachers also develop communication skills that translate into skills children can use with their peers.

Second, the relationships children develop early in life have a lasting effect on academic and social outcomes (Birch & Ladd, 1997; 1998; Hamre & Pianta, 2001). Specifically, Hamre and Pianta (2001) reported that teacher report of a low-quality relationship with a child in early childhood negatively predicted that child's grades, standardized test scores and work habits later in elementary school. They hypothesized that the teacher-child relationship quality may affect the ability of children to engage in the classroom and therefore their achievement (Hamre & Pianta, 2001). In addition to academic affects, teacher-child relationship quality has an effect on social and behavioral outcomes. Early teacher-child relationships serve as a model for social and academic situations children will encounter later in life (Rudasill et al., 2006). Children involved in healthy teacher-child relationships show healthier social interactions with

peers, marked by increased sensitivity to the emotions of others, as they grow older. Furthermore, children who have high-quality teacher-child relationships display more prosocial behaviors and engage in more complex play than children with low-quality teacher-child relationships (Garner & Waajid, 2008).

Third, children who have high quality relationships with their teachers are likely to learn more than children who have poor relationships (Mashburn et al., 2008). Indeed, evidence suggests that when teachers have more positive relationships with their students, they tend to provide more positive feedback on a wide variety of skills and learning related tasks (Hamre & Pianta, 2005; Raver, Garner, & Smith-Donald, 2007). Children who interact positively with their teachers are also better prepared to become engaged in the classroom and more likely to learn as compared to children who have negative interactions with their teachers. Additionally, children who have high quality teacher-child relationships have better work habits, higher grades, and increased achievement scores (Hamre & Pianta, 2001). In contrast, children with low-quality teacher-child relationships have poor work habits, lower academic competence, and lower scores on achievement tests than those children with healthy teacher-child relationships (Rudasill et al., 2006). Perhaps children who have high-quality relationships with their teachers posses a drive to achieve. That is, they want to do well in school and achieve high grades in order to impress their teachers and maintain their good relationships with them. Additionally, when teachers have quality relationships with children, they are likely to offer extra academic help and support (Garner & Waajid, 2008).

Teacher-child relationships are generally seen as a protective factor for children. However, a poor teacher-child relationship may also be considered a risk factor for future

relationships with teachers and peers, as well as for other outcomes. For example, the quality of children's relationships with their teachers in kindergarten was associated with the quality of their relationships with their teachers in first grade (O'Connor & McCartney, 2006). Therefore, if a child has a negative relationship with a teacher in kindergarten, he/she is likely to have negative relationships with future teachers. Children who experience high levels of conflict with their teachers tend to develop more negative attributions about themselves, their peers and their teachers (Hamre & Pianta, 2005). Additionally, children with low-quality teacher-child relationships are more likely to report loneliness and avoid school more often than children involved in high-quality relationships. Low-quality teacher-child relationships are associated with low levels of frustration tolerance, school competence, test achievement, and work habits (Rudasill et al., 2006). Additionally, children who are dependent on their teacher are typically not involved with or withdraw from peer activities. Dependent children may rely on a teacher to solve problems for them rather than interact with peers to solve their own dilemmas (Howes, et al., 1994). Additionally, dependency is thought to hinder children from exploring the classroom and therefore prevents them from forming relationships with their peers (Birch & Ladd, 1997). Hamre and Pianta (2001) determined that low-quality teacher-child relationships in early childhood were associated with disciplinary problems for boys in later elementary and middle school. Furthermore, low-quality teacher-child relationships are also associated with antisocial behaviors such as aggression and hyperactivity in young children (Birch & Ladd, 1998).

Differences in teacher-child relationship quality. The quality of relationships between teachers and children may depend on a variety of demographics. For example, one study found

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that girls have higher quality teacher-child relationships than boys. This study also determined that African American children had lower quality teacher-child relationships than did white children (O'Connor & McCartney, 2006), a phenomenon termed the "ethnicity gap." A study by Rudasill and colleagues (2006) determined that when children were matched with teachers of the same ethnicity, they had better overall relationships with them. This suggests that teachers may develop closer relationships with children of their own ethnicity. Teacher-child relationships may also be influenced by children's social and communication skills. Shy children with high language skills are more likely to have dependent relationships with their teachers. Outgoing children with lower language skills have more conflict with their teachers than do those with higher language skills. Children with weak communication skills may be at risk socially and academically because they lack opportunities for interaction with their teachers and are therefore unable to develop a healthy relationship (Rudasill et al., 2006). Teacher-reported school competence is positively associated with teacher-child relationship quality, once again suggesting that children's scholastic abilities have an effect on the type of relationship they have with their teacher (Garner & Waajid, 2008).

Research indicates that early attachment status is positively associated with teacher-child relationship quality in kindergarten such that children who had secure relationships with their parents were likely to have higher quality relationships with their teachers (O'Connor & McCartney, 2006). Additionally, avoidant children had lower quality relationships with teachers than did securely attached children. This may be a result of the fact that teachers have difficulties deciphering what avoidant children need, therefore causing anger and confusion.

Insecurely attached children tend to display behavioral problems, which are negatively associated with teacher-child relationship quality (O'Connor & McCartney, 2006).

Teachers' perceptions of children have an effect on the quality of the teacher-child relationship. Overall, teachers consider a relationship with a child to be healthy when there are high levels of closeness and low levels of discord and reliance. Teachers perceive their relationships with clingy and highly dependent children as negative (Rudasill et al., 2006). Furthermore, teachers recognize children's ability in the classroom, and respond more positively to children that are more engaged in class activities. They view these children as more "teachable" and therefore spend more time connecting and developing positive relationships with them (Rudasill et al., 2006; Garner & Waajid, 2008).

Although there is a large amount of research examining teacher-child relationships, there is still information we have yet to figure out. For example, we know that poor preschool quality has a negative impact on children. We also know that healthy teacher-child relationships are positively associated with peer relationships. However, we lack information about the mediating role that teacher-child relationships play in the association between quality and peer relationships. That is, we do not know whether positive teacher-child relationships can develop in the absence of high-quality settings or whether specific structural, process, or physical features of preschool settings are especially important for fostering these relationships. A low quality school may have fewer resources, placing stress on the teachers and staff. Teachers under stress are less likely to devote time to developing healthy relationships with their children. A high-quality school may provide more training opportunities for teachers where they are encouraged to maintain healthy relationships with their students.

Thus, we need more information about how preschool quality directly affects teacher-child relationships, which, in turn, affect peer acceptance and friendship quality. Finally, if teacher-child relationships do act as a mediator of the association between preschool quality and first grade peer relationships, it is possible that this association differs by child gender. For example, we know that girls generally have better quality relationships with their teachers. Therefore it is possible that girls in low quality preschool programs would benefit more from the protective effects of positive teacher-child relationships than boys.

The Present Study

As the literature suggests, peer relationships among young children are vastly important for a variety of reasons. Children learn how to have successful relationships with others in the early years of education (Howes et al., 1994; Walden et al., 1999). Additionally, children who are involved in healthy relationships with others are more likely to advance academically as compared to children not involved in healthy relationships (Ladd, 1990). Given the critical role that peer relationships play in children's social and academic development, it is vital to examine what factors may support (or hinder) the development of positive peer relationships. Because three out of five preschool-aged children are involved in some type of child care or preschool program (National KIDS COUNT Program, 2008), research examining how the quality of their program affects these relationships is essential. In addition, because the relationships children have with their teachers often serve as models for relationships they form with others (Howes et al., 1994), the quality of the teacher-child relationship must also be examined. However, little is known about the mediating role that teacher-child relationships may play in the association between preschool quality and peer relationships. Thus, research examining the

direct effects of preschool quality on both the teacher-child relationship and peer relationships is needed to fully understand the role that these early experiences play in children's subsequent development.

The present study aimed to determine the effect that preschool quality, marked by structural, process and physical features, has on peer acceptance and friendship quality in first grade. Additionally, the possibility of teacher-child relationships as a mediator of the association between preschool quality and first grade peer relationships was examined. That is, I examined whether preschool quality predicts the quality of the teacher-child relationship and whether teacher-child relationship quality in turn predicts children's peer acceptance and/or friendship quality. Finally, the study aimed to determine whether these associations were different for boys and girls.

Method

Sample

Data from phases I and II of the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD) was used in this study. Families participating in the NICHD SECCYD were first contacted after the birth of a child in 1991. Families were recruited through hospital visits at ten separate locations: Little Rock, AR; Irvine, CA; Lawrence, KS; Boston, MA; Philadelphia, PA; Pittsburgh, PA; Charlottesville, VA; Morganton, NC; Seattle, WA; and Madison, WI. This study included three phases of enrollment. Of the 8,986 families that gave birth to a child during the sampling period, 5,416 (60%) met eligibility requirements (healthy mother over eighteen years old and fluent in English; healthy, biological child; family lived within one hour of the research site in a neighborhood that was not exceptionally dangerous, not planning on moving, and not taking part in another study). Of the 5,416, 438 (4%) declined to participate and 3,015 (56% of those eligible) were invited to participate. Fifty-one percent of those families invited (1,526) agreed to participate and 1,364 (89%) completed the one month visit and were enrolled in the study.

At recruitment, the sample was diverse, including 24% ethnic minority children (13% African American, 6% Hispanic, and 5% Asian, Native American, or other ethnic backgrounds), 11% mothers who had not completed high school, and 14% single mothers. Mothers had an average of 14.4 years of education and the average family income-to-needs ratio was 3.6 times the poverty threshold, somewhat higher than middle class (indexed by an income-to-needs ratio of 3.0). Although the families in this study do not comprise a nationally representative sample, participating families were similar to other families in the catchment areas on many

demographic variables with two exceptions: mothers in the sample were slightly more

educated and had slightly higher income levels. Of the 1,364 families that were enrolled in the

study, 1,083 (79%) continued through the 54-month assessment. The 281 families that dropped

were different than those that stayed in the mothers had significantly lower education (M =

13.6 years vs. 14.4 years); there was less likely to be a husband or partner in the house (76% vs.

85%); children of families that did not stay in the study were more likely to be Black, non-

Hispanic (11% vs. 19%); and family incomes were lower (mean income-to-needs ratio of 3.2 vs.

3.6). A total number of 854 children were used in the present research so that there were no

missing data.

Measures

Peer Relationships

For the purpose of this research, peer relationships were examined as two separate

constructs, peer acceptance and friendship quality. Literature indicates that the two concepts

are different in that a child may be accepted by peers but not have a close, high quality

relationship with them (Lindsey, 2002; Hartup, 1989; Walden et al., 1999).

Peer acceptance. The Friends or Foes measure was used to assess peer acceptance in

first grade. Teachers answered questions about how many children liked or disliked the study

child and provided information about the study child's friends. Using a five-point Likert scale

(1= none to 5= nearly all) teachers answered questions like "Are there children who like to play

or work with the Study Child?" and "The Study Child is well liked by children of the same sex."

Teacher's rating of peer status (TCRPST1S) was computed as the sum of four items, with higher

scores indicating the child is well-liked (scores ranged from 4 to 20). Chronbach's $\alpha$ for the peer status composite was moderately high at first grade (.88).

Friendships quality. The Playmate Questionnaire (Vandell, 1995) was used to assess the quality of children's friendships in first grade. Children's mothers completed the measure when children were in first grade and addressed items such as how many friends the child had, how often they played together, and the quality of their play. More specifically, using a 4-point Likert scale (1= strongly disagree to 4= strongly agree) mothers rated how much they agreed with a variety of situations that may occur when their child played with his/her friends including, "Settle arguments together," "Fight verbally," and "Share with each other." Four subscales were derived from the questionnaire: harmony, which represented how the children played together; conflict, which described the discord children experienced; positive relationship, which represented positive, healthy interactions in the relationship; and negative relationship, which told of the unhealthy interactions within the relationship. For this study, I used a mean of nine items to represent friendship quality (PMPR_M1S). The nine items included questions from three of the four subscales. Questions such as "Children play happily together" and "Children say they like each other or are friends" represented harmony. Positive relationship was represented by questions like "Children share with each other" and "Children reach agreements easily." Negative relationship was signified by one question: "Children ignore each other's suggestions" which is reflected to represent a positive score. Conflict was not represented. The scores ranged from 2.09 to 4, with higher scores representing higher quality relationships. The Playmate Questionnaire demonstrates reasonable concurrent validity.

The items used to create this variable had moderate internal reliability (Cronbach's alpha= 0.81).

Primary Question Predictor

Preschool quality. Three measures were used to assess preschool quality at 54 months: Observational Ratings of the Caregiving Environment (ORCE; NICHD ECCRN, 1996), Classroom Practices Inventory (CPI; Hyson, Hirsh-Pasek, & Rescorla, 1990), and the Physical Environment Checklist (NICHD ECCRN, 1996). The Observational Ratings of the Caregiving Environment (ORCE) was used to assess the study child's overall experience in the preschool classroom. Trained observers visited the child's primary preschool classroom and observed the study child for a minimum of two 44-minute cycles. In addition, observers spent 5 minutes at the beginning and 10-minutes at the end of each observation cycle making notes about the classroom environment, including information about child group size, the number of children in the room, the number of available adults, the number of caregivers, and number of peers, which was computed for children from 3.5 to 5.5 years old. Observers at all 10 sites were trained at a centralized training workshop and used a standardized manual that provided extensive descriptions of codes and anchor points. All observers had to pass a videotaped reliability test that included six cycles of time-sampled coding as well as global ratings of the classroom quality and teacher interactions with the study child. At least a 60% match with a master coder on time-sampled codes was required before observers were certified to conduct observations. Average exact agreement was .75 at 54-months.

For the current study, I used numerous behavioral ratings of the teachers behaviors in the classroom, including  teacher reads aloud to children, offers encouragement and praise, ,

teaches social rule, and demonstrates prosocial tendencies. For the behavioral subscales, observers recorded the frequency of these specific behaviors during the observational period. For example the observer noted how many times the child asked an adult a question or was physically aggressive with another child during the 44-minute cycle. Higher ratings reflect more frequent observed behaviors.

The Classroom Practices Inventory (CPI; Hyson et al., 1990), completed by observers, was used to assess the overall positive emotional climate of the classroom. Using a 5-point Likert scale (1= not at all like, 5= very much like), observers noted whether teachers smiled at or spoke to children at their eye level, the environment was overall pleasant with sounds of conversation and laughter, if the teachers used competition or criticism as discipline techniques (reverse scored), teachers talked about feelings, the classroom sounded of harsh noise or enforced quiet (reverse scored), and if teachers used redirection, positive reinforcement, and encouragement as discipline techniques. A positive subscale was created from these six variables and scores ranged from 1 to 5, with higher scores indicating a more positive emotional climate. Items used to create this variable had high internal reliability (Cronbach's alpha= 0.86) and the interobserver reliability was 64%.

The Physical Environment Checklist was completed by the caregivers and included five subscales: health, safety, organization, stimulation, and ethnic richness. The health subscale included questions about sanitation, toileting, and ill children. Safety involved the maintenance and quality of play structures and equipment as well as adult supervision of play. The organization subscale involved the layout of the classroom and toys. Stimulation included the quality and variety of materials, aiming to involve and stimulate children with different

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interests. Finally, the ethnic richness scale reflected the center's display and recognition of a variety of ethnic backgrounds. For each subscale caregivers responded "yes" or "no" to 10 items about the quality of the physical environment. An overall rating of quality was generated from the means of each subscale. For the purpose of this research, a sum of the health, safety and organization subscales was created to represent physical quality because of the indicators they represent: cleanliness, sanitation, safety of materials, room arrangement, etc. The health and safety subscale and the organization subscale both had moderate internal reliability (Cronbach's alpha= 0.72 and 0.77, respectively). Scores ranged from 8.42 to 20, with higher scores representing better physical quality.

Mediator

Teacher-child relationship quality. The Student-Teacher Relationship Scale (STRS; Pianta, 1992) was used to evaluate the quality of the relationship between children (at 54 months) and their teachers. Teachers completed a 30-item questionnaire which assessed the teachers' perceptions of their relationships with their students. The questions were based on a five-point Likert scale (1=definitely not to 5=definitely) and comprised three subscales: conflict, closeness, and overdependence. The conflict subscale assessed the aggressive and disharmonious interactions between teacher and child by asking questions such as "This child and I always seem to be struggling with each other" (alpha=.93). The closeness subscale disclosed the amount of affection and open communication the teacher and child had in their relationship through questions like "I share an affectionate, warm relationship with this child" (alpha=.86). A total score was calculated reflecting the overall positive nature of the relationship. For the current study, I used the total positive relationship with child variable (TPRELA54) to represent

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overall teacher-child relationship quality. The items used to create this variable had moderate internal reliability (Cronbach's alpha= 0.84). Research indicates the STRS has been correlated with behavior (correlations ranging from .40 to .67; Pianta & Steinberg, 1992). Data did not vary by site.

Control Variables

Child sex. Maternal reports of child sex were collected when the study child was 1 month of age. Child gender was represented by a dichotomous predictor (Male=1).

Problem Behavior. The Social Skills Ratings System (SSRS; Gresham & Elliot, 1990) was used to assess teacher perceptions of children's social skills. Problem behavior was controlled for with a composite variable created to represent negative behavior (PRBSSM54). The SSRS demonstrates high levels of internal consistency (ranging from .91 to .94) as well as moderate concurrent and predictive validity (Gresham & Elliott, 1990).

Self regulation. The Delay of Gratification Task (Mischel, 1974) was used to assess children's self-regulation skills at 54 months (DOGPFO54). A dichotomous pass/fail variable was used to indicate whether the child successfully completed the task. This measure demonstrates reasonable predictive validity among preschoolers (Shoda, Mischel, & Peake, 1990).

Mother's education. Mother's education, represented by years of education, was included as a control (MOMED).

Family income-to-needs. Family financial information was obtained via maternal interviews when the children were 54 months (INC54). An income-to-needs variable was constructed by dividing the total family income by the poverty threshold for a family of that size, as determined by the US Bureau of the Census (US Census Bureau, 1992). Separate

indicators of family income-to-needs at first, third, and fifth grade were included to capture concurrent effects of income on children's achievement.

Child age. Child age in months at the time of the assessment was included to account for the possibility that some children will be older when they enter first grade.

Site. I included a vector of nine dummy variables representing the ten data collection sites, to control for unobserved site-level differences.

Data Analysis Plan

Descriptive statistics were conducted to acquire means and standard deviations of the outcome and predictor variables for the full sample as well as separately by child gender. T-tests were also conducted to examine whether differences between sample means for boys and girls were statistically significant. Additionally, I examined correlations among the variables to investigate associations between outcome and predictor variables.

Principal components analysis was used to determine whether the variables I chose for structural and process quality truly represented those constructs. I then fit a series of multiple regression models to determine whether preschool quality (i.e., structural, process and/or physical features) predicted my two peer relationship constructs (i.e., peer acceptance and friendship quality) at first grade and whether the quality of the teacher-child relationships at 54 months mediated that relationship (see hypothesized model in Figure 1). More specifically, I fit four direct effects models for each outcome (for a total of eight models) to determine whether each set of structural, process and physical quality indicators at 54 months, predicted peer acceptance or friendship quality at first grade. The first three models examined the independent effects of structural features, process features and physical features on each peer

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relationship construct. That is, I regressed peer acceptance or friendship quality on the four indicators of structural quality. I then removed these indicators and regressed my peer relationship variables on the five indicators of process quality, and so on. The fourth regression model examined the combined effects of all indicators on peer acceptance or friendship quality. That is, I regressed peer acceptance or friendship quality on all ten indicators of quality simultaneously.

Next I tested whether teacher-child relationship quality predicted peer acceptance or friendship quality. I fit models in which peer acceptance or friendship quality was regressed on the indicators of preschool quality and teacher-child relationship quality to determine whether mediation existed. That is, I added to the regression models the simultaneous effects of preschool quality and teacher-child relationship quality to examine whether preschool quality affects peer relationships through the quality of the teacher-child relationship. To determine partial or complete mediation, I examined whether the direct effect of preschool quality on either peer acceptance or friendship quality decreased or dropped to zero. These drops would provide evidence of either partial or complete mediation.

Finally, I tested a series of interactions to determine whether associations between preschool quality and peer relationships differed by child gender and/or teacher- child relationship quality. More specifically, I added to my models containing all structural, process and physical quality indicators, interactions between quality indicators and child gender or interactions between quality indicators and teacher-child relationship quality. To reduce the possibility of collinearity, I included a limited number of interactions at a time. That is, I first examined interactions with structural quality, followed by interactions with process quality

(with the structural quality interactions removed), and finally interactions with physical quality.

For each model a common set of covariates was controlled for: gender, problem behavior, self-regulation, mother's education, family income-to-needs at 54 months, and site. All analyses were conducted using SAS version 9.1.

Results

Preliminary Analyses

Descriptive statistics. Means and standard deviations for the outcome and key predictor variables are presented in Table 1. Children showed moderately positive relationships with peers based on the peer acceptance measure (M=16.15) and the friendship quality measure (M= 3.22). Nevertheless, there was some variability in peer acceptance and friendship quality as evidenced by the standard deviations of 3.02 and .31, respectively. There appears to be more variability in peer acceptance as compared to friendship quality.

There was an average of 12.71 children in participants' classrooms, but numbers ranged from 5 to 20 (SD=7.37). Additionally, the ratio of children to caregivers was 7.75 on average and varied from 3 to 11 children per caregiver (SD=4.31). On average caregivers had approximately 15 years of education and 10 years of experience. On a scale of 1 to 5, the classrooms of the study children had an average score of 3.51 representing the positive emotional climate. The mean score for the sum of health, safety and organization was 16.82 (SD=2.10) on a scale of 1 to 20, suggesting that the physical quality of the classrooms was very high. The mean score of total positive teacher-child relationship quality was 115.29 (10.2) on a scale of 27 to 135, with higher scores indicating a more positive relationship. The study children had rather high scores, suggesting the majority had exceedingly positive relationships with their teachers.

Table 2 contains descriptive statistics of all variables by gender. Means are typically similar for both females and males and did not vary greatly from the overall mean (see Table 2). There were however three significant differences between females and males. The mean

friendship quality for females was 3.25 (SD=.32), males= 3.19 (SD=.30; t-value=2.71, p<.05). The

process variable, teachers teach social rule, was also significantly different such that females

(M=0.97 , SD=1.55) received less direct teaching of social rule than males (M=1.19, SD=1.99; t-

value=-1.85~).  Finally, the control variable, problem behavior, was significantly different for

females (100.51, SD=10.35) and males (96.92, SD=10.02; t-value=5.15).

Correlations among all variables are reported in Table 3. Interestingly, caregivers' years

of experience was the only indicator of quality that was correlated with peer acceptance, and it

was only marginally correlated (0.06, p<.10). No other indicators of quality were correlated with

friendship quality. However, both peer acceptance and friendship quality were significantly

correlated with teacher-child relationship quality (0.24, p<.001 and 0.09, p<.05 respectively).

Principal components analyses (PCA). To determine whether the variables I selected

actually represent structural quality (group size, teacher-child ratio, caregiver education, and

caregiver experience) and process quality (positive emotional climate, teacher reads aloud to

children, encourages or praises, teaches social rule, and demonstrates prosocial tendencies), I

fit two principal components analysis models. For structural quality I identified two factors with

eigenvalues greater than one. Group size and observed teacher-child ratio loaded highly on the

first factor while caregiver education and caregiver years of experience loaded highly on the

second. Because the second factor only explained slightly more than one unit of variance

(eigenvalue = 1.07), I chose to keep only the first factor, which explained close to two units of

variance (eigenvalue=1.72). However, when I examined the reliability of this factor, it was

extremely low ($\alpha$=.39), suggesting that these variables did not reflect a reliable construct

representing structural quality. Therefore I chose to enter all four variables (group size, teacher-

child ratio, caregivers' years of experience, and caregivers' years of education) into my models separately. Similarly, I used PCA to identify factors for process quality. Again two factors were identified. Positive emotional climate, encourages and praises, and teaches social rule loaded highly on the first factor while demonstrates prosocial tendencies loads highly on the second factor. Reads aloud did not appear to load well on either factor. Again, because the second factor explained just over one unit of variance (eigenvalue = 1.08), I chose to retain only the first factor (eigenvalue =1.32). However, the reliability for this factor was also extremely low ($\alpha$=.18), so as with structural quality, I chose to enter the five indicators of process quality (positive emotional climate, reads aloud to children, encourages or praises, teaches social rule, and teaches prosocial behavior) into the models separately.

Do children who attend higher quality preschool classrooms (indicated by structural, process, and physical quality) exhibit more positive peer relationships (measured by separate indicators of peer acceptance and friendship quality) in first grade than children who attend lower quality preschool classrooms?

To address my first research question, I fit several regression models to determine the effects of the various aspects of preschool quality on first grade peer relationships. First I regressed peer acceptance on four indicators of structural quality (group size, teacher-child ratio, caregivers' years of experience, and caregivers' years of education; see Table 4, Model I). Group size had a statistically significant effect on peer acceptance such that larger group sizes were associated with lower peer acceptance ratings, controlling for the other indicators of structural quality as well as a wide range of child and family characteristics. Additionally, the effect of caregivers' years of experience on peer acceptance was marginally significant (see

Table 4, Model I), indicating that children whose teachers had more years of experience had higher peer acceptance ratings than children whose teachers had fewer years of experience. This was somewhat expected since these variables were significantly correlated in the bivariate correlation analysis. Teacher-child ratio and caregivers' years of education produced no significant associations with peer acceptance. Next I regressed peer acceptance on the five indicators of process quality (positive emotional climate, teachers read to children, teachers encourage and/or praise, teachers teach social rule, and teachers teach prosocial behaviors). Surprisingly, no indicators of process were significant in predicting peer acceptance at first grade (see Table 4, Model II). Finally, I regressed peer acceptance on the single variable representing physical quality (a sum of health, safety, and organization) and contrary to expectation found a statistically significant negative relationship (see Table 4, Model III). More specifically, children who attended preschools with better physical quality had lower peer acceptance scores than children who attended preschools with poorer physical quality.

Next, to examine associations between peer acceptance and the overall quality of children's preschool settings, I fit a model that included all ten indicators of quality (i.e., structural, process and physical) simultaneously (see Table 4, Model IV). The three indicators that individually predicted peer acceptance remained statistically significant when all variables were added at the same time. More specifically, group size predicted peer acceptance controlling for all other indicators of quality as well as child and family characteristics. This indicates that larger group sizes were associated with lower levels of peer acceptance. Additionally, caregivers' years of experience stayed marginally significant in predicting peer acceptance, again indicating that caregivers with more experience were associated with higher

levels of peer acceptance at first grade. Finally, physical quality was still a negative predictor of peer acceptance such that better physical quality was related to lower scores of peer acceptance. Taken together, these findings suggest that structural quality plays an important role in predicting teacher ratings of children's peer acceptance but neither process quality nor physical quality appear to be related to children's first grade peer acceptance, controlling for child and family characteristics.

Estimates of associations between preschool structural, process and physical quality and children's first grade friendship quality are presented in Table 5, Models I-IV. However, no significant relationships were found between any indicators of preschool quality and first grade friendship quality, suggesting that various aspects of quality at 54 months, have no impact on mothers' ratings of friendship quality in first grade.

Do positive teacher-child relationships mediate the association between the quality of preschool classrooms and children's peer relationships?

To test whether children's peer relationships are affected by structural, process, and/or physical quality through teacher-child relationships, I first regressed teacher-child relationship quality on all of the indicators of quality (structural, process and physical). I found that caregivers' years of education was marginally associated with teacher-child relationship quality (0.29, SD=0.17, p<.1) indicating that caregivers with more years of education had higher quality teacher-child relationships, controlling for all other structural, process and physical quality indicators. Additionally, positive emotional climate was a statistically significant predictor of teacher-child relationship quality (1.14, SD=0.5, p<.05), controlling for all other structural, process and physical quality indicators. This suggests that teachers and children in classrooms

with positive emotional climates were more likely to have healthy relationships as compared to teachers and children in classrooms with negative emotional climates. No other quality indicators significantly predicted teacher-child relationship quality.

Next, I fit a model in which peer acceptance was regressed on teacher-child relationship quality to determine whether teacher-child relationship quality predicted peer acceptance at first grade. I found a statistically significant positive relationship (Table 4, Model V) such that more positive teacher-child relationships at 54 months were associated with higher scores of peer acceptance in first grade. Finally, I fit a model in which I regressed peer acceptance in first grade on all indicators of quality as well as teacher-child relationship quality. If full mediation exists, I would expect the statistically significant associations between group size, caregivers' years of experience, and physical quality and peer acceptance found in Table 4, Models I-IV to become non-significant; partial mediation would be indicated by a decrease in the size of the coefficients. The estimates of the associations between quality, teacher-child relationship quality, and peer acceptance are presented in Table 4, Model VI. As indicated, the previously significant paths (group size and physical quality) were still significant in predicting peer acceptance when teacher-child relationship quality was added to the model, -0.05 (p=0.005) and -0.11 (p=0.04), indicating that mediation did not exist for group size, but slight mediation exists for physical quality, as the coefficient decreased in value from -0.13 (p<.05) to -0.11 (p<.05). However, the previously marginally significant predictor, caregivers' years of experience, became non-significant when teacher-child relationship quality was added, suggesting the possibility of mediation. Although the effect of both caregivers' years of education and positive emotional climate became non-significant in the final model, neither

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indicator was significant in predicting peer acceptance to begin with and therefore were not mediated by teacher-child relationship quality. Finally, teacher-child relationship quality remained significant in predicting peer acceptance (0.06 p<0.001).

As there were no statistically significant effects of preschool quality on friendship quality, I did not test for mediation by teacher-child relationship quality. However, I did examine whether teacher-child relationship quality was a significant predictor of friendship quality. Results indicated that teacher-child relationship quality was not significant in predicting friendship quality at first grade, and therefore cannot act as a mediator of preschool quality and friendship quality (Table 5, Models V & VI).

Is the effect of preschool quality on children's peer relationships moderated by child gender?

To test the possibility that the association between preschool quality and children's peer acceptance differs by child gender, I fit a series of models testing interactions between child gender and the statistically significant quality indicators (group size, caregivers' years of experience, and physical quality). More specifically, I tested whether group size had a different effect on peer acceptance based on the child's gender and did not find a statistically significant interaction, suggesting group size has the same effect on peer acceptance for both boys and girls (-0.001 p=0.96). Next I tested whether the effect of caregivers' years of experience differed by child gender and again found no statistically significant interaction (0.00 p=0.99). I also tested the interaction between child gender and physical quality and again did not find a statistically significant relationship (0.06 p=0.52). Finally, I tested whether the relationship between teacher-child relationship and peer acceptance was different for females and males and found no relationship (0.01 p=0.54). Therefore I concluded that child gender had no impact

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on the relationship between preschool quality and peer acceptance at first grade or student-teacher relationship quality and peer acceptance.

As previously mentioned, I found no evidence that teacher-child relationship quality mediated the relationship between preschool quality and peer relationships (both peer acceptance and friendship quality). Therefore I chose to examine whether the effect of preschool quality on peer acceptance differed by teacher-child relationship quality. More specifically, I tested whether the effect of group size on peer acceptance was different because of the quality of the teacher-child relationship. I found no significant relationship (0.00 p=0.35). Next I tested whether teacher-child relationship quality affected the relationship between caregivers' years of experience and peer acceptance and again found no relationship (0.00 p=0.14). Finally I looked at the effect of teacher-child relationship quality on the relationship between physical quality and peer acceptance and found that it had no impact (0.00 p=0.71). I did not test teacher-child relationship quality as a moderator of preschool quality and friendship quality because previous results indicated that no indicators of preschool quality significantly predicted friendship quality at first grade. Thus, it appears that neither child gender nor the quality of the teacher-child relationship moderate the association between indicators of preschool quality and children's first grade peer acceptance ratings.

Discussion

Review

A review of the literature indicates that the peer relationships in early childhood have lasting impacts on children's development later in life (Howes, 2000; Howes et al., 1994; Walden et al., 1999). For example, positive peer relationships are associated with later social competency and increased academic achievement (Howes, 2000; Howes & Phillipsen, 1998; Ladd, 1990). Many factors contribute to the development of peer relationships. The current study focused on the impact that preschool quality, including structural, process and physical features, and teacher-child relationships have on peer relationships in early childhood. Research suggests that high quality preschool programs are associated with positive development of peer relationships among children (Peisner-Feinberg et al., 2001). Additionally, because teacher-child relationships serve as models for peer relationships among children, healthy teacher-child relationships should be associated with skills necessary for healthy peer relationships (Rudasill et al., 2006).

The purpose of this study was to examine the relationship between three broad constructs of preschool quality, preschool teacher-child relationships, and peer relationships at first grade. As indicated by the review of the literature, two key aspects of peer relationships are peer acceptance and friendship quality (Sebanc, 2003; Walden et al., 1999). Therefore I considered the effects of preschool quality and teacher-child relationship quality on each of these constructs separately to investigate whether preschool experiences had different effects on various aspects of later peer relationships. Additionally, I hypothesized that a high-quality preschool setting may be necessary for a positive teacher-child relationship to exist and thus I

examined whether structural, process and physical quality impacted peer relationships indirectly through the teacher-child relationship. Furthermore, I inspected the possibility that child gender would moderate the relationship between preschool quality and peer relationships. O'Connor and McCartney (2006) determined that girls typically have higher quality relationships with their teachers as compared to boys. I hypothesized that preschool quality would be positively associated with peer relationships at first grade and that teacher-child relationship quality would either mediate or moderate that relationship. Finally, although I hypothesized that teacher-child relationship quality would mediate the effects of preschool quality on peer relationships, research has also suggested that high-quality teacher-child relationships can serve a protective function for children at risk (Rudasill et al., 2006; Garner & Waajid, 2008). Therefore I also investigated the possibility that these relationships might moderate the association between the three indicators of preschool quality and the peer acceptance and friendship quality such that children who were in low-quality settings but who had positive teacher-child relationships would have better peer relationships than children in low-quality settings with poor teacher-child relationships.

Direct Effects

I first fit a model regressing each indicator of peer relationships on structural, process and physical quality. When preschool quality was regressed on peer acceptance, I found three significant indicators. Group size negatively predicted peer acceptance such that larger group sizes were associated with less peer acceptance. Previous research suggests that smaller group sizes are associated with positive outcomes for children (Copple & Bredekamp). When there are fewer children in a classroom each child receives more direct interaction with their teacher

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and experiences more social interactions with their peers as compared to children in classrooms with large group sizes (Blatchford et al., 2002). Larger group sizes may mean less attention from teachers which in turn may be related to children acting out and being more rejecting of peers (Nye et al., 1999). Additionally, smaller group sizes in early childhood are related to higher achievement in both reading and mathematics later in school (Nye et al., 1999).

Caregiver years of experience was also marginally associated with peer acceptance such that more experience in childcare predicted greater peer acceptance among children. Experience among caregivers could be a positive influence for a number of reasons. First, teachers that have more experience are more comfortable in the classroom and are likely to set children at ease, thereby creating an environment in which children are more likely to accept one another (Pianta et al., 2005). Additionally, teachers with more experience may have a better understanding of how to teach peer relationship skills to their children. Pianta and colleagues (2005) determined that more experience teaching was related to higher quality classrooms, marked by healthy teacher-child interactions, appropriate discipline, and encouraging language to develop reasoning skills. Caregivers with more years of experience may have had the opportunity to work with a wider range of children throughout their teaching years. As a result, they may have learned effective strategies for fostering peer relationships among children, especially more behaviorally challenging children. Additionally, experienced teachers may have a better understanding of how relationships develop among young children and are able to assist children in a variety of strategies that would aid in the development of peer relationships, such as problem-solving and communication skills (Pianta et al., 2005).

Finally, physical quality, marked by health, safety, and organization negatively predicted peer acceptance suggesting that preschools with high quality physical environments are associated with less peer acceptance among children. This finding does not coincide with the small body of previous research examining physical quality, which indicates that physical quality is a positive predictor of social behavior (Read et al., 1999; Mashburn, 2008). For example, Read and colleagues (1999) determined that aspects of physical quality including wall color and ceiling heights had a positive impact on children's ability to play cooperatively with one another. The finding from my study suggests the opposite – that physical quality does not help foster positive peer interactions. However, I must consider the role that teachers might play in fostering the relationship between physical quality and child outcomes. That is, the classroom environment may have sufficient materials and enough space, but if a teacher does not organize the classroom in a way that allows for optimal peer interactions, the high quality of materials and space would not matter. One difference between the current study and other studies is that my measure of physical quality included a sum of three indicators: health, safety, and organization, and did not include specific information about classroom color or physical room structure. Additionally, an important indicator of physical quality, adequate space for play, was not included in the construct I used. It may be that the physical space and organization matters more than health and safety practices. Indeed, NAEYC offers recommendations for the amount of space per child that should be available in a play room, suggesting 35 square-feet (Copple & Bredekamp, 2008).

It is also possible that children in this study were affected differently by physical quality. For instance, if a preschool was in pristine condition with nothing out of place, children may

have felt suffocated and unable to express themselves.  They may have felt as if they could not truly play for fear of making a mess or breaking something.  Additionally, strict rules about health and cleanliness may have caused stress among the children, leading them to believe they could not truly express themselves. Therefore they would be less likely to accept their peers, as they did not feel comfortable to begin with. Yet I must also examine the possibility of measurement error.  Only one indicator of physical quality was used and may not have been sufficient in adequately measuring the physical quality of the preschool environment.  Future studies might consider examining the organizational quality scale alone or might investigate other physical space indices as predictors of peer acceptance and friendship quality.

I also found that teacher-child relationship quality positively affected peer acceptance at first grade.  This finding reflects existing literature in that healthy teacher-child relationships serve as models for how children should treat one another, and thereby be accepting of their peers (Rudasill et al., 2006). Children who have healthy relationships with their teachers are likely to transfer those relationship skills to their peers.  Those children show high levels of prosocial behaviors and are able to be involved in complex play with their peers whereas children with unhealthy teacher-child relationships are more aggressive and socially withdrawn (Garner & Waajid, 2008).  Furthermore, one indicator of a low-quality teacher-child relationship is over-dependency (Howes et al., 1994).  Children that are overly dependent on their teachers are also noticed as being clingy by other children.  This discourages the children to be accepting of the overly dependent child (Garner & Waajid, 2008; Howes et al., 1994; Pianta et al., 2005).

Research has indicated that the relationships children develop early in life have a lasting effect on social skills as well as academic outcomes (Birch & Ladd, 1997; 1998; Hamre & Pianta,

2001; Rudasill et al., 2006). This study provides evidence that teacher-child relationships in preschool also have a long-term effect on children's peer relationships, as peer acceptance and friendship quality were measured in first grade. The association between teacher-child relationship quality and peer acceptance has important implications for teacher training in that teachers' education and training should include a focus on fostering positive relationships among children during the preschool years.

There were no significant relationships among the indicators of preschool quality and friendship quality, suggesting that preschool quality may not have an impact on friendship quality. However, this may be due to the use of poor indicators of friendship quality. Only one indicator of friendship quality was used and may have not been sufficient. Additionally, that indicator was based solely on mothers' perceptions rather than observations or a combination of both. Research by Parker and Asher (1993) highlights a commonly used measure of friendship quality, the Friendship Quality Questionnaire (FQQ). This measure was a questionnaire administered directly to children in reference to a specific "best" friend and assessed children's perceptions of their friendship. As compared to the Playmate Questionnaire, the FQQ was completed by children rather than from mothers' perceptions. Additionally, the FQQ took into account friendship reciprocity, meaning both children involved acknowledged the other as a friend. When mothers completed the Playmate Questionnaire, it was based on a child whom they thought their own child was friends with, which may have been an incorrect assumption. The FQQ may have been a more reliable indicator of friendship quality; however it was not included in the NICHD data collection. Thus, future studies should

consider not only alternative measures of friendship quality but also the use of multiple informants, including the child, parent, teacher and perhaps observer.

The limited number of findings between preschool quality and child outcomes was surprising. Previous research has demonstrated the associations between preschool quality and positive child outcomes such that high-quality preschools are associated with decreased behavior problems, increased cognitive skills, and healthy social skills (Burchinal et al., under review; Lamb & Ahnert, 2006; Mashburn et al., 2008; McCartney et al., 2010; NICHD ECCRN, 1999, 2002b, 2005; Nye et al., 1999; Peisner-Feinberg et al., 2001; Pianta et al., 2005). Differences between my findings and those of other studies may be accounted for by the varying conceptualizations of quality used. In this study, I chose to divide aspects of quality into three categories: structural, process and physical. I took this approach because I was interested in whether there were specific aspects of the child's preschool experience that predicted peer relationships. Other research has examined quality by a total quality index which reflects the child's overall experience in the setting and often includes aspects of both structural and process quality. The use of different quality indices may partially explain differences between my findings and those from other studies. Additionally, the current study looked at the long-term effects of quality on later peer relationships without accounting for experiences in between preschool and first grade. Research suggests that the positive effects of high-quality experiences may fade by the time children reach first grade. For example, 60-80% of the cognitive gains made in high quality preschool settings dissipate by the time children enter first grade (Magnuson & Waldfogel, 2004). Therefore it would not be surprising to find that the positive effects of quality on social and relational skills dissipated in the same manner.

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Although I found few effects, my approach to examining quality was unique and was meant to provide more detailed information on children's preschool experiences than is typically provided by a broad quality construct. Had I found more associations, my study could have provided useful information to practitioners and policy-makers about which elements of the classroom experience are especially important for later developmental outcomes. Contrarily, the results I found may provide important implications for policy-makers and practitioners. My research implied that the individual aspects of preschool quality had no impact on friendship quality. As previously mentioned, overall quality may be what is important as compared to individual aspects of quality. Policy-makers might choose to examine the effect of total quality on peer relationships.

Mediation

After examining the direct effects model, I looked at the mediating role that teacher-child relationship quality plays in the association between preschool quality indices and peer relationships. Both group size and physical quality remained significant predictors of peer acceptance after adding teacher-child relationship quality, indicating no mediation. Physical quality also had no impact on teacher-child relationship quality, indicating that teachers could have good relationships with their children regardless of the quality of their physical environment. That is, this research may indicate that it is possible to have a high-quality teacher-child relationship in the absence of a high-quality classroom environment. However, slight mediation exists in the relationship between caregivers' years of experience and peer acceptance. That is, caregivers' years of experience has a positive impact on teacher-child

relationships, which in turn has a positive impact on peer acceptance. This suggests that caregivers with more experience are likely to have healthier relationships with children in their classrooms. As previously mentioned, those healthy teacher-child relationships have a positive effect on peer acceptance among children (Garner & Waajid, 2008; Howes et al., 1994; Pianta et al., 2005).

As with preschool quality, there was no relationship between teacher-child relationship quality and friendship quality which further presses the point that the indicator of friendship quality was not likely a good measure. Previous research has indicated that there is an association between teacher-child relationship quality and friendship quality (Howes et al., 1994). Garner and Waajid (2008) suggest that healthy teacher-child relationships increase children's feelings of involvement, thereby encouraging them to explore the classroom and become involved with their peers. As previously mentioned, a measure such as the FQQ may serve as more reliable (Parker & Asher, 1993).

Moderation by child gender and teacher-child relationship quality

I hypothesized that preschool quality may have a different effect on peer relationships for boys than it does for girls so I tested interactions between my significant quality indices and child gender. I found no evidence of moderation by child gender. That is, the effect of preschool quality (i.e., group size, caregivers' years of experience, and physical quality) on peer acceptance was not different based on gender of the child. Little research has been done on the effect of child gender on the relationship between preschool quality and peer acceptance. Thus, my research provides novel and important information about the role or lack thereof, that child gender plays in children's early experiences and relationships.

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Finally, although I hypothesized that the effect of preschool quality on peer

relationships would work through the quality of the teacher-child relationships, previous work

has suggested that the teacher-child relationship may serve to protect children against negative

experiences in the classroom or home (O'Connor & McCartney, 2006). For example, O'Connor

and McCartney (2006) reported that healthy teacher-child relationships acted as protective

factors for children's future relationships with teachers. Thus, I also examined whether teacher-

child relationship quality moderated the association between preschool quality and peer

relationships. I found no significant moderation, suggesting that teacher-child relationship

quality does not affect or change the relationship between preschool quality and peer

relationships. This may be because I found few significant relationships between indicators of

quality (class size, caregivers' years of experience, and physical quality) and peer acceptance

and no significant relationships between indicators of preschool quality and friendship quality.

Another explanation is that positive aspects of teacher-child relationships (i.e. closeness) serve

as protective factors while negative aspects (i.e. conflict and dependency) act as risk factors.

Future studies might consider examining the effect that different aspects of teacher-child

relationships have on children's peer relationships.

Limitations and future directions

Limitations of this research include the measures used and the sample. Only one

indicator was used for physical quality, teacher-child relationship quality, peer acceptance, and

friendship quality which may not have been sufficient. Future research should consider the use

of multiple measures of each of these constructs. For example, physical quality might be

examined with separate constructs for health, safety, and organization. Additionally, teacher-

child relationship quality could be divided into positive (closeness) and negative aspects (conflict and dependency). As previously mentioned, a commonly used measure for friendship quality, the FQQ , could be used as a more reliable indicator. This measure involved child rather than mother perception. The FQQ, however, did not include observation, which would be an additional indicator of friendship quality a future study may consider. Other methods of assessing peer relationships, including observation, might also be valuable. Furthermore, my models may have been over-controlled. That is, I controlled for SES, gender, and behavioral qualities that might be important in predicting peer relationships. Future studies should consider less control variables. An additional factor to consider is child temperament and disposition. Whether a child is easy-going or high-stress undoubtedly plays an important role in how they develop relationships with their peers. For example, two children in the same high-quality classroom with healthy relationships with their teacher are likely to have different outcomes in their peer relationships especially if one is shy and one is outgoing.

The sample used in this research was not very diverse, with 854 participants and 24% minorities. Further research should be done to examine the differences among race and socioeconomic status, as this sample did not include enough variety to test for that. There is a considerable body of evidence suggesting that preschool quality may matter more for some children than for others (e.g., Caughy, DiPietro, & Strobino, 1994; Currie, 2001; Desai, Chase-Lansdale, & Michael, 1989; Lamb & Ahnert, 2006). Importantly, research suggests that the impact of teacher-child relationships may vary based upon race (O'Connor & McCartney, 2006) although more research should be done to determine the dynamics of that association.

Future studies may choose to examine preschool quality with concurrent peer relationship outcomes. Perhaps the quality of a preschool has an immediate impact on children's peer relationships while in preschool. As noted above, these concurrent effects may fade depending on the kind of classroom children move into. Additionally, this study aimed to tease apart the different indicators of preschool quality and divided them into three categories: structural, process and physical quality. Although I did find that parts of structural quality as well as physical quality did have an impact on peer acceptance, a future study may examine preschool quality as a whole. It may be that the entire experience, rather than the specific aspects of the experience, contributes to the outcomes in peer relationships. As previous research indicates, peer relationships are enormously important aspects of young children's lives (Hartup, 1992; Howes, 2000; Ladd, 1990; Shulman, 1993; Walden et al., 1999) and preschool quality is an important factor that may contribute to how their peer relationships are formed.

Conclusion

In conclusion, the results of this research indicated that various indicators of structural, process, and physical quality in the preschool setting were not associated with friendship quality at first grade. However, class size, caregivers' years of experience, and physical quality were significant in predicting peer acceptance in first grade. Teacher-child relationship quality slightly mediated in the relationship between caregivers' years of experience and peer acceptance at first grade. There was no evidence of moderation by either teacher-child relationship quality or child gender. Clearly additional research is needed to better understand

the role that various aspects of children's preschool experiences plays in the development of

their early peer relationships.

References

Birch, S.H., & Ladd, G.W. (1997). The teacher-child relationship and children's early school

    adjustment. Journal of School Psychology, 35, 61-79.

Birch, S.H., & Ladd, G.W. (1998). Children's interpersonal behaviors and the teacher-child

    relationship. Developmental Psychology, 34, 934-946.

Blatchford, P., Moriarty, V., Edmonds, S., Martin, C. (2002). Relationships between class size

    and teaching: A multimethod analysis of English infant schools. American Educational

    Research Journal, 39 (1), 101-132.

Bowlby, J. (1982). Attachment and loss:  Vol.  1 Attachment.  New York: Basic Books. (Original

    work published 1969).

Bub, K. (2009). Testing the effects of classroom supports on children's social and behavioral

    skills at key transition points using latent growth modeling. Applied Developmental

    Science, 13 (3), 13-148.

Burchinal, M., Howes, C., Pianta, R. C., Bryant, D., Early, D., Clifford, R., et al. (2005). Predicting

    child outcomes at the end of kindergarten from the quality of pre-kindergarten

    teaching, instruction, activities, and caregiver sensitivity: Manuscript under review.

Caldwell, B. & Bradley, B. (1984). Home Observation Measurement of the Environment. Little

    Rock, AR:  University of Arkansas at Little Rock.

Caughy, M. O., DiPietro, J. A., & Strobino, D. M. (1994). Day-care participation as a protective

    factor in the cognitive development of low-income children. Child Development, 65,

    457–471.

Cillessen, A.H.N., Terry, R.A., Coie, J.D., & Lochman, J.E., (1992). Accuracy of teacher-

identification of children's sociometric status positions. Paper presented at the

Conference on Human Development, Atlanta, GA.

Clark, K.E. & Ladd, G.W. (2000). Connectedness and autonomy support in parent-child

relationships:  Links to children's socioemotional orientation and peer relationships.

Developmental Psychology, 36 (4), 485-498.

Copple C. & Bredekamp, S. (Eds.). (2008). Developmentally appropriate practice in early

childhood programs serving children from birth through age 8. Washington D.C.:

National Association for the Education of Young Children.

Currie, J. (2001). Early childhood education programs. Journal of Economic Perspectives, 15,

213–238.

Desai, S., Chase-Lansdale, P. L., & Michael, R. T. (1989). Mother or market? Effects of maternal

employment on the intellectual ability of four-year-old children. Demography, 26, 545–

561.

Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth

through Age 8 (2008). Retrieved October 14, 2009 from

https://oldweb.naeyc.org/about/positions/daptoc.asp

Evans, G.W. (2004). The Environment of Childhood Poverty. American Psychologist, 59, 77-92.

Evans, G.W., Gonnella, C., Marcynyszyn, L.A., Gentile, L., & Salpekarall, N. (2005). The role of

chaos in poverty and children's socioemotional adjustment. Psychological Science, 16,

560-565.

Garner, P.W. & Waajid, B. (2008). The associations of emotion knowledge and teacher-child

 relationships to preschool children's school related developmental competence. Journal

 of Applied Developmental Psychology, 29, 89-100.

Gresham, F. M., & Elliott, S. N. (1990). The social skills rating system. Circle Pines, MN: American

 Guidance Service.

Guralnick, M.J. & Groom, J.M. (1988). Friendships of preschool children in mainstreamed

 playgroups. Developmental Psychology, 24 (4), 595-604.

Hamre, B.K., & Pianta, R.C. (2001). Early teacher-child relationships and the trajectory of

 children's school outcomes through eighth grade. Child Development, 72, 625-638.

Hamre, B.K., & Pianta, R.C. (2005). Can emotional and structural support in the first-grade

 classroom make a difference for children at risk of school failure? Child Development, 76

 (5), 949-967.

Hartup, W.W. (1989). Behavioral manifestations of children's friendships. In Berndt T.J. & Ladd

 G.W. (Eds.), Peer relationships in child development (pp. 46-70). Oxford, Englad: John

 Wiley and Sons.

Hartup, W.W. (1992). Friendships and their developmental significance. In McGurk, H. (Ed.)

 Childhood social development (175-205). Hillsdale, NJ:  Lawrence Erlbaum Associates,

 Inc.

Hestenes, L.L, Cassidy, D.J., Shim, J., & Hegde, A.V. (2008). Quality in inclusive preschool

 classrooms. Early Education and Development, 19 (4), 519-540.

Howes, C. (2000). Social-emotional classroom climate in child care, child-teacher relationships

 and children's second grade peer relations. Social Development, 9 (2), 191-204.

Howes, C., Hamilton, C.E., & Matheson, C.C. (1994). Children's relationships with peers: Differential associations with aspects of the teacher-child relationship. Child Development, 65, 253-263.

Howes, C. & Phillipsen, L. (1998). Continuity in children's relationships with peers. Social Development, 7 (3), 340-349.

Hyson, M.C., Hirsh-Pasek, K., & Rescorla, L. (1990). The Classroom Practices Inventory: An observation instrument based on NAEYC's guidelines for developmentally appropriate practices for 4- and 5-year-old children. Early Childhood Research Quarterly, 5 (4), 475-494.

Innocenti, M.S., Stowitschek, J.J., Rule, S., Killoran, J., Striefel, S., & Boswell, C. (1986). A naturalistic study of the relation between preschool setting events and peer interaction in four activity contexts. Early Childhood Research Quarterly, 1, 141-153.

Ladd, G.W. (1983). Social networks of popular, average, and rejected children in school settings. Merrill-Palmer Quarterly, 29, 283-307.

Laad, G.W. (1990). Having friends, keeping friends, making friends, and being liked by peers in the classroom: Predictors of children's early school adjustment? Child Development, 61, 1081-1100.

Lamb, M.E. & Anhert, L. (2006). Nonparental child care: Contexts, concepts, correlates, and consequences. In W. Damon, L.M. Lerner, K.A. Renninger, I.E. Sigel (Eds.), Handbook of Child Psychology, Volume 4, Child Psychology in Practice, 6th Edition. Wiley.

Lindsey, E.W. (2002). Preschool children's friendships and peer acceptance: Links to social competence. Child Study Journal, 32 (3), 145-156.

Mashburn, A.J. (2008). Quality of social and physical environments in preschools and children's

    development of academic, language, and literacy skills. Applied Developmental Science,

    12 (3). 113-127.

Mashburn, A.J., Pianta, R.C., Hamre, B.K., Downer, J.T. Barbarin, O.A., Bryant, D., Burchinal, M.,

    & Early, D.M. (2008). Measures of classroom quality in prekindergarten and children's

    development of academic, language, and social skills. Child Development, 79 (3), 732-

    749.

McCartney, K., Burchinal, M., Clarke-Stewart, A.C., Bub, K.L., Owen, M.T., & Belsky, J. (2010).

    Testing a series of causal propositions relating time in child care to children's

    externalizing behaviors. Developmental Psychology, 46 (1), 1-17.

Mischel, W. (1974). Processes in delay of gratification. In L Berkowitz (Ed.), Advances in

    Experimental Social Psychology, Vol. 3 (pp. 249-292). San Diego, CA: Academic Press.

NICHD Early Child Care Research Network (ECCRN). (1996). Classroom Observational System.

NICHD Early Child Care Research Network (ECCRN). (1999). Child care and mother-child

    interaction in the first three years of life. Developmental Psychology, 35, 1399-1413.

NICHD Early Child Care Research Network (ECCRN). (2002a). Child-care structure -> process ->

    outcome: Direct and indirect effects of child-care quality on young children's

    development. Psychological Science, 13 (3), 199-206.

NICHD Early Child Care Research Network (ECCRN). (2002b). Early child care and children's

    development prior to school entry: Results from the NICHD Study of Early Child Care.

    American Educational Research Journal, 39, 133-164.

NICHD Early Child Care Research Network (ECCRN). (2005). Early child care and children's

    development in the primary grades:  Follow-up results from the NICHD study of early

    child care. American Educational Research Journal, 42 (3), 537-570.

National Institute for Early Education Research. (n.d.) Resources. Retrieved October 14, 2009

    from http://nieer.org/resources/policybriefs/9.pdf

National Institute for Early Education Research. (n.d.) The state of preschool 2008. Retrieved

    October 14, 2009 from http://nieer.org/yearbook/pdf/yearbook.pdf

National KIDS COUNT Program. (2008) Children enrolled in nursery school, preschool or

    kindergarten by age group. Retrieved October 14, 2009 from

    http://datacenter.kidscount.org/data/acrossstates/Rankings.aspx?ind=72

Nye, B., Hedges, L.V., & Konstantopoulos, S. (1999). The long-term effects of small classes: A

    five-year follow-up of the Tennessee class size experiment. Educational Evaluation and

    Policy Analysis, 21 (2), 127-142.

O'Connor, E. & McCartney, K. (2006). Testing associations between young children's

    relationships with mothers and teachers. Journal of Educational Psychology, 98(1), 87-

    98.

Parker, J.G., & Asher, S.R. (1993). Friendship and friendship quality in middle childhood:  Links

    with peer group acceptance and feelings of loneliness and social dissatisfaction.

    Developmental Psychology, 29 (4), 611-621.

Parker, J.G. & Gottman, J.M. (1989). Social and emotional development in a relational context:

    Friendship interaction from early childhood to adolescence. In Berndt T.J. & Ladd G.W.

(Eds.), Peer relationships in child development (pp. 95-131). Oxford, Englad: John Wiley and Sons.

Peisner-Feinberg, E.S., Burchinal, M.R., Clifford, R.M., Culkin, M.L., Howes, C., Kagan, S.L., & Yazejian, N. (2001). The relation of preschool child-care quality to children's cognitive and social development trajectories through second grade. Child Development, 72 (5), 1534-1553.

Pianta, R.C. (1992). Conceptual and methodological issues in research on relationships between children and nonparental adults. In Robert Pianta (Ed). (1992). Beyond the parent: The role of other adults in children's lives. New directions for child development, No. 57. (pp. 121-129). San Francisco, CA: Jossey-Bass Inc.

Pianta, R.C., Howes, C., Burchinal, M., Bryant, D., Clifford, R., Early, D. & Barbarin, O. (2005). Features of pre-kindergarten programs, classrooms, and teachers: Do they predict observed classroom quality and child-teacher interactions? Applied Developmental Science, 9 (3), 144-159.

Pianta, R. C., La Paro, K. M., Payne, C., Cox, M. J., & Bradley, R. (2002). The relation of kindergarten classroom environment to teacher, family, and school characteristics and child outcomes. Elementary School Journal, 102, 225-238.

Pianta, R.C. & Steinberg, M. (1992). Teacher-child relationships and the process of adjusting to school. In Pianta, R.C. (Ed.) Beyond the parent:  The role of other adults in children's lives (61-80). San Francisco, CA:  Jossey-Bass.

Raver, C. C., Garner, P., & Smith-Donald, R. (2007). The roles of emotion regulation and emotion knowledge for children's academic readiness: Are the links causal? In R. C. Pianta, M. J.

Cox, & K. L. Snow (Eds.), School readiness and the transition to kindergarten in the era of accountability (pp. 121–147). Baltimore: Brookes.

Read, M.A., Sugawara, A.I., & Brandt, J.A. (1999). Impact of space and color in the physical environment in preschool children's cooperative behavior. Environment and Behavior, 31 (3), 413-428.

Rudasill, K.M., Rimm-Kaufman, S.E., Justice, L.M., & Pence, K. (2006). Temperament and language skills as predictors of teacher-child relationship quality in preschool. Early Education and Development, 17 (2), 271-291.

Sebanc, A.M. (2003). The friendship features of preschool children: Links with prosocial behavior and aggression. Social Development, 12 (2), 249-268.

Shim, J., Hestenes, L., & Cassidy, D. (2004). Teacher structure and child care quality in preschool classrooms. Journal of Research in Childhood Education, 19 (2), 143-157.

Shoda, Y., Mischel, W., & Peake, P. (1990) Predicting adolescent cognitive and self-regulatory competencies from preschool delay of gratification: Identifying diagnostic conditions. Developmental Psychology, 26, 978-986.

Shulman, S. (1993). Close friendships in early and middle adolescence: Typology and friendship reasoning. In Laursen, B. (Ed.) Close friendships in adolescence (55-71). San Francisco, CA: Jossey-Bass.

Vandell, D.L. (1995). Playmate demographic characteristics. Unpublished questionnaire.

Walden, T., Lemerise, E., & Smith, M.C. (1999). Friendship and popularity in preschool classrooms. Early Education and Development, 10 (3), 351-371.

Wood, J.J. (2007). Academic competence in preschool: Exploring the role of close relationships

and anxiety. Early Education and Development, 18 (2), 223-242.

Table 1.

Descriptive Statistics for All Variables

| | Variable | N | Mean (SD) |
|---|---|---|---|
| Friendship Quality | positive relationship | 854 | 3.22 (.31) |
| Peer Acceptance | child well liked | 854 | 16.15 (3.02) |
| Quality: Structural | number of children | 854 | 12.71 (7.37) |
| | teacher-child ratio | 854 | 7.75 (4.31) |
| | caregiver experience (in years) | 854 | 10.75 (6.63) |
| | caregiver education (in years) | 854 | 15.11 (2.17) |
| Quality: Process | positive emotional climate | 854 | 3.51 (.81) |
| | reads aloud to children | 854 | 2.29 (4.00) |
| | encourages or praises | 854 | 3.47 (3.87) |
| | teaches social rule | 854 | 1.08 (1.78) |
| | exhibits prosocial tendencies | 854 | 0.81 (1.49) |
| Quality: Physical | sum of health, saftey, and organization | 854 | 16.82 (2.10) |
| Teacher-Child Relationships | total relationship quality | 854 | 115.29 (10.2) |
| Control | gender | 854 | 0.49 (0.50) |
| | problem behavior | 854 | 98.75 (10.34) |
| | self-regulation | 854 | 0.57 (0.47) |
| | mother's education (in years) | 854 | 14.58 (2.44) |
| | income to need at 54 months | 854 | 3.88 (3.36) |

Table 2.
Descriptive Statistics for All Variables for by Gender

| | | Female | | Male | | |
|---|---|---|---|---|---|---|
| | Variable | N | Mean (SD) | N | Mean (SD) | T-value |
| Friendship Quality | positive relationship | 435 | 3.25 (0.32) | 419 | 3.19 (0.30) | 2.71** |
| Peer Acceptance | child well liked | 435 | 16.24 (3.01) | 419 | 16.07 (3.04) | 0.82 |
| Quality: Structural | number of children | 435 | 12.73 (7.78) | 419 | 12.70 (7.16) | 0.07 |
| | teacher-child ratio | 435 | 7.65 (4.18) | 419 | 7.85 (4.45) | -0.67 |
| | caregiver experience (in years) | 435 | 10.40 (5.88) | 419 | 11.09 (7.32) | -1.51 |
| | caregiver education (in years) | 435 | 15.19 (2.17) | 419 | 15.03 (2.14) | 1.10 |
| Quality: Process | positive emotional climate | 435 | 3.51 (0.80) | 419 | 3.50 (0.83) | 0.35 |
| | reads aloud to children | 435 | 2.27 (3.96) | 419 | 2.30 (4.05) | -0.14 |
| | encourages or praises | 435 | 3.46 (3.71) | 419 | 3.48 (4.04) | -0.09 |
| | teaches social rule | 435 | 0.97 (1.55) | 419 | 1.19 (1.99) | -1.85~ |
| | exhibits prosocial tendencies | 435 | 0.87 (1.50) | 419 | 0.75 (1.49) | 1.14 |
| Quality: Physical | sum of health, saftey, and organization | 435 | 16.87 (1.93) | 419 | 16.77 (2.26) | 0.66 |
| T-C Relationships | total relationship quality | 435 | 115.74 (9.75) | 419 | 114.82 (10.54) | 1.32 |
| Control | gender | 435 | 0 (0) | 419 | 1 (0) | |
| | problem behavior | 435 | 100.51 (10.35) | 419 | 96.92 (10.02) | 5.15*** |
| | self-regulation | 435 | 0.58 (0.48) | 419 | 0.55 (0.46) | 0.72 |
| | mother's education (in years) | 435 | 14.61 (2.42) | 419 | 14.55 (2.45) | 0.32 |
| | income to need at 54 months | 435 | 3.94 (3.88) | 419 | 3.82 (2.73) | 0.53 |

~p<.1
**p<.01
***p<.001

Table 3
Correlations Among All Variables (n=854).

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Peer Acceptance | 1.00 | | | | | |
| 2. Friendship Quality | 0.08 | 1.00 | | | | |
| 3. Group Size | -0.05 | 0.03 | 1.00 | | | |
| 4. Ratio | 0.00 | 0.04 | 0.68*** | 1.00 | | |
| 5. Caregivers Experience | 0.06~ | 0.01 | -0.01 | 0.00 | 1.00 | |
| 6. Caregivers Education | 0.04 | 0.03 | 0.18*** | 0.08* | 0.09** | 1.00 |
| 7. Postive Emotional Climate | 0.04 | 0.04 | -0.08* | -0.19*** | 0.09* | 0.15*** |
| 8. Reads to Children | 0.02 | -0.01 | 0.05 | 0.05 | -0.01 | 0.03 |
| 9. Encourages/Praises | -0.02 | 0.01 | -0.07* | -0.09** | 0.05 | 0.13 |
| 10. Teaches Social Rule | 0.03 | -0.05 | -0.02 | -0.02 | 0.01 | 0.04 |
| 11. Prosocial Tendencies | 0.01 | -0.01 | -0.05 | -0.09* | 0.06~ | -0.003 |
| 12. Total Physical Quality | -0.04 | -0.02 | -0.01 | -0.19*** | 0.10** | 0.13*** |
| 13. Teacher-child Relationship Quality | 0.24*** | 0.09* | 0.07~ | 0.02 | 0.06~ | 0.11** |
| 14. Gender | -0.03 | -0.09** | 0.00 | 0.02 | 0.05 | -0.04 |
| 15. Problem Behavior | -0.10** | -0.10** | 0.01 | 0.02 | -0.02 | -0.03 |
| 16. Self-regulation | 0.11** | 0.07* | 0.01 | 0.02 | -0.01 | 0.05 |
| 17. Mother's Education | 0.14*** | 0.19*** | 0.08* | 0.07* | 0.00 | 0.14*** |
| 18. Income-to-needs | 0.12*** | 0.14*** | 0.12*** | 0.08* | 0.03 | 0.11** |

~p<.1
*p<.05
**p<.01
***p<.001

Table 3 (cont.)

| | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|
| 7. Postive Emotional Climate | 1.00 | | | | | |
| 8. Reads to Children | 0.05 | 1.00 | | | | |
| 9. Encourages/Praises | 0.18*** | 0.06~ | 1.00 | | | |
| 10. Teaches Social Rule | 0.09* | 0.03 | 0.17*** | 1.00 | | |
| 11. Prosocial Tendencies | 0.01 | -0.06~ | 0.02 | 0.10** | 1.00 | |
| 12. Total Physical Quality | 0.42*** | 0.02 | 0.09** | -0.02 | 0.00 | 1.00 |
| 13. Teacher-child Relationship Quality | 0.12*** | 0.00 | 0.05 | -0.00 | 0.04 | 0.04 |
| 14. Gender | -0.01 | 0.00 | 0.00 | 0.06~ | -0.04 | -0.02 |
| 15. Problem Behavior | -0.09* | 0.04 | 0.06~ | -0.02 | -0.02 | -0.07* |
| 16. Self-regulation | 0.06 | 0.03 | -0.02 | -0.05 | 0.00 | 0.00 |
| 17. Mother's Education | 0.14*** | 0.02 | 0.02 | 0.08* | 0.01 | 0.07~ |
| 18. Income-to-needs | 0.13*** | 0.02 | 0.04 | 0.09** | -0.02 | 0.07* |

~p<.1
*p<.05
**p<.01
***p<.001

Table 3 (cont.)

|  | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|
| 13. Teacher-child Relationship Quality | 1.00 | | | | | |
| 14. Gender | -0.05 | 1.00 | | | | |
| 15. Problem Behavior | -0.17*** | -0.17*** | 1.00 | | | |
| 16. Self-regulation | 0.07* | -0.02 | -0.06~ | 1.00 | | |
| 17. Mother's Education | 0.09** | -0.01 | -0.05 | 0.19*** | 1.00 | |
| 18. Income-to-needs | 0.09** | -0.02 | -0.07* | 0.15*** | 0.47*** | 1.00 |

~p<.1
*p<.05
**p<.01
***p<.001

Table 4
Regression Coefficients of Predictors on Peer Acceptance (n=854).

| | Peer Acceptance | | | | | |
|---|---|---|---|---|---|---|
| | Model I | Model II | Model III | Model IV | Model V | Model VI |
| Intercept | 16.20 | 15.81 | 17.79 | 17.02 | 8.20 | 9.38 |
| **Structural** | | | | | | |
| size | -0.05** (0.02) | | | -0.05* (0.02) | | -0.05** (0.02) |
| ratio | 0.05 (0.03) | | | 0.04 (0.03) | | 0.04 (0.03) |
| experience | 0.03~ (0.02) | | | 0.03~ (0.02) | | 0.02 (0.02) |
| education | 0.02 (0.05) | | | 0.03 (0.05) | | 0.01 (0.05) |
| **Process** | | | | | | |
| positive climate | | 0.07 (0.14) | | 0.19 (0.15) | | 0.12 (0.15) |
| reads | | 0.01 (0.03) | | 0.02 (0.03) | | 0.02 (0.03) |
| encourages | | -0.03 (0.03) | | -0.04 (0.03) | | -0.04 (0.03) |
| social rule | | -0.01 (0.07) | | -0.03 (0.07) | | -0.02 (0.06) |
| prosocial | | -0.01 (0.07) | | -0.01 (0.07) | | -0.03 (0.07) |
| **Physical** | | | | | | |
| physical quality | | | -0.11* (0.05) | -0.13* (0.07) | | -0.11* (0.05) |
| **STR** | | | | | | |
| relationship quality | | | | | 0.06*** (0.01) | 0.06*** (0.01) |
| R² | 0.07 | 0.06 | 0.06 | 0.07 | 0.09 | 0.12 |

~ p<.1
*p <.05
**p <.01
***p <.001

Table 5

Regression Coefficients of Predictors on Friendship Quality (n=854).

| | Friendship Quality | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Model I | Model II | Model III | Model IV | Model V | Model VI |
| Intercept | 3.33 | 3.33 | 3.41 | 3.41 | 3.14 | 3.24 |
| **Structural** | | | | | | |
| size | 0.00 (0.00) | | | 0.00 (0.00) | | 0.00 (0.00) |
| ratio | 0.001 (0.003) | | | 0.00 (0.00) | | 0.00 (0.00) |
| experience | 0.001 (0.001) | | | 0.00 (0.00) | | 0.00 (0.00) |
| education | -0.001 (0.01) | | | -0.001 (0.01) | | -0.001 (0.01) |
| **Process** | | | | | | |
| positive climate | | -0.001 (0.01) | | 0.01 (0.02) | | 0.01 (0.02) |
| reads | | 0.00 (0.00) | | 0.00 (0.00) | | 0.00 (0.00) |
| encourages | | 0.00 (0.00) | | 0.00 (0.00) | | 0.00 (0.00) |
| social rule | | -0.01 (0.01) | | -0.01~ (0.01) | | -0.01~ (0.01) |
| prosocial | | -0.002 (0.01) | | -0.001 (0.01) | | 0.00 (0.00) |
| **Physical** | | | | | | |
| physical quality | | | -0.01 (0.01) | -0.01 (0.01) | | -0.01 (0.01) |
| **STR** | | | | | | |
| relationship quality | | | | | 0.00 (0.00) | 0.00 (0.00) |
| R² | 0.06 | 0.07 | 0.06 | 0.07 | 0.06 | 0.07 |

~ p<.1

Figure 1

Hypothesized Path Model.