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PSYCHOLOGY

DO NICE GUYS FINISH LAST?

THE ROLE OF PROSOCIAL AND AGGRESSIVE BEHAVIOR IN PEER INTERACTIONS

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Dissertation under the direction of Professor Leonard Bickman

Existing research demonstrates that peer relationships are an important part of children's social contexts, with different types of peer interactions related to different benefits and risks as children develop. However, little is known about how individual child behaviors contribute to peer interactions and how various types of peer interactions differ from one another. This study examines how third grade children's prosocial and aggressive behaviors predict the number of mutual friendships they possess, the relative amount of social acceptance and rejection they experience from peers, and their prominence within their classroom network. Additionally, this study differentiates peer interaction measures by assessing reciprocated friendships, sociometric ratings, and social network analyses of betweenness centrality and rank prestige. For this dissertation, the prosocial and aggressive behaviors of 204 children in 13 classrooms were assessed in the fall by three types of informants (teacher, peer, and self-report). These behavioral assessments were then used to predict children's peer relationships four months later. Using multiple regression analyses, this study finds that prosocial behaviors can beneficially affect the development of friendship, peer acceptance, and network centrality and reduce peer rejection. Supporting the notion that while they may not finish first, these findings suggests that nice guys

do not finish last. Conversely, aggressive behaviors are found to often lead to negative peer outcomes such as peer rejection and friendlessness, especially when they occur without prosocial behavior. However, in combination with prosocial behavior, aggression increased network betweenness centrality, the likelihood of having a friend, and of being accepted by peers. The use of multiple informants in this study and their varying relationships with each outcome offer one explanation for why other studies have found aggression to be positively, negatively, and neutrally associated with peer interactions. Lastly, this study further supports the finding that friendship, peer preference, and network centrality are unique aspects of children's social lives. This dissertation is one more step towards understanding the complexity of prosocial and aggressive behaviors and the different aspects of peer interactions.

DO NICE GUYS FINISH LAST? THE ROLE OF PROSOCIAL AND AGGRESSIVE BEHAVIOR IN PEER INTERACTIONS

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An individual is usually defined as an indivisible, self-contained unit, with a separate, independent existence of its own. But individuals in this absolute sense are nowhere found in Nature or society, just as we nowhere find absolute wholes. Instead of separateness and independence, there is co-operation and interdependence, running through the whole gamut, from physical symbiosis to the cohesive bonds of the swarm, hive, shoal, flock, herd, family, and society.

-Arthur Koestler, 1967 p. 67

As a net is made up of a series of ties, so everything in this world is connected by a series of ties

-Buddha

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CHAPTER I

INTRODUCTION

Peers are an important component of the ecology of childhood. How socially accepted children are, who they befriend, and how they fit into social groups and the larger classroom network are all important elements of the context of children's lives and how they develop cognitively and emotionally. Numerous studies have found that children who are without friends, rejected by peers and isolated from their social networks experience negative outcomes such as school failure and psychopathology (e.g. Gifford-Smith & Brownell, 2003; Hartup, 1996). Additionally, the individual behaviors of children appear to contribute to how peers interact, with research traditionally viewing prosocial behaviors as highly adaptive to children's peer relationship and aggressive behaviors being detrimental to those interactions (Hartup & van Lieshout, 1995). When research has explored how individual child behaviors contribute to peer interactions, it tends to focus on friendship and social preference. Few studies have examined how behaviors contribute to children's larger social networks, thus, ignoring the larger context in which children are embedded. Furthermore, research in this area typically describes the behavioral characteristics of groups of children rather than assessing how such behaviors (e.g. altruism and aggression) contribute to peer interactions. For example, studies may find that rejected children tend to be aggressive but that does not mean that all aggressive children are rejected by their peers. Of the few studies that investigate the direct influence of prosocial and antisocial behaviors on peer interactions, not many have explored how these types of behaviors interact to contribute or hinder children's development of friendship, social status, and network

centrality. The primary goal of the present study is to examine how third grade children's prosocial and aggressive behaviors predict the number of mutual friendships they possess, the social acceptance and rejection they experience from peers, and their prominence within their classroom network. A secondary aim is to better describe and differentiate three types of measures of peer interactions - reciprocated friendships, peer acceptance/rejection, and network centrality/prestige (through social network analysis) - since in the vast field of peer research, only two studies have included all three (Spence, 2002; Gest, Graham-Berhann, & Hartup, 2001).

Research over the past 60 years or so has attempted to better understand the role peers play in child development. Studies have explored the influence of friends and how being liked or rejected influences social and academic outcomes. Less research has considered the greater social network in which children are embedded and how direct and indirect relationships within the network may differentially affect each child. From the few studies that have compared and contrasted these three aspects of peer interactions (i.e. friendship, peer acceptance/rejection, and network centrality/prestige), it is clear that these are unique aspects of children's social lives with their own correlates and corresponding developmental outcomes. As Gest, Graham-Berhann, and Hartup (2001) state, "having friends, occupying a central position in the network of informal peer groups, and being liked or disliked are three conceptually distinct aspects of children's social position in the classroom…each of these dimensions, however, may be developmentally important in its own right" (p. 23-24). When considering interventions to facilitate children's healthy development it becomes even more important to understand how these three types of peer relationships are developed and how they relate to one another.

In order to tease apart these constructs (i.e. friendship, peer acceptance/rejection, and network centrality/prestige) and how children's behaviors relate to them it is necessary to review the literature on each of these aspects of peer relations and how children's own behavior (both prosocial and antisocial) contribute to each. Therefore, this literature review will first describe these three types of peer interactions and their relationship to children's development. Then descriptions of research on the role of prosocial and aggressive behaviors in children's peer interactions will follow. The chapter will conclude with specific hypotheses for this study in light of the literature.

CHAPTER II

LITERATURE REVIEW

Peer Interaction and Children's Outcomes

Decades of research have demonstrated that how children interact with their peers influences the way they behave, perform in school, and feel about themselves (e.g. Newcomb & Bagwell, 1995). Different types of peer interactions are related to different benefits and risks as children develop. Thus, understanding the different types of interactions and their covariates is necessary for improving children's social experiences as well as for preventing future problems. Unfortunately, the bulk of research on children's peer interactions has focused exclusively on the dyadic level of mutual friendships and the aggregation of dyadic ratings into peer preference and social impact scores. These are methods that some researchers have argued do not sufficiently describe the ecology of children's groups, "the embeddedness of their social relationships, of the processes that govern how and why children choose to affiliate with particular peers and how these affiliative and interactional patterns influence the course of development" (Gifford-Smith & Brownell, 2003 p. 260). In order to identify the differences between different measures of peer interactions and to better depict the ecology of children's lives, this study will describe these three types of peer relations (i.e. mutual friendship, peer acceptance/rejection, and social network centrality/prestige) and assess how prosocial and aggressive behavior contribute to each.

Mutual Friendship

Friendship is the most commonly measured characteristic of children's peer interactions with research exploring predictors of friendship, characteristics and quality of mutual relationships, and outcomes associated with the presence or absence of reciprocated affiliations. Methods for measuring friendship vary from naming a "best friend" to rating enjoyment of playing with specific children. In order for assessments to be of reciprocated friendships, all methods require concordance between reporters (i.e. both children must name/rate each other highly). (See Erdley, Nangle, & Gold, 1998 for a discussion of the benefits and limitations each method of nomination).

Ample research has documented the important role friendship plays in the social development of children. Numerous studies have found that children who have friends are more sociable, cooperative, altruistic, confident and less lonely and troubled than those without friends (e.g. Hartup, 1992, 1996). Studies have found that children who enter school with a friend and those who make friends in their classroom tend to perform better academically than friendless children (Bukowski, 2003; Ladd, 1990). In a meta-analysis of friendship research, Newcomb and Bagwell (1995) found that reciprocated friendship was related to increased school effort, positive engagement, effective conflict management, and cooperation. Additional studies have found friendship to relate to increased independence, altruism (Aboud & Mendelson, 1998), school adjustment (Wentzel, Barry, & Caldwell, 2004), and academic accomplishments (Wentzel & Caldwell, 1997).

Peer Acceptance and Rejection

Peer acceptance and rejection is the second most common studied type of peer interaction. Methods for measuring acceptance and rejection include peer identification of social groups (i.e. who hangs out with whom), free recall of the most popular and unpopular children, and nomination of the peers liked most/least. These methods can rely on limited nominations (e.g. name 3 children) or be open-ended. They can also use a roster or rely on free recall. Typically there are boundaries around the population (e.g. classroom) and scores are standardized to control for differences in sample size. Depending on how scores are summarized, peer acceptance and rejection can be reported as peer preference (liked scores minus dislike scores), peer acceptance (sum of liked scores), peer rejection (sum of disliked scores) and social impact (liked plus disliked scores) scores or they can be lumped into sociometric (status) categories that describe children as popular, average, rejected, neglected, or controversial. Essentially all of these are measures of how well liked a child is compared to how disliked s/he is.

Studies have found that peer acceptance and rejection play an important role in the social-emotional development of children. Peer acceptance is related to increased social competence and positive thinking (Bukowski, 2003; Ladd & Price, 1986), increased risk-taking behavior with popular children experimenting more (Ennett & Bauman, 1996), and improved school performance (Bagwell, Newcomb, & Bukowski, 1998). Peer rejection has been associated with increased aggressive behavior (Dodge et al., 2003), increased loneliness and reduced self-serving bias (i.e. tendency to attribute good things to external causes and failures to internal sources) (Asher, Parkhurst, Hymel, & Williams, 1990). Some research has found a relationship between peer rejection and mental illness later in life (e.g. Kupersmidt, Coie, & Dodge, 1990).

Surprisingly, being disliked is only moderately associated with being liked and both have different correlates. For example, aggression has been found to be positively correlated with being disliked but not correlated with being liked (Hartup, Glazer, & Charlesworth, 1967). Friendliness is correlated with being liked but not with being disliked (Hartup, 1992).

Peer acceptance/rejection and its relationship to friendship. Peer acceptance and rejection are conceptually different than mutual friendship. In a study by Bagwell, Newcomb, & Bukowski (1998) of the relationship between popularity, reciprocal friendship, and outcomes in early adulthood, the authors found that childhood sociometric status (e.g. being popular, rejected, neglected), but not friendship, predicted school performance, educational aspirations, and job success while friendship, not popularity, predicted good attitudes towards self, friends, and family. Similarly, Ray and colleagues (1997) found that children's behaviors correlated differently with popularity and friendship. For example, aggressive behavior was correlated with being rejected by peers but not with the number of reciprocated friendships maintained.

The drawback to both friendship and peer acceptance/rejection measures is that they only describe direct connections to peers. That is, who likes a child and in the case of friendship, if the child likes that person too. Neither friendship nor acceptance/rejection measures describe how children are connected to their larger social network since neither considers the indirect relationships between children. Cairns, Xie, & Leung (1998) warn that without including network centrality, social relationships are reduced to the individual and dyadic level when only popularity and friendship are measured. The authors advocate for the use of social network analysis which allows for investigation into the group structure and the roles children play within them.[1]

[1] Most measures of social network centrality (e.g. betweenness, closeness) consider direct and indirect ties. However, within the field of social network analysis there is one type of centrality that looks only at direct ties. That

Social Network Prominence: Centrality and Prestige

The third type of peer interaction that could be affected by prosocial and aggressive behaviors is social network centrality/prestige. Social network centrality/prestige looks at children's social networks and assesses how connected children are to others. Unlike other measures of children's peer interactions, network centrality and prestige are not just concerned with the number of direct connections children have with peers but who the peers are connected to as well. Centrality and prestige, measures of network prominence, explore the relationships between every child in the network by looking at direct and indirect relationships (e.g. who you like as well as who your friends like). By graphing out all the connections within a network, social network analysis (SNA) is able to identify the most central and prestigious children within the network and how each member connects to one another. Graphing the ties (relationships) between every member of the network provides information about the importance, called prominence, of every person in the network. Prominence is typically described as centrality, prestige, and status. Wasserman and Faust (1994) describe prominence as being "particularly visible to the other actors in the network…by looking not only at the direct or adjacent ties, but also at indirect paths involving intermediaries" (p. 172).

The importance of looking at indirect ties is demonstrated in Figure 1. Both actors E and H have ties to two people. However, their integration into the greater network is quite different. Actor E is connected (directly or indirectly) to 7 other actors and his presence connects G and K to A, B, C, D, and F. Actor H is connected only to two actors.

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is degree centrality; a measure of the number of direct ties a person has to others in the network. For asymmetrical relationships, in-degree centrality refers to how often a person is selected by others (i.e. popularity) while out-degree centrality describes how often a person selects others (i.e. expansiveness). Other centrality indices incorporate indirect ties (Wasserman & Faust, 1994).

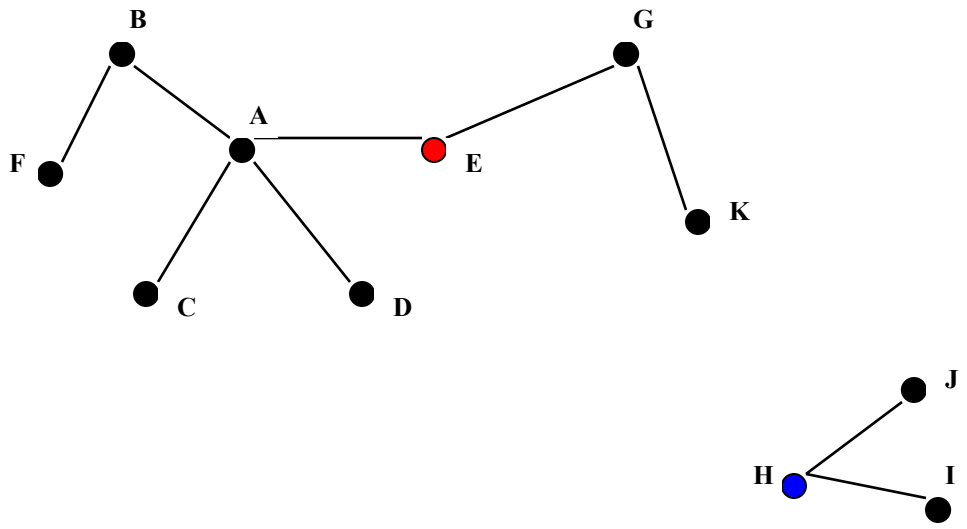

Figure 1. The Importance of Indirect Ties

Prominence in a network typically implies access to resources, such as information, power, or positive regard. In SNA, centrality refers to how easily one may access desired resources. Descriptions of this include how close an actor is to all other members in the network (closeness centrality), how often an actor is an intermediary between other actors (betweenness centrality), and the amount of ties an actor has to other actors (degree centrality). In addition to these measures of centrality, SNA considers the prestige, another type of prominence, of an actor in which his ranking is the sum of the prestige of the actors who pick him. Basically, a child's status is a function of the status of the children who pick her and those children's status is a function of the children who pick them and so on. In Figure 1, while Actors E and H have only 2 direct ties to other actors, Actor E would have higher rank prestige than Actor H because his score would include the prestige of the actors connected to him such as Actor A, who is the most popular person in the network.

Social network analyses of peer interactions are typically measured in three ways. One method is to ask all the actors in the network to list who hangs out with whom including themselves. This creates a type of cognitive social map (Cairns, Leung, Buchanan, & Cairns, 1995) with multiple actors reporting on relationships other than their own. Another method is peer nomination in which actors name the actors whom they hang out with or like to play with the most. Lastly, rating scales are used in which actors rate how much they hang out with (or like) every other actor in the network. These last two methods are the same procedures used for assessing peer acceptance/rejection however, they are analyzed quite differently.

Research has shown a strong relationship between network centrality and developmental outcomes, both positive and negative. For example, Liu and Chen's (2003) longitudinal study of children in China found that those with high centrality through clique membership had less loneliness, higher perceived competence, and more involvement in school than children who were peripheral to the network. Kindermann (1993) found that children's motivation at the start of the year predicted their group's motivation scores at the end of the year, demonstrating the strong influence centrality may have in the network. Crosnoe and Needham's (2004) study of the ecology of friendship found that while having a friend who drinks increases an adolescent's likelihood to drink, this relationship was significantly strengthened if the friend had high network centrality. Similarly, in a study of peer groups and smoking behavior, Michell (1997) found that highly central 11-13 year old children were more likely to engage in high risk behavior such as smoking, drug taking, and sexual activity than less central children.

Network centrality, friendship and peer acceptance/rejection. While social network centrality/prestige has been studied less than friendship and peer acceptance/rejection, evidence suggests that centrality is conceptually different than the other two measures of peer interactions

since it considers more of the context of children's social networks beyond direct ties to peers. As proponents of social network analysis argue, centrality "provides a new perspective because it maintains a focus on the context of the peer system" (Farmer & Rodkin, 1996 p. 186) by providing "information about children's specific relationships and roles within the social system" (Cairns et al., 1995 p. 1342).

Friendship and centrality. Several studies have compared social network centrality and friendship. In a study of the stability of friendships in 4th and 7th grade, Cairns and colleagues (1995) found that only 1/3 of mutual friendships were reciprocated after 3-weeks. When the researchers explored network centrality, they found that higher centrality in a group predicted membership within the same group, even if the friendship ties changed. Thus, children stayed in the same social groups even if their close friends in the group change, suggesting that social groups are more stable than friendships.

In another study, Liu & Chen (2003) found that Chinese high school students within defined social groups (i.e. cliques) with lots of friends scored the highest on measures of academic success and social competence while those who maintained only a dyadic friendship without group membership scored lower on these outcomes. However, children who were isolated (i.e. very low network centrality and no mutual friend) fared the worst. Thus, centrality was a better predictor of social and academic success than friendship. While these studies found centrality and friendship to be conceptually distinct, more research is needed to determine how they differ from peer acceptance/rejection and whether the behaviors of children differentially influence each type of peer interaction.

Peer acceptance/rejection and centrality. Although centrality and peer acceptance/rejection can employ the same data collection process, they provide similar but

unique information. Sociometric status (e.g. peer acceptance rating) describes how well liked or rejected a child is compared to his peers. Centrality provides information about how children cluster within a network and how connected children are to one another. This is conceptually meaningful when considering who children befriend. As Figure 1 demonstrates, children with the same peer acceptance scores may have very different social experiences. In Figure 1, Actors E and H were both liked by 2 people. However, Actor E is friends with the most liked child in the classroom and would probably have a different social experience than Actor H who is disconnected from the larger network and may have befriended the most disliked children. This type of information would be lost if only peer preference was considered, rather than centrality/prestige.

Studies that have compared the relationship of peer acceptance/rejection and centrality have found that the constructs are correlated but not synonymous as they have different predictors and outcomes. In a study of 2nd and 3rd graders, Gest, Grahamm-Bermann, and Hartup (2001) found that correlations of network centrality and being liked ranged from .46-.49. Popular (i.e. well liked) and controversial children (i.e. those who are liked and disliked) in this study typically had high network centrality while rejected (i.e. disliked) and neglected children (i.e. neither liked nor disliked) tended to have lower network centrality. When identifying behavioral correlates of peer acceptance and centrality, the researchers found that network centrality and being liked had a similar positive relationship to leadership-humor and negative relationship to sadness-sensitivity. However, network centrality was positively related to aggression-disruptiveness while sociometric status was negatively associated with these behaviors. Network centrality shared 25% of the variance with being liked and only 4% of the variance with being disliked.

In a study of first grade social networks, Estell and colleagues (2002) found that aggressive behavior was not a deterrent to popularity (i.e. high peer acceptance) but it did distinguish between different peer group profiles. Some groups with high centrality were characterized by low aggression, high popularity, and high academics while others were high in overt aggression, had the lowest levels of popularity, and low academic performance. Similarly, Farmer and Rodkin (1996) study of 3rd – 6th graders found variation in the centrality of popular students. Nuclear children (those with the highest centrality) tended to be more popular, athletic, studious and cooperative. However, not all central children were popular and some of the popular children were secondary and peripheral members of the network. Thus, popularity is not synonymous with centrality and being central does not ensure popularity.

Friendship, peer acceptance/rejection, and network centrality. To my knowledge, only two studies have explored these three aspects of children's social interactions (i.e. friendship, peer acceptance/rejection, and network centrality/prestige) with the same children, thus limiting our understanding of how these elements of peer interaction relate to one another and how each contributes to unique variance in child outcomes. The first, a study of elementary school children by Gest, Graham-Bermann, and Hartup (2001), compared common and unique features of friendship, sociometric status (peer acceptance/rejection), and network centrality. As described above, this study found that all three measures of peer interactions were correlated with one another but were conceptually unique. This study showed that while popular (well liked) and controversial (both liked and disliked) children tended to have higher network centrality than rejected and neglected children, high peer preference did not ensure high centrality. Additionally, popularity and high centrality did not guarantee reciprocated friendships. For instance, of rejected children, 18% had high network centrality and 39% had mutual friends. Of popular

children, 31% did not have even one mutual friend and 14% had low centrality. From these findings the authors concluded that "results provided strong empirical support for making distinctions among friendship, social network, and sociometric measures in middle childhood" (p. 33).

The second study to include all three measures of peer interactions was a dissertation by Spence (2002) that looked at the peer interactions of relationally aggressive females in the 4th grade. This study found that while relationally aggressive girls tended to be more disliked by their peers, they were just as likely to have reciprocated friendships as non-aggressive females. Additionally, network centrality did not differ between aggressive and non-aggressive girls. Even though relationally aggressive females were, overall, less liked by peers, they comprised 27% of the popular category of children. When looking at differences between relationally aggressive girls' friendships, sociometric status, and network centrality, Spence found the girls with more frequent prosocial behaviors tended to be liked more and hold more central positions, suggesting that prosocial behavior may moderate the negative effects of aggression. Unfortunately, this study only explored relationally aggressive females' peer interactions and did not look at the general population of fourth graders (such as boys, overtly aggressive children, and non-aggressive children). Thus, little is known about how prosocial and aggressive behaviors interact to promote or hinder the development of peer interactions.

The role of individual behavior. Research on peer interactions suggests that both aggressive and prosocial behaviors play a role in the development of mutual friendships, peer acceptance/rejection and network centrality. However, few have looked at both of these types of behaviors within the same children and only Spence (2002) explored the effect of both aggressive and prosocial behaviors on all three types of peer interactions. While this study

provided valuable information about the social interactions of relationally aggressive girls, research on other types of children that includes all three measures of peer interaction is needed. To date, some research has explored how aggression and prosocial behavior contribute to each of these three types of peer interactions yet little is known about how such individual behaviors work in conjunction or how they contribute similarly or differentially to each type of peer interaction. The next section provides a brief overview of the research on the relationship between aggressive and prosocial behaviors and peer interactions.

Child Behaviors that Affect Peer Interactions

A growing body of work has explored how child behaviors contribute to children's social interactions with the bulk of the work focused on reciprocated friendships and peer acceptance/rejection. Thus far, less attention has been directed towards exploring how children's behaviors influence their network centrality. Most of the work in this area has focused on the detrimental effect of aggression in peer interactions and the benefits of prosocial behavior in obtaining friends and peer acceptance. Prior research focuses on main effects of prosocial and aggressive behavior with little examination of possible interactions between the two types of behaviors in peer interactions. What is not considered in these studies is the possibility that aggressive and prosocial behaviors have differential effects on friendship, peer acceptance/rejection, and network centrality. Thus, the primary aim of this study is understand how aggression and prosocial behavior affect children's social interactions and whether the combination of prosocial and aggressive behaviors relate differently to friendships, peer acceptance/rejection and network centrality/prestige. Since peer interactions are associated with numerous benefits and risks, understanding the relationship of individual child behavior to these

social relationships could help identify ways to foster more nurturing and protective environments as well as reduce or prevent negative interactions and social patterns.

Aggressive Behavior

Research on aggressive behavior has found that displays of aggression influence children's social interactions in different ways. However, the research on whether aggressive behavior is detrimental to social interactions is equivocal. Part of the discrepancy in findings is due to differences in which genders are included in the study, how aggression is operationalized, the type of informant surveyed, and which social interactions are used as outcomes.

For this study, aggression is defined as any behavior, physical and non-physical, that is intended to harm another, including behaviors that are viewed as hurtful by the recipient of those actions (Underwood, Galen, & Paquette, 2001). These actions may include overt aggression such as hitting, fighting, and pushing or more indirect actions such as social manipulation, teasing, ignoring/exclusion, and rumor spreading (Bjorkqvist, 1994; Osterman et al., 1998).

Aggression and peer acceptance/rejection. Research on aggression and peer acceptance has found a negative relation between the two, suggesting that children who are highly aggressive are more likely to be rejected by their peers (e.g. Cillessen, Van Ijzendoorn, Van Lieshout, & Hartup, 1992). This has lead some researchers such as Coie to claim that aggression is the single largest behavioral predictor of poor peer status (Sandstrom & Coie, 1999). Studies of children who engage in high levels of bullying and reactive aggression have found that these children tend to be less preferred by (i.e. popular with) their peers (e.g. Dodge, Coie, Pettit, & Price, 1990). However, most of these studies are cross-sectional designs.

More recent research suggests that while high levels of aggression are highly correlated with peer rejection (being disliked) such behaviors may not actually prohibit popularity. For example, a study by Sandstrom & Coie (1999) of 4th grade boys identified as "rejected" found that those with higher rates of aggression experience greater increases in social preference over time than their non-aggressive, rejected peers. Additionally, Estell, Cairns, Farmer, and Cairns (2002) found a subset of popular (i.e. well liked) boys who engaged in high levels of aggression. Contrary to most research in this area, Phillipsen, Bridges, McLemore, and Saponaro (1999) found that aggressive behavior did not predict peer acceptance or rejection. While boys in this study were rated as more aggressive, no gender effect of aggression and peer acceptance was found.

Aggression and friendship. Aggression, even in children who are socially rejected, may not prohibit mutual friendships. In fact, numerous studies have found that aggressive children have mutual friends. In a study of relationally aggressive children, Rys and Bear (1997) found that the percentage of relationally aggressive children with one or more friends did not differ from non-aggressive peers. Similarly, Parker and Asher (1993) found that rejected children still had reciprocated relationships. Deptula (2003) and Johnson (2002) both found that while aggressive children had mutual friendships, they tended to have fewer of them than non-aggressive peers, suggesting that aggression may not impede forming a close friendship but it may prohibit forming many friendships. Some evidence suggests that aggressive children befriend other aggressive children (Wentzel et al., 2004; Ma, 2003) thus limiting the number of possible friends in a classroom to select (Stormshak et al., 1999).

In a study of the role of aggression, friendship and peer preference over time, Lindsey (2002) found that having more mutual friends was related to higher peer preference with

friendship (i.e. having a friend) at Time 1 predicting peer preference one year later. Ratings of aggressive behavior were comparable between children with varying levels of peer preference and number of friendships.

Aggression and network centrality/prestige. Since network centrality is the less frequently studied element of peer interactions, not as much is known about how aggressive behavior influences network centrality indices. Research on the effects of aggression on centrality is equivocal with some suggesting that the relationship between the two may be mediated by gender. In a study of 3rd-6th graders by Farmer and Rodkin (1996) and another of 3rd - 4th graders by Farmer and Farmer (1996), found that antisocial characteristics such as aggression were associated with lower centrality for girls and higher centrality for boys. Liu and Chen's (2003) study of Chinese children found that higher centrality was associated with lower levels of externalizing behavior overall, however, boys displayed higher levels of aggression than their female peers. Contrary to this, Crosnoe and Needham (2004) found that behavior problems (such as aggression) did not relate to network centrality, irrespective of gender. Xie, Cairns, and Cairns (1999) found that aggressive boys and girls tended to hold central positions in their peer networks while Salmivalli, Huttunen, and Lagerspetz's (1997) study of bullies found that these children had central roles in networks of other bullies but not in the class as a whole. Xu, Farver, Schwartz, and Chang (2004)'s study of 5th and 6th graders found that high levels of aggressive behavior did not contribute to isolation (low centrality) in the social network. In fact, 3 times more aggressive children were members of social groups than were isolated from their peers.

Thus, the relationship between network centrality and aggression is unclear, with some research suggesting that aggression may facilitate centrality for boys. Since most research looks

at the behavioral characteristics of children in different social positions, less is known about how behaviors contribute to social interactions. For instance, studies will identify central children and then measure their aggressive behavior, rather than studying aggression in the class as a whole and determining whether it predicts network centrality. This lack of causal testing contributes to the focus of research on specific types of aggressive children, such as bullies, without investigating the many other children throughout the classroom who display aggressive behaviors and maintain friendships, peer acceptance, and centrality.

Clearly, the research on the role of aggressive behavior and peer interactions is equivocal. While some children who display high levels of aggression lack friends or experience peer rejection and network isolation, other similarly aggressive children enjoy numerous friendships, popularity and high network centrality. One possible contributor to such discrepancies in findings is the cross-sectional nature of these studies. Research in this area often categorizes children (e.g. central or popular) and then attempts to identify variables that correlate with that category. Rather, longitudinal research is needed that explores how individual behaviors, such as aggression, predict peer interactions. Another possible contributing factor to these disparate findings may be the unexamined role of prosocial behavior accompanying aggressive behaviors.

Prosocial Behavior

Research has found that prosocial behavior may lead to beneficial developmental outcomes for children with some research directly exploring how prosocial actions influence peer interactions. Prosocial behaviors are actions that benefit or promote harmonious relations

with others (Jackson & Tisak, 2001). Examples of prosocial behaviors include empathy, helping, altruism, sharing, cooperating, and comforting. Such behaviors have been linked to increased sociability, educational attainment, perceived competency, worth (Caprara, Barbaranelli, Pastorelli, Bandura, & Zimbardo, 2000; Chen et al., 2002), satisfaction with school (Jackson & Tisak, 2001), likeability, and happiness (Denham, McKinley, Couchoud, & Holt, 1990). Research also suggests that prosocial behaviors are important for the development of friendships, peer acceptance, and network centrality (e.g. Sebanc, 2003; Wright, Giammarino, & Parad, 1986).

Prosocial behavior and friendship. Prosocial behavior appears to play an important role in the development and maintenance of mutual friendships. In a qualitative study of friendships in Greece, Avgitidou (2001) found that some degree of prosocial behaviors was present in all reciprocated friendship, suggesting that behaviors such as empathy may be a prerequisite for friendship development and maintenance. Rys and Bear's (1997) study of 3rd-6th graders found prosocial behavior to be a significant predictor of friendship status (i.e. having at least one mutual friend). Similarly, Rotenberg and colleagues (2004) found that prosocial behavior in the form of trustworthiness predicted the number of friends children had while Wentzel, Barry, and Caldwell (2004) found that children without friends had the lowest levels of prosocial behavior.

Prosocial behavior and peer acceptance/rejection. While prosocial behavior seems to be important in making friends, its influence on being accepted by peers seems to be equivocal with some research indicating a strong relationship between peer acceptance and prosocial behavior and other studies finding that highly prosocial children are not more accepted by their peers.

Numerous studies of prosocial behavior have found these actions to significantly predict popularity ratings with high levels of helping and empathetic behaviors corresponding to higher

popularity ratings (e.g. Denham et al., 1990; Gifford-Smith & Brownell, 2003). In a study of the relationship between behavior problems and peer acceptance in 1st graders, Stormshak and colleagues (1999) found a main effect of prosocial behavior on peer preference, regardless of the child's gender. When looking at the characteristics of popular children, several studies have found that children with high popularity ratings tend to engage in more positive behaviors such as helping and sharing (Coie & Kupersmidt, 1983; Newcomb, Bukowski, & Pattee, 1993).

Other studies have found that high levels of prosocial behavior do not predict high levels of peer acceptance. For instance, Parker and Seal's (1996) study of children in summer camp found the groups with the highest levels of prosocial behavior were most likely to decrease in ratings of peer acceptance, such that their friendship ties decreased as did the size of their social group. Although Wentzel, Barry, and Caldwell (2004) found that prosocial children tend to befriend other prosocial children, research by Chen and colleagues (2002) suggests that these positive behaviors do not predict peer acceptance. These studies warrant the question of whether other behaviors, such as aggression interact with prosocial behaviors to alter peer acceptance ratings.

Prosocial behavior and network centrality. How prosocial behavior relates to network centrality has been studied less frequently than its role in sociometric status and friendship. Studies so far, have suggested that prosocial attributes may contribute to network structure. In a study of 5th graders' engagement in school, Sage and Kindermann (1999) found that the level of positive traits (e.g. motivation, helping) stayed constant within a clique (i.e. subgroups of children), even when the members of the clique changed. Thus, the association between centrality and prosocial behavior stayed constant although the children occupying the central role may have changed. When looking at the differences between cliques, friends, and individuals,

Liu and Chen (2003) found mean levels of prosocial behavior to be higher in social groups than in dyads or isolates, suggesting that prosocial behavior is more normative in groups than in pairs. In exploring the predictive power of prosocial behaviors on network centrality, Estell and colleagues (2002) found that prosocial behavior did not differentiate highly central, secondary and peripheral children, since some children in each of these categories tended to be highly prosocial. This same study also identified a group of highly central children who were highly aggressive as well as prosocial, suggesting that aggression and prosocial behavior may both play a role in social network centrality.

Aggressive and Prosocial Behavior in Children's Peer Interactions

Perhaps looking solely at the main effects of aggressive and prosocial behaviors is too simplistic since some research suggests the possibility that both antisocial and prosocial behaviors contribute to children being liked and integrated into their social network (e.g. Estell et al. 2002). The lack of attention to both factors, in combination, may explain the inconsistency of previous findings, such as why some highly aggressive children are socially rejected while others are very popular. The role of aggression and prosocial behavior on having friends, being well liked, and holding a central network position has not been thoroughly tested, especially within the same group of children. Instead a few studies have explored the characteristics of children with friends, who are liked/disliked, or occupy central positions. While findings are mixed, many of these studies (e.g. Phillipsen et al. 1999; Rys & Bear, 1997) have found that prosocial and aggressive behaviors do not differentiate whether children have friends or not, nor do these behaviors consistently determine how well children are accepted or rejected by peers. In fact, most of the research on the role of aggression on peer preference is equivocal. The few studies

that assess network centrality have found that children who display aggressive or prosocial behaviors have varying degrees of centrality with some being isolated from their networks and others being highly central members. These ambivalent findings suggest that prosocial and aggressive behaviors may interact with one another and perhaps differentially affect how peers relate to one another.

Aggression, prosocial behavior and peer acceptance/rejection. Most of the work including both aggressive and prosocial behaviors has focused on the role of child behavior and sociometric status. Two studies of behavior and peer acceptance found that popular children tend to have high levels of both aggressive and prosocial behaviors (Luther & McMahon, 1996; Rodkin, Farmer, Pearl, & Van Acker, 2000). Along these lines, Rys and Bear's (1997) study of relational aggression and peer relations in 3rd-6th grade found that overt aggression and prosocial behavior correlated negatively with peer rejection (i.e. negative nominations). Wright, Giammarino and Parad's (1986) study of friendships in summer camp found that high levels of prosocial behavior predicted peer acceptance while high levels of aggression predicted negative acceptance but not rejection. Persson's (2005) observational study of preschool interactions found non-altruistic prosocial behavior to be positively correlated with aggressive behavior leading to the suggestion that "prosocial and aggressive behaviour orientations do not necessarily preclude each other" (p. 83).

Aggression, prosocial behaviors, and mutual friendship. While the bulk of research including both aggressive and prosocial behaviors in the study of peer interactions has focused mainly on peer acceptance/rejection, some has explored the role of these behaviors on the development of friendships. For example, Parker and Seal's (1996) study of friendships in summer camp found that friendship groups that were characterized by high levels of prosocial

behavior and low aggression had the greatest decline in size over time. The groups comprised of highly aggressive and prosocial friends tended to stay the same size but the members rotated in and out of the group. Thus, not all the friendships were stable. In a study of preschool classroom, Sebanc (2003) found that children with friends showed higher levels of prosocial behaviors than those without, but this did not necessitate reduced aggressive behaviors.

Aggression, prosocial behavior, and network centrality. Although a few studies have explored the interrelation of antisocial and prosocial behaviors to peer interactions, only Spence (2002) included all three types of measures of children's social networks (i.e. friendship, peer acceptance/rejection, and network centrality). This notable dissertation studied only a subset of children; females who displayed high levels of relational aggression. Spence found that girls with high levels of aggressive behavior tended to have high network centrality, especially if their aggression was coupled with prosocial behavior.

A recent, yet unsuccessful, attempt to explore the relationship between children's behaviors and their network centrality was conducted by Xu, Farver, Schwartz, and Chang (2004). Their study attempted to look at the relationship between aggression and prosocial behaviors in peer interactions using social network analysis. Due to the nature of Chinese culture and large classroom structure, children in this study tended to be a part of large interconnected networks rather than exist in small cliques with sufficient variation in centrality between children. The study found that only children with externalizing problems were isolated from the networks. All others children were members of the core structure of the class. Therefore, the researchers were unable to draw any conclusions regarding how social behaviors influence social relationships.

Two studies have focused on the unique behavioral characteristics of highly central children. In a study of 4^{th} – 6^{th} grade males, Rodkin et al. (2000) found two types of popular boys who also had high network centrality; model boys who displayed high levels of prosocial behavior and low aggression and tough boys who showed more antisocial behaviors. Unfortunately, these authors did not include friendship nor assess how children's behaviors might have influenced their subsequent centrality and sociometric status, rather they described the characteristic of children who were popular and central. In another study of classroom social position, Farmer and Rodkin (1996) found that children with high centrality tended to be popular, cooperative, studious, and leaders. Additionally, they found that "antisocial behaviors do not necessarily suppress students' social positions" (p. 184).

Research on peer relationships suggests that both prosocial and aggressive behaviors influence peer interactions. The bulk of research in this area has been cross-sectional, exploring the correlation of each type of behavior with mutual friendships or sociometric status. A few studies have included network centrality, with only 2 including at all three types of interactions with the same children. The findings of these investigations are equivocal and no studies, to date, have included both types of behaviors and all three types of peer interactions. What is lacking are longitudinal studies on how prosocial and aggressive behaviors work individually and in conjunction in the development of friendship, peer acceptance/rejection, and network centrality/prestige.

Study Aims

From the review of the literature cited above, what is needed is longitudinal research with the same groups of children that explores the role of prosocial and aggressive behavior on the development of friendships, peer acceptance, and network centrality. Thus, the primary goal of this study is to tease apart the influence of prosocial and aggressive behaviors on children's peer interactions as measured by these three methods. For example, if prosocial behaviors are always beneficial to peer interactions then children with high levels of prosocial behavior should have more friends, be more preferred, and occupy central positions in their social networks, irrespective of their aggressive behaviors. On the other hand, if aggressive behavior is detrimental then children with high levels of aggression should have fewer friends, be less preferred and more isolated from their networks, irrespective of prosocial behavior. However, from the preponderance of the research described above, it is unlikely that this relationship is so straightforward. It is quite possible that prosocial behavior buffers the negative effects of aggressive behavior. Equally feasible is the possibility that high levels of prosocial behavior without aggression is negatively related to peer interactions, supporting the old adage, *nice guys finish last*. Thus, this study will identify the effects of prosocial and aggressive behaviors, in combination, on the development of friendship, peer acceptance, and network centrality.

A secondary aim of this study is to contrast these three measures of peer interactions- mutual friendship, peer acceptance/rejection, and network centrality/prestige- by including all three as outcome variables in the same study. Thus, this study will assess their shared variance as well as unique contributors.

Behavior and peer interactions: Possible findings. If both aggressive and prosocial behaviors are beneficial for developing positive social interactions, then those children who

display high levels of aggression and prosocial behavior should have more friends, be more liked, and have higher centrality in their social network than those children who do not show both traits (e.g. just aggressive, just prosocial, or neither).

If prosocial behavior simply buffers the negative effect of aggressive behavior then children with high levels of aggressive behavior and no prosocial behaviors will have fewer friends, tend to be rejected, and be socially isolated, while those children with high aggressive and high prosocial behaviors will have more friends, be more popular, and more central in their network. While non-aggressive, prosocial children will have the most friends, peer preference, and centrality.

If prosocial behavior is essential to peer interactions then those children who are high in prosocial behavior, irrespective of aggressive behavior will have more friends, be popular, and more central.

If extremes of any type of behavior are detrimental to peer interactions, then children who display high levels of aggressive and/or prosocial behavior will have fewer friends, be less liked, and more peripheral in their social networks.

Relationships between friendship, peer acceptance/rejection, and network centrality. Based on research so far, it is likely that the measure of mutual friendships, peer acceptance/rejection, and network centrality/prestige will be highly correlated with one another yet conceptually different. For example, not all popular children should be highly central in their peer network nor would all central children have reciprocated friends. Additionally, how individual aggressive and prosocial behaviors influence these three types of social interactions should vary as well. For example, perhaps prosocial behavior is most important for having friends while the combination of aggressive and prosocial behavior is necessary for obtaining high network centrality.

This study fills an important research gap by 1) determining how prosocial and aggressive behaviors influence peer interactions and 2) investigating how friendship, peer acceptance/rejection, and network centrality/prestige relate to one another and individual child behaviors.

Numerous interventions have been focused on reducing aggressive behaviors and increasing prosocial acts in hopes of promoting more harmonious peer environments and reducing the negative outcomes of peer rejection and social isolation. What is assumed by such programs is that aggression is always bad for children and prosocial behaviors are always beneficial. However, it is possible that aggression is useful as children interact and if it is, interventions should be more specialized when targeting prosocial and aggressive behaviors. This study will shed some light onto the role of prosocial and aggressive child behaviors and how they influence different aspects of children's social interactions. This study will also enrich the field's understanding of peer interactions by examining friendship, peer preference, and centrality with the same group of children. Increased exploration into these three types of peer interaction will provide deeper understanding of children's social context as well as provide ways to target interventions to specific aspects of peer interactions.

CHAPTER III

METHODS

The data for this study were collected as part of a Department of Education/Institute of Educational Sciences (IES)-funded evaluation the effectiveness of a character education curriculum in promoting positive social and character development, increasing positive behaviors, and reducing antisocial behaviors among elementary school children. While the study is a 4-year longitudinal study, only data from the first two waves of the first year of the project were used. Additionally, due to the requirements for using social network analysis methods, only classes with student participation rates above 75% were included in this study.

Participants

Participants were 204 children in 13 third grade classes in 5 schools (mean age = 8.1 years (sd = 4 months) in a southern state. Fifty four percent were female and 82% were Caucasian, 15% African-American, 2% Asian, and 1% were Hawaiian/Pacific Islander. Five percent identified themselves as multiracial. Information was collected from children, their caregivers, (see table 1 for details), and third grader teachers. Caregivers were predominately mothers (92%) with a means age of 38 years (sd = 6.9). Participation rates per class ranged from 75% to 90% with a mean of 80.5% of the children participating. See table 2 for a class size and participation rates.

Written consent was obtained from the teachers while written assent was provided by the children (Appendix A). An institutional Review Board approved the protocol and measures for this study.

Table 1. Demographic information about respondents

Background Characteristic	**Percentage**
Child age	
7 years	6
8 years	81
9 years	14
Race (all that apply)	(only race)
White	84 (82)
Black	17 (15)
Asian	2 (2)
Hawaiian/Pacific Islander	2 (1)
Ethnicity	
Hispanic decent	6
Caregiver Type	
Mother	92
Father	7
Other	1
Parental Education	
Less than high school	3
High school/GED	15
Some College	15
Bachelors	34
Graduate degree	33
Family Pre-tax income	
Less than $20,000	13
$20,000-$39,999	10
$40,000-$59,999	20
Above $60,000	57

Procedure

Data were collected in September, 2004 (during the 5th week of the school year) and again in February, 2005. Children completed questionnaires during their class time. A researcher visited the school and read the questionnaires aloud while children followed along. Children were given a small toy for their participation (a pencil with a plastic animal topper for the 1st wave and colored erasers for the 2nd wave). Questionnaires were sent home to caregivers with the child and returned by hand to teachers by the child. The teachers returned these questionnaires to the researchers when the researchers visited the class for data collection with the children. Teachers completed forms and returned them directly to researchers. The teachers were paid $5 for each completed packet of questionnaires (1 packet per participating child in their class).

Table 2. Class size and participation rates

Class Size	**Number Participating**	**Percentage Participating**
23	18	78.3
22	17	77.3
21	16	76.2
20	18	90
20	17	85
20	16	80
20	15	75
20	15	75
20	15	75
19	17	89.5
19	15	78.9
18	16	88.9
13	10	76.9

Caregiver Questionnaire

Background Information. While caregivers were asked to complete a packet of questionnaires in the fall of 2005, only the brief, 16-item background questionnaire was used for this study. The multiple-choice form included questions about the child, caregiver, and family such as age, race, ethnicity, education, employment, custody arrangements, and income. (See appendix B) All forms were coded with an identification number and no names appeared on the forms.

Teacher Questionnaires

This study used a subset of the questionnaires completed by teachers in the fall of 2004. These measures were hand delivered to the classroom by either a researcher or school-based research coordinator (most typically a vice principal or school counselor). An envelope was provided for each set of measures with instructions to remove the piggyback sticker with the child's name once the forms were completed, thus, helping to ensure confidentiality. Table 3 provides psychometric information about each measure.

Aggression. Teachers were asked to complete the Behavioral Assessment System for Children Aggression Subscale (Reynolds & Kamphaus, 1998). This 14-item scale measures children's verbal and physically aggressive behavior on a 4-point Likert scale (0=never, 1=sometimes, 2=often, 3=almost always) and has high reliability reported by its authors (α = 0.95, test-retest of 0.91). The measure describes verbally aggressive (e.g. "calls other children names") and physically aggressive ("hits other children") behaviors.

Prosocial Behavior. The Social Competence Prosocial Scale was used to measure children's propensity for prosocial empathetic and helping behavior (Conduct Problems

Prevention Research Group, 1999). This 19-item scale was completed by each child's classroom teacher. The scale was originally measured on a 5-point Likert scale but was modified into a 4-point Likert scale (1 = never, 2 = sometimes, 3 = often, 4 = always) with a time frame of within the past 30 days for this study. The authors report high internal consistency (Cronbach's alpha = .87) when used with children in 1^{st} – 6^{th} grade.

Child Measures

Children completed self-report and peer report measures in the fall of 2004 and winter of 2005. The self-report measures involved questions about the child's own behavior while the peer-report measures involved sociometric reports of peer behaviors and relationships. Table 3 describes the properties of these measures in more detail.

Self-report measure of aggression. Children completed the 6-item, self-report Aggression Scale (Orpinas & Frankowski, 2001). This measure assesses children's own verbal and physical aggressive behaviors by asking about the frequency of behaviors such as hitting, shoving, teasing, ignoring, and manipulating during the past 2 weeks. The original 7-point response scale was reduced for this study into a 4-point Likert scale and the time frame was extended from 7 days to the past 2 weeks. Responses ranged from 0 (never) to 3 (many times). The authors of this measure have reported good internal consistency ($\alpha = 0.87$) and shown that it correlates highly with other predictors of violence.

Self-report measure of prosocial behavior. Children completed the Children's Empathy Questionnaire (Funk, Elliott, Bechtoldt, Pasold, & Tsavoussis, 2003). This 16-item scale measures children's empathetic responses to hypothetical and actual events, such as "When I see a kid who is upset it really bothers me." Response options include *yes*, *no*, and *maybe*. The

measure has demonstrated good reliability with an internal consistency of 0.73 reported by its authors.

Table 3. Psychometric Properties of Teacher and Child Measures

Measure (# of items)	**Response Options**	**Mean (sd)**	**Skew**	**Kurt.**	**Alpha (this sample)**	**Range**
Teacher Measure (n=195)						
Behavioral Assessment System for Children Aggression Subscale (14-items)	1 = never 2 = sometimes 3 = often 4 =almost always	1.2 (0.33) *2.8 (0.21)	2.19 *1.45	6.32 *2.0	0.90	1 – 2.9 *2.6 – 3.7
Social Competence Prosocial Scale (19 items)	1 = never 2 = sometimes 3 = often 4 = always	3.37 (0.65)	-0.86	-0.4	0.92	1.5 - 4
Self-report (n=180)						
Child Empathy Scale (16 items)	1 = no 2 = maybe 3 = yes	2.59 (0.3)	-0.88	0.61	0.81	1.6 - 3
*Children Aggression Subscale (6 items)	0 = never 1 = once or twice 2 = a few times 3 = many times	0.51 (1.45) *0.53 (0.68)	5.27 *1.27	35.83 *1.15	0.81	0.6 - 3 *0 - 2.6
Peer Report (n=204)						
Peer Prosocial Rating (1 item by all classmates)	1 = not at all 2 = a little 3 = some 4 = a lot	3.4 (0.46)	-1.07	2.01	.59-.92 Mean = .76	1 – 3.9
Peer Aggression Rating (1 item by all classmates)	1 = not at all 2 = a little 3 = some 4 = a lot	1.62 (0.55)	1.16	0.89	.82-.95 Mean = .90	1 -3.46
* log transformation applied						

Peer-report of prosocial and aggressive behavior. Children also provided peer-report of kind and deviant behaviors by children in their classroom. In the fall of 2004 children were given a roster of all the children in their class and asked to rate how often each child was nice and kind

to others on a 4-point Likert scale (from never to almost always). Next, children were asked to report how often the children on the same roster get in trouble using the same 4-point scale. Thus, each child has a single rating of prosocial and antisocial behavior provided by each of his/her peers in the classroom.

Sociometric measure. Measures of friendship, peer acceptance and network centrality were measured through the use of a sociometric rating scale and peer nomination procedure. Both of these procedures have been used numerous times in studies of children's peer interactions (e.g. Barnhart, 2000). In the winter of 2005 children were provided with a roster of all the children in their class and asked to rate how much they liked playing with each of the children on the list. Possible answers were *not at all*, *just a little*, *some*, and *a lot*. Next, children were asked to look at the same roster and circle the names of the three children they like playing with the most. Then, children were asked to look at the names again and underline the names of the 3 children they did <u>not</u> like to play with most[2]. Children were able to select from the entire class, including non-participating children, and were not limited to same gender nominations. From this measure, the number of mutual friendships, peer preference score, betweenness centrality and rank prestige (eigenvector centrality) were calculated as follows:

Mutual Friendship. Both the rating scale and peer nomination procedure were used to calculate the number of reciprocated friendships for each child. This was determined by adding together the number of mutual nominations received and mutual ratings of "a lot" on the rating scale. Thus, a mutual tie could be scored by two children rating their enjoyment of playing with each other "a lot" or by naming each other of as one of the three children they like to play with most.

[2] After conducting cognitive interviews with 3rd grade children we found that the phrasing, "did not like the most" was easier for children to understand than "like the least".

Peer acceptance and rejection. Peer acceptance for each child was calculated as the total ratings given by peers, standardized by the number of participating children per class. Since many classes were of different sizes, standardizing the scores allowed for comparison across individuals in different classes. A peer rejection score was calculated by dichotomizing all the ratings (of enjoyment of playing with) such that "not at all" equals one and all other responses (a little, some, a lot) were scored as zero. Then, the frequency of receiving a not liked rating was calculated for each child. This number was added to nominations of least liked. If a child nominated another child as the least liked and gave him a low rating (i.e. not at all), this was scored only once. The total disliked score was then standardized by classroom to provide a standardized rejection score.

Social network prominence-betweenness centrality and prestige. Two indices of network prominence were calculated; betweenness centrality and rank prestige (i.e. eigenvector centrality). In order to do this, a dependency matrix was created for each classroom in which the rows and column labels were the same (i.e. every child gave a rating for and received a rating from every other child). Each rating is referred to as a tie. For this study, ties were entered as both directional and valued. Directed ties indicate a relationship in one direction (*from* one person *to* another). For example, if Anna likes Scott that does not necessarily mean that Scott likes Anna as well. Thus, directional ties can be mutual, asymmetric or null (not present). Valued ties are ties in which the level of the tie is meaningful. In this study liking was rated as not at all (0), a little (1), some (2), or a lot (3).

Betweenness centrality is the idea that an actor in a network can control the flow of information by acting as a gatekeeper when s/he serves as a liaison between disparate people or regions of the network (Scott, 1991). Think about traveling in the continental US. Although it is

fastest to fly directly from Los Angeles to Nashville, typically the only way to travel between these cities is to stop in a city that is an airline hub, such as Denver. Sometimes you have to go through two hubs like LA to Denver to Chicago then to Nashville. The same is true for friendships. Sometimes people have connections to other people only through a mutual friend. Tommy may only play in the same sandbox as Susie when he is hanging out with Billy, but never without Billy. Thus, Billy connects Tommy to Susie. If these relationships were graphed, Billy would lay on the path between Tommy and Susie.

A person's betweenness centrality is calculated by identifying how often that person is part of the shortest path than connects other actors in the network (Freeman, 1978/9). This shortest path is called the geodesic. For example, in Figure 2, a path from C to D could go C to A to B to D or it could go from C to B to D. The latter path is shorter by only using 2 ties, rather than 3. This is the geodesic. Thus, B is between C and D on this path.

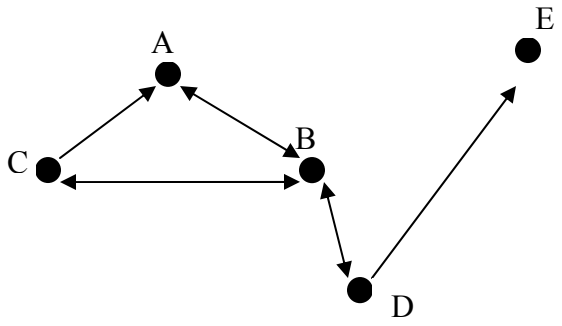

Figure 2. Betweenness Centrality Example

Calculating the betweenness centrality of each actor entails identifying all the geodesics in the network and determining how often a person lies on each of these paths. The frequency of

being on the geodesics is then compared to the maximum possible paths an actor could be on if s/he was on every geodesic in the network. Thus, the denominator is calculated by determining all possible (shortest) paths between actors in the network while the numerator is calculated by determining how many geodesics an actor actually lays on. For instance, imagine that there are 5 kids in a class, as in Figure 2. One would calculate how many of the geodesics, that connect Actors B, C, D, and E, Actor A lays on. This would be the numerator. This number would then be compared to the number of geodesic Actor A could lie on if she were the center of the network such as in Figure 3. This would be the denominator. The following equation taken from Wasserman and Faust (1994) demonstrates this:

Standardized betweenness centrality for directional ties = $$C_B^{'}(n_i) = \frac{\sum_{j<k} \frac{g_{jk}(n_i)}{g_{jk}}}{\frac{(g-1)(g-2)}{2}}$$

Where g_{jk} is the number of geodesics between *j* and *k* and $g_{jk}(n_i)$ is the number of geodesics between *j* and *k* that include actor *i*. Thus, $\frac{g_{jk}(n_i)}{g_{jk}}$ is the proportion of geodesics between *j* and *k* that include actor *i*. The letter *g* denotes the number of actors in the network. Thus, the denominator, $\frac{(g-1)(g-2)}{2}$, indicates the possible number of times a person could be on a geodesic if s/he were between every actor in the network. Thus, a high centrality index indicates that a person plays an important role as an intermediary in their network to connect people and assist in the transfer of information/positive regard (Newman, 2003).

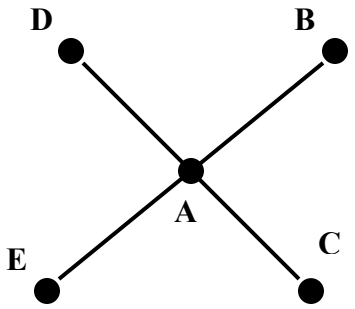

Figure 3. Example of A being on all geodesics

Prestige. A person's rank prestige (also known as eigenvector centrality) is a function of the prestige of the people who select him. A person who is connected to prestigious people should have more status than a person who is connected to less prestigious, peripheral people. Unlike betweenness centrality which factors in both in-degrees and out-degrees, rank prestige is mainly interested in who selects an actor rather than who that actor selects. While prestige is interested in an actor's popularity rather than expansiveness, it differs from peer acceptance by incorporating indirect ties into the calculation. Thus, being chosen by a high status person will increase an actor's own status. Rank Prestige is the linear combination of the prestige of actors selecting each person. It is the weighted sum of the ranks of those who chose actor *i.*

Rank Prestige = $P_R(n_i) = x_{1i}P_R(n_1) + x_{2i}P_R(n_2) + ... + x_{gi}P_R(n_g)$

In the sociomatrix for each class, there are *g* actors whose rank indices are placed into a vector. In this, vector P is the eigenvector corresponding to 1 and $P_R(n_i)$ is the actor-level rank prestige measure for actor *i* (Wasserman & Faust, 1994).

For instance, in Figure 2 although E has only one direct tie, this actor has high prestige because the calculation of his score is the sum of D's prestige (which is a function of B, who is connected to C and A). Thus, E is the top of the hierarchy, as all paths eventually lead to him.

For this study, both betweennness and prestige are calculated for any tie and for strong ties. To measure any tie, the ratings are dichotomized such that a rating of "a little", "some" or "a lot" is scored as a 1 and a rating of "not at all" is scored as a 0. For assessing strong ties, the scores are dichotomized so that "a lot" is scored as 1 and "some", "a little", and "not at all" are scored as 0.

This study is interested in how individual behaviors (i.e. prosocial and aggressive) predict children's peer interactions. Additionally, the study explores the relationship between three different measures of peer interactions; reciprocal friendship, peer acceptance/rejection, and network centrality/prestige. In order to do this, the correlations between the predictor variables were calculated (see Table 5). Then, the zero-order correlations between the outcomes were calculated. Next, multivariate regression analyses were used to assess how child behaviors contributed to peer interactions. Separate analyses were conducted for each type of outcome (i.e. friendship, peer acceptance, and network centrality), using the same predictor variables.

Outcome Variables for Multivariate Analyses

Friendship. Friendship, as an outcome, was measured as a dichotomous and continuous variable. One analysis assessed whether prosocial and aggressive behaviors (alone or in conjunction) contributed to whether a child had a friend or not. Next, another analysis was run to test whether these behaviors predicted the number of friends a child had.

Dichotomous outcome = having a mutual friend or not

Continuous = number of reciprocal relationships (standardized by class)

Peer preference. Peer preference was calculated by summing the total ratings and nominations for each child and standardizing them by classroom. Thus, the scores from children of different sized classrooms could be compared. Peer acceptance was the combination of most liked ratings and most liked nominations and peer rejection was combination of *not at all* ratings and least liked nominations. Both measures were standardized by classroom to control for differences in classroom size.

Social Prominence. Betweenness centrality and rank prestige (eigenvector centrality) were calculated for each children by dichotomizing relations in two ways; relationship present at all (i.e. ratings of *not at all* versus *a little*, *some*, *a lot*) and strong ties (i.e. *a lot* versus *not at all*, *a little* and *some*). Thus, the centrality and prestige were assessed for any connection and for strong connections.

Any tie = rating of 1 (a little), 2 (some), or 3 (a lot)

Strong tie = rating of 3 (a lot)

Table 4. Coding of Ratings and Nominations for to Calculate Outcomes

	Not at all	A little	Some	A lot	Positive Nom	Negative Nom
Friendship (if mutual)	0	0	0	1	1	0
Peer Acceptance	0	0	0	1	1	0
Peer rejection	1	0	0	0	0	1
Centrality/prestige: strong	0	0	0	1	-	-
Centrality/prestige: any	0	1	1	1	-	-

Covariates

Gender and race were tested in each regression equation to determine if the relationship between child behaviors and peer interactions different between boys and girls and children of

different races. Since the participants were predominantly white, this variable was dichotomized into Caucasian (1) and non-Caucasian (0).

Comparison of Different Types of Peer Interactions

Zero-order correlations were calculated between having a friend, number of friends, peer preference, peer rejection, betweenness centrality, and rank prestige. Next the contribution to individual child behaviors to each type of peer interaction was assessed. Basically, this assessed whether the variance in mutual friendships, peer acceptance/rejection, and centrality/prestige was explained by the same behavioral contributors and if so, whether these contributors accounted for the same amount of variance. For example, are the main effects of prosocial behavior the same for all three types peer relationships? By assessing the relationship of the three types of interactions to one another and to behavioral variables, this study is able to better describe and differentiate friendships, peer acceptance, and network indices.

Predictor Variables

Unlike much of the work on children's peer interactions, this study is interested in the ways individual child behaviors (i.e. prosocial and aggressive) contribute to friendships, peer preference, and network centrality rather than simply describing the characteristics of children who have friends, are well liked by peers, or are central in their network. Thus, child behaviors serve as predictors of peer interaction outcomes. As such, the Y each of the following equations corresponds to six different outcomes; having a reciprocal friend, the number of reciprocal friends, peer acceptance score, peer rejection score, betweenness centrality index, and prestige index (eigenvector centrality).

Multiple informants—teachers, children, and their peers-- provided information about each child's behavior in the fall of the school year. Their responses were used individually to assess their unique contribution to the main effect of aggression and prosocial behavior on peer interactions. Then, these respondents' questionnaires were used to create a composite score of aggressive behavior and one of prosocial behavior. This allows for more parsimonious investigation into the interactions between prosocial and aggressive behavior on the development of mutual friendships, peer acceptance, and network centrality. Principal components analysis (PCA), a method for explaining variance-covariance structures through linear combination, was used to combine information from each informant (Johnson & Wichern, 1998). While responses from each informant share some variance, it is expected that each will provide additional information about the latent variables being studied (Van Bruggen, Lilien, & Kacker, 2002). Previous research with multiple informants has found that teachers and peers tend to correlate more highly with each other than self-report (e.g. Pakaslahti & Keltikangas Jarvinen, 2000). This is not surprising given that peers and teachers are often privy to the same displays of behavior while children are aware their own behaviors that may go unnoticed by others (especially prosocial behaviors). Additionally, self-report is more prone to providing socially desirable responses to questions about behaviors. Thus, the combination of reporters is based on theory rather than the correlations within the sample (Kim & Mueller, 1978). For this study, it is assumed that teachers, peers, and children provide unique components to understanding prosocial and aggressive behavior and that all three reporters, in conjunction, are better indicators of child's true behaviors. Since there is an expectation of overlap between peers and teachers, PCA is used rather than averaging across informants. Table 5 shows the correlations between the measures included.

Aggressive and prosocial behavior and respondent. Aggressive and prosocial behaviors are reported by peers, teachers, and child self-report. To assess the main effects of aggressive behavior by respondent type, an initial analysis included each informant's score as a unique predictor for the regression equation. Similarly, the main effect of prosocial behaviors by respondent was tested by including each respondent's score as a predictor variable.

Aggression by informant

$$(Y = b_{\theta} + b_{aggrTeacher}X_1 + b_{aggrPeer}X_2 + b_{aggrChild}X_3 + e)$$

Prosocial by informant

$$(Y = b_{\theta} + b_{empathyChild}X_1 + b_{prosocPeer}X_2 + b_{prosocTeacher}X_3 + e)$$

Composites and Interactions. In order to assess the main effects of the composite scores of aggression and prosocial behaviors, each were included as predictor variables. Importantly, the interaction between the two was included as well to determine if the combination of aggressive and prosocial behaviors contribute to the development of mutual friendships, peer acceptance/rejection, and network centrality and prestige.

Composite main effects and interactions

$$(Y = b_{\theta} + b_{aggr}X_1 + b_{prosoc}X_2 + b_{aggr*prosoc}X_3 + e)$$

Table 5. Correlation between measures of aggression and prosocial behavior

	Ch Emp.	T Prosoc.	Peer Nice	Ch Aggr.	T Aggr.	P Aggr.
Child Empathy	1					
Teacher Prosocial	0.09	1				
Peer Nice	0.19*	0.57***	1			
Child Aggression	-0.08	-0.32**	-0.44**	1		
Teacher Aggression	-0.09	-0.63***	-0.38**	0.4***	1	
Peer Aggression	-0.17*	-0.67***	-0.67	0.25***	0.53***	1

* p < .01, ** p < . 001, *** p < .0001

CHAPTER IV

RESULTS

In order to assess the effects of aggressive and prosocial behavior on peer interactions, information on these types of behaviors was provided by teachers, peers, and child self-report. As can be seen in Table 5, measures of aggression from all three informants were highly correlated while high correlations of prosocial behavior were only found between teacher and peer reported measures. Apparently, children's self-report of prosocial behaviors differed from how teachers reported on such behaviors resulting in no significant correlation between these two informants on this construct. To assess how each informant predicted peer interaction outcomes, main effects by informant were calculated.

Regression Analyses

Multivariate regression analyses were used to assess the effects of prosocial and aggressive behaviors on peer interactions. Each type of peer interaction outcome was standardized per class to control for differences in classroom size with the exception of having a reciprocated friendship, which was dichotomized as either having a mutual friend (1) or not (0). Table 6 shows the ranges, means, and variation of these outcome measures. For the outcome, having a friend or not, a hierarchical linear model was used to partial out covariation based on children being nested within the same class. Outcomes for each regression analysis included having a mutual friend or not (dichotomous), the number of mutual friendships in a class (z-score by class), peer acceptance (z-score of liked ratings/nominations by class), peer rejection (z-score

of disliked ratings/nominations per class), and network betweenness and prestige (z-score of any tie and strong ties, standardized by class). All outcome measures were collected in the second wave of data collection in the winter.

Table 6. Descriptive Statistics of Outcome Variables

	Mean	Standard deviation	Skew	Kurtosis	Min	Max
Number of friends	2.37	1.73	0.85	0.80	0	8
Peer acceptance	2.44	1.75	0.9	0.96	0	8
Peer rejection	4.15	2.59	0.744	0.81	0	15
Prestige (any tie)	0.35	.09	-0.78	0.63	0.003	0.54
Betweenness (any tie)	0.04	0.04	2.0	5.156	0	0.25
Prestige (strong tie)	0.32	.17	-0.20	-0.74	0	0.68
Betweenness (strong tie)	0.06	0.08	2.1	4.49	0	0.45
Have a friend: 26=no friend, 178 = at least 1 friend						

Table 7. Main effects of Aggression by Informant

	Self report β (se)	**Peer Report β (se)**	**Teacher report β (se)**	**R^2**
Have a friend (y/n)	**- 0.059*** (0.03)	- 0.001 (0.03)	-0.023 (0.03)	0.36****
Number of friends	- 0.092 (.08)	**- 0.219*** (0.09)	0.065 (0.08)	0.23**
Peer acceptance	**- 0.166*** (0.07)	**- 0.395**** **(0.08)**	0.139 (0.08)	0.41****
Peer rejection	**0.144*** (0.07)	**0.354**** (0.08)	- 0.077 (0.08)	0.38****
Prestige (any tie)	- 0.087 (0.08)	**- 0.278**** (0.09)	0.051 (0.08)	0.23****
Betweenness (any tie)	0.043 (0.08)	- 0.106 (0.09)	0.094 (0.09)	0.102
Prestige (strong tie)	- 0.103 (0.08)	**- 0.233*** (0.09)	0.049 (0.09)	0.20**
Betweenness (strong tie)	0.047 (0.08)	- 0.134 (0.09)	0.076 (0.09)	0.11
* p < .05, **p < .01, ***p < .001, ****p < .0001				

Main effects of aggressive behavior. To assess the main effects of aggressive behavior by respondent type, a multivariate regression analysis was run with each informant's score used as a unique predictor for the regression equation. Across all the outcomes, peer report of aggression was the strongest predictor while teacher report of aggression was never a significant predictor. Peer reported aggression negatively predicted peer acceptance (β = - 0.39, se = 0.08, p < 0.0001), number of mutual friendships (β = - 0.22, se = 0.09, p < 0.05), and network prestige for any tie (*b*

= - 0.28, se = 0.09, p < 0.0001) and strong ties (β = - 0.23, se = 0.09, p < 0.05). Peer rated aggression positively predicted peer rejection (β = 0.35, se = 0.08, p < 0.0001). Child reported aggression negatively predicted peer acceptance (β = - 0.17, se = 0.07, p < 0.05) and having a friends or not (β = - 0.06, se = 0.03, p < 0.05) and positively predicted peer rejection (β = 0.14, se = 0.07, p < 0.05). None of the aggression measures were significantly related with network betweenness indices. Thus, higher level of aggression, as rated by peers and self-report, was associated with not having a friend, having fewer friends, less peer acceptance, lower network prestige, and increased peer rejection. No differences were found between males and females or white and non-whites and thus, are not presented in Table 7.

Main effects of prosocial behavior. The main effects of prosocial behavior by respondent were assessed by including each respondent's score as a predictor for each outcome. Similar to the main effects of aggression by reporter, peer-report was the most significant predictor of peer interaction outcomes. Peer-reported prosocial behavior positively predicted peer acceptance (β = 0.31, se = 0.09, p < .001), number of mutual friends (β = 0.24, se = 0.09, p < 0.01), and network prestige for having any tie (β = 0.20, se = 0.09, p < .05) and negatively predicted peer rejection (β = - 0.41, se = 0.087, p < 0.0001). Teacher-reported prosocial behavior was only related to determining whether a child had a mutual friend or not (β = 0.13, se = 0.03, p < 0.0001). Child self-reported prosocial behavior did not significantly predict any of the outcomes. Overall, high levels of peer-rated prosocial behavior led to more friends, greater peer acceptance, higher network prestige, and less peer rejection. Children with lower prosocial behavior as rated by teachers were less likely to have even 1 mutual friend. These relationships did not differ between males and females or whites and non-whites and are not included in Table 8.

Table 8. Main Effects of Prosocial Behavior by Informant

	Self report β (se)	Peer Report β (se)	Teacher report β (se)	R^2
Have a friend	0.012 (0.02)	-0.02 (0.03)	**0.127**** (0.03)	0.39****
Number of friends	0.014 (.07)	**0.243**** (0.09)	0.091 (0.09)	0.30****
Peer acceptance	0.001 (0.07)	**0.311***** (0.89)	0.135 (0.08)	0.39****
Peer rejection	0.066 (0.07)	-0.032 (0.08)	**- 0.412**** (0.09)	0.41****
Prestige (any tie)	0.107 (0.07)	**0.199*** (0.09)	0.14 (0.09)	0.32****
Betweenness (any tie)	0.109 (0.08)	0.085 (0.101)	-0.025 (0.095)	0.13
Prestige (strong tie)	0.127 (0.07)	**0.187*** (0.1)	0.113 (0.9)	0.30****
Betweenness (strong tie)	0.124 (0.08)	0.129 (0.1)	-0.042 (0.09)	0.17*
* p<.05, **p<.01, ***p<.001, ****p<.0001				

Composites of Aggressive and Prosocial Behavior

In order to assess the main effects of aggression and prosocial behavior and their interaction, across informants, a composite score was calculated for both aggression and prosocial behavior using principal components analysis. While the composite scores of aggression and prosocial behavior were to be based on teacher-report, peer-report, and child self-

report. Only the aggression measure included all three reporters. The prosocial composite included only teacher and peer report since child-self-report did not appear to contribute to a prosocial factor in a reliable way.

Aggressive composite. In order to include all informants simultaneously, the aggression measures from all three reporters were combined into a psychometrically cohesive index. As can be seen in Table 9, factor loadings per item on the aggression measure ranged from .38-.75, with the exception of 6 items with loadings less than .38. These items poorly conforming items were removed from the composite. These loadings were used as item weights in order to compute a new aggression composite for each child.

Prosocial composite. For combining prosocial measures, only teacher and peer reported measures were used to construct a prosocial composite since items from the child self-report measure of prosocial behavior did not load well onto this composite. Additionally, one teacher report item, although reverse coded, did not fit the composite well and was therefore dropped. See Table 10 for details.

Table 9. Aggression Composite Loadings

Full Loadings	Item	New Loading
0.36852	Self 1: I teased a kid at school	
0.54188	Self 2: I pushed, shoved, or hit a kid from school	0.49191
0.42219	Self 3: I called a kid at school a bad name	0.38100
0.35642	Self 4: I left out another kid on purpose	
0.21745	Self 5: I said that I would hit a kid at school	
0.44295	Self 6: Made up lie about student so kids wouldn't like him	0.41094
0.58233	Teacher 1: Blames others	0.58770
0.58874	Teacher 2: Shows off	0.55843
0.50836	Teacher 3: Threatens to hurt others	0.53107
0.29151	Teacher 4: Breaks other children's things	
0.51363	Teacher 5: Hits other children	0.54630
0.60996	Teacher 6: Is a sore loser	0.58841
0.38077	Teacher 7: Is critical of others	0.61556
0.35996	Teacher 8: Complains about rules	
0.60291	Teacher 9: Teases others	0.61556
0.62209	Teacher 10: Calls other children names	0.63089
0.77215	Teacher 11: Argues when denied own way	0.75167
0.59684	Teacher 12: Bullies others	0.62001
0.34091	Teacher 13: Orders others around	
0.55639	Peer 1: Peer gets in trouble rater 1	0.58013
0.59207	Peer 2: Peer gets in trouble rater 2	0.62137
0.61929	Peer 3: Peer gets in trouble rater 3	0.63367
0.47152	Peer 4: Peer gets in trouble rater 4	0.51922
0.63577	Peer 5: Peer gets in trouble rater 5	0.65987
0.40713	Peer 6: Peer gets in trouble rater 6	0.43067
0.47239	Peer 7: Peer gets in trouble rater 7	0.49765
0.53794	Peer 8: Peer gets in trouble rater 8	0.55392
0.50060	Peer 9: Peer gets in trouble rater 9	0.51091

Table 10. Prosocial Composite Loadings

Full Loadings	Item	New Loading
0.15465	Child 1: When I'm mean to someone, I feel bad about it later	
0.09170	Child 2: I'm happy when teacher says friend did a good job	
0.29768	Child 3: I would get upset if I saw someone hurt an animal	
-0.07475	Child 4: I understand how other kids feel	
0.21356	Child 5: I would feel bad if my mom's friend got sick	
0.14188	Child 6: Other people's problems really bother me	
0.16180	Child 7: I feel happy when my friend gets a good grade	
0.43785	Child 8: When I see a kid who is upset it really bothers me	
-0.04360	Child 9: Easy for me to tell when parent has good day at work	
0.18573	Child 10: It bothers me when my teacher doesn't feel well	
0.24342	Child 11: Feel sorry for kids who can't find anyone to play with	
0.19849	Child 12: Seeing a kid who is crying makes me feel like crying	
0.21425	Child 13: If two kids are fighting, someone should stop it	
0.20745	Child 14: It would bother me if my friend got grounded	
0.23392	Child 15: When I see someone who is happy, I feel happy too	
0.66292	Teacher 1: Expresses needs and feelings appropriately	0.73331
0.77585	Teacher 2: Resolves peer problems on his/her own	0.81839
-0.32584	Teacher 3: Talks back to teachers	
0.82571	Teacher 4: Is good at understanding other people's feelings	0.87085
0.53426	Teacher 5: Is aware of the effect of child's behvr on othrs	0.55645
0.80962	Teacher 6: Works well in a group	0.85459
0.70023	Teacher 7: Shares materials with others	0.73147
0.80362	Teacher 8: Cooperates with peers without prompting	0.83571
0.81710	Teacher 9: Is helpful to others	0.82053
0.87966	Teacher 10: Listens to others point of view	0.87397
0.68020	Teacher 11: Can give suggstns/opinions w/o being bossy	0.70411
0.73563	Teacher 12: Acts friendly towards others	0.77831
0.39135	Peer 1: Nice and Kind to other Rater 1	0.35554
0.41150	Peer 2: Nice and Kind to other Rater 2	0.44005
0.23706	Peer 3: Nice and Kind to other Rater 3	0.32222
0.35977	Peer 4: Nice and Kind to other Rater 4	0.29010
0.20612	Peer 5: Nice and Kind to other Rater 5	0.32222
0.34715	Peer 6: Nice and Kind to other Rater 6	0.37573
0.31641	Peer 7: Nice and Kind to other Rater 7	0.34545
0.33036	Peer 8: Nice and Kind to other Rater 8	0.34457
0.32416	Peer 9: Nice and Kind to other Rater 9	0.36077

Main effects and interactions with composites. In order to test the main effects of aggression and prosocial behavior and well as their interaction, a multivariate analysis was conducted using the aggression composite, prosocial composite, and child self-reported prosocial behavior. Thus the following regression analysis was run for each peer interaction outcome.

$$Y = \beta_0 + \beta_1 Ag_{all} + \beta_2 \mathrm{Pr}_{TeachPeer} + \beta_3 \mathrm{Pr}_{Self} + \beta_4 \mathrm{Pr}_{TeachPeer} * \mathrm{Pr}_{Self} + \beta_5 \mathrm{Pr}_{Self} * Ag_{all} + \beta_6 \mathrm{Pr}_{TeachPeer} * \mathrm{Pr}_{Self} * Ag_{all}$$

While all the regression models accounted for significant amounts of variance in the outcomes, few of the predictor variables were significant. The prosocial composite obtained from peer and teacher report predicted half of the peer interaction outcomes. Increases in peer/teacher reported prosocial behavior was associated with having at least one mutual friend ($\beta = 3.33$, se = 0.71, $p < .0001$), more friends ($\beta = 4.94$, se = 2.26, $p < .05$), higher peer acceptance ($\beta = 5.4$, se = 2.23, $p < .05$), and higher network prestige ($\beta = 4.97$, se = 2.34, $p < .05$). Children who were high on both aggressive and prosocial behavior, as reported by all three informants, were more likely to have at least one mutual friend ($\beta = 27.06$, se = 10.08, $p < .01$). See Table 11 for details.

Friendship, Acceptance/Rejection, and Network Betweenness/Prestige

While all types of peer interaction measures were strongly correlated, they appear to be distinctly different constructs. While there was significant covariation, these outcomes were not synonymous. Table 12 shows the correlation matrix of the peer interaction measures. Peer rejection and peer acceptance, both peer preference outcomes, were most highly correlated while peer rejection and having at least one friend were not significantly correlated at all. All of the network centrality indices were correlated with the sociometric and friendship outcomes, with network prestige with any tie being most highly correlated with peer acceptance.

Table 11. Main Effects and Interactions of Aggression and Prosocial Behavior

	(A) Aggress Composite β (se)	**(P_C) Prosocial** Teach/Peer Composite β (se)	**(P_S) Prosocial** Self β (se)	**A*P_S** Interaction Aggress* Self β (se)	**A*P_C** Interaction Aggress* Teach/Peer β (se)	**A*P_C*P_S** Interaction all β (se)	R^2
Have a friend	1.3 (0.77)	**3.33**** (0.71)	0.049 (0.029)	1.07 (0.94)	0.9 (0.63)	**27.06**** (10.09)	0.45****
Number of friends	-0.03 (2.46)	**4.94*** (2.26)	0.0514 (0.091)	1.91 (3.03)	0.67 (2.01)	22.45 (32.3)	0.27***
Peer acceptance	-1.24 (2.44)	**5.40*** (2.23)	0.002 (0.09)	1.278 (3.0)	0.994 (1.99)	1.95 (31.98)	0.32****
Peer rejection	2.39 (2.45)	-3.97 (2.24)	0.05 (0.091)	-2.59 (3.02)	-1.5 (2.01)	-3.50 (32.12)	0.32****
Prestige (any tie)	-2.39 (2.46)	4.01 (2.25)	0.12 (0.091)	1.70 (3.02)	1.51 (2.01)	17.47 (32.24)	0.33****
Betweenness (any tie)	2.79 (2.7)	2.64 (2.48)	0.14 (0.1)	0.01 (3.33)	1.9 (2.21)	1.3 (35.54)	0.15*
Prestige (strong tie)	0.03 (2.56)	**4.97*** **(2.34)**	0.1 (0.09)	2.93 (3.15)	1.09 (2.1)	2.26 (33.56)	0.28***
Betweenness (strong tie)	1.22 (2.63)	1.94 (2.41)	0.19 (0.1)	5.12 (3.23)	3.11 (2.15)	26.32 (34.49)	0.19*
* p < .05, **p < .01, ***p < .001, ****p < .0001							

Table 12. Correlations between Outcome Measures of Peer Interactions

	1. Friend (y/n)	2. # of friends	3. Peer accept	4. Peer rejection	5. Btwn-any	6. Prestige-any	7. Btwn-strong	8. Prestige-strong
1. Has friend (y/n)	1							
2. Number of Friends	0.50***	1						
3. Peer Acceptance	0.24**	0.53***	1					
4. Peer Rejection	- 0.13	- 0.42***	- 0.88***	1				
5. Betweeness (any tie)	0.23**	0.43***	0.38***	- 0.34***	1			
6. Prestige (any tie)	0.16*	0.39***	0.58***	- 0.54***	0.52***	1		
7. Betweeness (strong tie)	0.25***	0.48***	0.28***	- 0.27***	0.47***	0.40***	1	
8. Prestige (strong tie)	0.28***	0.50***	0.57***	- 0.47***	0.41***	0.71***	0.37***	1

*p<.01 **p<.001 ***p<.0001

CHAPTER V

DISCUSSION

Aggression and Peer Interactions

When looking at the main effects of aggression as reported by peers, teachers, and self-report, high levels of this type of antisocial behavior was associated with being friendless, having fewer reciprocated friendships, less peer acceptance, and reduced network prestige. High levels of aggression also led to increased rejection from peers. Thus, aggression, when viewed without prosocial behavior, appears to be detrimental to positive peer interactions. Interestingly, not all types of informants reporting on aggression predicted peer interaction outcomes, suggesting that self-reported aggression may be different in nature than peer-reported or teacher-report aggression. The different predictive value of each informant also introduces the question of whether the type of informant has contributed to the equivocal findings in other studies of the role of aggression in peer interactions.

Informants of aggression. In this study, peer-reported aggression contributed most to peer interaction outcomes while teacher-report of aggression did not predict any of the outcomes. Child self-report of aggression was negatively associated with having a friend and peer acceptance but was not related to any other outcomes. Research on the role of aggression and peer interactions has relied predominantly on peer-report with the bulk of the research finding a high correlation between aggressive behaviors and peer preference outcomes. Such studies have found highly aggressive behavior to correspond to high levels of rejection (e.g. Johnson, 2002; Ray et al., 1997) whereas low levels of aggression correlate with high peer acceptance (e.g.

Chang, 2004; Cillessen & Mayeux, 2004). While some research that has employed teacher-report of aggression has found similar findings for peer acceptance/rejection (e.g. Attili, Vermigli, & Schneider, 1997; Denham & Holt, 1993), other studies have failed to find a significant relationship between teacher-reported aggression and peer interactions. For instance, Phillipsen, Bridges, McLemore, and Saponaro (1999) found no relationship between teacher-reported aggression and peer acceptance or the number of mutual friendships a child maintained. Similarly, Estell and colleagues (2002) did not find a significant relationship between teacher-reported aggression and peer acceptance or network prominence. In their study, popular and central children as well as those that were rejected and isolated displayed high levels of aggression. Thus, teacher-reports of aggression did not differentiate children with different types of interactions with peers (e.g. high acceptance, low prestige). Thus, it is possible that the types of behaviors that teachers view as aggressive may not be viewed in the same way by peers and the perpetrators of these actions and therefore do not influence how children interact with one another.

Although teacher-report did not predict any peer interaction outcomes in this analysis, child self-report of aggression was negatively associated with peer acceptance and having a friend. These findings are somewhat surprising. While a negative association between self-reported aggression and peer acceptance have been found occasionally (e.g. Salmivalli, Lagerspatz, Osterman, & Kaukiainen, 1995), most of the research in this area has not found any relationship between aggression and peer acceptance. For instance, both Mouttapa, Valenta, Gallaher, Rohrbach, and Unger (2004) and Henry, Guerra, Huesman, Tolan, Van Acker, and Eron (2000) found no association between child self-reports of aggression and peer acceptance. In a meta-analysis of aggression and peer preference, Newcomb, Bukowski, and Pattee (1993)

found that self-reported aggression did not differentiate popular (high acceptance), average, or neglected children. However, in this study, rejected children received high aggression scores from all types of informants.

The finding that child self-reported aggression predicted being friendless is also unexpected given that numerous studies have failed to find any relationship between aggression and being friendless (e.g. Deptula, 2003; Rys & Bear, 1997). In fact, Burr, Ostrov, Jansen, Cullerton-Sen, and Crick (2005) concluded that being aggressive, "does not prohibit young children from forming mutual friendships" (p. 174). However, none of these studies used self-report measures of aggression. Instead, all used peer-report measures of aggression with two including a teacher-report measure as well (Johnson, 2003; Rys & Bear, 1997). This suggests that self-reported aggression may be different from aggression rated by peers and teachers.

From the analysis of the main effects of aggression, it appears that peer-reports of aggression are more important in predicting peer interactions than teacher and child self-reports with the exception of determining whether a child has a friend or not. In this case, only child self-report predicted this dichotomized variable. One possible reason for the greater utility of peer-report in this study, as compared to self- and teacher-report, is its greater sensitivity to varying degrees of child aggression. Both the teacher-report and self-report measures of aggression were highly skewed with most children receiving low aggression scores. Thus, these measures did not detect much variance in children's aggressive behaviors and only identified those children with high levels of aggression. However, the peer-reported aggression scale was more normally distributed which may have accounted for its increased predictive validity. While both the self-report and teacher-report measures were log transformed, they still lacked the variability of the peer measure. The observed lower scores of aggressive behaviors when using

self-report as compared to peer-report in this study has also been found in other research as well (e.g. Salmivalli et al, 1995).

As for why self-reported aggression predicted whether a child had a mutual friend or not and peer acceptance, may be associated with the types of children who report on their own high levels of aggressive behavior. Perhaps these children display extreme levels of aggression while more mild aggressors tend to not acknowledge their own aggressive behavior. Thus, child self-report may be useful in identifying a specific sub-type of child, i.e. those will extreme aggressive behaviors.

Table 13 describes the research on the role of aggression and peer interactions considering who reports on the aggressive behaviors. As you can see, self-reported aggression is less commonly used as compared to self-report and peer-report. Many of the studies that utilize self-reports of aggression have found it unrelated to peer acceptance and rejection (e.g Hawley, 2003; Mouttapa et al., 2004). None of the studies in table 13 included a self-report measure in the assessment of friendship or network centrality indices. Interestingly, the use of peer-reported measures of aggression showed the strongest association with all of the peer interaction outcomes. It should be noted in viewing table 13 that most of the studies looked at correlations between aggression and specific groups of children (e.g. children who are rejected, those that are very central) and did not assess whether aggression differentiated different types of children/peer interactions.

Table 13. The role of aggression in peer interaction outcomes as rated by peers, teachers, and self-report

Study	**Informant**	**Acceptance**	**Rejection**	**Friend (Y/N)**	**Number Friend**	**Centrality**
Attili, Vermigli, & Schneider, (1997)	Teacher		(+) Of rejected group			
Bagwell, Coie, Terry, & Lochman, (2000)	Peer					No relationship
Burr Ostrov, Jansen, Cullerton-Sen, & Crick (2005)	Peer			No relationship	(-/+) High aggr in fall = fewer friends in Spring High aggr in spring = more friends in spring	
Chang (2004)	Teacher Peer	(-) less acceptance				(+) higher centrality (teacher) (-) lower centrality (Peer)
Cillessen & Mayeux (2004)	Peer	(-) less acceptance (except popular group)	(+) more rejection			
Denham & Holt (1993)	Teacher	(-) more acceptance				
Denham, McKinley, Couchoud, & Holt (1990)	Teacher	No relationship				
Deptula (2003)	Peer			No relationship	No relationship	
Estell, Cairns, Famer, & Cairns (2002)	Teacher	No relationship (some popular were highly aggressive)				No relationship (some central were highly aggressive)

Farmer & Farmer (1996)	Peer					(+) higher centrality for boys
Farmer & Rodkin (1996)	Peer					(+) 1 type of central kids were highly aggressive
Gest, Graham-Bermann, & Hartup (2001)	Peer		(+) more rejection	No relationship	No relationship	(+) high centrality
Hawley (2003)	Teacher Peer Self	(-) less acceptance (teacher) No relationship (peer) No relationship (self)				
Henry Guerra, Huesmann, Tolan, VanAcker, & Eron (2000)	Self	No relationship	No relationship			
Johnson (2002)	Teacher Peer	(-) Physical aggr (teacher) (-) Relational aggr (peer)	(+) Physical aggr (teacher) (+) Relational aggr (peer)	No relationship	(-) Physical aggr (teacher) (-) Relational aggr (peer)	
Lancelotta & Vaughn (1989)	Peer	(-) less acceptance				
Liu & Chen (2003)	Teacher Peer Self					(-) low centrality/isolate (peer and teacher) No relationship (self)
Mouttapa Valente, Gallaher, Rohrbach, & Unger (2004)	Self	No relationship				

Phillipsen Bridges, McLemore, & Saponaro (1999)	Teacher	No relationship	No relationship			
Ray, Cohen, Secrist, & Duncan (1997)	Peer		(+) more rejection		No relationship	
Rys & Bear, (1997)	Teacher Peer	(-) Less acceptance (teacher and peer)	(+) More rejection (esp girls with relational aggress)		(-) Fewer friends (physical aggr for males)	
Salmivalli, Lagerspetz, Bjorkqvist, & Osterman (1996)	Peer Self	(-) low acceptance (male bullies)	(+) high rejection (male bullies)			
Sandstrom & Coie (1999)	Peer		(-) decreased rejection (males)			
Sebanc (2003)	Teacher			No relationship		
Spence (2002)	Teacher	(-) Less acceptance (relational aggr for females)		No relationship		(+) More centrality
Werner & Crick (2004)	Peer		(+) Physical aggression Relational aggr for females			
Wright, Giammarino, & Parad, (1986)	Peer	(-) less acceptance	(+) More rejections			
Xu, Farmer, Schwartz, & Chang (2004)	Teacher Peer	(-) less acceptance (Peer)				

Aggression in friendship, acceptance/rejection, and centrality/prestige. The main effects of aggression, as reported by each type of respondent independently, accounted for 4-16% of the variance in all peer interaction outcomes with the exception of network betweenness centrality. This suggests that aggression plays a role in whether children have friends, their number of mutual friendships, the amount of acceptance, the level of rejection and the degree of prestige within a network they receive, but not to how they connect to others in the social webbing of the class. While aggression may relate to prestige, it appears to have little influence in which children connect other children within the network. Part of the reason for the lack of a relationship between aggression and betweenness centrality may be due to the fact that the classrooms in this study were not very centralized. That is, they lacked a star-like structure in which most of the children connected to one or a few key people. Rather, the distribution of betweenness indices was leptokurtic showing that most of the children shared similar levels of betweenness centrality. Most of the classes in this study were well integrated with mean centralization scores of 11. Thus, there was not a lot of variability in this network outcome. The small differences in this outcome left little opportunity for another construct to co-vary with it (Pedhazur, 1997).

Aggression in the composite model. While aggression was related to most peer interaction indices in the first analyses, when information from all three informants was combined into a composite score and prosocial behavior was added to the analysis, the main effects of aggression were lost. This begs the question of whether prosocial and aggressive behaviors are collinear, if prosocial is a much more important construct in estimating peer interaction outcomes or if the combining of informants into a composite score masked the informant-unique components of aggression that influence peer interactions. In order to explore this question, a post-hoc analysis

was conducted looking at main effects of aggressive behaviors, prosocial behaviors, and their interactions as reported by each informant. A description of, and the results from, this analysis appear after the discussion of the main effects of prosocial behavior and the composite scores main effects and interactions.

Prosocial Behavior and Peer Interactions

Informants and prosocial behavior. Exploring the main effects of prosocial behavior by including each informant individually found that peer-reported prosocial behavior was highly predictive of having more mutual friendships, being more accepted by peers, and obtaining higher prestige in the network for both weak and strong ties. Teacher-reported prosocial behavior was predictive of having at least one mutual friend and less peer rejection while child self-reported prosocial behavior was not related to any peer interaction outcome. Other studies of prosocial behavior in peer interactions have predominately utilized peer report with several studies including both peer and teacher report (e.g. Hawley, 2003; Stormshak et al., 1999). These studies have typically found a positive relationship between prosocial behavior and peer acceptance and friendship and a negative relationship between prosocial behavior and peer rejection. For instance, Attili and colleagues (1997) found that children with high levels of teacher-reported prosocial behaviors experienced less rejection from peers. Similarly, Chang (2004) and Chen et al. (2002) found a similar result when using peer-reports of prosocial behaviors. The relationship between informant-type of prosocial behaviors and peer interactions can be seen in table 14.

Table 14. The role of prosocial behavior in peer interaction outcomes as rated by peers, teachers, and self-report

Study	Informant	Acceptance	Rejection	Friend (Y/N)	Number Friend	Centrality
Attili, Vermigli, Schneider (1997)	Teacher		(-) less rejection			
Caprara Barbaranelli, Pastorelli, Bandura, & Zimbardo (2000)	Teacher Peer Self (SEM)	(+) more acceptance				
Chang, (2004)	Peer	(+) more acceptance				
Chen Liu, Mowei Rubin, Cen, Gao, & Li (2002)	Peer	(+) acceptance (friendship questionnaire)			(+) More friends (friendship questionnaire)	
Denham & Holt, (1993)	Teacher	(+) more acceptance				
Denham, McKinley, Couchoud, & Holt (1990)	Teacher				(+) more liked (friendship questionnaire)	
Estell, Cairns, Cairns, & Farmer, (2002)	Teacher					No relationship (central and peripheral-prosocial)
Farmer & Farmer (1996)	Peer					(+) higher centrality (girls)
Farmer & Rodkin (1996)	Peer	(+) more acceptance (popular)				
Gest, Graham-Bermann, & Hartup (2001)	Peer	(+) More acceptance	(-) Less rejection		(+) More friends	(+) Higher centrality
Hawley (2003)	Teacher Peer	No relationship (teacher) (+)				

	Self	more acceptance (peer) No relationship (self)				
Lui & Chen (2003)	Teacher Self					(+) More central (teacher and self)
Mostow, Izard, Fine, & Trentacosta (2002)	Teacher Self	(+) more acceptance	(-) less rejection			
Pakaslahti, Karjalainen, & Keltikangas Jarvinen (2002)	Peer Self	(+) more acceptance (peer) No relationship (Self)	(-) less rejection (peer) No relationship (Self)			
Phillipsen, Bridges, McLemore, & Saponaro (1999)	Teacher	No relationship	No relationship	No relationship		
Rys & Bear, (1997)	Teacher Peer	(+) more acceptance				
Sebanc (2003)	Teacher			(+) Have a friend		
Stormshak, Bierman, Bruschi, Dodge, Coie, & Conduct Problems, Prevention Research Group (1999)	Teacher Peer (averaged score)	(+) more acceptance				
Warden, Cheyne, Christie, Fitzpatrick, & Reid (2003)	Self	(+) More popular (descriptive)				
Wentzel, Barry, & Caldwell (2004)	Self			(+) lower prosocial (until 8th grade)		
Wright, Giammarino, & Parad (1986)	Teacher Peer Self	No relationship (teacher) (+) more acceptance (peer) No relationship (self)				

The lack of a relationship identified between self-reported prosocial behavior and peer interactions found in this study is consistent with some of the other research in this area. In a study by Hawley (2003) of child behaviors and interactions with peers, only peer-reports of prosocial behavior proved predictive of popularity (acceptance) scores while teacher-reports and self-reports were non-significant. Along this same line, Pakaslahti et al's (2002) study of prosocial behaviors and peer preference found peer-reported prosocial behavior to be associated with increased acceptance and reduced rejection while self-reported prosocial behavior was unrelated to these outcomes. While all three informants contributed to peer acceptance outcomes, Caprara and colleagues' (2000) use of teacher, self, and peer-report in a structure equation model analysis found peer-reports of prosocial behavior to be a more valid indicator of the construct.

In considering why self-reported prosocial behavior did not contribute significantly to peer interactions in the current study, it is possible that social desirability greatly influenced how children reported their own prosocial behavior with self-report leading to over-reporting of prosocial behaviors. Equally feasible is the possibility that many prosocial behaviors are subtle and not noticed by outside observers, such as peers and teachers. This also could lead to higher reporting of prosocial behavior through self-report measures. In a study of helpful and bullying behaviors, Salmivalli and colleagues (1995) found that self-report measures of prosocial behaviors tended to result in higher scores on prosocial behaviors as compared to peer-reported measures of the same behaviors. Given the lack of predictive power of self-reported prosocial behavior in this specific study, it seems likely that only helpful behaviors observed by others influence peer interactions, irrespective of whether other prosocial acts are executed without notice or are exaggerated by self-reporting methods.

Interestingly, peer-report and teacher-report of prosocial behavior were associated with different outcomes. Peer-reported prosocial behavior predicted greater peer acceptance, more friends and higher prestige while teacher-reported prosocial behavior predicted having at least one friend and less rejection from peers. It is surprising that peer-reported measures of prosocial behavior were not related to all peer interaction outcomes since previous work has found information from this informant to be significantly related to all types of peer interactions (e.g. (Farmer & Farmer, 1996; Pakaslahti et al., 2002; Wright et al., 1986). However, the finding of teacher-reported prosocial behavior only relating to a couple of peer interaction outcomes is more consistent with the literature (Hawley, 2003; Mostow et al., 2002).

One explanation for differences in peer and teacher report could be that children who are rejected by peers and friendless differ greatly from their more liked, popular, and prestigious classmates. Perhaps teachers are better at identifying the absence of prosocial behaviors that potentially leads to social isolation and rejection than peers and children are, since such behaviors are considered risk factors in the education literature. Teachers may be taught to try to identify and help these less socially integrated children who lack helpful and cooperative behaviors (Brophy, 1996). As such, teacher-report would lead to higher predictability for these two outcomes; especially when considering only 13% of the participants were friendless. On the other hand, peer-report may be more sensitive to different levels of prosocial behavior displayed across all types of children in the class, not just the socially rejected and friendless ones. As such, peer-report may be better at predicting varying levels of peer friendship, acceptance, and prestige. In comparing the mean scores for prosocial measures in this study, teachers reported lower prosocial scored for friendless and rejected children than peers and self-report did for these same children.

Network outcomes. Similarly to reports of aggression, ratings of prosocial behavior did not predict network betweenness centrality. This suggests that prosocial behavior is not important to determining how children connect to one another within their classroom network. However, as mentioned above, centralization of these 13 classes was rather low with little variance to account for. As such, it is difficult to draw any conclusions about the role of prosocial behavior and betweenness centrality.

Overall, prosocial behaviors seems beneficial for children's peer interactions with high levels of prosocial behavior predicting having a friend, more friends, being liked, having more prestige and being less rejected. This is in line with the bulk of research that has looked solely at prosocial behaviors without aggression. For instance, Rys and Bear (1997) found that prosocial behavior was positively related to peer acceptance and Liu and Chen (2003) found that prosocial behaviors reduced the likelihood of being socially isolated in a network. The benefits of prosocial behavior persisted in the composite model of aggressive behavior, although to a lesser extent, begging the question of whether combining informants captures the construct of prosocial behavior well.

Composite Main Effects and Interactions

By combining both prosocial and aggressive behaviors from all three types of informants into the same regression equation, 2-20% of the variance in peer interaction outcomes was accounted for. While all the models were significant, few of the predictor variables were. For the most part, only the peer/teacher composite of prosocial behavior was a useful predictor of the peer interaction outcomes. Higher scores on this prosocial composite was associated with having

at least one friend, more friends, higher peer acceptance, and increased network prestige for strong ties. Conversely, the composite of aggressive behavior did not significantly predict any outcome alone, indicating that aggressive behavior is not related to any outcome except having a friend or not. Although the main effect of aggression is not associated with being friendless, aggression does play a role in having a mutual friend when it occurs with prosocial behavior. Thus, children who are prosocial are less likely to be friendless but those children who are both prosocial and aggressive are the least at risk of being without a friend.

Network outcomes. Interestingly, neither prosocial or aggressive behavior nor their interaction contributed to predictions of network betweenness centrality or prestige for any tie. This suggests that either network indices are unrelated to prosocial and aggressive behaviors or that the combining of informants did not represent the aggression and prosocial constructs accurately and thus, masked any interaction effects that may have been present. If network betweenness centrality and prestige for any tie are unrelated to prosocial and aggressive behaviors, then network indices are clearly different measures of peer interactions than friendship and sociometric outcomes, which are related to these individual child behaviors. However, it is possible that these network outcomes are related to prosocial and aggressive behaviors and that the creation of composites obscured the unique characteristics of reports by different informants. In order to test this possible explanation, post-hoc analyses were run in which main effects and interactions were tested for each informant, individually.

Post-hoc Analyses by Informant Type

Once aggressive and prosocial behaviors were combined into composites, many of their main effects on peer interactions were lost. It is possible that the combining of information

provided a unique assessment of these two constructs. Equally feasible is the possibility that different informants report on unique components of each construct and that the combining of multiple informants masks valuable information. In the field of mental health, concordance between informants in somewhat uncommon with measures of child behavior by self-report, peer-report, and teacher-report typically yielding correlations in the 0.20's (De Los Reyes & Kazdin, 2005). In reviewing research in peer interactions, concordance between different informants is often low as well. For instance, in a study of peer interactions, Hawley (2003) found no significant correlation between self-report and teacher-report and only a low correlation between peer and teacher-report for measures of prosocial and aggressive behaviors. Similarly, Pakaslahti and Keltikangas Jarvinen's (2000) study of direct and indirect aggression found low correlations between multiple informants, with peer-report and teacher-report correlating most. These authors concluded that, "self-ratings are not well interchangeable with peer and teacher assessments" (p. 177). While the aim of the study was to combine informants to create a more well-rounded assessment of aggression and prosocial behavior, it is possible that the creation of composite scores reduced useful informant-specific aspects of these two constructs.

In order to test whether the main effects and interactions between aggression and prosocial behavior were clouded by the creation of composite scores, a multivariate analysis was run for each outcome using only one informant per outcome. Since numerous outcomes were assessed for three different informants, a Bronferroni correction was used, as a very conservative method for reducing Type I error rates. For the first analysis, the role of *peer-reported* aggressive and prosocial behaviors and their interaction on peer interactions was tested. Then the role of *teacher-reported* aggressive and prosocial behaviors and their interactions were tested, followed by child *self-reported* aggressive and prosocial behaviors and their interactions on the outcomes.

As Table 15 shows, more variance in the outcomes (4-23%) could be accounted for by utilizing individual informants rather than creating composites for prosocial and aggressive behaviors. The highlighted cells show which informant accounted for the most variance in each outcome. Overall, peer-reported prosocial and aggressive behaviors accounted for more variance in outcomes than child self-report and teacher-report. Peer-report was most useful in predicting peer acceptance (R^2=0.45), rejection (R^2= 0.48), number of friends (R^2= 0.26), and prestige with strong ties (R^2= 0.34) and any tie (R^2= 0.27). Teacher-report was most effective in predicting whether a child had a friend or not (R^2= 0.45) and if s/he had high betweenness centrality (R^2= 0.19) when considering any connection (tie) between children. Child self-report was beneficial when looking at betweenness centrality in networks of strong ties (R^2= 0.22).

Informant type and construct validity. While it is easy to determine which informant's reporting of behaviors contributed greater explanatory power to the outcomes, it is less clear how to interpret these findings when the relationships between aggression, prosocial behaviors, and peer interaction outcomes differ depending on who reports on these behaviors. For instance, the interaction of both prosocial and aggressive behavior leads to increased peer acceptance and decreased peer rejection when these behaviors are reported by peers, suggesting a benefit of the combination in peer preference outcomes. Similarly, the interaction of these behaviors, when reported by teachers, resulted in higher prestige in the network of loose connections (any tie), another beneficial effect of the interaction of these behaviors. However, the combination of aggressive and prosocial behaviors was associated with worse peer interactions when reported by child self-report. Children who described themselves as both prosocial and aggressive tended to be friendless, have fewer friends, be less prestigious in loosely connected networks, and have lower betweenness centrality for closely and loosely tied networks.

Table 15. Main effects and interactions of aggression and prosocial behavior by type of informant

	Peer: Aggress β (se)	**Peer: Prosocial β (se)**	**Peer: Aggr* Prosoc β (se)**	**R^2**	**Teacher: Aggress β (se)**	**Teacher: Prosocial β (se)**	**Teacher: Aggr* Prosoc β (se)**	**R^2**	**Self: Aggress β (se)**	**Self: Prosocial β (se)**	**Self: Aggr* Prosoc β (se)**	**R^2**
Have a friend	- 0.035 (0.03)	0.044 (0.04)	- 0.032 (0.02)	0.38***	0.04 (0.03)	**0.14**** (0.03)	0.01 (0.02)	0.45****	**- 0.08**** (0.02)	0.02 (0.02)	**- 0.07***** (0.02)	0.43****
Number of friends	- 0.05 (0.12)	**0.23*** (0.09)	- 0.003 (0.06)	0.26***	0.16 (0.1)	**0.25**** (0.09)	0.08 (0.06)	0.23***	**- 0.16*** (0.07)	0.06 (0.07)	**- 0.16*** (0.06)	0.23**
Peer acceptance	- 0.11 (0.1)	**0.26**** (0.09)	**0.114*** (0.05)	0.45****	0.12 (0.1)	**0.36**** (0.08)	0.02 (0.06)	0.32****	**- 0.25***** (0.07)	0.05 (0.72)	- 0.08 (0.06)	0.26***
Peer rejection	0.06 (0.1)	**- 0.33***** (0.08)	**- 0.12*** (0.05)	0.48****	- 0.01 (0.1)	**- 0.27**** (0.08)	-0.01 (0.05)	0.27****	**0.23**** (0.07)	0.01 (0.07)	0.02 (0.06)	0.23**
Prestige (any tie)	- 0.08 (0.11)	**0.21*** (0.09)	0.09 (0.06)	0.34****	0.17 (0.1)	**0.23**** (0.09)	**0.18**** (0.06)	0.31****	**- 0.16*** (0.07)	**0.15*** (0.07)	**- 0.13*** (0.06)	0.25***
Betweenness (any tie)	0.09 (0.11)	0.17 (0.1)	0.06 (0.06)	0.15*	**0.25*** (0.11)	0.11 (0.09)	**0.15*** (0.06)	0.19**	0.02 (0.08)	0.15 (0.08)	**- 0.19**** (0.07)	0.24**
Prestige (strong tie)	- 0.008 (0.11)	**0.19*** (0.1)	0.097 (0.06)	0.27****	0.17 (0.1)	**0.23*** (0.09)	0.1 (0.06)	0.23**	- 0.06 (0.08)	**0.17*** (0.08)	- 0.09 (0.07)	0.19**
Betweenness (strong tie)	0.03 (0.11)	0.12 (0.09)	0.03 (0.06)	0.12	0.18 (0.11)	0.09 (0.09)	0.09 (0.06)	0.13	0.02 (0.08)	**0.16*** (0.08)	**- 0.16*** (0.07)	0.22**

* p<.05, **p<.01, ***p<.001, ****p<.0001

Clearly, children report on different things than peers and teachers when asked about aggressive and prosocial behaviors. What is unclear is whether they report on different elements of the same construct or if they are providing information on some other construct that we, as researchers, have mislabeled aggression and prosocial behavior. Overall, in this study and in previous research, peers and teachers seem to be more similar in their reporting of prosocial behaviors with these kind actions significantly predicting almost all of the peer interaction outcomes (Rys & Bear, 1997; Stromshak et al, 1999). Peer-reported and teacher-reported prosocial behaviors are related to having at least 1 friend, having more friends, greater peer acceptance, higher prestige (both any and strong ties), higher betweenness centrality for any tie, and less peer rejection.

Conversely, child self-report of prosocial behaviors was unrelated to all peer preference (i.e. acceptance and rejection) and friendship outcomes and was only predictive of network centrality indices. Self-reported prosocial behaviors predicted 3 of the 4 network outcomes; high betweenness centrality (any tie) and prestige for loosely connected networks and those with strong ties. For these network outcomes, self-reported prosocial behaviors helped foster increased prominence in the network.

Peer and teacher report seems to correlate highly when reporting on aggressive behavior as well. However, these concordant ratings do not seem to be directly related to peer interactions since none of the main effects of aggression, as reported by peers and teachers were significant, with the exception of teacher-reported aggression predicting higher betweenness centrality for loosely connected networks.

While peer and teacher-reported aggression did not contribute much to peer interaction outcomes, child self-report of aggressive behaviors was predictive of all friendship and peer

preference outcomes, plus one network outcome; prestige for any tie. Self-reported aggressive behavior was detrimental to all outcomes, even when it was accompanied by prosocial behaviors. It is possible that peers and teachers report on a broad spectrum of prosocial and aggressive behaviors while children who self-report on these behaviors tend to be rather homogenous with the exception of a specific subset of highly aggressive children. In looking at the distribution of measures of aggressive behaviors, the self-report measure is more highly skewed than peer-report and teacher-report, showing the identification of more children in the upper tail of aggressive behaviors.

Interactions between aggression and prosocial behaviors. One of the primary aims of this study was to determine how prosocial and aggressive behaviors interact to promote or hinder peer interactions. From this post–hoc analysis, how the interaction of these two types of child behavior affects social interactions is dependent on who is asked about the child's behavior. For teacher and peer report, the interaction of prosocial and aggressive behaviors is beneficial for peer preference, network centrality, and prestige. Based on teacher-report, children who are both aggressive and prosocial tend to be more accepted by peers and experience less rejection. Additionally, the combination of teacher-reported behaviors leads to higher prestige and increased betweenness centrality for loosely connected networks. Conversely, when self-report is used, the combination of prosocial and aggressive behavior is detrimental to friendships and network centrality. Children who report their own behavior as both prosocial and aggressive are more likely to be friendless, have fewer friends, be less prestigious in loosely connected networks and not be situated in strategic places in the network of strong and loose ties.

From this post-hoc analysis it is apparent that child behaviors and their interactions are important for promoting positive peer interactions. However, how prosocial and aggressive

behaviors interact in peer interactions and which outcomes they effect is greatly dependent on whether peers, teachers, or children provide information on these behaviors.

From the review of the literature in Chapter II, it is clear that the research on the role of individual behaviors and peer interactions is equivocal. Equally disparate are the main effects and combination of prosocial and aggressive behaviors in this study depending on which informant provides information of these behaviors. Perhaps the ambivalence in the literature is also due to differences in informants. Since most studies utilize only one source of information of child behaviors, the effects of different informants had not previously been noticed.

Key Findings and Take-home Messages

While this study did not result in clear-cut findings of the main effects and interactions of aggressive and prosocial behaviors in peer interactions, it did shed some light onto 1) possible reasons for equivocal findings in the peer interaction literature, 2) influences of aggressive behavior, 3), simple main effects of prosocial behavior, and 4) differences between mutual friendships, peer acceptance/rejection, and network centrality/prestige.

Who you ask affects what you find. While this study aimed at teasing apart the beneficial and detrimental aspects of prosocial and aggressive behaviors, individually and in conjunction, on how children interact with one another, it uncovered a potential explanation for the disparate findings in the literature. Who is asked about child behaviors can greatly influence the relationships found. When exploring the direct role of prosocial behavior, peer-report and teacher-report are most beneficial. When looking at the main effects of aggression, peer-report and self-report better explain peer interaction outcomes. However, if researchers are interested in how aggression and prosocial behaviors, alone and in conjunction, affect social relationships,

which informant provides information could change the direction of the effect found. Overall, peer-report explains more of the variance in each outcome, especially when exploring peer preference outcomes (i.e. peer acceptance and rejection). When looking at all the peer interaction outcomes simultaneously (friendship, peer acceptance/rejection, and network centrality/prestige), child self-report has the greatest utility since self-report measures significantly predict every outcome. The bottom line is that who you ask about child behaviors effects what is found. When designing a study or simply reading about the role of children's prosocial and aggressive behaviors in peer interactions, researchers need to be aware of what type of informant is surveyed.

Nice guys finish first. One consistent finding from all the analyses is that prosocial behaviors alone are never detrimental to peer interactions. Irrespective of the informant type, prosocial behavior was either unrelated to (often when self-reported) or showed a positive relationship (often when reported by peers and teachers) with having a friend, being accepted, and having higher prestige and betweenness centrality. Prosocial behavior also had a negative relationship with being rejected. Overall, prosocial children were liked, accepted, and integrated into their peer networks. This finding supports several studies in this area. On example is Stromshak and colleagues (1999) study of how child behaviors affect peer preference in light of classroom norms around aggression and prosocial behavior. These researchers found prosocial behavior to be beneficial to peer acceptance irrespective of whether this behavior corresponded to prosocial classroom norm. Additionally, Rys and Bear (1997) found a positive relationship between prosocial behavior and having at least 1 friend, while Rotenberg and colleagues (2004) found prosocial behaviors to result in having more friends. These findings support the conclusion that nice guys actually finish first.

Mean guys might finish last. When viewing the role of aggressive behaviors in peer interactions, it appears that high levels of aggression, without prosocial behaviors, can be detrimental to all types of peer interactions with the exception network betweenness centrality. This negative role of aggression is especially true when self-report and peer-report methods are used. The finding that teacher-reported aggression predicts higher betweenness centrality suggests that aggression may be useful for maintaining a strategic position in a network but does not lead to being well-like, accepted, or prestigious in one's classroom. This finding is in-line with some research in this area (e.g. Cillessen et al., 1992) but is inconsistent with studies that have found a subset of children who are highly aggressive yet well liked, popular, and central in their network of peers (e.g. Estell et al., 2002; Farmer & Rodkin, 1996). From this study, it appears that children who are aggressive without prosocial behaviors tend to finish last or at least behind their more prosocial peers.

Interactions between prosocial and aggressive behaviors are unclear. While the main effects of prosocial behaviors seem to be beneficial and aggressive behaviors seem to be detrimental, the effects of their combination are unclear. In looking at the interaction of these two types of behaviors, it becomes apparent that who you ask greatly affects what is found.

While the findings of the interactions between prosocial and aggressive behaviors varied as a function of informant, it is still interesting to look descriptively at whether nice guys (highly prosocial children) fared better than mean guys (highly aggressive children) or if combinations of both aggressive and prosocial behaviors facilitate or hinder peer interactions. In order to explore child characteristics descriptively, I categorized children as high, medium, or low on aggressive and prosocial behaviors by looking across informants. If a child's score was more than 1 standard deviation above the mean on at least 2 measures of aggression (e.g. both peers

and teachers rated the child as highly aggressive), then that child was given a high score of aggression. If the child scored more than 1 standard deviation below the mean on at least 2 measures of aggression, that child was categorized as having low aggression. All other children (i.e. those with scores within 1 standard deviation of the mean or none of the informants agreed) were categorized as medium aggressive. The same categorization process was used for prosocial behavior.

Peer preference. When looking at the categories of child behaviors as high, medium, and low, the absence of prosocial behavior did not seem to be detrimental if aggression was absent as well. Forty percent of the children with low scores (more than 1 standard deviation below the mean) of prosocial and aggressive behaviors were categorized as popular (high peer acceptance and low rejection) by their peers and another 32% of these low prosocial/low aggression children were considered average (mean levels of acceptance and rejection). Conversely, 62% of children with low prosocial behavior and high aggressive behavior were either rejected (47%) or neglected (15%) by their peers.

While high levels of prosocial and aggressive behaviors in the same children did not occur often in this study, all 3 of the children who fit this description were categorized as popular, suggesting that high levels of both might be rare and highly beneficial for peer preference. Of the children who were categorized as highly aggressive and average in prosocial behavior, 33% were rated as popular and 40% were rejected. Of those viewed as highly prosocial and average in aggressive behavior, 41% were popular and 27% were rated as average. Thus, aggression is not necessarily detrimental to peer acceptance and rejection if it is accompanied by average to high levels of prosocial behavior.

Network indices. Of the children with high scores on aggression and low scores on prosocial behavior, only 29% had low (1 standard deviation below) network prestige for any tie and 35% for strong ties. The other 71% and 65% respectively were viewed as average or highly prestigious. When considering the role of high prosocial behavior in conjunction with aggression, only 22% of these children had low prestige for networks with any tie or strong ties, supporting the notion that the combination of aggression and prosocial behavior may be beneficial to network prestige.

Of the highly aggressive children with low levels of prosocial behavior, only 4% had low betweenness centrality in loosely tied networks and none had low betweenness in strongly tied networks. The majority of these children had betweenness centrality scores within 1 standard deviation of the mean. Of the 3 children who were rated as both highly aggressive and highly prosocial, all had high betweenness centrality scores. Thus, aggression does not seem to hinder network centrality and when accompanied by prosocial behavior, may facilitate it.

Friendship. When looking at the distribution of the number of friends children had, 46% of the children who were categorized as having a large number of friends (1 sd above the mean), were viewed as highly aggressive. Of these highly aggressive and befriended children, only 1 child was highly prosocial as well. However, when looking at the characteristics of friendless children, 46% of these children were highly aggressive with 38% having low levels of prosocial behavior. It appears that being aggressive does not have a strong effect on making friends. However, those children who are aggressive in the absence of prosocial behavior appear to be more likely to be friendless.

While there is no gold standard for measuring children's prosocial and aggressive behaviors, peer-report did explain more of the variance in peer interaction outcomes overall.

Additionally, by categorizing children by agreement between reporters (such as scoring children as high on a behavior when at least 2 informants rated that child as 1 standard deviation above the mean) provides valuable descriptive information about where children with high, medium, and low levels of aggressive and prosocial behavior fall within distributions of peer interaction outcomes. Lastly, while some of the findings from this study are difficult to interpret given the effects of different informants, it seems clear that mutual friendship, peer acceptance/rejection, and network centrality/prestige are all different constructs that describe the social interactions of peers.

Differences between Friendship, Acceptance/Rejection, and Network Centrality/Prestige

While measures of all three types of peer interactions were highly correlated, none of them were identical. In fact, two of these measures, peer rejection and having a friend or not, were not significantly correlated at all. Several components of this study illuminate the differences between these peer interaction outcomes. First, different outcomes had different relationships to aggressive and prosocial behaviors. Second, prediction of the peer interaction outcomes depended largely on which reporter was used. Lastly, children who occupied high levels in one peer interaction outcome did not necessarily hold high levels on a different outcome. For instance, having high betweenness centrality in a network did not ensure being well liked or even having a friend.

Different relationships with prosocial and aggressive behaviors. Each of the peer interaction measure had different associations with aggressive and prosocial behaviors. Measures of aggression were most predictive of peer acceptance and rejection measures while having a friend and the number of friends were most influenced by prosocial behaviors alone and in

conjunction with aggressive behaviors. Additionally, the network measures of prestige and betweenness centrality had the lowest association with prosocial and aggressive behaviors, especially when looking at networks of strong ties. Since less variance in these network outcomes was explained by aggressive and prosocial behaviors, other constructs might be more influential for these peer interaction outcomes.

Different informants have different relationships. The relationship between aggressive and prosocial behaviors in peer interactions was highly dependent on who reported on the behavior. If all of the peer interaction measure were the same, one would expect the relationship between each type of informant to be equivalent across outcomes. However, this was not the case. Peer-reported prosocial behavior was predictive of peer preference outcomes, having more friends, and higher prestige but was not related being friendless or having high betweenness centrality. Similarly, self-reported prosocial behavior was only related to the network outcomes (betweenness centrality and prestige) but not to any of the friendship or peer preference outcomes. Another interesting finding in this study was the opposite effect of the combination of prosocial and aggressive behavior on network outcomes depending on who reported on them. In this study, teacher-reported child behaviors in combination were associated with higher betweenness centrality and prestige. Conversely, child self-reports of these same behaviors were associated with lower betweenness centrality and prestige.

Same children are not high on all outcomes. In looking at which children occupy central roles, have lots of friends, and are well-liked demonstrates clearly how each of these measures of peer interactions are similar but different. For instance, of the popular children (high acceptance and low rejection), only 35% had high network prestige and 37% had high betweenness centrality. While merely 1 popular child was friendless, only 30% of popular children had high

numbers of mutual friends in their class. When considering children who were rejected by their peers, only 16% were friendless. Also, being rejected did not correspond to low prominence in the network since only 11% of rejected children had low prestige and only 46% had low betweenness centrality. Clearly, each of the measure of peer interactions used in this study is different since children occupy very different positions in each.

While it is evident that these peer interactions differ, research needs to explore how these different types of interactions effect proximal and distal outcomes such as school success and socio-emotional development. Future research should include all peer interaction indices with the same children to truly identify what is unique about each peer interaction measure as well as what they hold in common.

Final Conclusions

Prosocial and aggressive behaviors influence how children interact with one another. Prosocial behavior, especially when reported by teachers and peers, can promote peer acceptance, friendship, and prestige as well as minimizes peer rejection. Conversely, aggression can be related to reduced acceptance, fewer friends, and less prestige. The combination of prosocial and aggressive behaviors has differential effects on peer interactions depending on who reports on the behavior. When children self-report on their own prosocial and aggressive behaviors, their combination tends to be related in worse peer interactions (e.g. less acceptance, more rejection, lower prestige, lower betweenness centrality, and fewer friends--if any at all). On the flip side, teacher reports of prosocial and aggressive behaviors correspond to higher prestige and betweenness centrality. Overall, peer-reports of prosocial and aggressive behaviors are more predictive of peer interaction outcomes than teacher and self-report.

This study found that including more informants of child behavior does not provide a clearer picture of how prosocial and aggressive behaviors affect peer interactions. Instead, the use of multiple informants may be one contributing factor to discrepancies in the research in this area. While I tried to identify the trends in findings based on informant type, more studies are needed that look specifically on informant-effects in peer relationship research. Ideally, a meta-analysis should be undertaken to identify the effects of informant on peer interaction outcomes.

As expected, this dissertation found peer acceptance/rejection, mutual friendships, and network centrality/prestige to be unique, yet related, aspects of peer relationships. While many of these peer interaction outcomes were correlated, each maintained a different relationship with aggressive and prosocial behaviors. Additionally, these peer interaction outcomes held different relationships to child behaviors depending on who reported on them. Looking at where individual children fall on each of these outcomes, clearly shows that these are, indeed, different aspects of children's social relationships. Children who scored highly on one peer interaction measure did not necessarily score highly on another measure. For instance, being popular was not related with being prestigious in a network nor having lots of friends. Future work is needed to explore how these peer interaction measures relate to developmental outcomes such as school success and reduced psychopathology. The need for research in this area is especially warranted for the social network analysis outcomes since they have not been studied as thoroughly as peer preference and friendship.

Limitations

This study suffered from several limitations. First, the sample size was relatively small since social network analyses require at least 75% of the network to contribute information.

Thus, not all classrooms from the IES-funded evaluation could be included in this dissertation. While this study has sufficient power[3] to find medium effect sizes, more participating classes would have made the study more sensitive to smaller effects. Also, since dependency matrices were used to assess the outcome measures, it is possible that some of the non-consented children in this study differed from their consented peers. It is possible that the omitted children were isolates or perhaps well connected with a star-like structure. If these children differed significantly, their absence could have altered the peer preference and centrality scores obtained. Thus, future studies should strive for 100% participation rates.

Second, since this was a secondary analysis, the study was limited in the measures selected by the national evaluation team to assess prosocial and aggressive behaviors. As such, none of the aggression instruments measured subtypes of aggressive behavior such as relational, verbal, and physical aggression or subtypes of prosocial behavior such as helping, cooperation, and kindness. Perhaps specific subtypes of aggressive and prosocial behaviors contribute significantly to peer interactions and these effects were not detected with the current measures. Another shortfall of the child and teacher measures of aggression and prosocial behaviors was their limited sensitivity to variations in these constructs. The aggression measures were negatively skewed while the prosocial measures were slightly positively skewed. Future studies should utilize more sensitive, normally distributed measures.

The greatest problem with the instrumentation was the wording of the peer measure of aggression that might have included behaviors that would not be considered aggressive such as

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[3] Power was calculated for the regression analyses using the following equation from Cohen, Cohen, West, & Aiken (2002) $f^2 = \frac{R^2}{1-R^2}$ where $n^* = \frac{L}{f^2} + k + 1$. Analyses were estimated with power (1 – β) = .80 and alpha (α) = .05. This study had power to detect a R^2 = .038. Typically an R^2 = .02 is considered small while an R^2 = .15 is viewed as a medium size effect.

inattention, tardiness, and hyperactivity. Thus, the peer measure of aggression may have assessed antisocial behavior in general, with aggression being only a subset of the constructs contributing to a child's score. As such, the measure potentially may not accurately describe aggressive behavior. In the post-hoc analysis of the main effects and interactions of prosocial and aggressive behavior as rated by peers (Table 15), main effects of peer-rated aggressive behavior were not found but interactions between prosocial and aggressive behavior were associated with increased acceptance and reduced rejection. If this measure of "aggression" is tapping into behaviors that violate adult norms, it is reasonable that these other non-aggressive behaviors contributed to this effect. For instance, being a class clown may result in getting in trouble while also endearing a child to his/her peers. Thus, the construct validity of this measure is a grave limitation of this study. Future work should explore the relationship of peer interactions to general antisocial behaviors, across informants as well as contrast ratings of "getting in trouble" and "aggression" to see if children differentiate aggression from other types of anti-social behavior.

A third limitation of this study was the finding that many of the classrooms were not very centralized and as such, did not provide much variability in betweenness centrality indices. This limited this research endeavor's ability to capture how child behaviors contribute to how they are positioned with in their social networks. Perhaps a study with more classes would have yielded greater variability in this outcome. Fourth, this study included classrooms from one southern state which may not be representative of classrooms in other parts of the country. Future studied should try to include other regions to assess the generalizability of these findings. Lastly, the predictor and outcome variables used were collected at only one point in time (predictor variables in the fall and outcome variables in the winter). Therefore, the stability of these variables could not be assessed. Future studies should try to collect data on child behaviors and

peer interactions as baseline and follow-up to determine the status of peer interactions at baseline as well as the stability of child behaviors at time 2.

Even in light of these limitations, this study makes a contribution to the field by shedding light onto the complex role prosocial and aggressive behaviors play, individually and together, in how children interact socially. This role is complicated even further depending on whether it is teacher-report, peer-reported, or self-reported aggression and prosocial behaviors. Unlike most studies of peer interactions, this project included a broad range of children (rather than specific sub-groups like those who are rejected) and included both main effects and interaction of prosocial and aggressive behavior in predicting peer outcomes. Additionally, this study explored these relationships longitudinally, showing that prosocial behaviors can have beneficial effects on the development of friendship, acceptance, and centrality, contesting the adage, nice guys finish last. This study also helped illuminate the complex role aggression plays in peer interactions, showing that this behavior is often associated with negative peer outcomes, especially when it occurs without prosocial behavior. However, in combination and depending on who reports on the behavior, aggression can increase betweenness centrality, the likelihood of having a friend, and being accepted by peers. The inclusion of multiple informants in this study identified one possible source of the equivocal findings in the field, since aggression and prosocial behaviors hold different relationships with peer interaction outcomes depending on who reports on them. Lastly, this study added further support to the finding that friendship, peer preference, and network centrality are unique aspects of children's social lives. This dissertation is one more step towards better understanding the ecology of children's lives and how their own behaviors influence their social interactions.

APPENDIX A

TEACHER CONSENT

CHILD ASSENT

Dear Teacher,

Your school has been chosen to take part in a national study on social and character development (SACD) programs designed to help school officials learn about the best ways to promote positive behaviors and social interactions among students. Vanderbilt University, along with Mathematica Policy Research, Inc. (MPR) is doing this study for the U.S. Department of Education and the Centers for Disease Control and Prevention.

What It Means to Participate. We will ask you to help with the parent consent-to-participate process using the following schedule: 3rd grade teachers in fall 2004, 4th grade teachers in fall 2005, and 5th grade teachers in fall 2006 and in spring 2007. This involves sending parent consent forms home with students up to two times, collecting filled out forms, and returning them to a central location in your school. We will ask you to keep track of the students for whom consent forms are returned. You will be paid $2 for each consent form returned. *Payment is independent of whether the family chooses to participate.*

As part of this research, early in the school year you will be asked to complete paper-and-pencil questionnaires concerning your beliefs about and experience teaching character education. You will be paid $20 for up to 30 minutes to complete these questionnaires.

During the school year we will contact you to schedule group data collection with children in the study. Children will follow along as we read instructions and questions aloud. If needed, we will arrange to work individually with students who may have difficulty keeping pace with the group. In the fall and spring there will be two sessions: one 50-minute session and one 20-minute session. In the winter we will schedule one 20-minute session. In the fall and spring, we will give you parent surveys to send home with students in the study.

In the fall and spring of this school year you will be asked to complete paper-and-pencil reports about each child in your class whose parents have consented for them to participate. Each report may take up to 15 minutes to complete. It asks questions about your relationship with each child and his/her child's behavior, emotions, and social interactions in school. You will be paid $10 for each report you complete. In the fall, you will also be asked to complete a 10-minute paper-and-pencil survey about your background and experiences in teaching, and in the spring, an update of similar information. The total time for completion of paper-and-pencil instruments over the school year is a maximum of 10 hours, although we anticipate an average of 6 to 8 hours for most teachers. Completion time depends largely on the number of students in your classroom who are participating in the study.

Within 2-3 weeks from the beginning of the school year, you will be assigned a personal web page. Your web page will have a link to a brief online survey about character education activities in your classroom. Vanderbilt staff will provide you a secure web address with a unique user name and password. You will be asked to complete the online survey every week and report on character education activities for every school day. You will receive $100 base pay to participate in the online survey. At the end of the fall and spring semesters you will receive $10 for every 10% of school days for which you complete surveys (for example, 80 surveys out of 100 possible days would be $80). In addition, you will be asked monthly (nine times) to fill out a 20-minute online "process" survey asking how things are going with character education in your class. You will receive $20 each time you complete this survey. Altogether you could receive $300 for the weekly surveys and $180 for monthly surveys for a yearly total of $480.

Participant Protection. Participation in this study poses minimal risk to you. All of the information that you provide will be kept strictly confidential and will be used for research purposes only. We will use ID numbers to identify you, and your name will not be written on any report form. You will not be identified in any report or

presentation. Any researcher using your information will sign a confidentiality agreement before using it. We will also make sure that no student, parent, or anyone in your school will see your responses. The information will *not* be part of a child's school records.

We cannot guarantee complete privacy any time information is transferred or presented on the Internet. However, we have taken measures to minimize this risk by all means available with current technology. Furthermore, you will never be asked to enter personal information in any web-based application, ensuring that any breach of information, no matter how unlikely, cannot be traced to you. Because of these measures, we believe this aspect of participation also poses minimal risk to you.

Participation in this research is voluntary. If you choose not to participate, your decision will not affect your job or your relationship with students in any way. You will not have to answer questions you do not want to answer, and you may withdraw from the study at any time without penalty.

Please sign below indicating whether or not you consent to participate and return this form in the envelope provided to James Schut, Ph.D., the Vanderbilt Project Manager for this study, as soon as possible. Should you have any questions about this study, please call me at (615) 322-8694. You may also call Dr. Schut at (615) 343-1674 or toll free at 1-866-449-2686, or you may call Dr. Audrey McDonald at Mathematica toll free at 1-866-883-8543. If you have general questions about giving consent or about your rights as a volunteer in this study, please call the Vanderbilt Institutional Review Board Office at (615) 322-2918 or (866) 224-8273.

Thank you in advance for your help in this important study.

Sincerely,

Leonard Bickman, Ph.D.
Principal Investigator

Please check one and sign below.

☐ **I AGREE** to participate in the Social and Character Development Research Study. I will provide the requested information (1) about character education, (2) about students in my class whose parents have consented for them to participate, (3) about my own background and experiences in teaching, and (4) about activities in my classroom using the internet. I understand that I may decline to answer any questions that I do not want to answer.

☐ **I DO NOT AGREE** to participate in the Social and Character Development Research Study, and I understand that there will be no negative consequences for this decision.

_____ _____
TEACHER SIGNATURE DATE

_____
YOUR FULL NAME (PLEASE PRINT)

CHILD ASSENT TO BE IN THIS RESEARCH STUDY

Hi. My name is _____. I want to tell you about a study we are doing, and then we are going to ask if you want to answer some questions. We are going to ask you to fill out forms today and other times like in the fall, winter, and spring. We will ask you to fill out forms next year and the year after that. Every time we come, YOU decide if you want to do it. So if you fill out forms today, you don't have to fill them out other times if you don't want to. Your mom or dad or someone from home has already given their permission for you to answer questions. Now we want to let you decide for yourself if you want to.

Why are we doing this study?

This study will help us learn more about students your age. If you decide to participate, we will ask you some questions about things you do and what you think about them, questions about other kids in your class, how things are going in your life, and how important it is to learn new things. We will give you a toy for answering the questions.

We also want to learn how children your age get along with other people such as friends and teachers. We will also come visit your school a few times during the year to see what happens in your school and how your classmates and your teachers work together.

Do you have to be in the study?

You don't have to be in the study if you don't want to. No one will get angry or upset with you. If you decide to be in the study today, you can change your mind later if you don't want to be in the study anymore.

Who will see my answers?

Only people like us doing this study will see your answers. No one else will know how you answer the questions. We will not tell anyone…not your friends, not your parents, not your teachers, not the principal.

What if I have a question?

You can ask a question any time. Just raise your hand when you have a question. Before you turn the page over, are there any questions now?

Now check the box that tells us if you want to be in the study and answer questions. If you want to, then check the box that says "YES, I WANT TO BE IN THE STUDY." If you don't want to, then check the box that says, "NO, I DO NOT WANT TO BE IN THE STUDY." Remember, if you don't want to be in the study, that's all right. If you are in the study today, but change your mind later, that's okay, too. Please keep your answers to yourselves. When you are done checking the box, please print your full name, sign your name, and put today's date on the line. Then we will come to you and collect your form.

CHECK ONE OF THE BOXES BELOW, AND THEN PRINT AND SIGN YOUR NAME.

☐ **YES, I WANT TO BE IN THE STUDY.**

☐ **NO, I DO NOT WANT TO BE IN THE STUDY.**

_____

Print your first and last name here

_____ _____

SIGN YOUR NAME ON THIS LINE Today's Date

APPENDIX B.

MEASURES

Background Questionnaire

Behavioral Assessment System for Children Aggression Subscale

Social Competence Prosocial Scale

Aggression Scale

Children's Empathy Questionnaire

Peer-report prosocial

Peer-report aggression

Background Questionnaire

Citation: Centers for Disease Control and Prevention

Respondent: Primary Caregiver Report

Number of items selected: 16

Items:
1. What is your third grader's date of birth?
2. Is this child of Hispanic or Latino origin?
3. What is this child's race?
4. What is your date of birth?
5. Are you of Hispanic or Latino origin?
6. What is your race?
7. What is the highest grade or year of school that you have completed?
8. Which category best describes your employment?
9. What is your marital status?
10. What is your relationship to this child?
11. Does your third grader live in one or multiple households?
12. Does this child live with you in your household?
13. Who lives with you in this household and how are they related to your third grader?
14. In all, how many people live in your household?
15. What is the highest grade or year of school that anyone in your household, including yourself, has completed?
16. What was your total household income from all sources before taxes in 2003?

BASC Aggression Subscale; Teacher

Citation: Reynolds, C.R., & Kamphaus, R.W. (1998). *Behavioral Assessment System for Children*. Circle Pines, MN: American Guidance Service Inc.

Respondent: Teacher Report on Student

Number of items selected: 14

Items:
1. Argues when denied own way.
2. Threatens to hurt others.
3. Blames others.
4. Bullies others.
5. Breaks other children's things.
6. Talks back to teachers.
7. Orders others around.
8. Is critical of others.
9. Calls other children names.
10. Shows off.
11. Teases others
12. Complains about rules.
13. Hits other children.
14. Is a "sore loser'.

Revisions and Notes:

- In the SACD Teacher Report on Student, items from this scale are integrated with items from four other scales.
- The original 4-point scale (*Never, Sometimes, Often, Alw*ays) was based on the student's behavior in the last 6 months; this was slightly reworded to a 4-point scale (*Never, Sometimes, Often, Almost Always*) based on the past 30 days.

Social Competence Prosocial Scale

Citation: Conduct Problems Prevention Research Group (1999). Initial impact of the Fast Track prevention trial for conduct problems I: The high-risk sample. *Journal of Consulting and Clinical Psychology, 67*, 631-647.

Respondent: Teacher Report on Student

Number of items selected: 19

Items:
1. Can accept things not going his/her way.
2. Copes well with failure.
3. Accepts legitimate imposed limits.
4. Expresses needs and feelings appropriately.
5. Thinks before acting.
6. Resolves peer problems on his/her own.
7. Can calm down when excited or all wound up.
8. Can wait in line patiently when necessary.
9. Is very good at understanding other people's feelings.
10. Is aware of the effect of his/her behavior on others.
11. Works well in a group.
12. Plays by the rules of the game.
13. Controls temper when there is a disagreement.
14. Shares materials with others.
15. Cooperates with peers without prompting.
16. Is helpful to others.
17. Listens to others' points of view.
18. Can give suggestions and opinions without being bossy.
19. Acts friendly towards others.

Revisions and Notes:

- In the SACD Teacher Report on Student, items from this scale are integrated with items from four other scales.
- The original 5-point response scale (*Not at all, A little, Moderately well, Well, Very well*) was not time-dependent and was constructed for teacher report.
- The response scale was changed to a 4-point scale (*Never, Sometimes, Often, Almost Always*) based on the child's behavior in the past 30 days.

Aggression Scale

Citation: Orpinas, P., & Frankowski, R. (2001). The Aggression Scale: A self-report measure of aggressive behavior for young adolescents. *Journal of Early Adolescence, 21*, 50-67.

Respondent: Child Report

Number of items selected: 6

Items:
1. I teased a kid at school.
2. I pushed, shoved, or hit a kid from school.
3. I called a kid at school a bad name.
4. I said that I would hit a kid at school.
5. I left out another kid on purpose.
6. I made up something about other students to make other kids not like them anymore.

Revisions and Notes:

- This scale, obtained from the authors, is an updated and shortened version of the scale published in the original article.
- In the SACD Child Report, items from this scale are integrated with items from three other scales.
- The original 7-point response scale (*0 times, 1 time, …6 or more times*) was revised to the following 4-point scale (*Never, Once or twice, A few times, Many times*). The original stem asked students to report on their behavior during the last 7 days, the stem used in this evaluation asked students to report on their behavior in the last two weeks.

Altruism Scale, Child Version

Citation: Solomon, D., Battistich, V., Watson, M., Schaps, E., & Lewis, C. (2000). A six-district study of educational change: Direct and mediating effects of the Child Development Project. *Social Psychology of Education, 4*, 3-51.

Respondent: Child Report

Number of items selected: 8

Items:
1. At school or someplace else, I helped someone who was hurt.
2. At school or someplace else, I cheered up someone who was feeling sad.
3. At school or someplace else, I helped someone who was being picked on.
4. At school or someplace else, I helped someone who fell down.
5. At school or someplace else, I got help for someone who was hurt.
6. At school or someplace else, I helped an older person.
7. At school or someplace else, I stopped a kid from hurting another kid.
8. At school or someplace else, I helped a younger child who was lost.

Revisions and Notes:

- In the SACD Child Report, items from this scale are integrated with items from three other scales.
- One item was deleted due to controversial content: *I stopped someone from hurting an animal*.
- The original 4-point scale (*Never, Once, A few times, Many times*) was reworded to the following 4-point scale: *Never, Once or twice, A few times, Many times*.
- The original stem asked students to report on their behavior since the start of the school year, the stem used in this evaluation asked students to report on their behavior in the last two weeks.

Peer Prosocial Measure

Directions to student: **Read the sentence and circle the answer for each kid in your class. Remember, no one at school or at home will see your answers. Please keep your answers private and do not share them with anyone.**

I think this classmate **is kind** and **nice** to others.				
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always

Peer Aggression Measure

Directions to student: **Read the sentence and circle the answer for each kid in your class. Remember, no one at school or at home will see your answers. Please keep your answers private and do not share them with anyone.**

I think this classmate **gets in trouble at school**.				
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always
Child name	Never	Sometimes	Often	Almost Always

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