Network Ties and Mean Lies: A Relational Approach to Relational Aggression

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Abstract

The current study considers how the structure of peer networks facilitates or constrains children's opportunities to engage in relationally aggressive behaviors such as social exclusion and rumor spreading. Specifically, the influence of two network features, centrality and density, on relational aggression are explored using grade-level behavioral and social network data collected on a demographically diverse sample of 144 third through eighth grade urban elementary school students. As hypothesized, these network features influenced levels of teacher-rated and peer-nominated relational aggression above and beyond the effects of demographic characteristics (i.e., gender and grade). Results revealed that relational aggression is influenced not only by *who* children are, but also by *where* they are located in the peer context. Implications for future research and intervention are offered.

Keywords

relational aggression; social aggression; indirect aggression; social networks; children; adolescents

Relational aggression refers to attempts to harm others through the manipulation of peer relationships (Crick & Grotpeter, 1995). Common forms include rumor spreading, social exclusion, and betrayals of trust. These behaviors, also known as indirect or social aggression, are noteworthy because they are prevalent among children, and are associated with a multitude of psychological, social, and behavioral outcomes for aggressors and victims (e.g. Craig, 1998; Crick & Grotpeter, 1995; Crick, 1996; Crick & Nelson, 2002; Putallaz, Grimes, Foster, Kupersmidt, Coie, & Dearing, 2007). Relational aggression can also create a hostile peer environment, leading to harmful consequences for the school and classroom context (Underwood, 2003).

Much of the past literature on relational aggression has focused on the effects of individual-level demographic characteristics, primarily gender and age (see Archer & Coyne, 2005 for review). Although this research provides some insight about which children are likely to engage in relational aggression, it offers little information about the social conditions that drive these behaviors. To address this topic, it is fruitful to consider the structure of peer social networks. Features of children's social network positions may facilitate their abilities and increase their motivations to effectively engage in relationally aggressive behaviors.

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Thus, it is important to ask not only *who* relational aggressors are, but also *where* they are located in their social networks (Neal, 2007).

Social network analysis consists of a powerful set of tools that allow researchers to quantify the structure of relationships between individuals (Wasserman & Faust, 1994). This approach places greater emphasis on the social position of individuals relative to one another than on those individuals' demographic characteristics or internal psychological states. Community psychologists have long advocated the examination of social networks as a promising methodology for assessing social support, social processes, and ecological context (e.g., Cauce, 1986; Hirsch, 1979; Langhout, 2003; Seidman, 1988, Tseng & Seidman, 2007). As Hirsch (1980) noted: "Research on social networks and natural support systems is clearly feasible. Understanding and promoting the health-enhancing capabilities of such informal social structures is an important task for community psychology" (p.171).

To date, only a handful of studies have used social network methodologies to examine relational aggression, yielding mixed results. Xie and colleagues employed social cognitive mapping techniques to classify children's network centrality as high, medium, or low based on a combination of their individual prominence (i.e., the number of times they were nominated by peers into a group) and group prominence (i.e., the average individual prominence of the two children in the group with the most nominations). They demonstrated associations between high centrality and increased levels of relational aggression among fourth and seventh grade Caucasian students (Xie, Cairns, & Cairns, 2002; Xie, Swift, Cairns, & Cairns, 2002) and first, fourth, and seventh grade African American girls (Xie, Farmer, Cairns, 2003). In an adult sample, Green, Richardson, & Lago (1996) examined the link between density, or the degree to which an individual's relations are also related to one another, and relational aggression. Results demonstrated that high levels of density led to increased relational aggression among males, but not females. These studies were important trailblazers, setting the tone for the examination of relational aggression from a contextual perspective. However, they possessed certain methodological limitations. Xie and colleagues' use of social cognitive maps relied heavily on group identification, ignoring important interconnections between actors. In addition, their measure of network centrality focused on how salient children's network positions are to peers, rather than on their actual position within the network structure (see Neal, 2008). Green et al. (1996) limited the number of relationships an individual could report in his/her network, a strategy known to distort measurements of social networks (Holland & Leinhardt, 1973).

Heeding the call for social network research, the current study examines the contextual influences of children's grade-level network features on teacher-rated and peer-nominated relational aggression in a sample of 144 urban third through eighth grade students. This study aims to extend preliminary research by demonstrating how two features of children's network position, centrality and density, influence the propensity for children to engage in relational aggression. Moreover, unlike prior research, this study employs a cognitive social structures methodology to explore network features (Krackhardt, 1987). This method provides direct information about the interconnections between individuals, and does not provide a limit on the number of acquaintances that an individual can have (Neal, 2008).

Centrality and Relational Aggression

Centrality, defined here as the proportion of relationships that a child has with grade-level peers (Freeman, 1978/1979), has implications for both children's ability and motivation to engage in relationally aggressive behaviors. At a minimum, in order to successfully implement behaviors like rumor-spreading and social exclusion, children require some access to social ties. Thus, children with low centralities (e.g., isolates or children who are connected to only a few grade-level peers) may be constrained in their use of relational aggression. In addition, centrality in the peer network likely influences children's impetus to employ relationally aggressive behaviors. Ethnographic accounts suggest that children and adolescents often use rumor spreading and the exclusionary tactics associated with relational aggression to build alliances and ascend up the social ladder (Adler & Adler, 1995; Eder, 1985). This strategy may be particularly useful to children with moderate centrality, who have access to the connections necessary to enact relational aggression, but still have room to advance up the social hierarchy. For example, Adler and Adler (1995) noted that children use social exclusion to sacrifice friendships with less central peers "in order to assert themselves as part of a relationship with those in central positions" (p. 151). Here, alienating less central peers through relationally aggressive tactics is a good trade-off because it results in gaining relationships with more central peers, enhancing one's social status. In contrast, as the proportion of grade-level peers to whom children are connected increases, they no longer need to use relational aggression to experience gains in social position. Indeed, for children with high centrality, relational aggression should provide diminishing social returns or negative growth because alienating peers would not necessarily yield an additional gain of friendships with more central individuals. Thus, a curvilinear relationship is expected between centrality and relational aggression, where relational aggression will be positively associated with moderate centrality (Hypothesis 1).

Density and Relational Aggression

In addition to examining the degree to which children are connected to their grade-level peers (i.e., centrality), it is useful to consider the degree to which children's acquaintances are also related to one another (i.e., density). Children in low density positions serve in liaison roles, connecting individuals who are not related to one another. In contrast, children in high density positions are generally members of tightly connected cliques, where all of their acquaintances are also related to one another. High density may facilitate relationally aggressive behavior by promoting increased intimacy and competition for social status.

First, membership in a dense group of individuals who all know one another likely enhances intimacy by concentrating opportunities for social interaction, and by facilitating in-depth contact and the exchange of personal information between network members. Prior research has suggested a positive link between intimacy and relational aggression (Grotpeter & Crick, 1996). Although this may seem counterintuitive, certain relationally aggressive behaviors (e.g., betrayals of trust) require knowledge of the victim's secrets, and high levels of intimacy may be needed to gain access to his/her personal thoughts. As noted by Grotpeter and Crick (1996), "relationally aggressive children may support or elicit high levels of intimacy in relationships in order to gain control over their friends" (p. 2332). Thus, because

high levels of density are likely to increase opportunities for intimate exchanges, children who maintain these network positions may be advantaged in carrying out relationally aggressive activities.

Second, high density may also prompt competition for social status, yielding higher levels of relational aggression. Specifically, children, especially young adolescents, view clique membership and crowd affiliation as particularly important (Brown, Eicher, & Petrie, 1986; Crockett, Losoff, & Peterson, 1984; Shrum & Cheek, 1994). Given the strong desire to be part of a highly dense clique, it is likely that children may use relationally aggressive behaviors to attain and maintain these positions (Adler & Adler, 1995; Neal, 2007). These arguments suggest that density will positively predict levels of relational aggression (Hypothesis 2).

Network Features Versus Demographic Characteristics

Although there is some evidence that demographic variables influence childhood relational aggression, children's location in their grade-level peer social networks also have the potential to influence these behaviors. Thus, network features (i.e., centrality and density) are expected to explain unique variance in relational aggression, above and beyond common demographic characteristics in the literature (i.e., gender and grade) (Hypothesis 3).

Method

Research Participants and Informed Consent

Network and behavioral data were collected in May 2006 for the entire population of third through eighth grade students at one urban public elementary school (N=144). The study did not include kindergarten through second grade students because they were not likely to meet the cognitive demands of participating in the study. The population of students was racially diverse with African American (34%), White (25.7%), and Latino (29.9%) students represented at similar percentages. Nearly half of the children were female (48.6%), and 79.9% were eligible for free or reduced/price lunch.

The study included two levels of research participation: primary and secondary. Primary participants included 99 (68.7%) students who received parental permission and provided assent to actively participate in the research procedures. All third through eighth grade teachers and one special education teacher (N=7, 100%) also provided informed consent, and served as primary participants. Secondary participants included 45 (31.3%) students who did not have both active parental consent and assent to participate in research activities. Although these students did not complete survey measures, perceptual data about their social networks and behavior were collected from primary participants. According to the Common Rule, a waiver of parental consent and assent can be granted for secondary participants when: (1) the research poses minimal risks (2) it would not be practical to conduct the research without secondary participants and (3) the research would not adversely affect participants' rights. This current research did not pose risk beyond those encountered by children and teachers in their every day lives. A review of 145 studies using similar sociometric measures suggests that their use had only rare and mild negative

consequences (e.g., discomfort with receiving negative nominations) (Bell-Dolan & Wessler, 1994). Additionally, in order to accurately determine the structure of social networks, it was necessary to have near complete data on all children within a grade (Wasserman & Faust, 1994). As Klovdahl (2005) noted: "Social network research would not be possible (whatever the funding available) if informed consent was required from each network associate prior to-or indeed- even after-interacting with the primary subject" (p.128). Finally, because the data collected reflected primary participants' perceptions of secondary participants' readily observable friendships and behaviors, accessing this information did not violate secondary participants' rights to privacy.

A waiver of parental consent and assent for secondary participants was granted from University of Illinois at Chicago's Institutional Review Board (IRB Protocol # 2006-0231). Moreover, the use of secondary participants was also reviewed and approved by the principal of the school where the research was conducted. A disclaimer was included in all consent forms that notified parents that even if they did not agree to allow their child to actively participate in completing research measures, their child's name would still be listed on surveys completed by students and teachers. In addition, parents, teachers, and students, were provided with contact information for the researchers and the University of Illinois at Chicago's Institutional Review Board. During the study, there was no contact from parents asking that their children's names be removed from the surveys. Additionally, there were no reports of adverse events related to survey administration from parents, teachers, or students. For more information on the necessity and the ethics of the use of secondary participants in social network research, please see Klovdahl (2005) and Neal (2008).

In this study, primary participation rates within grades ranged from 53.3% to 86.4%. To ensure that primary participants were demographically comparable to secondary participants, their gender, race, and free/reduced price lunch status were compared within each grade using Fisher's exact tests. These analyses yielded no significant demographic differences.

Setting

The school, located in a large Midwestern city, served pre-kindergarten through eighth grade students. With only one classroom per grade and a magnet cluster status, the school was an ideal location for a grade-level network study. First, small grade sizes ensured that all children in the network were familiar with one another, making it possible for each child to report on the network ties of every other child in his/her grade (as described below). In addition, the school's magnet cluster status meant that children were bussed to the school from several different neighborhoods, ensuring that the vast majority of their interactions occur within the context of the school.

Measures

Demographic Characteristics.—Student demographic characteristics, including race, gender, and grade, were determined using self-report, when available (i.e., primary participants) because it is presumed to be the most accurate, especially with respect to race. When unavailable (i.e., secondary participants), teacher-report was used instead.

Grade-Level Peer Social Networks.—Cognitive social structures, developed by Krackhardt (1987), were used to collect grade-level peer social networks (see also Neal, 2008). Students serving as primary participants were asked to identify the specific children that hang out with each of their grade-level peers. Specifically, for each child in the same grade (including themselves), primary participants were presented with a full grade-level roster, and instructed to circle the names of children whom that particular child hangs out with often. To assess the percentage of cross-grade ties in the network, there was a designated space where primary participants could identify other children in their school that hang out with each peer. In addition, there was a check box that primary participants were instructed to mark if they thought a particular child did not hang out with any other children. Data from this measure were used to create matrices representing each primary participant's perception of the grade-level network.

For each grade-level, matrices containing each individual's report of the whole network were aggregated by adding each relationship between actors *i* and *j* across *k* respondents, a procedure known as consensus aggregation (Krackhardt, 1987). Symbolically, this is represented by the equation:

$$\mathbf{R'_{i\,j}} = \sum\nolimits_{k} R_{i,\,j} \tag{1}$$

Next, following Neal's (2008) recommendation, the resulting summed grade-level matrix was binarized using a binomial rule. Specifically, based on the number of respondents in the grade and the underlying probability that any tie between any two actors was reported across all respondents, the binomial distribution was used to determine how many respondents needed to report a particular tie between actors *i* and *j* to exceed random chance (i.e., $\alpha =$ .05). This number ranged between a minimum of 5 respondents for the third and fifth grades to a maximum of 8 respondents for the eighth grade.

Centrality and Density.—The UCINET software package was used to obtain information on peer network features for children in each aggregated, binary grade-level network (Borgatti, Everett, & Freeman, 2002). Centrality was operationalized using Freeman's (1978/1979) measure of normed degree centrality. This measure provides each child's proportion of direct ties out of all possible ties in his/her grade. Density was calculated for each child as the proportion of all possible ties that were present between each of his/her individual relations.

Relational Aggression.—Two distinct measures were used to assess relational aggression (one teacher-rated and one peer-nominated assessment). Teachers rated the relationally aggressive behavior of all primary and secondary participants in their classroom using a six-item scale that included five items from the *Children's Social Behavior Scale-Teacher Report (CSBS-T)* relational aggression subscale (Crick, 1996) and one additional item from Oesterman Bjorkqvist, Lagerspetz, & Kaukiainen (1994). Teachers rated each child in their classroom on each item using a response scale ranging from 1 (this is never true of the child) to 5 (this is almost always true of the child). Items were then summed yielding a teacher-rated relational aggression score ranging from a minimum of 6 to a

maximum of 30. A principal factor analysis with orthogonal varimax rotation revealed a one factor solution, with all items demonstrating factor loadings between .81–.92. A reliability analysis of the six-item scale with the current sample resulted in a high Cronbach's alpha (α = .94), consistent with past research using teacher-rated measures (Crick, 1996).

Children's peer nominations of classmates' relational aggression were measured using a five-item scale that included four items from the *Social Behavior Scale-Peer Report (CSPS-P)* relational aggression subscale (Crick & Grotpeter, 1995), and one item adapted from additional measures of relational aggression (Oesterman et al. 1994; Henington, Hughes, Cavell, & Thompson, 1998). A principal factor analysis with orthogonal varimax rotation resulted in a one factor solution, with all items demonstrating factor loadings between .66–.90. Cronbach's alpha for the five-item scale was .90 in the current sample.

Although prior studies using the *CSPS-P* employed a fixed choice model where children could only nominate up to three individuals for each item, the current study allowed them to nominate an unlimited number of peers for each item. Similar free-choice designs have been employed successfully in other studies of urban children (e.g., Metropolitan Area Child Study Group, 2002), and should increase variability and provide a more accurate measurement of relational aggression. Similar to procedures outlined by Crick & Grotpeter (1995), the five items on the modified *CSBS-P* subscale were standardized within the sample and then summed to create a measure of peer-nominated relational aggression for all primary and secondary participants. Items were standardized across the entire sample rather than within grade in order to preserve the ability to test for grade level differences in relational aggression.

Procedure

Collecting Data from Peers.—Data from students serving as primary participants were collected during an hour-long, classroom-based survey administration that included a 30-minute network survey and a 30-minute peer nomination survey. All students without parental permission or assent left the room under the supervision of a teacher or school staff member during the survey to participate in an activity of their classroom teacher's choosing. To minimize student discussion of survey answers, research staff members provided each primary participant with a blank sheet to cover their answers and asked them to space their desks apart. The research staff also worked closely with teachers to ensure that survey administrations were not scheduled before an unstructured period (e.g., lunch) when children might have opportunities to talk about their survey responses.

Research staff provided oral instructions and examples of how to complete items on each survey measure. Respondents completed the network measure at their own pace as research staff circulated the room to provide support and answer questions. After all respondents had completed the network measure, the research staff orally administered the peer-nomination measure. Procedures adapted from the Metropolitan Area Child Study Group (2002) were used to ensure the confidentiality of both the respondents and their peer nominations. Specifically, the research staff provided each respondent with a booklet containing a different colored sheet for each item on the *CSBS-P* that had a grade-level roster and the response option "No One". For each item, the research staff instructed students to turn to the

appropriately colored sheet and label a box at the top with a corresponding question number. Next, they read the item aloud and asked respondents to circle all the names on the sheet that fit the its description. Because the wording of actual items did not appear anywhere on the paper surveys, data could only be linked to their content by the research staff.

Collecting Data from Teachers.—Research staff distributed surveys containing the *CSBS-T* to all classroom teachers. Teachers completed this measure for each student in their classroom at their own leisure, and research staff returned after a week to collect it. This yielded near complete data for students in the third through seventh grade. Omissions by the eighth grade teacher accounted for 94.44% of all missing data in the sample. This large amount of missing data, and the fact that the eighth grade teacher was a permanent substitute teacher, compromised the integrity of teacher-reported *CSBS-T* data for the eighth grade. Therefore, eighth grade students were omitted from all analyses of teacher-reported relational aggression.

Results

Ordinary least squares (OLS) hierarchical regression models were performed to test the effects of network features on teacher-rated and peer-nominated relational aggression. In each analysis, demographic variables (i.e., gender, grade, and race) were entered in the first block and network features (i.e., centrality and density) were entered in the second block. Isolates and children with only one relationship (N=13) were excluded from the analyses because their scores on the density variable were undefined.

Descriptive statistics for centrality, density, teacher-reported relational aggression, and peer-nominated relational aggression are presented in Table 1. Children included in the analyses varied in their level of centrality, ranging from having relationships with 7% to 64% of the students in their grade. On average, they exhibited relationships with nearly one-quarter (i.e., 23%) of their grade-level peers. The density of children's networks ranged from 0 to 1. On average, 66% of the possible ties between a child's friends were present. Finally, children exhibited variability in both teacher-rated and peer-nominated relational aggression.

Prior to conducting the analyses, variables were transformed to improve normality and linearity. First, because both teacher-reported relational aggression (skewness= 1.21; standard error of skewness= .23) and peer-reported relational aggression (skewness= 1.49; standard error of skewness= .20) exhibited significant positive skew, logarithmic transformations were applied to these variables to improve normality. Second, because prior cross-sectional studies have found a curvilinear relationship between grade and relational aggression (e.g., Bjorkqvist, Lagerspetz, & Kaukiainen, 1992; Landau, Bjorkqvist, Lagerspetz, Osterman, & Gideon, 2002, Tiet, Wasserman, Loeber, McReynolds & Miller, 2002), quadratic terms for grade were included in all models.

Effects of Network Features on Teacher-Rated Relational Aggression

Equations for the first and second blocks of the hierarchical regression model used to test the effects of demographic variables and network features on log-transformed teacher-rated relational aggression are presented below:

Block 1:

$$
\begin{aligned}
\ln(Teacher_{RA}) = {} & \alpha + \beta_1(Female) + \beta_2(Grade) + \quad \beta_3\left(Grade^2\right) + \beta_4(AfAm) \\
& + \beta_5(Latino) + \beta_6(Other) + \varepsilon
\end{aligned}
\tag{2a}
$$

Block 2:

$$
\begin{aligned}
\ln(Teacher_{RA}) = {} & \alpha + \beta_1(Female) + \beta_2(Grade) + \beta_3\left(Grade^2\right) + \beta_4(AfAm) \\
& + \beta_5(Latino) + \beta_6(Other) + \beta_7(Centrality) + \beta_8\left(Centralityy^2\right) + \beta_9(Density) \\
& + \varepsilon
\end{aligned}
\tag{2b}
$$

Results of the analysis are presented in Table 2. In the current sample, females' levels of teacher-rated relational aggression were 31% higher than those of males, controlling for grade and race ($\exp(.27) = 1.31$, $p < .01$). Consistent with prior empirical findings, there was a significant quadratic effect of grade on teacher-rated relational aggression, with these behaviors peaking close to the fifth grade, controlling for gender and race (linear: B= .70, p< .01; quadratic: B= −.07, $p < .01$). In addition, controlling for gender and grade, African American ($\exp(.32) = 1.37$, $p < .01$) and Latino ($\exp(.29) = 1.34$, $p < .05$) students received teacher ratings on relational aggression that were 37% and 34% higher respectively than European American students.

In the second block of the analysis, all variables measuring grade-level network features were added to the regression model. Results demonstrated continuing significant effects of gender, grade, and race. Contrary to Hypotheses 1, the linear and quadratic terms for centrality were not significant. However, density had a significant positive effect on teacher-rated relational aggression, providing support for Hypothesis 2. Individuals in a clique member role (see Figure 1B) had levels of teacher-rated relational aggression that were 45% higher than individuals in a liaison role (see Figure 1A), holding all other variables in the model constant ($\exp(.37) = 1.45$, $p < .05$). The second block explained a larger proportion of the variance in relational aggression ($R^2 = .31$) than the first block ($R^2 = .26$) ($f^2 = .08$). An incremental F-test demonstrated that the addition of network variables in the second block led to a significant increase in the R^2 value ($F(3, 94) = 3.75$, $p < .05$). This result, which supports Hypothesis 3, suggests that density explained unique variance in teacher-rated relational aggression above and beyond demographic characteristics.

Effects of Network Features on Peer-Nominated Relational Aggression

The same hierarchical regression analysis was repeated using log-transformed peer-nominated relational aggression as the dependent measure:

Block 1:

$$
\begin{aligned}
\ln(Peer_{RA}) = {} & \alpha + \beta_1(Female) + \beta_2(Grade) + \beta_3\left(Grade^2\right) + \beta_4(AfAm) \\
& + \beta_5(Latino) + \beta_6(Other) + \varepsilon
\end{aligned}
\tag{3a}
$$

Block 2:

$$\ln(Peer_{RA}) = \alpha + \beta_1(Female) + \beta_2(Grade) + \beta_3(Grade^2) + \beta_4(AfAm)$$
$$+ \beta_5(Latino) + \beta_6(Other) + \beta_7(Centrality) + \beta_8(Centrality^2) + \beta_9(Density) + \varepsilon$$

(3b)

Results of this analysis are presented in Table 2. Girls exhibited levels of peer-nominated relational aggression that were 36% higher than boys (exp(.31)= 1.36, $p<$ .05). However, contrary to past results, linear and quadratic terms for grade were not significant, suggesting that grade did not have a curvilinear influence on levels of peer-nominated relational aggression. Furthermore, there were no significant race differences in peer-nominated relational aggression.

Network variables, including density and the linear and quadratic terms for centrality, were added to the second block of the hierarchical regression analyses. After these network characteristics were included, the effect of gender on peer-nominated relational aggression became insignificant (exp(.25)= 1.28, $p>$ .05). In its place, the results reveal a significant quadratic effect of centrality on peer-nominated relational aggression, supporting Hypothesis 1, which stated that moderate levels of centrality would be positively associated with relational aggression (linear: B= 5.96 $p<$ .01; quadratic: B= −11.23, $p<$ .01). Specifically, the maximum was .27, suggesting that peer-nominated relational aggression increased until children exhibited relationships with approximately 27% of their classmates, and then declined. Contrary to Hypothesis 2, density did not have a significant effect on peer-nominated relational aggression. The second block of the regression model explained 16% of the variance in peer-nominated relational aggression (R^2= .16, f^2= .10). Compared to the first block (R^2= .07), this is a significant increase in the amount of explained variance in peer-nominated relational aggression ($F(3, 122)$= 4.51, $p<$ .01). Specifically, the significant quadratic effect of centrality explained unique variance in peer-nominated relational aggression above and beyond demographic characteristics, providing support for Hypothesis 3.

Discussion

The current research extends existing literature on childhood relational aggression by exploring *where* relationally aggressive children are located in their grade-level social networks. Consistent with past research, results suggest that levels of relational aggression are influenced by the demographic characteristics, gender and grade. More importantly, however, aspects of children's grade-level network position, including centrality and density, also affect these behaviors. First, results provided support for the curvilinear influence of centrality on peer-nominated relational aggression, with these behaviors peaking at moderate levels. Second, findings demonstrated a positive effect of density on teacher-rated relational aggression. In both cases, network features explained unique variance in relational aggression above and beyond demographic characteristics, suggesting that they play an important role in facilitating and instigating these behaviors.

Reconciling Discrepant Results

Although the results of the current study provide support for the effects of both demographic characteristics and network features on relational aggression, this evidence is complicated by different findings for teacher-rated and peer-nominated measures. In particular, among social network features, centrality was influential on relational aggression when nominated by peers, while density had an influence on relational aggression when rated by teachers. Although the samples for analyses of teacher-rated and peer-nominated measures differed slightly because the teacher-rated measure excluded the eighth grade, a re-analysis of the peer-nominated measure without eighth grade students yielded the same disparate findings.

Teacher and peer measures may assess different facets of relational aggression, providing one potential explanation of these differences. This is supported by the moderate correlation between these measures in the current sample ($r = .47$), and is also consistent with past research on general aggression. Specifically, studies have found that teacher measures better explain variation among extremely aggressive children whereas peer measures better explain variation among moderately aggressive children (Metropolitan Area Child Study Research Group, 2002; Huesmann et al., 1996). If this is also true of relational aggression measures, it is not surprising that findings related to teacher and peer report are different. Perhaps density is more critical for the extreme relational aggression recognized by teachers, and centrality is more crucial for the normative relational aggression captured by peers.

Another possible explanation lies in an assumption of the current research. Specifically, this study assumes that peer network features (i.e., high density, moderate centrality) should result in higher levels of teacher-rated and peer-nominated relational aggression. However, although these network features provide structural opportunities to engage in relational aggression, not all children presented with these opportunities will act on them. This suggests that it may be fitting to examine variation in rather than absolute levels of relational aggression across network features. When network features are at levels that provide opportunities to engage in relationally aggressive behaviors, variation in relational aggression should be greater.

Examining variation in relational aggression may improve consistency between results for teacher-rated and peer-nominated measures. Figure 1 illustrates this idea by depicting scatterplots of the relationship between centrality and both measures of relational aggression. Both scatterplots show differences in the amount of variation in relational aggression across the range of centralities. Specifically, for both dependent measures, the widest amounts of variation in relational aggression occurred at levels of centrality between .15 and .25. Children who have moderate levels of centrality (i.e., relationships with 15–25% of their classmates) may have the greatest structural opportunity to engage in relational aggression, but some do not act on this opportunity. In contrast, very small or large centralities discourage children from engaging in relationally aggressive acts, constraining the amount of variation in relational aggression. These findings suggest that while results for teacher-rated and peer-nominated measures were discrepant for total amounts of relational aggression, they were consistent for variation in relational aggression.

Implications for Future Research

Future research should continue to explore the influence of peer network features on relational aggression among children and adolescents. Studies in this vein will clarify the process of relational aggression and help researchers identify aspects of the social structure that drive relationally aggressive behaviors. Specifically, in addition to examining whether variation in relational aggression changes across different levels of network features, continued research in three areas will be useful: (1) longitudinal studies to tease apart causal influences (2) the consideration of the influence of additional network variables on relational aggression and (3) studies that generalize relationships between network features and relational aggression to a wide variety of environmental contexts.

The cross-sectional nature of the current study makes it impossible to determine causal relationships between network features and relational aggression. This paper argues that network features influence relational aggression by facilitating or constraining opportunities to engage in these behaviors. It is also possible, however, that relational aggression creates changes in network features. For example, relational aggression may alienate some peers, making it difficult to obtain high levels of degree centrality. Future research should measure both network features and relational aggression longitudinally to tease apart causal influences, and assess potential feedback loops.

Although this study has explored the effects of centrality and density on relational aggression, another promising area of future research concerns exploring the influence of additional network features on these behaviors. Bonacich (1987) proposed a family of centrality measures that assesses how well connected an individual's relations are to others in the network. This focus on "friends of friends" may provide additional insight into the influence of network structure on different types of childhood relational aggression. Relationships with well-connected peers may be most beneficial for rumor spreading, which is likely to be effective if rumors can diffuse quickly. However, relationships with poorly connected peers may facilitate social exclusion, which is likely to be effective when those excluded (in this case, poorly connected peers) do not have alternate sources of social support. Thus, in addition to expanding the range of network features studied, it might also be useful to follow in the footsteps of Gest, Graham-Bermann, & Hartup (2001), who addressed the benefits of examining different aggression items as separate dependent measures.

Finally, new research should continue to explore the associations between relational aggression and peer network features in a wide variety of contexts to ascertain the generalizability of the current study's results. First, results should be replicated in a wide variety of school contexts, including urban, racially and economically diverse schools like the one explored in this study as well as schools in suburban and rural settings, and schools with different demographic make-ups. Second, research should be expanded to consider the influence of peer networks outside the classroom on relationally aggressive behaviors in settings such as neighborhoods and after-school clubs.

Implications for Intervention

In addition to providing implications regarding future research, the current study offers new implications for the prevention and reduction of relationally aggressive behaviors among children and early adolescents. In contrast to the large number of interventions designed to target physical and verbal aggression, to date, there are few research-based interventions aimed at preventing or reducing relational aggression (Leff, Power, Manz, Costigan, & Nabors, 2001; Young, Boye, & Nelson, 2006). Existing interventions have concentrated on curbing relationally aggressive behaviors by changing cognitions and building social, emotional, and behavioral skills, with mixed results (Cappella & Weinstein, 2006; Fraser et al., 2005).

Past research on relational aggression focused largely on the influence of demographic characteristics, providing information about *who* interventionists should target. In contrast, the current research examines the effects of network features on relational aggression, informing the process of these behaviors and offering interventionists fresh insight on *what* to target. Specifically, certain network features including moderate centrality and high density were linked to higher levels of relationally aggressive behavior. These network features can be seen as viable points of intervention for the prevention and reduction of relational aggression. If children's levels of centrality and density in the peer network can be influenced through environmental modifications to the classroom, it may be possible for interventionists to reduce opportunities to engage in relationally aggressive acts.

Interventionists should consider simple changes to classroom and school environments that encourage larger, more inclusive networks and networks that are less dense. For example, they could persuade classroom teachers to periodically change classroom seating charts or to assign new study/work groups to encourage new contacts among students. Avoiding modular seating arrangements that facilitate closed, dense relationships between small subsets of students may also be helpful in reducing relational aggression. Finally, interventionists should look for ways to expand children's peer networks beyond classroom settings. For example, assigning rather than allowing students to choose sports teams during physical education may help children forge new relationships. More research is needed to see if these straightforward, structural changes to the classroom and school environment hold promise for limiting relational aggression, and to ensure that they do not result in unintended negative consequences.

Conclusion

Given the negative social, psychological, and behavioral outcomes associated with relational aggression perpetration and victimization, it is essential to learn more about the social structures that aid or hinder these behaviors. Whereas past research has focused primarily on *who* commits relationally aggressive acts, the current study concentrated on *where* relationally aggressive individuals were located in their classroom social networks, with findings suggesting that the peer social structures play an important role in the process of these behaviors. Future research and intervention efforts will benefit from continuing consideration of the role of relations in relational aggression, especially as they offer an alternative to individualistic interventions.

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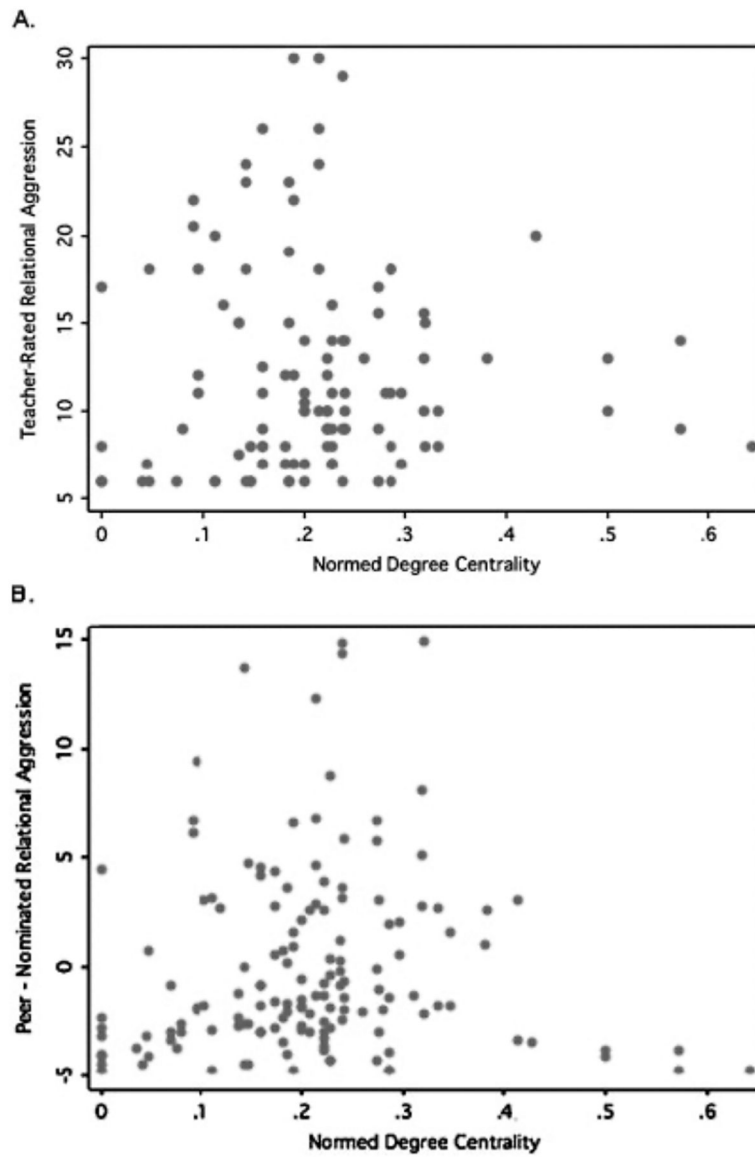
Figure 1.
Scatterplots demonstrating conditional variation of teacher-rated and peer-nominated
relational aggression across different levels of centrality.
1a. Variation in Teacher-Rated Relational Aggression across Different Levels of Centrality
1b. Variation in Peer-Nominated Relational Aggression across Different Levels of Centrality

Table 1

Descriptive Statistics for Network and Relational Aggression Variables

Variable	N	M	SD	Min.	Max.
Centrality	131	.23	.10	.07	.64
Density	131	.66	.29	0	1
Teacher-Rated Relational Aggression	104	12.40	5.87	6	30
Peer-Nominated Relational Aggression	131	.27	4.30	−4.66	14.87

Table 2

Unstandardized Coefficients and Standard Errors for Hierarchical Regression Models Predicting Log-Transformed Teacher-Rated and Peer-Nominated Relational Aggression

Variable	Teacher-Rated Relational Aggression				Peer-Nominated Relational Aggression			
	N=104				N=131			
	Block 1		Block 2		Block 1		Block 2	
	B	SE	B	SE	B	SE	B	SE
Female	.27 **	.08	.25 **	.09	.31 *	.13	.25 †	.13
Grade	.70 **	.23	.52 *	.26	−.004	.29	.15	.29
Grade^2	−.07 **	.02	−.05 *	.03	.004	.03	−.01	.03
Af. American	.32 **	.11	.30 *	.10	.12	.17	.10	.16
Latino	.29 *	.11	.27 *	.11	−.09	.18	−.06	.17
Other Race	.20	.14	.27 †	.14	−.09	.23	.02	.23
Centrality	--	--	.58	1.39	--	--	5.96 **	2.06
Centrality^2	--	--	−1.02	2.11	--	--	−11.23 **	3.35
Density	--	--	.37 *	.14	--	--	.03	.22
R^2	.26		.31		.07		.16	
F-Change			3.75 *				4.51 **	
f^2			.08				.10	

†
p < .10;

*
p < .05;

**
p < .0