J Youth Adolescence (2013) 42:235–249
DOI 10.1007/s10964-012-9839-7

EMPIRICAL RESEARCH

The Role of the School Environment in Relational Aggression and Victimization

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Received: 21 July 2012 / Accepted: 5 October 2012 / Published online: 31 October 2012

Abstract Research conducted over the last decade has documented both the high rates of and serious consequences associated with both victimization and perpetration of relational aggression. This study examines risk for involvement in relational aggression and victimization among middle school youth, evaluating both individual beliefs about violence, as well as aspects of the school environment, including interpersonal school climate and school responsiveness to violence. A sample of 5,625 primarily urban minority middle school youth (49.2 % female) participating in a violence prevention project completed measures of relational aggression and victimization as well as indicators of individual beliefs about aggression, school norms for aggression, student–teacher and student–student interpersonal climate, and school responsiveness to violence. Unlike results previously found for physical aggression, no school-level indicator of climate was related to relational aggression or victimization. However, individual beliefs about aggression and individual perceptions of the school environment were related strongly to both the perpetration of and victimization by relational aggression. These results suggest not only that individual beliefs and perceptions of the school environment are important in understanding perpetration and victimization of relational aggression, but also that risk for involvement in relational aggression is distinct from that of physical aggression. Implications for school interventions are discussed, as well as suggestions for future research.

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Keywords Relational aggression · Relational victimization · School climate

Introduction: Risk and Protective Factors for Relational Aggression

Research focused on relational aggression has increased significantly in the last decade. Studies have documented the serious consequences associated with both victimization by and perpetration of relational aggression (Crick and Grotpeter 1995; Crick et al. 1999; Preddy and Fite 2012). This same research has shown that, while highly correlated with physical aggression (Card et al. 2008), relational aggression has a developmental course distinct from that of physical aggression. Girls are more likely to report experiences of both relational aggression and victimization, though high rates are found across genders (Xie et al. 2003; Waasdorp and Bradshaw 2009). Children who exhibit relational aggression are at heightened risk for a host of poor outcomes including peer rejection, loneliness, depression and isolation (Card et al. 2008; Galen and Underwood 1997), as well as substance abuse, externalizing and other behavior problems (Crick et al. 1996; Cullerton-Sen and Crick 2005; Galen and Underwood 1997; Sullivan et al. 2006). Given the serious problems linked to both relational aggression perpetration and victimization, understanding associated risk and protective factors is critical to informing the development and implementation of intervention and prevention programs focused on this distinct form of aggression.

Much of the previous research on the correlates of relational aggression has focused on individual-level predictors of involvement (e.g. Preddy and Fite 2012; Herrenkohl et al. 2009). While these studies have provided

important direction, relatively little research has expanded beyond individual risk factors to examine environmental or contextual factors related to relational aggression. Ecological theories point to environmental and contextual factors as important influences on child development (Bronfenbrenner 1986). For children and youth of school age, the school setting is a particularly important developmental context (Jessor 1993). School factors, including norms about behavior and climate, consistently have been shown to be important in understanding behavioral and academic outcomes (Henry et al. 2011; Kuperminc et al. 1997). These findings suggest that the school environment also may play an important role in risk for relational aggression. This study is intended to expand on existing research by examining the relationship between both individual and school-level factors and risk for involvement in relational aggression.

Of early research on relational aggression, much has focused on preschool and early childhood samples, with surprisingly less attention on middle school and early adolescent youth. However, understanding the factors related to relational aggression and victimization may be especially important for early adolescents. Close peer relationships are important at this developmental stage, and risk for both perpetration and victimization may be particularly high (Savin-Williams and Berndt 1990). Given the importance of peer relations at this time, actions intended to harm those connections may be especially hurtful. Contextual factors, particularly school factors, also may be of special importance. Middle school youth are no longer with one teacher for the full day, classroom constellations of students change, and students often receive higher levels of responsibility at school and spend more time away from home, making the school and peer contexts especially influential (Crockett and Petersen 1993). These developmental changes indicate that the school environment—particularly norms regarding aggression, relations between students and teachers and school response to aggression and violence—may be especially important in risk for relational aggression.

The Impact of School Climate on Relational Aggression and Victimization

Previous research points to three aspects of the school context that may be important for understanding what supports or decreases the risk for relational aggression among middle school youth: (1) interpersonal school climate (i.e., the quality of student–teacher relationships and student–student relationships), (2) norms for aggression, and (3) school responsiveness to violence. Because the literature on contextual factors related to risk more generally and school climate more specifically and relational aggression is in its early stages, in cases where little research exists on relational aggression, we draw on evidence for physical aggression to inform our hypotheses.

Interpersonal Climate: Student–Student and Student–Teacher Relationships

Social learning theorists have long posited that individuals learn from observing the behavior of others, and that behavior is more likely to be imitated when it is observed repeatedly (Bandura 1986). Among early adolescents, interactions between students and teachers and among students are perhaps those most frequently observed in the school environment. A robust body of research links positive school interpersonal climate—relations between students and teachers and among students—to lower levels of emotional and behavioral problems, including externalizing problems (Roeser and Eccles 1998; Kuperminc et al. 2001). The broader peer context may be particularly influential for relationally aggressive youth, who have a high degree of network centrality (Xie et al. 2002).

There is also evidence that more positive student–teacher relationships promote lower levels of aggression (Henry et al. 2011). Teacher warmth and quality of relationships with students have been associated with greater student rejection of aggressive behavior (Chang 2003) and lower levels of student aggression (Hughes et al. 1999). Student–teacher relationships also may influence student victimization. For example, anti-social student behavior predicts conflict with teachers (Birch and Ladd 1998), and these conflictive student–teacher relations may model a lack of acceptance of the student to peers, who may respond similarly. These data suggest that interpersonal school climate impacts physical aggression. However, no studies to our knowledge have evaluated the relationship between interpersonal school climate and relational aggression.

School Responsiveness to Violence: Perceptions of School Safety and Awareness and Reporting

Data suggest that perceptions of school safety problems (e.g., fighting, destruction of property and carrying weapons at school) may cause emotional stress and increase problem behaviors, especially for middle school students, who are more likely than their younger peers to view the school environment as unsafe (Astor et al. 2001). It has been well documented that adolescents who are fearful in school face an array of health risk behaviors, including alcohol use, carrying weapons, and poor sleep habits (Dowdell and Santucci 2003). Researchers also have found positive associations between higher perceived school safety problems—such as fighting and destruction of

property—and bullying perpetration, victimization, and problem behaviors (Bowen and Bowen 1999). While it is clear that school safety concerns influence physical aggression, less research has explored how school safety may impact relational aggression and victimization.

Related to students' experience of school safety is the way teachers and administrators respond to aggression and violence. Schools that have unclear and inconsistent policies and that ignore student misbehavior have been found to have higher rates of student victimization (Gottfredson and Gottfredson 1985). Henry et al. (2011) found that higher school-levels of awareness and reporting of aggression and violence predicted lower individual-levels of physical aggression. Policy evaluations support this connection: interventions designed to raise student and teacher awareness about school violence and create clear rules and policies have been found to reduce aggression and violence within schools (Astor et al. 2005).

It is not clear if and how these same associations may hold for relational aggression. Research has found that adults' response to relational aggression may differ from that of physical aggression, with teachers responding inconsistently to acts of relational aggression (Yoon and Kerber 2003). Unlike physical aggression, there may be more acceptance and belief that this type of behavior is "normal" and expected of youth (Casey-Cannon et al. 2001). Additionally, relationally aggressive acts, such as peer manipulation and spreading rumors, tend to be covert (Crick and Grotpeter 1995), making them less visible to those outside the peer group and more difficult for teachers and administrators to respond. Given the findings in the literature on physical aggression, however, we expect that students who perceive higher levels of school safety problems and higher responsiveness to violence will be less likely to experience relational aggression and victimization.

School-Level Norms Regarding Violence

Social norm theorists highlight the powerful influence collective norms have on individual behavior (Cialdini et al. 1990). This body of literature distinguishes between descriptive norms (mean levels of behavior) and injunctive norms (the perception of what should be) (Cialdini et al. 1991). While both descriptive and injunctive norms have been linked to physical aggression (Henry et al. 2011; Barth et al. 2004), research has shown that injunctive norms about the acceptability of aggression exert an especially strong influence on individual-level aggression (Henry et al. 2000). Injunctive norms may motivate behavior by promising social rewards or punishment for particular actions (Cialdini et al. 1991).

Few studies have evaluated the relationship between school-level norms and relational aggression. Onishi et al. (2011) found that perceptions of classroom injunctive norms regarding abusive behavior were related to relational aggression among a sample of 5 and 6th grade adolescents. However, their study was cross-sectional and drew on a sample of children in Japan, which may have limited generalizability to American youth. Kuppens et al. (2008) found in a longitudinal study that classroom-level norms supporting aggression were associated positively with relational aggression among 3rd through 5th grade youth. This study conceptualized norms as the mean level of behavior in the class and did not examine the impact of injunctive norms. The present study builds on previous research by examining the impact of school-level injunctive norms regarding aggression on relational aggression.

Individual Beliefs

Cognition plays a powerful role in the perpetration of aggressive acts, according to learning theories of aggression (Bandura 1986; Huesmann 1988). Beliefs may have an especially salient influence on aggression as youth enter middle school. Whereas aggressive behavior has been found to be predictive of normative beliefs about aggression among elementary school children, as children age, it is beliefs supporting aggression that predict aggressive behavior (Huesmann and Guerra 1997). Research suggests that as children approach adolescence, beliefs solidify and become more predictive of behavior; these beliefs may affect aggression through heightening the perception of hostility from others or cuing aggressive scripts for social behavior (Guerra et al. 1994; Huesmann 1988). Empirical evidence backs the position that normative beliefs have a powerful influence on aggression. Numerous studies demonstrate that individual beliefs exert a strong influence on individual-level behavior (e.g., perpetration of aggression) (Zelli et al. 1999). More recently, studies have shown that individual beliefs supporting aggression are correlated positively with relational aggression (Werner and Hill 2010). Researchers also recently have found evidence that norms supporting nonviolence may impact aggression differently than beliefs supporting nonviolence (Henry et al. 2011). These findings suggest that individual-level beliefs impact physical aggression; however, little is known about how beliefs supporting nonviolence impact relational aggression.

Current Research and Hypotheses

The current study expands on previous research by exploring factors in the school environment that may contribute risk for relational aggression and victimization. Specifically, this study is designed to evaluate whether

individual beliefs about aggression and individual perceptions of the school environment (school interpersonal climate and school responsiveness to violence) are predictive of relational aggression and victimization. This study also explores whether aggregated school-levels of interpersonal climate, school responsiveness to violence, and school norms favoring nonviolence are predictive of relational aggression and victimization after controlling for individual-levels of these constructs. Given gender differences that have been found both in the rates of relational aggression (Crick and Grotpeter 1995; Xie et al. 2003) and the intimacy of personal relationships (Maccoby 1998), potential gender differences are explored.

Two broad sets of hypotheses guide the present study. We expect individual beliefs and perceptions of the school environment, controlling for the aggregated school-level indicators, to be associated with relational aggression and victimization. We similarly expect school-level variables, controlling for individual-level variables, to be associated with relational aggression and victimization. For both the individual perceptions and aggregated school predictors, we anticipate that a more positive interpersonal climate, norms more supportive of nonviolence and less supportive of violence, and higher levels of awareness and reporting and lower levels of school safety problems will be associated negatively with relational aggression and victimization.

Second, we hypothesize that individual perceptions of the school environment and their aggregated school levels will be predictive of relational aggression for both females and males, but that the strength of these relationships will vary by gender. The broader literature has indicated that female peer relations may be characterized by higher intimacy and than those of males (Maccoby 1998; Parker and Asher 1993), and that females may be more responsive than males to the input of teachers (Underwood 2003). Based on these findings, we expect that the effect of interpersonal school climate on relational aggression and victimization will be stronger for females.

Method

Procedure

This study uses data collected in the context of a multisite randomized trial. Investigators from four universities—Duke University, The University of Georgia, University of Illinois at Chicago and Virginia Commonwealth University—recruited area schools serving middle school students. Data were collected from students who returned both assent and parental consent forms; telephone follow-ups and home visits were made to increase study participation. Of 7,364 eligible students, 5,625 returned active parental consent and student assent, for a mean recruitment rate of 76 %. Students received a $5 gift card for returning consent forms at the 3 sites it was permitted. Nine-tenths of the sample had two waves of the outcome variables, resulting in a sample size of 5,106 for the present study. The institutional review boards at the four participating universities and the Centers for Disease Control and Prevention Institutional Review Board approved all study procedures.

Two to three schools from each site were assigned randomly to one of four intervention conditions: (1) a universal condition including a social-cognitive student intervention (Meyer et al. 2004) and a teacher training and support intervention (Orpinas et al. 2004; $n = 9$ schools and 1,305 youth); (2) a selective intervention condition, which included a group-based family intervention (Phillips-Smith et al. 2004; $n = 10$ schools and 1,349 youth); (3) a condition that included both universal and selective interventions ($n = 9$ schools and 1,241 youth); and (4) a no-intervention control condition ($n = 9$ schools and 1,211 youth).

Graduate students administered a 20 session social-cognitive problem-solving curriculum focused on avoiding danger, ignoring teasing, and asking for help in the universal condition (Meyer et al. 2000). Teacher training included a two-day workshop and 10 support group meetings for teachers; meetings aimed to augment teacher awareness of various forms of aggression, increase ability to prevent aggression, and develop better classroom management skills (Orpinas et al. 2004). The selective intervention was designed to increase home-school partnerships, teacher efficacy, parent monitoring and communication strategies, as well as improve parent and child coping and problem solving skills. Students who were identified by teachers as exhibiting high levels of aggression and influence with peers were recruited, along with their parents. A 15-week intervention was conducted for four to eight youth and their families. Sessions began with a meal and introduced new topics through interactive activities, including role-plays. Beginning in 2001, data from a representative sample of students and teacher ratings of students was collected for two successive cohorts of 6th grades. Data was collected from students and teacher ratings of students in each cohort during the fall and spring of the 6th grade and in the spring of 7 and 8th grade years.

Participants

This study uses six waves of data collected over three years (6 through 8th grade) from 5,106 middle school students. This sample was recruited from 37 schools at four sites (northeastern GA, $n = 9$ schools; Chicago, IL, $n = 12$ schools; Durham, NC, $n = 8$ schools; and Richmond, VA, $n = 8$ schools) that participated in the Multisite Violence

Prevention Project (Multisite Violence Prevention Project (MVPP) 2004). In Chicago, where schools include grades K-8, we selected schools for size (over 1,100 students) and those with at least 75 % of students residing within school district boundaries. Participating schools in Durham and Richmond represented almost all middle schools in the public school systems, while middle schools in Georgia represented six school districts in Northeastern Georgia. All included schools had a high proportion of low-income students, based on eligibility for the federal free and reduced lunch program (percentage ranged from 42 to 96 % across sites). See Table 1 for demographic characteristics by site.

Participants consisted of a random sample of about 80 students per cohort from the rosters of each of the larger middle schools in three of the sites and all eligible students at the smaller Chicago schools. Students who had been selected for Cohort 1 but repeated the 6th grade were not included in Cohort 2. The sample was approximately 50 % male and 50 % female, and 52.1 % reported African American ethnic identification, 21.2 % Hispanic, 17.3 % Caucasian, with remaining students identifying as American Indian or Asian. Of participants, 70 % reported the presence of an adult male in the home (see Table 1).

Measures

This study utilized two individual-level outcome variables (relational aggression and relational victimization) and three individual-level and school-level constructs drawn from six predictor variables: individual beliefs about aggression, individual perceptions of school norms for aggression, interpersonal climate (positive student–teacher relationships and positive student–student relationships), and school responsiveness to violence (awareness and reporting of violence and school safety problems). School-level scores on the predictors were constructed by taking the mean score of all students within each cohort at each of the 37 schools for each wave, resulting in 74 school-level scores for each wave. Thus, each student in a particular cohort had identical scores on each school-level measure.

Relational Aggression

Relational aggression was assessed with a 6-item scale drawn from the Problem Behavior Frequency Scales (Farrell et al. 2000). The items were based on Crick and Grotpeter's (1995) measure of relational aggression. All items were preceded by the stem, "In the last 30 days, how many times have you?" Items included "spread a false rumor about someone," and "left another kid out on purpose when it was time to do an activity" and were rated on a 6-point scale ranging from "Never" to "20 or more times." Scores were calculated based on the mean value for items in the scale; higher values represent a higher level of aggression. The internal consistency of the relational aggression scale was .72.

Relational Victimization

Relational victimization was assessed using the same items as the relational aggression scale, but with the stem, "In the last 30 days, how many times has this happened to you?" Items included "been left out on purpose by other kids when it was time to do an activity," and "had a told tell lies about you to make other kids not like you anymore." Items

Table 1 Multi-site violence prevention project school and sample characteristics by site

	Chicago	Durham	Georgia	Richmond
School characteristics				
No. of participating schools	12	8	9	8
Average no. of 6th graders	70	241	239	236
Grade levels	K-8	6–8	6–8	6–8
% of Eligible for federal lunch program	96	42	47	75
Overall sample				
Black non Hispanic (%)	37	56	29	75
Hispanic (%)	53	9	12	5
White non Hispanic (%)	2	23	46	6
Multiracial (%)	6	8	9	11
Gender (% male) (%)	50	47	50	49
Adult male in the home (%)	74	68	77	61
Two-parent families (%)	47	44	53	30
Single parent families (%)	35	36	27	44
Single parent & stepparent families (%)	11	12	15	15

were rated on a 6-point scale, ranging from "Never" to "20 or more times." Scores were calculated based on the mean value for items in the scale; higher values represent a higher level of victimization. The scale has a Cronbach's alpha of .84.

Individual Beliefs About Aggression and Nonviolence

Individual approval of aggression and nonviolence were assessed using two scales, one (10 items) assessed beliefs about verbal and physical aggression, and the other (8 items) assessed beliefs about nonviolent solutions to conflict. Items were rated on a 3-point scale (approval, disapprove, or neutral). Questions about aggression included, "How would you feel if a kid at your school threatened someone who said something mean" and questions about nonviolence included, "How would you feel if a kid in your school avoided a fight by walking down a different hall to class?" The scale of individual norms measure had internal consistency reliability of .73 for aggression and .74 for nonviolence (Miller-Johnson et al. 2004). Previous research has found that at the individual-level these scales are only moderately correlated with each other and have independent effects on measures of aggressive behavior (Henry et al. 2011; Henry et al. (in press)).

School-Level Norms Regarding Aggression

School level norms were measured by creating a single scale out of two scales, one assessing perception of schoolmate's approval of aggression (10 items), and the other schoolmate's approval of nonviolent solutions to conflict (8 items). Items were rated using a 3-point scale (approval, disapprove, or neutral). Questions about aggression included "How would other students feel if a kid at your school hit someone for no reason," and questions about nonviolence included, "How would students at your school feel if a kid in your school avoided a fight by walking down a different hall to class?" The scale of perceived school norms measure had internal consistency reliability of .80 for aggression and .70 for nonviolence (Miller-Johnson et al. 2004). The school-level scale was created by reverse scoring the 10 aggression items and then aggregating 18 questions from the two individual-level scales for perceived school norms described above by taking the mean of each class (cohort within school). Multilevel factor analysis had revealed that a single factor at the school-level, representing support for nonviolence and disapproval of aggression, fit the data well (6th grade fall, $\chi^2(135) = 110.31$, *ns,* CFI = 1.0, RMSEA = 0.000; 8th grade spring, $\chi^2(135) = 58.85$, *ns,* CFI = 1.0, RMSEA = 0.000; Henry et al. 2011) but that two factors were required to model the data at the individual level. Moreover, the school-level scale had effects on physical aggression with the individual-level scores in the model.

Interpersonal Climate

Interpersonal climate was assessed through two measures: positive student–student relationships and positive student–teacher relationships.

Positive student–student relationships Student–student relationships were assessed using the Vessels' School Climate Survey (Vessels 1998). Students are asked to report on the degree to which students in the school get along with each other. Items included "students are kind and supportive of one another" and "students stop other students who are unfair or disruptive." Responses were rated on a 4-point scale ranging from "strongly disagree" to "strongly agree," with higher scores representing more positive relationships. Internal consistency was .61.

Positive student–teacher relationships Student–teacher relationships were also assessed using the Vessels' School Climate Survey (Vessels 1998). Items included "teachers treat students fairly" and "teachers praise students more often than they criticize them." Responses are rated using a 4-point scale ranging from "strongly disagree" to "strongly agree," with higher scores representing more positive student–teacher relationships. The internal consistency was .66.

School Responsiveness to Violence

School responsiveness to violence was assessed with two measures: awareness and reporting of violence and school safety concerns.

Awareness and reporting of violence Awareness and reporting of violence was measured using a scale from the Vessels School Climate Scale (Vessels 1998). The scale is intended to measure teachers' response to hearing about or witnessing bullying and violence and includes items such as "teachers know when students are being picked on or being bullied" and "students report it when one student hits another." Responses are rated using a 4-point scale ranging from "strongly disagree" to "strongly agree." Internal consistency for the scale was .63. Higher scores indicate higher levels of awareness and reporting of violence.

School safety concerns Concerns about school safety were measured with a 10-item scale based on the Department of Education Schools and Staffing Survey (US Department of Education 1999–2000). The scale is intended to measure the extent to which students perceive their school to be unsafe, with higher scores indicating higher levels of concern regarding

school safety. Students were asked questions representing potential problems or issues within the school and included items such as "fighting (hitting and kicking) among students" and "students carrying weapons." Students responded using a 4-point scale, with responses ranging from "not a problem" to "serious problem." Internal consistency was .89.

Demographics

Demographic information was collected from student reports and included gender, race, ethnicity and family structure (presence of adult male in the home).

Data Analytic Approach

Henry et al. (2011) report acceptable school-level reliability for each of the school-level predictors used in this investigation. Three mixed effects regression models were run for each outcome to assess the impact of individual- and school-level predictors: (1) a base model with the non-climate predictors (e.g. time, gender, intervention condition, and school); (2) a model adding all individual-level predictors to the base model; and (3) a third model adding all school-level predictors to Model 2. Mixed effects regression models can include cases with missing data at one or more waves of assessment without requiring multiple imputation since each data point within every individual is used to estimate the group trend at the time the measure was gathered. The additional explanatory power of each model was assessed by finding the difference in −2 log-likelihoods between the models and evaluating the result using the Chi-square distribution with degrees of freedom equal to the difference in free parameters between models. The model with the smaller −2 log likelihood value was considered a better fit if the difference in −2 log-likelihoods between the models was significant. Additionally, a pseudo R^2 was calculated for the additional explanatory power of each model by dividing the difference in −2 log-likelihoods by the −2 log-likelihood of the base model.

Mixed effects regression models were then used to evaluate the effects of the school-level predictors on relational aggression and victimization. First, a set of mixed effects regression models were used to examine the effect of each school-level predictor on each outcome variable. A fixed quadratic time variable was included in the initial models to explore whether the growth over time was curvilinear. Only predictors that emerged as significantly associated with the outcomes were included in the final models for parsimony.

The models included terms to measure the effect of ethnicity and adult male in the home. Time was centered at pretest so all effects on the school intercepts could be interpreted as effects at the fall of 6th grade. Each model also included dummy codes for the intervention condition with the control group as a comparison, so that all effects could be interpreted as expected effects in the control group. Henry et al. (2011) tested this procedure, finding that the parameter estimates for the full sample closely approximated the parameter estimates that were obtained in analysis using the control group only. School level terms that were significant in these initial models were entered into a final model.

We tested moderation by gender for all outcome variables by entering a binary variable representing gender as well as an interaction between gender and each predictor in each model. If the interaction was significant effects were estimated separately by gender to facilitate interpretation.

Results

Preliminary Analyses

Descriptive statistics and correlations for individual-level outcome variables at baseline (6th grade fall) and 8th grade spring are reported in Table 2. The correlations were moderate in magnitude (.34–.37) and were in the expected direction. These correlations were significant, which was expected given the large sample size.

Individual and school-level predictor descriptive statistics and correlations are presented in Table 2. Baseline correlations are reported on the subdiagonal and 8th grade spring correlations are reported on the superdiagonal. Most correlations were small to moderate. Student–student relationships and student–teacher relationships were moderately correlated (.36 at baseline and .43 at spring 8th grade for individual and .48 at baseline and .56 at spring 8th grade for school-level)—not an unexpected result given that these predictors are conceptually related. Student–teacher relationships and awareness and reporting were also moderately correlated (.48 at baseline and .61 at spring 8th grade for individual and .53 at baseline and .76 at spring 8th grade for school).

Main Effects and Changes in Effects on Relational Aggression over the Course of Middle School

Main effects did not differ by intervention condition for models predicting relational aggression perpetration. The quadratic term added in the initial models was not significant and was therefore dropped from the final models. Consistent with our hypothesis, individual beliefs and individual perceptions of school climate added significant explanatory power to the model both in the fall of 6th grade and over time. The individual-level variables added approximately $R^2 = .10$ for at the cross sectional level and $R^2 = .07$ in the longitudinal model. However, contrary to our hypothesis, the

Table 2 Descriptives, outcomes and predictors

	6th grade fall		8th grade spring		Correlations					
	Mean	SD	Mean	SD	1	2	3	4	5	6
Outcomes										
1. Relational aggression	1.54	.64	1.61	.73	1	.34***				
2. Relational victimization	1.73	.85	1.49	.73	.37***	1				
Individual-level predictors										
Norms										
1. Beliefs favoring nonviolence (NL)	2.32	.43	2.35	.42	1	−.46***	.13***	.24***	.19***	−.13***
2. Beliefs favoring aggression (NA)	1.38	.35	1.65	.41	−.13***	1	−.19**	−.30***	−.30***	.03***
Interpersonal climate										
3. Student–student relationships (SS)	2.66	.46	2.64	.41	.00	−.21***	1	.43***	.47***	−.12***
4. Student–teacher relationships (ST)	3.12	.58	2.80	.64	.10***	−.25***	.36***	1	.61***	−.06***
School responsiveness to violence										
5. Awareness and reporting (AR)	2.96	.50	2.59	.56	.04***	−.26***	.44***	.48***	1	−.05***
6. School safety problems (SP)	1.83	.82	1.56	.79	−.17***	−.02	−.02	−.03***	.02	1
School-level predictors										
1. School norms favoring nonviolence (SN)	−.08	.09	−.31	.12	1	.44**	.50**	.65**	−.31**	
Interpersonal climate										
2. Student–student relationships (SS)	2.67	.08	2.64	.10	.49**	1	.56**	.53**	.00	
3. Student–teacher relationships (ST)	3.12	.10	2.80	.18	.39**	.48**	1	.76**	.18**	
School responsiveness to violence										
4. Awareness and reporting (AR)	2.96	.10	2.59	.15	.57**	.69**	.53**	1	.00	
5. School safety problems (SP)	1.83	.28	1.56	.29	−.14**	.21**	−.11**	.19**	1	

Units of analysis consist of one cohort in one school. 6th-grade fall correlations are on the sub-diagonal, 8th-grade spring correlations are on the superdiagonal

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

Table 3 Significance tests between models

	Relational aggression		Relational victimization	
	Cross sectional	Longitudinal	Cross sectional	Longitudinal
Model 1: demographics and time	10,819.4	39,804.3	11,568.4	39,742.6
Model 2: individual-level effects	1,044.5***	2,913.6***	405.5***	1,164.8***
Change in pseudo R^2	.10	.07	.04	.03
Model 3: school-level effects	9.6	34.2*	8	33.4*
Change in pseudo R^2	0	0	0	0

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

addition of school-level indicators of school climate did not have a significant impact on relational aggression in the 6th grade. Over time, these variables together added marginal explanatory power to the model (see Table 3), but the contribution in terms of pseudo R^2 was miniscule, and none of the school-level predictors explained significant unique variance in either outcome.

Effects of Individual Beliefs

Individual beliefs favoring aggression were significantly and positively associated with relational aggression perpetration ($B = .62$, $p < .001$), as was hypothesized. The strength of this association varied by gender, as expected: Compared to females, males showed a somewhat weaker positive association between beliefs favoring aggression and relational aggression ($B = .48$, $p < .001$) (see Table 4). The positive effect of individual beliefs favoring aggression on relational aggression became stronger over the course of middle school ($B = .40$, $p < .001$), supporting our hypothesis; but contrary to expectations, change over time did not vary by gender. Individual beliefs favoring nonviolence was significantly and negatively associated with relational aggression at baseline ($B =$

Table 4 Effects of individual-level predictors, controlling for school-level predictors

	Cross sectional	Longitudinal
Relational aggression		
Individual beliefs about aggression		
Individual beliefs favoring aggression	.62***	.40***
Time*beliefs favoring aggression	–	−.12***
Gender*beliefs favoring aggression	−.14**	−.02
Individual beliefs favoring nonviolence aggression	−.08**	−.14***
Time*beliefs favoring nonviolence	–	−.02
Gender*beliefs favoring nonviolence	.02	.05*
Interpersonal climate		
Student–student relationships	−.16***	−.13***
Time*student–student relationships	–	−.02
Gender*student–student relationships	.03	.01
Student–teacher relationships	−.10***	−.11***
Time*student–teacher relationships	–	.00
Gender*student–teacher relationships	−.01	.00
Responsiveness to Violence		
Awareness and Reporting	−.01	−.07***
Time*awareness and reporting	–	.00
Gender*awareness and reporting	−.04	.01
School safety problems	.04**	.03*
Time*school safety problems	–	.01
Gender*school safety problems	−.01	.02
Relational victimization		
Individual beliefs about aggression		
Individual beliefs favoring aggression	−.06	−.07***
Time*beliefs favoring aggression	–	−.02
Gender*beliefs favoring aggression	.07	.08**
Individual beliefs favoring nonviolence aggression	-.01	.02
Time*beliefs favoring nonviolence	–	.02
Gender*beliefs favoring nonviolence	.00	.01
Interpersonal Climate		
Student–student relationships	−.23***	−.18***
Time*student–student relationships	–	.03
Gender*student–student relationships	.02	−.01
Student–teacher relationships	−.05	−.03*
Time*student–teacher relationships	–	−.02
Gender*student–teacher relationships	−.04	−.02
Responsiveness to violence		
Awareness and reporting	−.02	−.02
Time*awareness and reporting	–	.01
Gender*awareness and reporting	.02	.02
School safety problems	.08***	.08***
Time*school safety problems	–	−.01
Gender*school safety problems	.01	.01

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

−.08, $p < .001$), consistent with our hypothesis, and this relationship became stronger over time ($B = -.14$, $p < .001$). However, contrary to predictions, this relationship did not vary by gender.

Effects of Interpersonal Climate

Individual perceptions of positive student–student relationships was negatively associated with relational aggression perpetration in the fall of 6th grade ($B = -.16$, $p < .001$), consistent with our hypothesis. This relationship became increasingly negative over time ($B = -.13$, $p < .0001$) but did not vary by gender (see Table 4). Also supporting our hypothesis, students who perceived more positive student–teacher relationships also exhibited lower levels of relational aggression ($B = -.10$, $p < .001$); this relationship became stronger over the course of middle school ($B = -.11$, $p = .001$) but did not vary by gender.

Effects of Responsiveness to Violence

Individual perceptions of awareness and reporting were not significantly associated with relational aggression and there was no significant interaction with gender. Although the interaction between the time slope and this predictor was significant ($B = -.07, p < .001$), post hoc analysis revealed that by 8th grade, awareness and reporting was not significantly associated with relational aggression. Students who perceived higher levels of school safety problems exhibited significantly higher levels of relational aggression in the 6th grade ($B = .04, p < .001$), findings in line with expectations. This relationship became stronger during middle school ($B = .03, p < .05$) (see Table 4) and did not vary by gender.

Main Effects and Changes in Effects on Relational Aggression over the Course of Middle School

In models predicting relational victimization, none of the intervention effects were significant and the quadratic term was not significant. Individual level indicators of school climate added significant explanatory power to the model both in the fall of 6th grade and over time, in line with our expectations. Individual-level predictors explained an additional $R^2 = .04$ in relational victimization in the cross sectional model, and an additional $R^2 = .03$ in the longitudinal model. As with relational aggression, the school-level indicators of school climate did not have a significant impact on relational victimization in the 6th grade, contradicting our hypothesis. Over time, these variables together added marginal explanatory power to the model but none of the specific school-level climate variables explained unique additional variance (see Table 3).

Effects of Individual Beliefs

Individual beliefs favoring aggression were not significantly associated with relational victimization and did not vary by gender; although the interaction between time and perceived norms indicated significant change in the association over time ($B = -.07$, $p < .001$), post hoc analyses revealed that this construct was not significantly associated with relational victimization by the spring of 8th grade. Individual beliefs favoring nonviolence were not significantly associated with relational victimization and did not have a significant interaction by gender (see Table 4). These results were contrary to our hypotheses.

Effects of Interpersonal Climate

Students who perceived better relations with other students reported lower levels of relational victimization ($B = -.23$, $p < .001$), and this became increasingly true over the course of middle school ($B = -.18$, $p < .001$), supporting our hypothesis. This relationship did not vary by gender. Student perception of student–teacher relationships was not significantly associated with relational victimization and there was no significant moderation by gender, also contrary to our hypotheses (see Table 4).

Effects of Responsiveness to Violence

Perception of awareness and reporting at the individual level was not associated with relational victimization and did not vary by gender. Perceptions of school safety problems were positively associated with relational victimization ($B = .08$, $p < .001$), in line with our hypothesis, and this relationship became increasingly strong over time ($B = .08$, $p < .001$). This relationship did not vary by gender, contrary to expectations (see Table 4).

Discussion

Although the literature has highlighted important individual risk factors for relational aggression (Preddy and Fite 2012; Herrenkohl et al., 2009), few studies have examined how contextual factors—particularly norms around the use of aggression and violence, interpersonal relationships within the school environment, and school response to aggression and violence—may relate to relational aggression. Schools are among the most important developmental contexts for adolescents (Jessor 1993), and the literature has provided strong evidence that the school environment has a powerful effect on physical aggression (Henry et al. 2011). However, little is known about how factors in the school environment may influence relational aggression. This study was one of the first to examine the impact of both individual- and school-level risk factors related to the perpetration and victimization of relational aggression over the course of middle school.

Consistent with the literature on physical aggression, we find that perceptions of interpersonal school climate and school safety were related to both relational aggression perpetration and victimization. Individual beliefs regarding the use of aggression and nonviolence alternatives were also, not surprisingly, related to relational aggression perpetration. Thus, as expected, individual beliefs and perceptions of safety and the interpersonal environment were related to involvement in relational aggression.

However, unlike results found for physical aggression (Henry et al. 2011), school-level indicators of school climate were unrelated to youth victimization or perpetration of relational aggression above and beyond individual perceptions of the same school climate constructs. Social ecological theory has long emphasized that perceptions of the social environment are critical to understanding how individuals adapt to their social environment (Bronfenbrenner 1986). These results suggest that relational aggression appears to be more strongly related to individual beliefs and individual perceptions of the environment than aggregated indicators of the school environment.

Beliefs Favoring Aggression and Nonviolence

Consistent with previous findings (Kuppens et al. 2008; Onishi et al. 2011), we found that individual beliefs were associated with higher levels of relational aggression perpetration. These findings also extend previous research by suggesting that it is not just norms supporting violence, but also norms supporting nonviolence that are important for understanding risk. Having strong beliefs that there are nonviolent alternatives to violence is related to reduced risk for relational aggression. These findings suggest a potentially important point of intervention for programs aiming to reduce relational aggression.

Notably, we found that the relationship between beliefs about aggression and relational aggression was moderated by gender. The effect of individual beliefs supporting aggression on relational aggression was stronger for females than males. It is possible that beliefs supporting aggression have stronger effects on relational aggression for females compared to males because the behavior is more common among middle school females (Xie et al. 2003). Data have indicated that engaging in gender nonnormative forms of aggression (relational aggression for males and physical aggression for females) is associated with higher levels of psychological stress (Crick 1997). It

may be that the social sanctions against relational aggression are stronger for males than for females, and that beliefs supporting aggression must be stronger for males in order for them to act out relationally. This is an area that further research should explore.

Interpersonal Climate

Previous studies suggest that a more positive interpersonal climate, indicated here by student–student relationships and student–teacher relationships, are predictive of lower levels of physical aggression (Hartup and Stevens 1997; Hughes 1999). As expected, both student–student relationships and student–teacher relationships were predictive of lower levels of relational aggression. The relationship to victimization, however, diverged from our expectations. While positive student–student relationships were associated negatively with relational victimization, student–teacher relationships were not related to relational victimization.

One possible explanation for why positive teacher relations did not impact relational victimization is that teachers may view acts of relational aggression as normative (Casey-Cannon et al. 2001) and have more lenient responses to such acts (Bauman and Del Rio 2006). The differential effects of student–teacher relationships on relational aggression and relational victimization also may be due to these being individual-level predictors. School-levels of interpersonal climate measures could be expected to have similar effects on relational aggression and victimization levels because they reflect a system where aggression and victimization levels should correspond. At the individual-level, however, a student's perpetration of relational aggression could be influenced more powerfully by teacher relationships than the experience of relational victimization.

School Responsiveness to Violence

We hypothesized that higher levels of school responsiveness to violence, in this study conceptualized as awareness and reporting of violence and school safety concerns, would predict lower levels of relational aggression and victimization. Surprisingly, awareness and reporting were not related to relational aggression or victimization. One explanation for this lack of relationship is that teachers and students may not be as aware of and likely to report relational aggression as other forms of aggression. Studies have suggested that teachers often see relational aggression as normative and are less likely to intervene than with physical aggression (Craig et al. 2000). Additionally, many teachers may not be aware of relational aggression due to its covert nature (Crick and Grotpeter 1995). Students may perceive teachers as responding to other forms aggression that may be unrelated to their acts of relational aggression; in these cases, higher perceptions of awareness and reporting would not impact relational aggression.

In regard to school safety, as predicted, youth who perceived higher levels of school safety concerns exhibited higher levels of relational aggression and higher levels of relational victimization. These results support the argument that, parallel to physical aggression, students who perceive greater school safety problems are more likely to be victimized by and perpetrate acts of relational aggression (Astor et al. 2005). This is in line with research that shows that students who are exposed to violence in school experience higher psychological problems (Flannery et al. 2004), which may lead to increased behavioral problems.

Limitations and Future Directions

Although the present study demonstrates robust results concerning the relationship between perceptions of the school environment and the experience of relational aggression, these findings must be interpreted with consideration of the study's limitations. One limitation is related to the measures used in this study. This study relied on self-reported experiences of relational aggression and victimization, and some researchers have argued that self-reports of these acts may result in bias due to a desire to hide these experiences from adults (Bjorkqvist et al. 1992). However, studies have shown that teachers may not be aware of relationally aggressive acts when they are occurring (Card et al. 2008); for this reason, self-reports may be more valid than teacher reports of relational aggression and victimization. Future research should explore the effect of the school environment on relational aggression drawing on multiple informants for relational aggression. Additionally, our measure of norms favoring aggression is in reference to verbal and physical aggression, yet research has indicated that relational aggression may be particularly sensitive to norms related to specifically relational aggression (Werner and Nixon 2005; Werner and Hill 2010). Because of this, the present study may provide a conservative estimate of the effects of individual norms on relational aggression. Finally, a number of scales used in the present study had comparatively low levels of internal consistency. This would tend to increase Type II error, or the likelihood that our study would detect real effects.

Another limitation is that we drew on data from a prevention trial in which most youth in our study participated. Both the predictors and outcomes in this study may have been affected by the interventions. We attempted to address this limitation by including dummy variables for the interventions with the control condition as the

comparison. The fact that the direction of our effects did not substantially differ by intervention condition provides some evidence that our sample is not skewed by intervention participation. Related to the prevention trial, our sample was drawn from schools serving low-income populations and may not be representative of the broader population. Therefore, our results must be interpreted with caution and not assumed to be applicable to more affluent samples.

In spite of these limitations, our results collectively present evidence that unlike physical aggression, school-level indicators of school climate do not add to the explanation of involvement in relational aggression and victimization. Rather, it is perceptions of the school environment and individual beliefs that are related to risk. Students who hold beliefs favoring nonviolence, who perceive positive interpersonal relations in school, and who perceive their school to be safe are less at risk for victimization by and perpetration of relational aggression. Our findings that responsiveness to violence and school-level indicators of school climate did not affect relational aggression notably differed from the literature on physical aggression (Henry et al. 2011).

These results have implications for the prevention of relational aggression. While a recent review of programs targeting relational aggression (Leff et al. 2010) found that none met the high standards for efficacious set forth by the Society for Prevention Research (2006), some interventions have shown promise. A relatively brief school-based bullying prevention intervention, *Steps to Respect*, was correlated with a reduction in the prevalence of relationally aggressive acts (Low et al. 2010). *Steps to Respect: A Bullying Prevention Program*, a universal school-wide intervention specifically targeting relational aggression (Frey et al. 2005), aims to create positive norms through implementing school policies about bullying, to increase teacher responsiveness to relational aggression through teacher training, and to enhance healthy interactions among youth through teaching social skills. Our findings support interventions such as *Steps to Respect* that focus on creating a safer school climate through fair policies as well as improving the relationships between teachers and students and among students. With studies showing that from an early age, youth see relational aggression as more acceptable than physical aggression (Goldstein et al. 2002), targeting individual beliefs, particularly those that support the use of nonviolent alternatives to aggression, is important to changing rates of relational aggression.

The present study highlights the important role that perceptions of the school environment and individual beliefs about aggression play for relational aggression and victimization. Researchers in adolescent development have established the powerful influence of school climate on physical aggression (Henry et al. 2011; Kuperminc et al. 1997). This study provides evidence that, for relational aggression, it is perceptions of—and not school-level measures of—the school environment that matter: students' perceptions of school safety and interpersonal climate influence both victimization by and perpetration of relational aggression. Our finding that beliefs supporting nonviolence predicted lower levels of relational aggression over and above the influence of beliefs favoring aggression builds on previous work linking beliefs supporting aggression to relational aggression (Kuppens et al. 2008; Onishi et al. 2011) and represents a potentially new point of intervention. Together, these results underscore the promise of research that explores how perceptions of the social environment impact relational aggression and victimization.

Acknowledgments This research was funded by Grant # U49CE001296 from the Centers for Disease control and Prevention. We are grateful for the contributions of the originators of the Multisite Violence Prevention Project (MVPP), the talented and dedicated team that made this project possible. The members of the MVPP project include: Centers for Disease Control and Prevention, Atlanta GA: Thomas R. Simon, PhD; Robin M. Ikeda, MD, MPH (National Center for Injury Prevention and Control; Emilie Phillips Smith, PhD (Penn State University); Le'Roy E. Reese, PhD (Morehouse School of Medicine); Duke University, Durham NC: David L. Rabiner, PhD; Shari Miller-Johnson, PhD; Donna-Marie Winn, PhD (University of North Carolina—Chapel Hill); Kenneth A. Dodge, PhD (Center for Child and Family Policy); Steven R. Asher, PhD (Department of Psychology and Neuroscience); University of Georgia, Athens GA: Arthur M. Horne, PhD (Department of Counseling and Human Development Services); Pamela Orpinas, PhD (Department of Health Promotion and Behavior); Roy Martin, PhD (Dept. of Educational Psychology and Instructional Technology); William H. Quinn, PhD (Clemson University); University of Illinois at Chicago, Chicago IL: Patrick H. Tolan, PhD (University of Virginia); Deborah Gorman-Smith, PhD (University of Chicago); David B. Henry, PhD; Franklin N. Gay, MPH, Michael Schoeny, PhD; Virginia Commonwealth University, Richmond VA: Albert D. Farrell, PhD; Aleta L Meyer, PhD (National Institute on Drug Abuse); Terri N. Sullivan, PhD; Kevin W. Allison, PhD (all Department of Psychology).

Author Contributions CE conceived of the study, performed the statistical analysis, and drafted the manuscript; DGS participated in the design and coordination of the study and helped conceive of the study and draft the manuscript; DH participated in the design and coordination of the study, helped with the statistical analysis, and helped draft the manuscript. All authors read and approved the final manuscript.

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