5-2016

Effects of Bullying and Victimization on Friendship Selection, Reciprocation, and Maintenance in Elementary School Children

Marisa Lynn Whitley
University of Tennessee - Knoxville, mwhitle3@vols.utk.edu

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I am submitting herewith a thesis written by Marisa Lynn Whitley entitled "Effects of Bullying and Victimization on Friendship Selection, Reciprocation, and Maintenance in Elementary School Children." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

Laurence C. Elledge, Major Professor

We have read this thesis and recommend its acceptance:

Jenny Macfie, Todd M. Moore

Accepted for the Council:
<u>Carolyn R. Hodges</u>

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Maintenance in Elementary School Children

A Thesis Presented for the
Master of Arts
Degree
The University of Tennessee, Knoxville

Marisa Lynn Whitley
May 2016

Acknowledgements

Abstract

This study examined the effects of elementary school children's bullying and victimization experiences on their friendships over time. The majority of children experience acts of aggression or bullying before the end of elementary school, and bullying and peer victimization is associated with academic, social, behavioral, and psychological difficulties. This study used social networks analysis (R SIENA 4.0) to examine whether peer reports of forms of bullying and victimization (i.e., overt and relational) affect the likelihood of friendship selection, reciprocation, and maintenance in 2nd-4th grade children. Children ($N = 143$) from the Midwestern region of the United States completed a peer nomination inventory that included questions pertaining to their friendships and classmates' bullying behaviors and peer victimization experiences. Analyses compared unique models containing novel effects with traditionally tested selection-only models. Results from the unique effects models showed that friendship maintenance was less likely for children who engaged in overt bullying or experienced relational bullying. Selection-only models were not sufficient in detecting the maintenance effect, and instead showed only a decreased likelihood to receive friendship nomination for children who engage in overt bullying or experience relational victimization. Results point to friendship maintenance as a potentially important area for focused intervention in bullying and victimization.

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Chapter 1

Introduction and General Information

Developing and maintaining friendships is an important developmental task that has implications for children's social, emotional, and psychological health. The perpetrators and victims of bullying struggle in building and maintaining friendships with peers, which places them at significant risk for adjustment difficulties. Past research investigating the relation between peer victimization and friendship has primarily focused on how peer victimization affects friendship quality and the selection of friends (Banny, Heilbron, Ames, & Prinstein, 2011; Cavell, Elledge, Malcolm, Faith, & Hughes, 2009; Crawford & Manassis, 2011; Kawabata, Crick, & Hamaguchi, 2010; Parker & Asher, 1993; Shin, Hong, Yoon, & Espelage, 2014; You & Bellmore, 2012). The goal of the current study was to examine the effects of bullying and peer victimization on friendship development, reciprocation (e.g., both children name each other as friends), and maintenance (e.g., does the friendship persist), which address an important gap in the research literature. Examining the influence of both bullying and victimization on friendship paints a more comprehensive picture of the evolution of elementary school children's friendships over time compared to considering only one aspect of peer aggression at a time, and may shed light on important avenues for intervention that could deflect children off a path toward negative adjustment outcomes.

Bullying is a major public health problem in the United States and abroad (Benedict, Vivier, & Gjelsvik, 2015; Shin, 2010). Borrowing from prior research, bullying is defined as instrumental aggressive behavior that is perpetrated repeatedly with

the intention of harming another individual (Volk, Dane, & Marini, 2014). Peer victimization is a term often used to described children who are victims of peer aggression, bullying, or harassment. Bully-victim dyads are characterized by a power imbalance favoring the bully, but this imbalance often extends beyond the dyad to include bystanders, supporters, and others who witness but typically fail to intervene in the face of peer harassment (Salmivalli, 2010; Salmivalli & Voeten, 2004). A national telephone survey of 63,816 children ages 6-17 found 15.2% of children self-reported engaging in acts of bullying (Benedict et al., 2015). Prevalence rates for peer victimization vary depending on the definition, informant, measure, and age of children involved (Ladd & Kochenderfer-Ladd, 2002; Nicolaides, Toda, & Smith, 2002; Snell, MacKenzie, & Frey, 2002), but researchers consistently find age- or grade-related declines in the prevalence of peer victimization with estimates that 10-15% of elementary school students and 5-10% of middle or junior high school students are chronically bullied (Goldbaum, Craig, Pepler, & Connolly, 2003; Ladd & Kochenderfer-Ladd, 2002; Olweus, 1993; Salmivalli, 1999; Solberg & Olweus, 2003). Bullying and peer victimization are associated with academic, social, behavioral, and psychological difficulties (Fite, Evans, Cooley, & Rubens, 2014; Pedersen, Vitaro, Barker, & Borge, 2007). These outcomes place a serious burden on the mental health of individuals and the broader health care system.

Chapter 2

Literature Review

Friendship, Child Aggression, and Bullying

Research suggests that quality friendships during childhood can protect children from developing later psychopathology (Deutz, Lansu, & Cillessen, 2015; Padilla-Walker, Fraser, Black, & Bean, 2015). For example, friendships promote resilience to depressive symptoms (Schrepferman, Eby, Snyder, & Stropes, 2006), psychosocial risks often concurrent with social anxiety (Erath, Flanagan, Bierman, & Tu, 2010), and widespread psychopathology following sexual abuse (Marriott, Hamilton-Giachritsis, & Harrop, 2014). Peers often reject children who perpetrate bullying, resulting in fewer friendships or friendships of lower quality (Smith, 2004; Veenstra, Verlinden, Huitsing, Verhulst, & Tiemeier, 2013).

However, findings linking bullying to friendships are mixed when studies take into consideration the form of bullying. Researchers routinely distinguish between overt and relational bullying (Crick & Grotpeter, 1995). Overt bullying refers to acts of physical or verbal aggression (e.g., hitting, name-calling) whereas relational or indirect bullying refers to acts of aggression that are more covert in nature and often target children's social relationships or social standing (e.g., malicious gossip, social exclusion). There is some evidence that engaging in relational bullying has positive implications for friendships; Banny, Heilbron, Ames, and Prinstein (2011) found that engagement in relational bullying within a reciprocal friendship increased friendship quality longitudinally, perhaps because relational talk may be associated with increased self-

disclosure and positive reinforcement amongst friends. However, others have found that when prosocial behavior is low, both forms of bullying are negatively related to friendship quality (McDonald, Wang, Menzer, Rubin, & Booth-LaForceb, (2011); this indicates that children who engage in bullying and have prosocial skills deficits may have greater difficulty making and keeping quality friendships. More research is needed to tease apart the effects of aggression on children's peer relationships, which is a goal of the current investigation.

Peer Victimization and Friendship

A wealth of research has examined concurrent and prospective associations between bullying, peer victimization, and children's peer status, but relatively few studies have considered the effects of bullying and victimization on friendship. Friendships may be particularly important for children who are victimized. Previous studies have shown friendships can protect victimized children against future victimization and from the development of psychopathology and suicidality (Borowsky, Taliaferro, & McMorris, 2013; Fitzpatrick & Bussey, 2014; Ybarra, Mitchell, Palmer, & Reisner, 2015). However, victimized children are often less accepted or actively rejected by their peer group, and therefore may find it more difficult to develop or sustain friendships (Kawabata, Tseng, & Crick, 2014). Much of the existing work in this area has focused on the relation between friendship quality and peer victimization (Banny et al., 2011; Cavell et al., 2009; Crawford & Manassis, 2011; Kawabata et al., 2010; Parker & Asher, 1993; Shin et al., 2014; You & Bellmore, 2012), with far fewer studies examining friendship experiences of peer victimized children over time or the prospective link

between peer victimization and friendship selection (Dijkstra, Berger, & Lindenberg, 2011; Espelage, Green, & Wasserman, 2007; Sijtsema et al., 2010).

A number of researchers now turn to Social Network Analysis (SNA) to test longitudinal friendship selection effects (refer to Chapter 4 for a brief introduction to SNA). Espelage et al. (2007) used PNet software to test the concept of homophily—the idea that children who are similar tend to be friends—in a sample of 7th grade adolescents. Results from this study showed that: children are unlikely to form new friendships without behavioral or structural incentives; children who have a friend in common will become friends; children are more likely to form friendships with more popular children than with those who are more socially isolated; cliques are important; and children who bully tend to be friends with others who bully rather than with those who do not. SNA was also used to test friendship selection effects for physical and relational aggression along with network, gender, and social status effects in a sample of 5th and 6th grade Chilean children (Dijkstra et al., 2011). Findings from this study revealed physical and relational aggression homophily effects disappeared when network, gender, and social status effects were included in the model, thus identifying a potential overemphasis on bullying selection effects in studies that did not control for important covariates (Dijkstra et al., 2011).

Researchers have also examined longitudinal relationships between bullying and likeability in adolescents (Sentse, Kiuru, Veenstra, & Salmivalli, 2014) using Simulation Investigation for Empirical Network Analyses (SIENA) SNA software. Analyses revealed an inverse relationship between level of engagement in bullying behaviors and

peer-reported likeability. Results also showed a homophily effect for bullying behavior that was stronger at low levels of bullying and, unlike the findings of Dijsktra et al. (2011), this effect remained robust when popularity and gender selection effects were included in final models. Sentse et al. (2014) also found that adolescents were likely to increase their bullying behavior over time when they liked peers who were high in bullying, and decrease their bullying behavior over time when they liked peers who were low in bullying (i.e., a *quadratic influence* effect for bullying).

In summary, prior research points to a number of relationships between bullying and friendship selection. First, children who bully tend to befriend other children who perpetrate bullying, but gender and social status may attenuate these effects. Moreover, children tend to like classmates who bully less, and adolescents tend to change their levels of bullying over time to match that of their friends.

The Present Study

No studies using SNA have examined the effects of forms of bullying and victimization on the evolution of friendship over time. The current study addresses gaps in the literature by examining previously untested friendship trajectory effects using novel variables in SNA. By focusing on a younger age group (i.e., elementary school children versus adolescents), this study extends the understanding of the characteristics of peer ecologies downward and provides important information for the development of earlier bullying and victimization interventions.

The current study sought to examine the influence of bullying and peer victimization on the likelihood of (a) sending and receiving friendship nominations, (b)

friendship reciprocation, and (c) friendship maintenance over time. The first aim was to examine how peer nominations of overt and relational bullying and victimization influence the likelihood of receiving and sending friendship nominations. Based on prior SNA research demonstrating children who bully are less liked by peers (Sentse et al., 2014), it was predicted that the likelihood of receiving a friendship nomination will be lower for children who are nominated as engaging in overt and relational bullying.

Alternatively, it is anticipated that the effects of peer victimization on the likelihood of receiving a friendship nomination will vary as a function peer victimization form. Children tend to avoid classmates who are the targets of overt bullying (Smith, 2004), which creates a classroom or school context in which children who bully have fewer opportunities to interact with their classmates, thus placing them at a relative disadvantage for developing friendships. Therefore, it is predicted that peer nominations of overt victimization will be associated with a *decreased* likelihood of receiving a friendship nomination. In regards to relational victimization, there is some evidence that children who are victims of relational bullying tend to be popular (Peters, Cillessen, Riksen-Walraven, & Haselager, 2010). In light of this limited evidence, it is hypothesized that peer nominations of relational victimization will be associated with an *increased* likelihood of receiving a friendship nomination.

The second aim of the current investigation was to examine the relationship between forms of peer reported bullying and victimization and the likelihood that a friendship tie was reciprocated. Based on findings that children who bully or experience peer victimization struggle to sustain mutual friendships (Kawabata et al., 2010;

McDonald et al., 2011), it was predicted that peer nominations of overt and relational bullying and victimization would be associated with *decreased* likelihood of reciprocated friendship.

The final study aim was to ascertain the influence of peer reported forms of bullying and victimization on friendship maintenance over time. Previous research indicates children ages 11 to 14 link conflict to friendship dissolution (Azmitia, Lippman, & Ittel, 1999); it is possible this association extends downward to elementary school-aged children. Therefore, it is hypothesized that peer nominations of both forms of bullying and victimization will be associated with decreased friendship maintenance over time, due to the amount of conflict these behaviors create in relationships.

Chapter 3

Materials and Methods

Participants

Participants were 346 children recruited from eight schools located in the Midwestern United States. Schools were selected to represent the ethnic and socioeconomic diversity of the area. Fifty-five children were participating in a randomized-controlled trial testing the efficacy of a school-based mentoring program (Lunch Buddy Mentoring) and 291 children were the classroom peers of the children participating in the intervention trial. In the spring semester of year 1 (screening), teachers nominated 136 1st, 2nd, or 3rd grade children from their classroom who met a behavioral description (physical, verbal, relational aggression) of an aggressive child (Hughes, Cavell, Meehan, Zhang, & Collie, 2005). Parental consent forms were sent home with teacher-nominated children, and 84 parental consent forms were returned to school. Sixty-seven parents (78.8%) consented to allow their child to participate in the intervention arm of the study. Eligible for the intervention were teacher-nominated children who met the following criteria: (a) a *T* score of 60 or above on the Aggressive Behavior subscale of the Teacher Report Form of the Child Behavior Checklist (Achenbach, 1991a) or (b) a *T* score of 60 or above on the Aggressive Behavior subscale of the Parent Report Form of the Child Behavior Checklist (Achenbach, 1991b). Fifty-five participating children were both eligible for the intervention and randomized to the conditions of the intervention (28 = Lunch Buddy Mentoring; 27 = Waitlist control). In the fall semester of year 2, parental consent forms were sent home with the classmates of

children participating in the intervention arm of the study (513 children from 25 classrooms). 390 parental consent forms were returned to school, with 349 (68%) agreed to participate in a larger study examining the correlates of peer conflict, teasing, and bullying in schools.

Participants were 346 (181 girls, 159 boys) 2nd- through 4th-grade children (125 in 2nd grade, 133 in 3rd grade, and 88 in 4th grade) between the ages of 6 and 10 years old (M age at consent = 8.49 years, SD = .88 years). Racial makeup of the total sample was: 66.2% Caucasian American, 4.9% African American, 1.4% Asian American, 3.5% Hispanic, 4.0% American Indian, 15.6% multiracial, 0.3% other ethnicity, 4.0% missing. Median family income was $35,000-$50,000, with 32.7% receiving reduced price lunch and 40.2% receiving free lunch.

Social network analysis using SIENA is most reliable in cases where network completion rates are high; although research has recently suggested completion rates as low as 10-20% can be acceptable for obtaining reliable peer nomination data (Marks, Babcock, Cillessen, & Crick, 2013), individual consultation with a social network analysis expert resulted in the use of a conservative cut-off of 70% network completion for classroom inclusion in the current study (L. Echols, personal communication, June 30, 2015). Therefore, classrooms that had less than a 70% consent rate were excluded from the final analyses.

Participants included in the final sample were 143 (68 boys, 73 girls) 2nd- through 4th-grade children (46 in 2nd grade, 75 in 3rd grade, and 20 in 4th grade), from 9 classrooms, between the ages of 6 and 10 years old (M age = 8.38 years, SD = .74 years).

Racial makeup of the final sample was: 63.5% Caucasian American, 5.1% African American, 1.5% Asian American, 3.6% Hispanic, 5.1% American Indian, and 21.2% multiracial. Median income of the children's families was $25,000-$35,000, with 39.5% receiving reduced price lunch and 51.5% receiving free lunch.

Significant difference on demographic and study variables were examined between the analysis subsample and the whole sample. Analyses revealed no statistically significant differences between the groups on ethnicity, reduced lunch, or like most peer nominations. However, participants in the analysis subsample received more nominations at Time 1 ($F(1,204) = 5.54$, $p = .020$) and Time 2 for relational bullying ($F(1,204) = 7.21$, $p = .008$), and at Time 2 for overt bullying ($F(1,204) = 5.66$, $p = .018$) compared to the whole sample. Mean differences between the groups were small ($MD = .30, .39,$ and $.42$, respectively). Additionally, an examination of effect sizes revealed small group difference effects ($\eta^2 = .026, .034,$ and $.027$, respectively).

Procedure

Data were collected as part of a project testing the efficacy of a school-based mentoring intervention for children showing early signs of aggression as well as examining the correlates of peer conflict, teasing, and bullying in schools. The University Institutional Review Board approved this project. An informational parent consent form and demographic questionnaire was sent home in children's weekly folders and written parent consent and child assent were obtained for all study participants prior to participation. Peer reports of classmates' victimization and friendships were collected in early fall (September/October) and late spring (April/May) of project year 2 when

children were in the 2nd-, 3rd-, or 4th-grade. Children completed peer-report measures in class groups overseen by trained research assistants. For the peer nomination procedure, children used a numerical roster and items were read aloud; children nominated classmates by circling the number corresponding to their name. To minimize discussion about ratings, children were spaced, instructed to keep answers covered, and allowed to work on distracter activities (e.g., mazes) between sets of questions and for approximately 5 minutes after the completion of all questionnaires to minimize the possibility of discussion about ratings or nominations.

Measures

Demographic questionnaire. Demographic information was obtained to assess individual difference characteristics of children and their families (i.e., birth date, gender, ethnicity, languages spoken at home, family makeup, free/reduced lunch, and income).

Peer nomination inventory. A peer nomination procedure (Coie, Coppotelli, & Dodge, 1982) was used to assess overt bullying ("Who in your class bullies other children by hitting, pushing, threatening, or teasing them?"), relational bullying ("Who in your class bullies other children by gossiping about them, telling lies, or leaving them out of activities?"), overt victimization ("Who in your class gets hit, pushed, threatened, or teased by other children?"), relational victimization ("Who in your class gets gossiped about or left out of activities?"), and friendship ("Who in your class do you like the most?"). Children were provided with a numerical roster and nomination items were read aloud by trained graduate or undergraduate student research assistants performing the

assessment. Children were instructed to nominate up to three classmates for each item by circling the number corresponding to the student's name on the roster.

Data Analysis

Social network analysis (SNA) involves the study of relationships of people who interact within a system (i.e., network). The statistical method is concerned with the flow of information between people within a system, and what contributes to the movement of information from person to person. An important assumption made in SNA is that people and their actions are viewed as interdependent (Wasserman, 1994). In a setting like an elementary school classroom, this assumption is fitting; children and teachers interact in a highly collaborative setting. This method of analysis is concerned with the creation and dissolution of relationships (i.e., ties) between individual people within a network. In this study, networks were defined as individual classrooms within each school. Relationships between children were determined based on peer "like most" nominations. See Figure 1 for a visualization of friendship nominations within a single classroom from the current study[1].

The analyses for the current study were conducted using the Simulation Investigation for Empirical Network Analyses (SIENA) program, version 4.0 in R (R Core Team, 2012), using the following packages: sna (Butts, 2014), network (Butts, 2015), ergm (Handcock, 2014), texreg (Leifeld, 2013), and RSiena (Ripley & Snijders, 2013). SIENA is a statistical program that uses the Stochastic Actor-Oriented Model to complete the statistical estimation of models for repeated-measures of social networks

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[1] In Figure 1, circles denote individual students and lines denote friendship nominations. Arrows show the direction of the friendship nomination.

(Ripley, 2014). The Stochastic Actor-Oriented Model approach to social network

modeling assumes that changes in the network are "actor-based," or the decisions people

make are influenced by the aspects of the network itself and/or characteristics of

individuals (Ripley, 2014). SIENA estimates actor-based models longitudinally, based

on the idea that relationships within the network and the behaviors of people within the

network change concurrently over time (Ripley, 2014). SIENA model estimates are

reported as log odds ratios. To ease interpretation, however, model estimates were

converted to odds ratios. Moreover, for odds ratios less than 1, the inverse of the odds

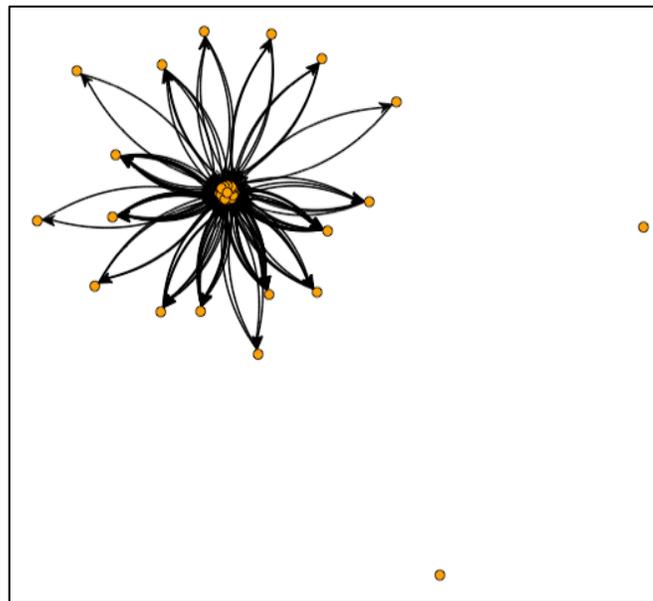ratio was reported in text and the interpretation of the finding was adjusted accordingly.

Figure 1. Sample Network Visualization

Network effects, also referred to as structural effects, are features of the network itself (Ripley, 2014). Density and reciprocity effects are two kinds of network effects. The density effect measures the overall concentration of ties in the network (Ripley, 2014). The density effect therefore represents the proportion of friendships relative to the total number of possible relationships. The reciprocity effect reflects the number of reciprocated ties in the network (Ripley, 2014), or the likelihood that any relationship within the network is mutual between both individuals. SIENA automatically includes the density and reciprocity effect in all models.

In the current study, models were built by adding effects incrementally (i.e., forward model selection), based on the increased likelihood of algorithm instability when many effects are included (Echols, 2015). Therefore, additional network effects were tested one-by-one and significant effects were included in all final models. Models also forward tested gender effects and controlled for participation in a bullying intervention, age, ethnicity (dummy-coded such that 1 = Caucasian, 0 = any other ethnicity), and income.

Selection effects are a group of effects based on the characteristics of individuals. These effects include: the ego effect, or the likelihood that an individual will endorse a relationship with another based on their own individual characteristic; the alter effect, or the likelihood another network member will endorse a relationship with an individual based on that individual's characteristic; and the similarity effect, or the likelihood that a relationship will exist between two individuals who are evenly matched on a characteristic (Ripley, 2014). Three functions—creation, endowment, and evaluation—

may be specified for any network or selection effect (Echols, 2015). The creation

function tests the creation of a new relationship that did not exist in the prior network

(Echols, 2015). The endowment function tests the maintenance of a relationship that

existed in the prior network (Echols, 2015). The evaluation function combines the

creation and endowment functions to reflect the general formation of a relationship in the

network (Echols, 2015).

Typically, actor-based models utilized in aggression and bullying research focus

on evaluation selection effects (e.g., Dijkstra et al., 2011; Sentse et al., 2014; Sijtsema et

al., 2010). In the current study, unique effects were tested to answer questions about

friendship maintenance and stability as effected by bullying and victimization. These

effects included: ego evaluation effects, alter creation effects, ego x alter interaction

evaluation effects, ego x alter x reciprocity interaction evaluation effects, and alter

endowment effects. The following is an example interpretation for the overt bullying

model: the ego evaluation effect tests the likelihood (log odds) that a child nominates a

classmate as a friend or maintains a friendship nomination over time based on their overt

bullying score. The alter creation effect tests whether overt bullying influences the

likelihood of receiving a new friendship nomination. The ego x alter interaction

evaluation effect tests whether overt bullying influences the likelihood that a child will

develop or maintain a reciprocated friendship. The ego x alter x reciprocity interaction

evaluation effect tests whether children's overt bullying is influenced by the total overt

bullying of their reciprocated friends. The alter endowment effect tests whether overt

bullying influences the likelihood that a friendship is maintained over time. To the author's knowledge, no published study has tested these effects.

Selection effects (i.e., ego, alter, and reciprocated evaluation effects) were examined alone in a separate series of models to compare this more common methodology with the results of this study's novel approach to modeling friendship effects. Four unique effects models and four selection-only effects models were constructed—one for each form of bullying and victimization—in order to examine differences in effects between the forms.

Chapter 4

Results and Discussion

Results

Descriptive Statistics and Correlations

At Time 1, associations among forms of bullying and victimization were significant (see Table 1), indicating that children who were nominated as participating in bullying were also more likely to be nominated as victims. At Time 2, we found similar associations; however, relational bullying and overt victimization were not significantly correlated, nor were overt bullying and relational victimization.

Descriptive network statistics focusing on network density showed that the proportion of friendships found in the networks out of the total number of possible friendships remained stable between Time 1 and Time 2 (see Table 2). The overall number of friendships in the network decreased slightly over time. The number of mutual friendships decreased over time, and the number of asymmetrical (i.e., one-sided) friendships increased. Between the time points, slightly more friendships ended than were created, with less than half of the total friendships maintained over the school year. Still, friendships tended to be relatively stable over time, as evidenced by a Jaccard index above .3 (Ripley, 2014).

Primary Analyses

The structural network effects for all four models (Tables 3 and 4) revealed that friendship nominations were likely to be reciprocated over time (positive reciprocity effect; overt bullying model: OR 2.18 = t(143) = 1.66, p < .01, relational bullying

Table 1. Correlations Between Main Variables ($N = 143$) at Time 1 (Below Diagonal) and Time 2 (Above Diagonal)

	1	2	3	4
1. Overt bullying	−	0.70**	0.17*	0.14
2. Relational bullying	0.79**	−	0.12	0.18*
3. Overt victimization	0.45**	0.33**	−	0.69**
4. Relational victimization	0.37**	0.29**	0.49**	−

Note. Proportion scores were used for all measures.
**$p < 0.01$, *$p < 0.05$

Table 2. Descriptive Statistics for Friendship Network ($N = 143$)

	Time 1	Time 2
Density	0.019	0.018
Average degree	2.62	2.60
Number of friendships	372	369
Mutual friendships	172	164
Asymmetric friendships	400	410
Missing fraction	0	0
Friendship changes		
Absence of tie (0 → 0)	19,460	
Creating friendship (0 → 1)	190	
Resolving friendship (1 → 0)	193	
Stable friendship (1 → 1)	179	
Jaccard index[a]	0.32	

Note. [a]Jaccard index shows the proportion of stable friendships out of the total number of created, resolved, and stable friendships.

model: *OR* 2.09 = $t(143)$ = 1.66, $p < .01$, overt victimization model: *OR* 2.10 = $t(143)$ = 1.66, $p < .01$, relational victimization model: *OR* 2.13 = $t(143)$ = 1.66, $p < .01$) and friends of friends tended to form friendships (positive *transitive reciprocated triplets* effect; overt bullying model: *OR* 1.19 = $t(143)$ = 1.66, $p < .05$, relational bullying model: *OR* 1.19 = $t(143)$ = 1.66, $p < .05$, overt victimization model: *OR* 1.20 = $t(143)$ = 1.66, $p < .05$, relational victimization model: *OR* 1.18 = $t(143)$ = 1.66, $p < .1$).

Table 3. Results of SIENA Bullying Analyses ($N = 143$)

	Estimation	S.E.	OR
Overt bullying			
Structural network effects			
Rate parameter	4.27**	(0.30)	71.5
Density	-1.78**	(0.24)	5.95
Reciprocity	0.78**	(0.16)	2.18
Transitive reciprocated triplets	0.17*	(0.088)	1.19
Indegree popularity (square root)	0.39**	(0.12)	1.47
Unique effects			
Alter creation	-0.08	(0.90)	1.09
Alter endowment	-2.17*	(1.04)	8.77
Ego evaluation	0.58	(0.48)	1.78
Ego x alter evaluation	-2.83	(6.44)	16.9
Ego x alter x reciprocity evaluation	-1.23	(11.5)	3.43
Selection effects			
Overt bullying ego	-0.085	(0.67)	1.09
Overt bullying alter	-1.74**	(0.67)	5.71
Similarity selection	-0.82	(0.55)	2.26
Relational bullying			
Structural network effects			
Rate parameter	4.28**	0.32	72.2
Density	-1.83**	(0.23)	6.25
Reciprocity	0.74**	(0.17)	2.09
Transitive reciprocated triplets	0.17*	(0.088)	1.19
Indegree popularity (square root)	0.42**	(0.12)	1.52
Unique effects			
Alter creation	-0.59	(1.20)	1.80
Alter endowment	-1.09	(1.05)	2.97
Ego evaluation	0.58	(0.56)	1.79
Ego x alter evaluation	4.45	(7.80)	85.3
Ego x alter x reciprocity evaluation	13.95	(15.17)	1143953
Selection effects			
Relational bullying ego	0.93	(0.71)	2.54
Relational bullying alter	-0.54	(0.67)	2.72
Similarity selection	0.31	(0.46)	1.37

** $p < 0.01$, * $p < 0.05$

Table 4. Results of SIENA Victimization Analyses (*N* = 143)

	Estimation	S.E.	OR
Overt victimization			
Structural network effects			
Rate parameter	4.27***	(0.32)	71.2
Density	-1.80***	(0.25)	6.06
Reciprocity	0.74***	(0.17)	2.10
Transitive reciprocated triplets	0.18**	(0.085)	1.20
Indegree popularity (square root)	0.41***	(0.13)	1.51
Unique effects			
Alter creation	1.33	(1.67)	3.80
Alter endowment	-0.79	(1.40)	2.20
Ego evaluation	0.87	(0.76)	2.38
Ego x alter evaluation	2.78	(10.5)	16.1
Ego x alter x reciprocity evaluation	-1.77	(31.4)	5.88
Selection effects			
Overt victimization ego	0.43	(0.89)	1.54
Overt victimization alter	-0.21	(0.80)	1.23
Similarity selection	-0.36	(0.35)	1.43
Relational victimization			
Structural network effects			
Rate parameter	4.23***	(0.31)	68.9
Density	-1.80***	(0.23)	6.06
Reciprocity	0.76***	(0.17)	2.13
Transitive reciprocated triplets	0.16*	(0.088)	1.18
Indegree popularity (square root)	0.40***	(0.12)	1.50
Unique effects			
Alter creation	-0.70	(1.41)	2.00
Alter endowment	-2.96**	(1.48)	19.23
Ego evaluation	0.41	(0.69)	1.51
Ego x alter evaluation	1.96	(10.4)	7.11
Ego x alter x reciprocity evaluation	14.08	(23.3)	1307987
Selection effects			
Relational victimization ego	0.66	(0.81)	1.94
Relational victimization alter	-1.63**	(0.80)	5.10
Similarity selection	0.39	(0.43)	1.47

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Children who were more popular in the network received more friendship nominations (positive *indegree popularity* effect; overt bullying model: *OR* 1.47 = $t(143)$ = 1.66, *p* < .01, relational bullying model: *OR* 1.52 = $t(143)$ = 1.66, *p* < .01, overt victimization model: *OR* 1.51 = $t(143)$ = 1.66, *p* < .01, relational victimization model: *OR* 1.50 = $t(143)$ = 1.66, *p* < .01). Other structural network effects were insignificant, and were therefore removed from final models. Age, gender, ethnicity, household income, classroom membership, and intervention status were not significant predictors of any bullying and victimization subtypes and were removed from final models.

Results of the unique effects model for overt bullying indicated that overt bullying was associated with a *decreased* likelihood of maintaining a friendship over time (negative *alter endowment* effect; *OR* 8.77 = $t(143)$ = 1.66, *p* < .05). In other words, children who received fewer overt bullying nominations were approximately 9 times more likely to maintain a friendship until the end of the school year. The selection-only model for overt bullying showed that children with fewer overt bullying nominations were about 6 times more likely to be nominated as a friend by classmates (negative *overt bullying alter* effect; *OR* 5.714 = $t(143)$ = 1.66, *p* < .01). All other effects for both overt bullying models were not significant, and no significant effects were found in either relational bullying model.

Results of the relational victimization models reflected the same characteristics as those of overt bullying. The unique effects model indicated that children with fewer relational victimization nominations were approximately 2 times more likely to maintain a friendship over time (negative *alter endowment* effect; *OR* 2.20 = $t(143)$ = 1.66, *p* <

.05). In other words, children who experienced relational victimization were more likely to lose existing friendships by the end of the school year. The selection model for relational victimization indicated that children with fewer relational victimization nominations were about 5 times more likely to be nominated as a friend by classmates (negative *relational victimization alter* effect; *OR* 5.10 = $t(143) = 1.66, p < .05$). All other effects of both relational victimization models were not significant, and no significant effects were found in either overt victimization model.

Discussion

The current study examined how bullying and victimization affect friendship selection, reciprocation, and stability over time. It was predicted that (1) selection would be affected in the following ways: overt and relational bullying and overt victimization would be associated with *decreased* likelihood of being selected as a friend, and relational victimization would be associated with *increased* likelihood of being selected by a friend. Also predicted was that (2) both forms of bullying and victimization would be associated with *decreased* likelihood of friendship reciprocation. Finally, it was predicted that (3) both forms of bullying and victimization would be associated with *decreased* friendship maintenance. Hypotheses were partially supported.

The unique effects models showed that bullying and victimization did not significantly impact friendship selection or reciprocation. This finding is at odds with the results from the selection-only model and suggests that friendship selection and reciprocation effects may be overstated when friendship maintenance effects are not included in the model. However, bullying and victimization were associated with a

decreased likelihood of friendship maintenance for two form-based behaviors: overt bullying and relational victimization. Children whose peers reported them as engaging in overt bullying or experiencing relational victimization at Time 1 were significantly less likely to maintain a friendship over the school year. These findings are consistent in part with past research on aggressive children's friendships; aggressive children do not have trouble obtaining friends, but are less able to maintain friendships over time (Ellis & Zarbatany, 2007). However, the same study found that victimized children struggle to form new friendships, and are less able to maintain existing friendships with non-victimized children (Ellis & Zarbatany, 2007). The latter finding was not supported by data from the current study. More research is needed in this area to better describe the effects of bullying and victimization on friendships selection and reciprocation when maintenance is considered concurrently.

The negative maintenance effect for overt bullying could be explained by the increased conflict introduced into friendships by bullying. Past research shows that high rates of conflict are negatively related to friendship stability (Poulin & Chan, 2010). In the case of relational bullying in friendships, the children who engage in these behaviors may be better able to manage the conflict it introduces into the friendship, as indicated by the potential for increased friendship quality when relational aggression is bidirectional in a friendship (Banny et al., 2011). This may account for the lack of a maintenance effect found for relational bullying. However, children who experience (but do not also perpetrate) victimization may be less adept at handling conflict appropriately (Champion, Vernberg, & Shipman, 2003), putting them perhaps at even greater risk for friendship

instability. This phenomenon may explain the negative maintenance effect for relational victimization in the current study.

The inability to maintain friendships can have deleterious consequences for children. Decreased friendship stability has been linked to lower intimacy and decreased interaction frequency with friends (Poulin & Chan, 2010). Therefore, it may be especially important for children to develop high quality friendships toward the goal of increasing friendship stability. Additionally, appropriate strategies for maintaining friendships may be sex-specific; research suggests that adolescent girls' use of confrontation and assertive strategies and boys' use of problem minimization leads to increased friendship maintenance (Bowker, 2004). The current findings highlight the potential importance of targeting friendship maintenance for children who engage in overt bullying or experience relational victimization.

When traditional selection-only models were compared with the unique effects models, selection-only models provided an incomplete picture of what occurred in children's friendships. Results of selection-only models revealed that overt bullying and relational victimization were associated with a decreased likelihood of *receiving* friendship nominations from peers, suggesting a deficit in the ability to develop friendships. This effect was not seen in the unique effects models, suggesting that when additional friendship effects are included, the friendship selection effect drops out in favor of the more specific question of friendship maintenance. In other words, children who engage in overt bullying or experience relational victimization are losing existing

friendships over time, and those friendships are not being replaced. This is distinctly different from these children simply failing to be nominated as friends.

Overall, the results point to friendship maintenance as a particular issue for children who engage in overt bullying and/or experience relational victimization. The null findings for the other hypotheses are also noteworthy, as they suggest that bullying and victimization may not impact friendship selection and reciprocation when maintenance effects are also included in analyses, thereby instilling a somewhat hopeful outlook for the success of bullying intervention programs targeted at fostering friendship maintenance in children.

Strengths and Limitations

The current investigation has several strengths. Data were collected using a short-term longitudinal design, which allowed for an examination of the effects of bullying and victimization on friendship trajectories over time. Moreover, studies using SNA to look at the effects of bullying and peer victimization on friendship networks have often focused on older children or adolescents. This study focused on a younger group of children, extending our understanding of these effects downward, which has the potential to inform intervention efforts targeting younger elementary school children.

There are also several limitations to the current study that are worth noting. Friendships were defined based on "like most" nominations," as opposed to direct friendship nominations. Although this method or a similar method has been used in past research assessing peer-nominated friendship (Bukowski & Hoza, 1989; Popp, Laursen, Kerr, Stattin, & Burk, 2008; Salmivalli & Isaacs, 2005), it is possible that some students

nominated children whom they like, but do not consider friends. Relatedly, children were only allowed to nominate three classmates whom they "liked the most." It is possible that relationship data was lost by using a limited nomination procedure (Gommans & Cillessen, 2015). In addition, classrooms with a network completion rate of less than 70% were excluded from analyses, which reduced our sample size, and as a result, power to detect model effects. Finally, the absence of a gender effect in the study of friendship is uncommon; most research on friendships demonstrates that children tend to select same-sex friends (Dijkstra et al., 2011; Poulin & Chan, 2010). It is possible that the current investigation was not appropriately powered to detect the gender effect.

Chapter 5

Conclusions and Future Directions

It is recommended that future studies replicate the unique study models using larger samples and a range of age groups. It is possible that some of the non-significant networks effects would become significant in models with larger samples and increased statistical power. Integration of testing of the selection, stability, and maintenance effects with other dimensions of friendship (such as overall quality, intimacy, frequency of interaction, etc.) would help provide a more comprehensive picture of children's friendships.

Overall, the results of the current study are hopeful for the friendships of children who engage in bullying or experience victimization. It is possible based on these results that bullying and victimization do not affect all facets of friendship, and particularly may not affect friendship selection and reciprocation. This study provides useful direction for the development of interventions for children who bully or experience victimization. Future interventions that focus specifically on teaching children adaptive strategies for maintaining existing friendships may be especially fruitful, as this seems to be a relative deficit for children who bully or are bullied at school.

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Vita

Marisa Whitley was born in Kingsport, Tennessee. She grew up in St. Paul, Minnesota. Marisa graduated with a B.A. in English from Grinnell College in 2009. She worked as a preschool teacher, study abroad program assistant in Madurai, India, psychometrist, research coordinator, and more until she began her graduate studies in Clinical Psychology at the University of Tennessee, Knoxville in 2014.