Aggression, Victimization, and Social Prominence

in Early Adolescent Girls and Boys

by

Naomi C. Z. Andrews

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Graduate Supervisory Committee:

Laura D. Hanish, Chair
Carol Lynn Martin
Kimberly A. Updegraff

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ABSTRACT

Although aggression is sometimes thought to be maladaptive, evolutionary theories of resource control and dominance posit that aggression may be used to gain and maintain high social prominence within the peer group. The success of using aggression to increase social prominence may depend on the form of aggression used (relational versus physical), the gender of the aggressor, and the prominence of the victim. Thus, the current study examined the associations between aggression and victimization and social prominence. In addition, the current study extended previous research by examining multiple forms of aggression and victimization and conceptualizing and measuring social prominence using social network analysis. Participants were 339 6th grade students from ethnically diverse backgrounds (50.4% girls). Participants completed a peer nomination measure assessing relational and physical aggression and victimization. They also nominated friends within their grade, which were used to calculate three indices of social prominence, using social network analysis. As expected, results indicated that relational aggression was associated with higher social prominence, particularly for girls, whereas physical aggression was less robustly associated with social prominence. Results for victimization were less clear, but suggested that, for girls, those at mid-levels of social prominence were most highly victimized. For boys, results indicated that those both high and low in prominence were most highly relationally victimized, and those at mid-levels of prominence were most highly physically victimized. These findings help inform intervention work focused on decreasing overall levels of aggressive behavior.

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TABLE OF CONTENTS

iii

LIST OF TABLES

LIST OF FIGURES

Chapter 1

INTRODUCTION

Aggressive behavior – behavior intended to harm others – is often problematic for children and adolescents in that it can be associated with social, academic, and behavioral maladjustment (Card, Stucky, Sawalani, & Little, 2008; Lee, 2009; Parker & Asher, 1987). For example, in a meta-analytic review of child and adolescent aggression, Card et al. (2008) found that those higher in aggression had more externalizing problems (such as emotional dysregulation, attention deficit hyperactivity disorder symptoms, and delinquent behaviors), and more internalizing problems (such as depression and anxiety). Others have found links between aggression and social incompetence, deficits in social skills, and peer rejection (Dodge, 1983). Both concurrently and predictively, aggression has been linked to academic problems (Eron & Huesmann, 1984; Huesmann, Eron, & Yarmel, 1987). In addition, aggressive adolescents are more likely than non-aggressive adolescents to be involved in delinquent behaviors and crime, both as juveniles and as adults (Eron & Huesmann, 1984; Parker & Asher, 1987; Roff & Wirt, 1984).

However, this is not always the case. It has also been suggested that aggression may be normative, or even beneficial to the aggressor (e.g., Hawley, 2003). There are social rewards that accompany some forms of aggressive behavior, and in some contexts, aggression is associated with positive adjustment outcomes and desirable characteristics (Hawley & Vaughn, 2003; Heilbron & Prinstein, 2008). This notion is supported by research indicating that some aggressive children and adolescents hold highly prominent social positions, display prosocial behaviors, and are socially skilled (Estell, Cairns, Farmer, & Cairns, 2002; Farmer, Estell, Bishop, O'Neal, & Cairns, 2003; Newcomb,

1

Bukowski, & Pattee, 1993). In their meta-analysis, Card and colleagues (2008) found that certain types of aggression were in fact associated with higher prosocial behavior, which included helping others, sharing, and cooperating. Hawley (2003) described a subset of aggressors that possess both positive and negative characteristics. For these adolescents, it was argued that using a combination of social skills allows them to succeed in controlling valuable resources within their peer group. Thus, some adolescents may, in fact, use aggression as a strategy to gain and maintain high social status and power within their peer group, thereby affording them access to material and social recourses, as well as internal rewards (Buss & Shackelford, 1997; Hawley, 2003; Savin-Williams, 1979).

This research leads to unnerving conclusions. That is, if adolescents are, at least in some cases, benefiting from their aggression, they may have less reason to decrease their aggression. As such, it is important to consider how aggression is related to social status. That is, examining the association between aggression and social status will help uncover how and under what circumstances adolescents may be benefiting from their use of aggression. In addition, because aggression and victimization are so related (in that they are inherently the same interaction), it is important to also understand the role of the victim and the victim's social status. In fact, the success of using aggression to gain and maintain status may be dependent not only on the aggressor's status and position within the peer network, but on the victim's status as well. As such, uncovering the association between social status and victimization is also essential.

This is particularly important given the negative consequences associated with being the victim of peer aggression. That is, although aggressive behavior may not be

2

uniformly negative for the aggressor, outcomes for victims of aggression are predominantly, if not completely, negative. Peer victimization occurs when one is exposed, often repeatedly, to negative actions from one or more other persons (Olweus, 1991). These negative actions involve an intentional infliction of injury, discomfort, or harm to the victim. Victimization may also involve an imbalance of power, such that the victim may have difficulty defending him- or herself. Victimization has also been found to be fairly common, with prevalence rates as high as 10-25% (Perry, Kusel, & Perry, 1998; Storch & Masia-Warner, 2004). Victimization predicts increases in internalizing behavior, depression, and loneliness, and decreases in empathy and peer acceptance (Goodman, Stormshak, & Dishion, 2001; Hodges & Perry, 1999; Ladd, Kocherderfer, & Coleman, 1996; Malti, Perren, & Buchmann, 2010; Morrow, Hubbard, Rubin, & McAuliffe, 2008; for an exception, see Kochel, Ladd, and Rudolph [2012], who found that depression predicted victimization and no evidence of a transactional model). In a review of the literature, Storch and Ledley (2005) found that victimization was associated with social anxiety, deficits in social skills, loneliness, academic difficulties, depressed mood, and low self-worth. Victimization can also have compounding and enduring effects on children's adjustment, even after the victimization has stopped (Biggs, Vernberg, Little, Dill, Fonagy, & Twemlow, 2010). Taken together, these studies clearly indicate the negative effects of being victimized by peers.

This highlights the need to examine associations between both aggression and victimization and social status. However, these associations are likely complicated both by form of aggression (i.e., relational and physical) and gender. That is, boys and girls tend to use different forms of aggression at different rates, and boys' and girls' use of

3

aggression is differentially accepted based on form (Card, Hodges, Little & Hawley, 2005; Grotpeter & Crick, 1996; Heilbron & Prinstein, 2008; Lee, 2009; Tomada & Schneider, 1997; Underwood, 2003). For instance, physical aggression is more frequently used by boys and is seen as gender normative for boys, whereas relational aggression may be used more by girls and as seen as more gender normative for girls (Crick, 1997; Crick & Grotpeter, 1995; Grotpeter & Crick, 1996; Lee, 2009). Thus, the use of different forms of aggression may be differentially accepted and rewarded based on an individual's gender. As such, adolescents may have differing success when using aggression to gain and maintain status, based both on their own gender and on the form of aggression being utilized. The same is true regarding victims. That is, social status may be related to victimization differently for boys and girls, and differently based on the form of victimization (Adler & Adler, 1995; Berger & Rodkin, 2009; Merten, 1997; Rodkin & Berger, 2008).

Thus, the goals of the current study were to identify the association between social status and aggression, and the association between social status and victimization (see Figures 1 and 2 for conceptual model). In addition, this study extends previous research by assessing both relational and physical forms of aggression and victimization separately, to examine whether these associations differed based on form of aggression and victimization. Finally, gender was assessed as a potential moderator of these associations.

The current study also adds to the extant literature in this area by operationalizing social status in terms of social prominence (visibility within the peer group), using social network analysis. This represents an advance over prior research because it better

4

represents the structure and dynamics of an adolescent's social environment than other measures of social status, which may only measure likability or reputational status. Social network analysis allows for a more in-depth understanding of social relations within a peer group by simultaneously considering multiple relationships (e.g., close friends, friends of friends, distant peers; Robins & Morris, 2007; Wasserman & Faust, 1994). As such, it provides a more nuanced representation of an adolescent's social status and position within the overall peer group hierarchy than do measures of popularity and likability. Few prior studies have utilized social network measures of prominence in exploring the relations between social status and aggression or victimization. Thus, there is little literature on social prominence per se to draw on. For this reason, the literature review will largely include studies that have conceptualized social status as popularity or likability.

The findings generated in this study help in our understanding of if and how adolescents benefit from their use of aggression, and in determining if these benefits depend on form of aggressive behavior and gender. This can inform intervention work focused on providing alternative, positive methods by which aggressive adolescents can gain the same benefits (e.g., increased status) they receive from their aggressive acts in a manner that is less harmful to others.

Chapter 2

LITERATURE REVIEW

Adolescents' Aggressive Peer Interactions as a Developmental Process

In his bioecological model of human development, Bronfenbrenner describes how the process of human development occurs (Bronfenbrenner & Morris, 2006). Bronfenbrenner contends that human development, in general, occurs as an individual interacts with his or her environment or social context (Bronfenbrenner & Morris, 2006). These interactions are termed proximal processes – reciprocal interactions between an active, human organism and other people, objects, or symbols, which occur on a regular basis and over an extended period of time. In other words, as individuals actively participate in, or interact within, their social context, they experience developmental changes in such areas as behaviors, skills, and cognitions (Bronfenbrenner & Morris, 2006). It is not, however, the objective properties of the social context that matter most for development; rather, it is the way in which the context is subjectively experienced by the individual that drives development.

In discussing development, Bronfenbrenner's bioecological model focuses specifically on children and adolescents (Bronfenbrenner & Morris, 2006). As children grow older, proximal processes become increasingly complex as their developmental capacities become more complex. One such proximal process is a child's interaction with his or her peers. Once children are in school, and particularly in the adolescent years, a great deal of time is spent in the company of same-age peers. Thus, repeated interactions with peers can act as the proximal process through which children's and adolescents' development occurs. Through such processes as peer pressure (e.g., Brown,

6

2004), peer modeling (e.g., McAlister, Ama, Barroso, Peters, & Kelder, 2000), or overt regulation of peer group norms (e.g., Hamm, Schmid, Farmer, & Locke, 2011), interacting with peers can affect adolescents' development in important and longstanding ways. In fact, as Bronfenbrenner's bioecological model suggests, peers can impact adolescents' development over a variety of outcomes, including enhancing cognitive skills (e.g., Vygotsky, 1978), affecting emotions (e.g., Goodman & Southam-Gerow, 2010), and impacting social behaviors (e.g., Martin & Fabes, 2001).

Although Bronfenbrenner's model discusses the development of behavior in general, and not aggressive behavior specifically, the processes involved can easily extend to the development of aggressive behavior. That is, repeated aggressive interactions between peers may be a central area through which children and adolescents develop. Aggressive behavior is important to understand because it is linked with some negative outcomes for the aggressor, but also because it is linked with negative outcomes for the victim (Dodge, 1983; Eron & Huesmann, 1984; Ladd et al., 1996; Morrow et al., 2008; Storch & Ledley, 2005). In fact, consistent with the idea of proximal processes, aggressive interactions occur between peers, often on a regular basis, and often over an extended period of time. Those aggressive exchanges that are persistent and long-lasting are most harmful to the victim (and potentially to the aggressor as well; e.g., Biggs et al., 2010). Thus, interactions with peers are a mechanism through which development occurs, and aggressive peer interactions can be seen as particularly important.

The Peer Context of Aggression

Aggressive interactions: Aggressors, victims, and peers as intertwined social partners. Aggressive interactions are very common in childhood and adolescence.

7

Studies typically report that 7-14% of early adolescents are aggressive (Pellegrini, Bartini, & Brooks, 1999; Rodkin & Berger, 2008). Unfortunately, these percentages may be even higher for victims, with anywhere from 10-25% of early adolescents and adolescents reported as victims of peer aggression (Perry et al., 1998; Storch & Masia-Warner, 2004). There is also a subset of children who are both aggressors and victims (Vaillancourt, Hymel, & McDougall, 2003). This may occur when a child or adolescent is both aggressor and victim. For instance, when one is aggressive to his or her peers, peers can respond with retaliatory aggression (Cicchetti, 2006; Leadbeater & Hoglund, 2009). Alternatively, an individual may act as aggressor in one interaction, and victim in another. Here, it may be, for example, that an adolescent is victimized, and then displaces his or her feelings of subsequent anger on another peer. Or, adolescents may be aggressive, which then leads peers to treat him or her as a victim at a later point in time (Olson, 1992). In any case, however, aggressive interactions involve – at minimum – two people: an aggressor and a victim. In fact, aggression can be seen as an inherently social behavior because it necessarily links the perpetrator(s) and target(s), who are involved in the same aggressive interaction.

In most cases, other peers are involved as well. Aggressive behaviors often occur in the presence of other peers (Salmivalli, Lagerspetz, Björkqvist, Österman, & Kaukiainen, 1996). For instance, Craig, Pepler, and Atlas (2000) observed that 85% of aggressive episodes in the classroom and 79% on the playground occurred in the company of peers other than the aggressor and the victim. Similarly, Salmivalli and colleagues described aggression as a social phenomenon or a group process (Salmivalli et al., 1996). In some instances, peers act as innocent bystanders, watching or being aware

8

of the attack but doing little to respond to it, which in and of itself can be passively reinforcing. In other instances, those peers can take a less passive role – actively inciting and encouraging the aggressor. Alternatively, peers can exhibit equally assertive behavior to defend the victim or dispute the attack. Because of peers' frequent presence in aggressive interactions, involved adolescents' social relationships are likely affected by how others perceive the aggressor, the victim, and the aggressive behavior itself. This underscores the importance of the peer context in relation to aggressive behavior.

As the studies above suggest, aggression is inherently a group process, as opposed to simply an interaction between two individuals. As such, it is likely that the peer group can influence an individual's involvement in aggressive behavior. For instance, the aggressive behaviors of an adolescent's friends or peers can influence his or her own participation in aggressive behavior (Poulin, Dishion, & Hass, 1999). Another way that peers can have an impact is through reinforcement of aggressive behavior. That is, when friends are accepting or supportive of aggressive behaviors in general, this can increase the amount of aggression an adolescent exhibits in the future. Alternatively, if peers denigrate the use of aggression or norms against aggression are made salient in the classroom, this can decrease subsequent levels of aggression (Henry, Guerra, Huesmann, Tolan, Van Acker, & Eron, 2000; Huesmann & Guerra, 1997). Through processes such as peer modeling or reinforcement, peers can strongly impact an individual's level of aggression. Thus, it seems that social interactions and relationships with peers are a central mechanism through which adolescents participate in and experience peer-directed aggressive behaviors.

Social status and aggressive behaviors. The research reviewed above suggests that the peer context is of particular importance to aggressive behaviors. One's position within the peer group hierarchy is an important aspect of the peer context. Adolescents desire to be high in status and popularity, even more so than being high in achievement and success (Eder, 1985; Merten, 2004; Rosenberg & Simmons, 1975). This may be because being high in status increases an individual's capacity to influence peers and have power and control over others (Faris & Felmlee, 2011; Hawley, Little, & Pasupathi, 2002). Status hierarchies allow for certain individuals to be in powerful leadership positions, and it forces others to be dependent on these high status peers (Freeman, 1979; Wasserman & Faust, 1994). As such, popularity can be used as power (Merten, 1997). In fact, Faris and Felmlee (2011) suggested that high status provides individuals the power to pursue their own goals. Therefore, becoming dominant and connected in the peer group is highly sought after and offers adolescents the ability to shape behavioral norms and gain influence over their peers.

Because status is so highly sought after by adolescents, it is important to understand how aggression and victimization are related to one's place within the peer group. For instance, dominant, high status adolescents are well connected, powerful, and have the ability to shape group behavioral norms. This is particularly salient in adolescence, when having friends and gaining popularity within the peer group is highly valued and desirable (Merten, 2004). Thus, gaining high status is a highly sought after position within the peer group, and engaging in aggressive behaviors can either help or hinder this process. In fact, an individual's reputation as an aggressor or a victim has

been found to be related to their social status within the peer group (Hodges & Perry, 1999; Pellegrini et al., 1999).

Specifically, social status may be tied to aggressive behaviors in that the competition to establish or increase status may motivate the use of aggression against particular other members of the peer group. Olweus' (1978) definition of bullying behavior includes a power imbalance, wherein an aggressor chooses a particular victim that is less powerful than himself (or herself, although Olweus' work only involved boys). This power may be psychological or physical in form. Alternatively, an aggressor and victim may be relatively equal in power, as each vies with one another to gain increased power (e.g., Merten, 1997). Thus, power seems to be a key feature of the relationship between aggressor and victim. That is, aggression may be used as a strategy to increase one's social status and gain power and dominance within the peer group. Relatedly, those who are victims may have limited ability to gain status and to influence their peers. In fact, certain children and adolescents may be victims simply because they lack the support or recourse to defend themselves against their aggressor. Therefore, social status is principally important for both aggressors and victims.

Evolutionary Theories: Aggression as a Strategy to Gain and Maintain Status

The idea that social status is intricately tied to adolescents' involvement in aggression can be supported by evolutionary theories of resource control and dominance (Buss & Shackelford, 1997; Hawley, 2003; Hawley et al., 2002). These evolutionary theories explore how a potential function or purpose of aggressive behavior may be to change social status. Thus, these theories can be used to explain why adolescents use aggression, particularly in relation to their quest for gains in status and dominance.

11

Aggression can be thought of as evolutionarily adaptive. Indeed, there are several adaptive problems (i.e., inflicting costs on same-sex rivals, obtaining resources from others, negotiating status hierarchies) to which aggression may be the evolved solution (Buss & Shackelford, 1997; Wilson & Daly, 1984). For instance, one of the reasons that humans use aggression is to gain access to resources that are coveted by others (Buss & Shackelford, 1997). This idea is more fully developed by Hawley's resource control theory. Resource control theory states that humans need to be participating members of a larger social group, because the presence of other group members facilitates acquisition of certain resources that would be difficult or impossible to obtain on one's own (Hawley, 2003; Hawley et al., 2002). However, just as the group aids in the acquisition of resources, conflict within the social group develops, as group members must compete for the resources they have just obtained. These resources may range from material resources, such as preferred objects or seats in a classroom (Savin-Williams, 1979), or social resources like attention, romantic partners, or social options on the weekend (Faris & Felmlee, 2011). These may even be internal rewards, such as pleasure and self-fulfillment (Hawley, 2003), in that being dominant is, in itself, highly satisfying and sought after, even regardless of material rewards. Because these resources are often limited, conflict and competition within the group is common. Hawley and Little (1999) explain that in order to be successful and survive in a social world, one must learn to gain personal resources, and aggression may be a way to do this.

As discussed above, in peer groups, social status itself is an extremely valuable and coveted resource. Thus, aggression may be one strategy used to gain access to this resource. That is, aggression may be used to increase one's power within a social

hierarchy (Buss & Shackelford, 1997). For example, within street gangs, those who are particularly aggressive (e.g., beating rival gang members) experience an increase in status within the gang (Campbell, 1993). For adolescents, fighting and physically threatening others, as well as using harsh verbal directives, are often used to assert dominance and rise to the top of the hierarchy (Savin-Williams, 1979). Particularly in times of transition (e.g., elementary school to middle school), physical bullying is a common way that adolescents manage dominance relationships (Pellegrini & Bartini, 2000; Pellegrini & Long, 2002). This is because adolescents often self-organize into a system of dominance, differentiating themselves based on relative levels of power (Pellegrini, 2001; Savin-Williams, 1979). Thus, when entering a new school with new peers, adolescents must reorganize their system of dominance, and may do so by increasing their aggression. When organized into a dominance hierarchy, those at the top are the ones with the evolutionary advantage, and have access to valuable and scarce resources. Thus, it seems that aggression is not only evolutionarily adaptive, but also may be used as a strategy to increase or maintain status, and to gain control over coveted resources.

However, there is also a great body of research indicating that aggression is maladaptive, and is associated with mental health difficulties in several areas. For instance, Kaltiala-Heino, Rimpelä, Rantanen, and Rimpelä (2000) found that aggression was associated with anxiety, depression, and psychosomatic symptoms, as well as excessive drinking and substance use. For girls, aggression was also associated with eating disorders. In a meta-analysis, Cook and colleagues found that bullies had both externalizing and internalizing problems, and held negative self-beliefs (Cook, Williams, Guerra, Kim, & Sadek, 2010). Children and adolescents who use aggression often have

adjustment problems and have low self-control (Densen, DeWall, & Finkel, 2012; Dodge, 1983; Newcomb et al., 1993). Even when considering only relational aggression, in a review of the literature, Heilbron and Prinstein (2008) found that relational aggression was associated with anger to provocation, low empathy, high levels of anxiety, and negative self-representation.

Aggression is also associated with maladaptation in social and academic domains. Studies report that some aggressive children have few friends and are rejected from their peer groups (Atlas & Pepler, 1998; Pellegrini et al., 1999). In Cook and colleagues' meta-analysis, it was found that bullies had poor social problem solving skills and were likely to be negatively influenced by their peers (Cook et al., 2010). Indeed, Parker and Asher (1987) suggested that those who are aggressive have limited opportunity to be involved in positive interactions with peers and thus have less opportunity to be socialized to learn social competencies and cognition. Eron and Huesmann (1984) similarly view aggression as a maladaptive problem-solving style, learned in childhood and persisting into adulthood. In fact, they found that aggression at age eight predicted social failure, psychopathology, low prosocial behavior, and low social attainment 22 years later. Similarly, aggression has been found to be related to poor academic functioning, and it has been suggested that aggressive behavior itself may impede social interactions with peers and teachers that facilitate academic and intellectual functioning (Cook et al., 2010; Farmer, Estell, Leung, Trott, Bishop, & Cairns, 2003; Farmer & Xie, 2007; Huesmann et al., 1987).

Therefore, it seems that there are certainly some aggressive individuals for whom aggression is not evolutionarily adaptive, and who are not successful in using aggression

to increase or maintain high status. It has been suggested that, for these adolescents,

aggression may be used in reaction to problems at home or with other peers (Ellis &

Zarbatany, 2007). Alternatively, this behavior may unite rejected adolescents and

enhance a sense of behavioral conformity in lower status groups or impress other low

status, aggressive friends (Ellis & Zarbatany, 2007; Estell et al., 2002). Another

possibility is that these low status, aggressive adolescents are using their aggression

defensively, to retaliate or ward off aggression from peers (Estell et al., 2002).

Moreover, using a social goals perspective, Erdley and Asher (1999) described how some

aggressive individuals are using their aggression to pursue maladaptive social goals such

as retaliation or avoidance, and that behavior is then reinforced such that aggression

persists over time. Thus, it seems that although some aggressive adolescents are well

liked and popular, others are socially marginalized. This differential success suggests

that there may be several factors involved in determining the effectiveness of a particular

adolescent's aggression in gaining or maintaining status.

The role of gender and forms of aggression. The form of aggression used and

the gender of the aggressor are two of these potential factors. Gender is intricately tied to

both aggression and the concept that aggression is evolutionarily adaptive. One of the

most commonly cited purposes of human aggression is to cause damage to same-sex

rivals. This is most often seen in terms of male-male competition, wherein males vie for

access to valuable females, using aggression to negotiate status and power hierarchies,

and to inflict costs on other males (Buss & Shackelford, 1997). Even in chimpanzees,

males show physical aggression against other males in order to compete for status and

mates (Wilson & Wrangham, 2003). Although intrasexual competition is typically found

among males, female-female competition also occurs, based on the availability of males or the benefits that are provided by those males (Rosvall, 2011). Thus, an individual's gender plays a large role in how and why they may be involved in an aggressive interaction.

This seems to be the case for children and adolescents as well. In fact, girls and boys are often reported as using aggression at different rates. It has been found that, across all ages, more aggression is displayed by boys than by girls (David & Kistner, 2000; Grotpeter & Crick, 1996; Heilbron & Prinstein, 2008; Lee, 2009). However, this does not mean that girls do not engage in aggression, nor does it mean that aggression does not impact their social and emotional development (Estell, Farmer, Pearl, Van Acker, & Rodkin, 2008). In fact, this gender difference may be explained by examining different forms of aggression. Aggressive behavior is often described as coming in two forms (e.g., Werner & Crick, 2004). Physical aggression refers to observable displays of aggression, such as hitting, kicking, or pushing (Card et al., 2005; Heilbron & Prinstein, 2008). Relational aggression is a covert type of behavior intended to disrupt others' social relationships or to manipulate others' peer acceptance through the use of gossip, social exclusion, or withholding friendships (Card et al., 2005; Crick & Grotpeter, 1995; Merten, 1997). Thus, although boys typically display more physical aggression than do girls (Grotpeter & Crick, 1996; Lee, 2009; Heilbron & Prinstein, 2008), girls are in fact more likely to use relational aggression than physical aggression to harm a victim (Heilbron & Prinstein, 2008). Some researchers have even found that girls engage in more relational aggression than boys (Crick, 1997; Crick & Grotpeter, 1995; Lancelotta & Vaughn, 1989; Salmivalli, Kaukiainen, & Lagerspetz, 2000), although others have

16

found more equal levels of relational aggression used by boys and girls (Pakaslahti & Keltikangas-Järvinen, 2000; Willoughby, Kupersmidt, & Bryant, 2001). Others still have found that boys engage in more relational aggression than do girls (David & Kistner, 2000). In a recent meta-analysis on the gender differences in aggression, Card and colleagues (2008) reported that relational aggression is more commonly displayed by girls than by boys, but that the difference is trivial in magnitude.

In any case, however, there do seem to be important gender differences in boys' and girls' involvement in aggression, which depend in part on the form of aggression used. In addition, how aggression is perceived may depend both on the aggressor's gender, and on the form of aggression used. For example, Nelson and colleagues suggested that, for males, physical aggression itself is seen as a reputational indicator of dominance and sexual prowess (Nelson, Robinson, Hart, Albano, & Marshall, 2010). The high status reputation that accompanies physical aggression is not echoed for females (Tomada & Schneider, 1997). Thus, for girls, using physical aggression may in fact decrease status and dominance because of the societal taboos against displays of physical aggression in girls (Tomada & Schneider, 1997). On the other hand, relational aggression can be seen as gender-normative for girls (Heilbron & Prinstein, 2008; Underwood, 2003). In fact, research has found that engaging in gender normative aggression (physical as normative for boys, relational as normative for girls), is less harmful in terms of maladjustment outcomes (Crick, 1997; Phillipsen, Deptula, & Cohen, 1999).

This suggests that engaging in physical aggression may be detrimental to girls' relationships, because it is seen by peers as gender non-normative (Crick, 1997; Estell et

17

al., 2008), whereas engaging in relational aggression may be less detrimental to girls'

relationships and more effective in gaining and maintaining status. In support of this,

Rose and colleagues (Rose, Swenson, & Waller, 2004) found that for girls, but not for

boys, relational aggression predicted increased peer-perceived popularity over time.

Additionally, Xie and colleagues (Xie, Farmer, & Cairns, 2003) found that girls who

were high in relational aggression were higher in social network centrality than were non-

aggressive girls. Thus, girls, in particular, may gain power and dominance in the social

hierarchy by utilizing relational aggression. Engaging in physical aggression may be less

detrimental for boys than for girls. In support of this, Maccoby (1998) described how

boys use and support physical aggression with other boys in order to establish and

maintain male dominance hierarchies, which are more well-defined than girls'

hierarchies. Similarly, in a sample of African American children and adolescents, boys

high in physical aggression had higher levels of social network centrality than non-

aggressive boys, while no relation was found for boys' relational aggression and

centrality (Xie et al., 2003). In addition, Farmer and Rodkin (1996) found that for boys,

but not for girls, physical aggression was associated with high centrality.

Taken together, this suggests that although adolescents may use aggression to

increase and maintain their status in the dominance hierarchy, this may be more effective

for those engaging in gender normative forms of aggression. Therefore, it may be that

relational aggression is a strategy used by girls to successfully gain status, and physical

aggression a strategy used by boys for the same purpose, because they are seen by peers

as gender normative forms of aggression. Conversely, it can be surmised that adolescents

18

who engage in gender non-normative forms of aggression are likely to be rejected by their peers and to lack the social skills necessary to increase their status.

In summary, evolutionary theory and resource control theory can be posited as explanations for the use of aggression in peer groups. That is, based on these theories, adolescents may use aggression against their peers in order to negotiate status hierarchies and to gain access to the resources enjoyed by those occupying higher status network positions. However, some aggressive adolescents remain low in status. These disparate findings may be explained by considering the combination of form of aggression and gender. Specifically, the use of gender normative forms of aggression (relational for girls, physical for boys; Crick, 1997; Heilbron & Prinstein, 2008) may be successful in gaining and maintaining high status, while gender non-normative forms may be less accepted by peers, thus indicating low social skills and low status.

Aggressive Interactions: The Role of Status in Determining Who is Victimized

As discussed above, an aggressor and victim are intricately linked in their involvement in aggressive behavior. In addition, although aggression may be either a premeditated or reactive act, an aggressor can, in a sense, choose upon whom to inflict his or her aggressive acts. However, aggressing against some adolescents may lead to increases in status when it involves certain victims, but not others. That is, the social status of the victim may also affect how effective aggression is in increasing an aggressor's status. As such, for aggressive adolescents to be successful in using aggression to gain or maintain status, it may be that they need to aggress against particular peers. For instance, researchers have suggested that a power imbalance exists between aggressors and victims, with victims being of lower status than their aggressors

19

(particularly for physical aggressive; Card & Hodges, 2008; Card et al., 2005; Olweus, 1978). On the other hand, Adler and Adler (1995) described how some high status early adolescents (4th to 6th grade) aggressed against both low and high status peers in order to maintain their highly prominent, dominant positions in the social status hierarchy. That is, they reported that adolescents directed aggression towards high status members of their own peer groups, and towards lower status adolescents outside of their group, in order to foster compliance and fear among both group members and outsiders. Therefore, the use of aggression as a strategy to maintain dominance over the social hierarchy may be successful only to the extent that adolescents are using aggression against victims of a certain social status (although whether this is high or low status peers remains unclear, due to conflicting research). It is possible that the use of aggression against the wrong 'type', or status, of peer may not result in the same successes in gaining and maintaining social status. Therefore, the social status of the victims of aggression is equally important in terms of the likelihood that aggression is used to maintain or increase social status.

As alluded to above, it remains unclear exactly who aggressive adolescents should aggress against in order to maximally gain and maintain high social status or power within the dominance hierarchy. On one hand, high status adolescents may aggress against those who are low status, in order to boost their own status above that of their peers. For example, aggressing against low status peers may keep them from trying to 'fight back' (Adler & Adler, 1995), which preserves the aggressors' dominance and control. Evolutionary theory would concur; to procure valuable resources, individuals should aggress against those against whom they have the best chance of being successful

(Buss & Shackelford, 1997; Wilson & Daly, 1984). As such, aggressors may choose to target low status victims, who lack friends, to minimize potential retaliation the aggressor may face from supporters of the victim (Hodges, Boivin, Vitaro, & Bukowski, 1999). Similarly, Rodkin and Ahn (2012) argued that high status individuals will aggress against low status peers in order to maintain a strong hierarchy within the classroom, with the aggressor solidly at the top. In fact, these notions are supported by research showing a negative association between victimization and social status (Boulton, 1999; Hodges & Perry, 1999; Nelson et al., 2010; Perry et al., 1988). Thus, it may be that low status adolescents are most highly victimized.

On the other hand, aggressors may feel the need to compete with peers who are more similar to themselves in status, in order to establish or re-establish a higher place in the dominance hierarchy. For instance, Adler and Adler (1995) described how high status group leaders would frequently aggress against other high status group members, in order to maintain their own personal dominance, even within a high status group. That is, when adolescents are in similar status positions, they may compete more with one another in order to advance their position above that of their peers (e.g., Dijkstra, 2012). Therefore, higher status, aggressive adolescents may be aggressing against equally high (or higher) status peers, in order to fight for that top position within the dominance hierarchy. In fact, in accordance with evolutionary theory, aggressing against higher status peers may be more beneficial to an aggressor, in that it allows for the maximum gain in resources and status. In Merten's ethnographic study (1997), it was found that high status girls aggressed internally against other high status peer group members, rather than against low status outsiders. In another study, victims were perceived by their peers

21

as being average in popularity (Rodkin & Berger, 2008). Thus, adolescents who are high in social status may also be frequently victimized. These conflicting accounts suggest that more research should be done to clarify these relations, and to ascertain who are the adolescents being victimized.

The role of gender and forms of victimization. As with aggression, a victim's gender, as well as the form of victimization used, may be important. This is because, for one, research on gender differences in victimization is contradictory. Many researchers have found that girls and boys are victimized equally (Perry et al., 1988; Veenstra, Linderberg, Zijlstra, De Winter, Verhulst, & Ormel, 2007). However, some researchers have found that girls are more likely to be victimized (Berger & Rodkin, 2009), and others have found that boys are more likely to be victimized (Maccoby & Jacklin, 1974). In addition, some gender differences in relation to status have been found, such that, although boys who were victimized were low in status, there were female victims who, in fact, had high status (Berger & Rodkin, 2009; Rodkin & Berger, 2008). However, this was only the case when examining the victims of male aggression.

Unfortunately, most empirical studies that examine gender differences in victimization look only at physical victimization or bullying behavior in general, and do not differentiate by relational versus physical forms of victimization (Boulton, 1999; Hodges & Perry, 1999; Perry et al., 1988). In one study, Rodkin and Berger (2008) found that there were both high status girls and low status boys being victimized by boys. Because boys typically engage more in physical than relational aggression (Lee, 2009), it may be that both high status girls and low status boys are the victims of physical aggression. However, this may not be the case when girls are the aggressors. Thus, the

22

associations between status and physical victimization for girls and boys are not completely clear.

There has also been very little research with regards to social status and relational victimization. In ethnographic studies, researchers have suggested that low status girls are relationally victimized by high status girls in attempts to maintain dominance and exclusivity in high status peer groups (Adler & Adler, 1995; Merten, 1997). That is, exclusion and other relationally aggressive behaviors would make less popular girls fearful of the high status group, so that they would not rally and 'fight back' against the high status peers. In addition, researchers suggested that popular girls may aggress against other high status peers in order to maintain their personal dominance among their high status peers (Adler & Adler, 1995; Merten, 1997). Thus, there may be both high and low status girls who are relationally victimized. Research on boys' relational victimization in adolescence is particularly lacking. Thus, although hypotheses cannot be made, the current study can help identify the association between social status and relational victimization for boys.

Measurement of Social Status

The extant research on aggressive behavior and social status has employed a variety of methods to measure social status. One of the earliest methods used was sociometric nominations of status (Dodge, 1983; Dubow, 1988; Nelson et al., 2010; Newcomb et al., 1993). In this, children are asked to nominate peers that they like most and least. These nominations are then combined to categorize children into five groups. For instance, those with many like most nominations and few like least nominations are labeled as 'popular', and those with few like most and many like least nominations are

labeled as 'rejected'. However, several studies have distinguished between being well

liked and in the sociometric category of 'popular', and being nominated as popular by

peers (known as perceived popularity; e.g., LaFontana & Cillessen, 1999; Parkhurst &

Hopmeyer, 1998). For instance, there are highly aggressive children who have friends

and are popular within the peer group as a whole, but who are not well liked. Eder

(1985) described how those lower in the peer hierarchy often feel resentment towards

those at the top of the hierarchy (and thus would not nominate them as most liked) but

still want to be friends with them in order to increase their own social position.

As such, several studies have examined the association between aggressive

behavior and status using peer nominations of perceived popularity (Peeters, Cillessen,

Riksen-Walvaren, & Haselager, 2010; Peeters, Cillessen, & Scholte, 2009). Whereas

sociometric nominations concern which individuals are liked and disliked, perceived

popularity refers more to a child's global reputation of being 'popular' (Prinstein,

Rancourt, Guerry, & Browne, 2009). However, this method typically involves asking

only one question: "Name your classmates who are most popular". Popularity is

typically not defined; thus adolescents may have different conceptions of what being

'popular' means.

A limited number of studies have also utilized direct observations to measure

status and peer association (Fujisawa, Kutsukake, & Hasegawa, 2008; Strayer & Santos,

1996). However, these studies were conducted with much younger children. In fact,

with adolescents, direct observations unfortunately cannot easily take place in several

settings in which adolescents interact (e.g., buses, hallways, restrooms; Gest, Farmer,

Cairns, & Xie, 2003). This is also the case when using teacher nominations of

popularity, a method several studies have utilized to examine social status and aggression (Farmer, Estell, Bishop, et al., 2003; Rodkin, Farmer, Pearl, & Van Acker, 2000). That is, although teachers may see their students in classroom and playground settings, they still do not have access to all areas in which adolescents interact. In addition, Rodkin and Ahn (2012) suggested that teachers vary in their ability to accurately perceive and assess students' friendships and social status. Thus, teachers' reports of status may not accurately assess adolescents' social status.

Another method that has been used more recently to measure social status is social cognitive mapping (SCM; e.g., Estell et al., 2008; Gest, Graham-Bermann, & Hartup, 2001; Rodkin & Ahn, 2009; Rodin et al., 2000). Here, respondents list groups of peers that they think 'hang around together a lot'. Through the SCM procedure, social status, or centrality within the peer group, is calculated based on the number of nominations each person receives relative to the whole peer group. As opposed to direct observations or teacher nominations, this method (like sociometric nominations) may more accurately measure status because adolescents can observe the entire peer group in every context (Cairns, Perrin, & Cairns, 1985). This method provides information on the centrality, or status, of each member of a small peer group relative to other members of that group, and on the centrality of each small group relative to all other groups. However, it remains difficult to determine an individual's status within the overall peer network hierarchy.

Social network analysis. A more recent, more sophisticated method used to measure social status is social network analysis (SNA). SNA has advantages over other methods of measuring status because it allows for understanding not only of individuals

and their behavior, but also of the relational connections among both individuals and among their behaviors. Because social behavior is so complex, it is important to consider both the regularities and the variability in processes that give rise to network ties (Robins & Morris, 2007). As such, instead of simply examining an individual's social or behavioral characteristics, SNA allows for examination of relationships within the overall peer context. In SNA, adolescents report who their friends are within their peer network. Thus, SNA can be used to measure social status locally, looking at an individual's own friendships, as well as globally, examining an individual's position within the network as a whole. This provides a more nuanced representation of an adolescent's social status, which simultaneously considers multiple relationships (e.g., close friends, friends of friends, distant peers; Wasserman & Faust, 1994). Despite the benefits of SNA, very little research thus far has utilized SNA as a method of measuring social status in relation to aggression and victimization. One study did examine social status using SNA to determine if status could increase the capacity for aggression, and found that aggression increased as status increased, but decreased for those at the very top of the status hierarchy (Faris & Felmlee, 2011). The current study builds on this prior work by also considering the victim's role in these interactions.

SNA measures of social status. In SNA, adolescents are first asked to name up to 10 friends. A peer network is then created, from which various measures of social status within the peer group can be calculated. In the present study, social status was conceptualized as *social prominence*; a social network concept concerned with visibility within the peer group (Wasserman & Faust, 1994). In SNA, social prominence indicates how important or prestigious an individual is within their network (Wasserman & Faust,

1994). Adolescents with high prominence are generally seen as having high capacity for influence and control over others. This is slightly different from other measures of status, such as sociometric nominations. For instance, using sociometric nominations, high status individuals are the most well-liked. On the other hand, when using SNA to calculate social prominence, high status individuals are important within their peers group, and have the potential for influence and power over their peers. Thus, social prominence is particularly important in terms of aggression and victimization because of the theoretical reasoning associated with using aggression to gain influence and dominance (Hawley, 2003; Salmivalli et al., 1996).

Social prominence is commonly split into measures of direct contact between individuals within a peer group, and measures that include indirect ties, thus considering status within the entire peer network. Measures of direct contact simply measure how involved an individual is in relationships with others. Thus, this assesses how active or visible one is in their peer group. Measures that include indirect ties consider not only how involved an individual is, but also whether the peers with which one is involved are also important and visible themselves. As such, this assesses an individual's social prominence at a more global, network level. The current study will utilize one direct measure of social prominence and two measures of indirect social prominence.

The first, most direct measure of social prominence is popularity (which is operationalized here as *indegree*; Wasserman & Faust, 1994). In this case, popularity refers to a person's direct affiliations, or their closest relationships. This is based on the number of peers who consider an individual to be their friend; thus, a person with high popularity has many individuals who consider him or her to be a friend. For example, in

Figure 3, individual A has 3 incoming nominations, whereas individual B only has 1 incoming nomination. Therefore, A has higher popularity than B. Thus, popularity represents an individual's activity and importance within the peer group (Freeman, 1979; Wasserman & Faust, 1994). Popularity, measured in this way, means that a highly popular adolescent has the capacity for influence over a greater number of peers than a less popular adolescent. This is particularly important when considering aggressive behavior because aggression may be used as a way of gaining popularity, and thus influence over others.

The next measures of social prominence involve the entire peer network, and consider not only direct friendships, but also indirect ties (i.e., friends of friends, distant peers). These two measures are referred to as centrality. Common interpretations of centrality concern the idea that a point at the center of a star is the most central position possible (Freeman, 1979). One common measure of centrality is *betweenness centrality*, which refers to how often an individual 'connects' or is 'in between' two other peers (Wasserman & Faust, 1994). For example, in Figure 4, individual A lies on the shortest path between several pairs of peers (B and H, E and H, B and F, E and F, for instance). On the other hand, B lies on the shortest path between only one pair of peers (A and D). Thus, A has higher betweenness centrality than B. If an individual is the only connection between two peers (or groups of peers, potentially), that individual has high potential for influence. This is seen as a strategically optimal position, in that a person is on a communication path between pairs of others, and thus has the ability to share, withhold, or distort information (Freeman, 1979). Thus, aggression may also be used as a strategy

28

to increase one's betweenness centrality, given that it is an optimal position for power and control.

Another common measure of centrality is *Bonacich centrality* (Bonacich, 1987). This considers not only how prominent an individual is (based on the number of friends they have), but also how prominent each of that individual's friends are (Wasserman & Faust, 1994). That is, one's centrality is enhanced by the centrality of those to whom they are connected. For example, in Figure 5, both A and B are connected to 6 peers. However, A's friends are also connected to many peers, whereas B's friends have far fewer friends. Thus, A is more prominent within the overall peer network, and has higher Bonacich centrality than B. Therefore Bonacich centrality represents popularity based on the overall peer network. Similar to betweenness centrality, high Bonacich centrality indicates that an individual can influence a peer (or peers) who can subsequently influence many other peers (Borgatti, 2005). Therefore, the first individual is highly influential within the peer network as a whole. Again, this form of centrality is expected to be related to aggressive behavior because having high Bonacich centrality indicates having more power and influence within the peer group. As such, for example, an individual with high Bonacich centrality may not experience a large amount of victimization, because aggressors might fear retaliation from this influential peer.

These three measures of social prominence (popularity, betweenness centrality, Bonacich centrality) concern popularity, visibility, and potential for influence and control, and thus represent social status. Although each tap into a slightly different dimension of social status within the peer group, all are expected to be similar to one another in terms of their associations with aggression and victimization. However, these

measures allow for an in-depth examination into facets of social status and a person's position within the social network that cannot be gleaned from sociometric measures or the SCM method.

Chapter 3

CURRENT STUDY

To examine the relations among aggression, victimization, and social prominence, the current study focussed on sixth graders. Sixth grade is an optimal age to examine these relations because, in this sample, sixth grade adolescents have just transitioned to middle school. As children and adolescents transition to new peer groups, they tend to use more aggressive behavior to establish dominance and leadership hierarchies among these new groups (e.g., Pellegrini & Bartini, 2000). Therefore, the current study examined the aggressive behaviors and social prominence of early adolescents shortly after their transition to middle school.

Peer reports were used to assess aggression, victimization, and social prominence. This method has been supported by past research. Peers are very aware of which peers are aggressive and which peers get victimized, and aggression usually occurs in contexts where teachers or other adults are not present (Hawley, 2003; Perry et al., 1988). This is particularly true for relational aggression and victimization, which may be more covert in nature, and can be easily hidden from adults. In addition, aggregating peer nominations has the advantage of minimizing the impact of rater bias from any individual (Perry et al., 1988).

Adolescents identified aggressive peers and those peers' victims though a peer nomination procedure (Rodkin & Berger, 2008). In addition, adolescents identified friends in their grade, and these friendship nominations were used to calculate three social network measures of social prominence. These measures are popularity (calculated as indegree), betweenness centrality, and Bonacich centrality. Although each

of these three metrics describes a slightly different facet of prominence within the peer group, all three are related to an adolescent's potential for influence and dominance. Thus, all three were expected to relate to aggression and victimization similarly. Including multiple measures of prominence enables one to test for the robustness of the anticipated associations between prominence and aggression and victimization. In addition, including all three indices in the same model (as was done in the current study) allows for examination of their relative strength of association.

The first goal of the current study was to clarify the association between aggression and social prominence (see Figure 1 for conceptual model). Based on resource control theory and dominance theory, aggression was expected to be positively related to social prominence, as adolescents use aggression as a strategy to increase and maintain high status, dominant positions within the peer group. However, the literature also shows that some adolescents are unsuccessful in using aggression to gain and maintain status, suggesting that aggression may also be negatively related to social prominence. This idea underlies hypotheses about how relational aggression and physical aggression were expected to relate to social prominence in differing ways for girls and boys. As such, for girls, relational aggression was expected to be positively related to social prominence, whereas physical aggression was expected to be negatively related to prominence. These hypotheses were based on theory and empirical findings that suggest gender normative aggression may be effectively used to gain social status, where gender non-normative aggression signifies adjustment issues and dysregulation (e.g., Crick, 1997). For girls, relational aggression is gender normative and common, but physical aggression is gender non-normative. Conversely, relational aggression is not

32

gender normative for boys, but physical aggression is gender normative and may be more accepted or even expected by peers. Thus, for boys, relational aggression was expected to be negatively related to social prominence, and physical aggression was expected to be positively related to prominence.

The second goal was to examine the relation between social prominence and victimization (see Figure 2 for conceptual model). Dominance theories and extant literature suggest that aggressors target peers of a particular social status, in order to successfully use aggression to impact their own status. Therefore, it was expected that social prominence would predict victimization, as opposed to victimization predicting social prominence. Although the paucity of extant empirical literature makes hypotheses tentative, it was expected that those low in social prominence would be most highly victimized. Again, however, social prominence was expected to relate to relational and physical victimization in different ways. In addition, there was again expected to be moderation by gender. Specifically, for girls, there was hypothesized to be a positive curvilinear association between social prominence and both forms of aggression, such that being both high and low in prominence would be associated with high victimization. For boys, prominence was expected to be negatively associated with physical victimization. Because research on boys' risk for relational victimization is limited, no directional hypotheses were made.

Chapter 4

METHODOLOGY

Participants

Data for this study were taken from a large, two-year, three wave, longitudinal study of identity development and peer influences in early adolescence (data were collected in spring of year 1, fall of year 2, and spring of year 2). The current study included the entire cohort of sixth grade adolescents from the second wave (fall of year 2) of the study. Aggression and victimization were not assessed in the first wave of this longitudinal study, and they were not assessed separately by form of aggression in the third wave of the study. Therefore only data from the second wave will be utilized. Sixth grade students in this sample had just transitioned into middle school, and aggression is likely to increase during times of transition as dominance and hierarchies become re-established (e.g., Pellegrini & Bartini, 2000). Thus, sixth grade is an optimal age group for the current study.

Adolescents in the participating school were recruited for participation at the beginning of the school year. The participating school is ethnically diverse and located in an urban southwestern city. Information letters and consent forms were sent home with all students in the school to inform parents of the intent to collect student survey data ($N = 367$ 6th grade students). This study employed passive consent, meaning that if parents did not specifically opt their child out of the study, consent was assumed. Twenty-two parents requested that their child not participate. At the beginning of survey administration, students completed an assent form indicating their willingness to participate in the study (one student refused to participate). In addition, four students

were absent from school during survey administration and one student had been withdrawn from the school by the time of survey administration. This resulted in a final sample of 339 participants.

Participants ranged in age from 10 to 14 years ($M = 11.12$ years, $SD = .51$), with an approximately equal number of boys and girls (50.4% girls). Participants were from ethnically diverse backgrounds, with children self-identifying as Hispanic (34%), non-Hispanic White (30%), Black or African American (21%), American Indian or Alaska Native (10%), Asian (2%), and other (3%). The majority of adolescents were from low socioeconomic status families (82% were eligible for free lunches, 9% were eligible for reduced-price lunches). Forty-eight percent of the participants and their parents were United States (US) born, 13% of participants were US born with one parent foreign born, 30% were US born with both parents foreign born, and 9% were foreign born with both parents foreign born. Approximately half of the adolescents came from two-parent married families (46%), and the remaining adolescents were mainly from single parent families (31%) or two-parent, unmarried families (18%).

Procedure

All measures used in the current study were collected at one time point, in the fall semester of the school year. Participating adolescents completed a large questionnaire package in a classroom, group setting, in pencil and paper format. Researchers read aloud each item in the questionnaire package. Individualized assistance was provided as needed to adolescents who had difficulty completing the questionnaires (e.g., students with learning disabilities or language difficulties).

For the purposes of the current study, only the peer nominations of aggression, victimization, and friendships were used. To complete the peer nominations, students were given a list of participating peers in their grade (those with parental consent to participate), and were instructed to think of peers in their grade that fit each description (i.e., aggressor, victim, friend) and record peers' first name and last initial. Participants were told that they could not nominate themselves, but that they could nominate the same person for more than one description. If they could not think of peers, they were instructed to leave the space blank. The questionnaire package was administered on two consecutive days, and took approximately two hours to complete. Students were given a pencil and a bracelet as a token of appreciation for their participation, and the school received a $500 donation. This study was approved by the Arizona State University Institutional Review Board.

Measures

Measures of aggression and victimization were based on the "Who Bullies Whom" measure (Rodkin & Berger, 2008). The Who Bullies Whom measure was modified such that adolescents were asked to nominate bullies and their victims separately for relational and physical forms of aggressive behavior (see Appendix A), using items frequently used in peer nominations of aggression (e.g., Peeters et al., 2009). Peer reports of aggression and victimization were used because past research has shown that peers are best able to assess aggressive behaviors, which often occur in contexts where adults are not present (Hawley, 2003; Perry et al., 1988), and because aggregating peer nominations minimizes the impact of rater bias from an individual (Perry et al., 1988).

36

Aggression. This measure included one item assessing relational aggression; "Someone who gossips about others or excludes others" and one item assessing physical aggression; "Someone who hits, kicks, or pushes others." The use of a single item is common in peer reports of aggressive behavior (Cillessen & Mayeux, 2004; Cillessen & Mayeux, 2007; Peeters et al., 2009), and because each individual could be nominated by all peers, no peers, or any number of peers in between, there is still great variability in scores even using one item. In addition, these items used have been frequently used to assess relational and physical aggression and show large correlations or alphas when used in combination with other items (Bowker, Rubin, Buskirk-Cohen, Rose-Krasnor, & Booth-LaForce, 2010; Farmer, Estell, Leung, et al., 2003; Peeters et al., 2009). Students were able to nominate up to three peers for each form of aggression. The number of nominations received by each participant for each item was summed to yield total relational aggression and physical aggression scores. Because adolescents were told they could nominate anyone in their grade, rather than solely in their classroom, it was not necessary to standardize nominations within classroom.

Victimization. For each peer nominated as an aggressor (discussed above), participants were asked to nominate up to three peers that the nominated person directed their aggressive behavior towards. For example, the item assessing relational aggression read "List one person who gossips about others or excludes others," and the corresponding item assessing relational victimization read "Who does person 1 gossip about or exclude the most?" As with aggression, the number of times each participant was nominated as a victim was summed to create total relational victimization and physical victimization scores.

Response rates for relational aggression and physical aggression were .82 and .57, respectively, and were .76 and .49 for relational and physical victimization, respectively. Past research has recommended at least a 60-70% response rate for peer nominations (Cillessen, 2009; Crick & Ladd, 1989). The response rates here are somewhat lower, particularly for physical aggression and victimization. However, those studies have involved nominations of "like most" and "like least" in the classroom, rather than behaviors for any grademate. For nominations of "like most" and "like least", the size of the reference group is likely unimportant. However, grade-level behavioral nominations require adolescents to be knowledgeable of the sometimes hidden or subtle behaviors of a much greater number of peers – something that is likely challenging. Preliminary analyses on the current sample indicate that those who responded were also significantly more likely to be those who are involved in aggressive interactions, either as aggressor or victim (or both) as indicated by logistic regressions predicting response/non-response from self-reports of aggression, self-reports of delinquency, peer-reports of aggression, and peer-reports of victimization. Thus, non-responders tended to be those who were unlikely to be involved in aggressive interactions. Presumably, they had limited ability to report aggressive relationships out of such a large reference group. Given that the participants responding were more likely to be involved themselves in aggressive interactions, it is likely that they were knowledgeable about who was involved in these aggressive interactions, which provides support for the validity of these peer reports. In addition, response rates were lower for physical than relational aggression and victimization, which is perhaps due to the fact that physical aggression occurs less often at this age group (as opposed to younger children). Levels of self-reported relational

aggression were also marginally significantly higher than self-reported levels of physical aggression, which also supports this hypothesis (self-reported relational aggression $M = 1.51$, $SD = .66$, self-reported physical aggression $M = 1.45$, $SD = .65$, $t[306] = 1.81$, $p < .075$).

Social prominence. To report on friendships, students used the same list of participating peers as they did for the peer nominations of aggression and victimization. They were asked to write the first name and last initial of up to 10 of their closest friends in their grade, starting with their best friend (see Appendix B). If they did not have 10 friends, they were told to leave any remaining spaces blank. Although the majority of studies that have used SNA, as well as other nomination methods, such as sociometric nominations and SCM, are conducted at the classroom level (meaning that students are instructed to only nominate peers within their class; Farmer, Estell, Bishop, et al., 2003; Gest et al., 2001; Rodkin & Berger, 2008; Rodkin et al., 2000), in the current study, students were able to nominate any peer within their grade, so that social prominence could be measured at the grade level. When adolescents are only able to nominate peers in their class, their full social network is truncated into small groups of 20-30 adolescents, even though adolescents generally have frequent associations with peers in their grade outside their classroom. This is particularly true in middle school and high school, when adolescents are typically in different classrooms with different peers for each subject. Therefore, allowing participants to nominate any peers within their grade allows for a more accurate examination of social status and prominence within the entire grade-level network.

Data based on these friendship nominations were arranged in 339 X 339 binary matrices. In the matrix, cell X_{ij} corresponds to i's relation to j, as reported by i. That is, if i nominated j as a friend, cell X_{ij} was coded as 1. If i did not nominate j as a friend, cell X_{ij} was coded as 0. Because only one network was being examined (the sixth grade network), it was not necessary to standardize any social networks variables.

First, the direct measure of popularity (known as *indegree*) was calculated, measured as the total number of incoming nominations of each adolescent made by others (meaning that peers nominated actor i as a friend, rather than those peers whom i named as friends; see Figure 3 for example). That is, indegree was computed as a count of the number of incoming friendship ties each actor had:

$$\text{Indegree}_i = \sum_j a_{ij}$$

The first measure of social prominence that includes both direct and indirect relationships, *betweenness centrality*, was calculated using a symmetrised network, because of the difficulty of interpreting betweenness centrality for nonsymmetric data (Mehra, Kilduff, & Brass, 2001; see Figure 4 for example). This symmetrised network was calculated such that only reciprocated friendship ties were counted as a friendship tie. That is, a tie was included between two participants only if both nominated the other as a friend. Betweenness centrality measures the frequency with which an actor falls between other pairs of actors on the shortest path that can connect them (Freeman, 1979). Therefore, adolescents with higher betweenness centrality scores are more often a structural pathway connecting others in the network. If g_{kj} is the total number of geodesic paths (the shortest path from one actor to another) from actor k to actor j, and

g_{kij} is the number of geodesic paths between actor k and actor j that pass through actor i, betweenness centrality is computed as (Borgatti & Everett, 2006):

$$\text{Betweenness}_i = \sum_k \sum_j (g_{kij} / g_{kj})$$

The final measure, which also considers both direct and indirect relationships, *Bonacich centrality*, was calculated by weighting each actor's centrality by the centrality of those to whom he or she sends ties (Wasserman & Faust, 1994; see Figure 5 for example). Where X is the total friendship network, α is a scaling factor (determined mathematically to allow the equation to be solved), β is a power weight reflecting the degree of dependence of an actor's prestige on the extent of prestige of the peers to whom the actor is connected (which will be set equal to .1), Bonacich centrality is computed as (Haas, Schaefer, & Kornienko, 2010):

$$\text{Bonacich centrality } X\,(\alpha,\,\beta) = \alpha * (I - \beta * X)^{-1} X1$$

Chapter 5

RESULTS

The goals of the current study were to examine the association between aggression and social prominence, as well as the association between social prominence and victimization. A secondary goal was to examine how gender moderated these associations. It was expected that, for girls, relational aggression would be positively related to social prominence and physical aggression would be negatively related to social prominence. For boys, it was expected that relational aggression would be negatively, and physical aggression would be positively, related to social prominence. In terms of victimization, associations were again expected to be moderated by gender. Tentative hypotheses (tentative due to lack of extant empirical research) suggested a positive curvilinear association between social prominence and both relational and physical victimization for girls, such that being both high and low in prominence would be associated with high victimization. For boys, negative associations were expected between social prominence and physical victimization, and specific hypotheses for the association between prominence and relational victimization were not made.

To address these goals, both multiple regression analyses and multiple group structural equation modelling procedures were used. Analyzing these associations separately for each index of social prominence, as is done in multiple regression analyses, is the most direct way to address these goals. All three indices of social prominence were expected to relate to aggression and victimization in the same way, thus similar findings from separate regression analyses would support the robustness of these associations. However, with structural equation modelling, all three indices can be included in the

42

same model. This builds on the multiple regression analyses in that this allows for simultaneous examination of each measure of social prominence. Thus, from structural equation modelling, the relative strength of the association of each index of social prominence to aggression and victimization can also be determined.

Descriptive Analyses

Aggression and victimization scores were computed as a sum of peer nominations of each type of aggression and victimization. Relational aggression scores ranged from 0 to 18 ($M = 1.65$, $SD = 2.22$). One hundred and thirty-five participants were not nominated as relationally aggressive, 101 participants were nominated once, and 134 were nominated anywhere from 2 to 18 times. Physical aggression scores ranged from 0 to 16 ($M = .93$, $SD = 2.02$), with 214 participants not nominated as physically aggressive, 90 participants nominated once, and 66 nominated between 2 and 16 times. Relational victimization scores ranged from 0 to 23 ($M = 3.62$, $SD = 3.33$), with 48 participants not nominated as relationally victimized, 59 nominated once, and 263 nominated between 2 and 23 times. Finally, physical victimization scores ranged from 0 to 11 ($M = 1.76$, $SD = 1.83$), with 97 participants not nominated as physically victimized, 106 nominated once, and 167 nominated between 2 and 11 times.

Most variables were normally distributed, as indicated by skewness of less than two and kurtosis less than seven (Tabachnick & Fidel, 2006). However, relational aggression, physical aggression, and betweenness centrality were not normally distributed (skewness = 2.67, 4.65, and 2.10 and kurtosis = 11.32, 26.21, and 5.53, respectively). Therefore, these variables were log-transformed to better approximate normal distributions, and the transformed variables were used in all subsequent analyses.

43

Independent samples *t*-tests were conducted to test for gender differences in each of the study variables (see Table 1). Log-transformed variables were used for relational aggression, physical aggression, and betweenness centrality. Girls were rated by their peers as significantly more relationally victimized, and boys were rated as more physically aggressive. There were no gender differences for relational aggression or physical victimization. In addition, girls had significantly higher popularity, betweenness centrality, and Bonacich centrality. Levene's test for equality of variances was also conducted to examine homogeneity of variance, which revealed greater variance for boys than girls on physical aggression, and greater variance for girls than boys on relational victimization and popularity. All other variable indicated homogeneity of variance for boys and girls.

Correlations Among Variables

Zero-order correlations were computed separately for boys and girls to assess the relations among variables (see Table 2). For both boys and girls, relational aggression, physical aggression, relational victimization, and physical victimization were all positively and significantly related to one another. However, based on Fisher's *r*-to-*z* test, the correlation between relational and physical aggression was significantly stronger for boys ($r[168] = .59, p < .001$) than for girls ($r[171] = .36, p < .001$), and the correlation between relational and physical victimization was stronger for girls ($r[171] = .54, p < .001$) than for boys ($r[168] = .35, p < .001$). In addition, the correlation between relational aggression and relational victimization was stronger for girls ($r[171] = .51, p < .001$) than for boys ($r[168] = .29, p < .001$), but the correlation between physical aggression and physical victimization was stronger for boys ($r[168] = .49, p < .001$) than

for girls (r[171] = .22, $p < .01$). In addition, popularity, betweenness centrality, and Bonacich centrality were all positively and significantly related to one another, for both boys and girls. Based on Fisher's r-to-z test, these correlations did not differ by gender.

Zero-order correlations were also computed to examine correlations between measures of aggression and victimization and indices of social prominence. For girls, these associations were quite robust. That is, for girls, relational aggression, relational victimization, and physical victimization were all positively and significantly related to all three measures of social prominence, although physical aggression was only significantly positively correlated with popularity. For boys, however, the relations were much weaker. Relational aggression, relational victimization, and physical victimization were significantly and positively related only to popularity, but they were not significantly related to the other two indices of social prominence. No other significant correlations were obtained.

Multiple Regression Analyses: Aggression

The first aim of this study was to examine whether relational and physical aggression predicted social prominence and to test whether these associations were moderated by gender. To do this, several hierarchical multiple regression analyses were conducted. As suggested by Aiken and West (1991), predictors were centered prior to running regression analyses (that is, the group mean was subtracted from the predictor). Log-transformed variables were used for relational aggression, physical aggression, and betweenness centrality. A separate regression analysis was run for each outcome variable: popularity, betweenness centrality, and Bonacich centrality. In addition, because relational and physical aggression were expected to relate to social prominence

45

in differing ways, they were also included in separate regression analyses. In the first step of each analysis, dummy-coded ethnicity (with white as the reference group) and generational status were entered as covariates. In the second step, the predictor (either relational aggression or physical aggression, in separate analyses) and the moderator (gender) were entered. In the final step, an interaction term of aggression and gender was added. When the interaction term was significant, the interaction was probed such that analyses were conducted separately for boys and girls. That is, the slopes of simple regression lines of aggression predicting social prominence were calculated separately for boys and girls.

Relational aggression and gender predicting social prominence. Regression analyses indicated that relational aggression significantly positively predicted popularity, and gender significantly negatively predicted popularity (see Table 3). However, these main effects were subsumed by a marginally significant interaction between relational aggression and gender. When examined separately by gender, regressions revealed that relational aggression significantly predicted popularity for girls ($\beta = 2.30$, $p < .01$) and for boys ($\beta = 1.02$, $p < .05$). Analyses also indicated significant interactions between relational aggression and gender when predicting both betweenness and Bonacich centrality (see Table 3). When these were run separately by gender, analyses indicated that relational aggression significantly and positively predicted betweenness and Bonacich centrality for girls ($\beta = 1.10$, $p < .01$ and $\beta = .13$, $p < .01$, respectively), but did not significantly predict betweenness or Bonacich centrality for boys ($\beta = -.36$, $p > .05$ and $\beta = -.04$, $p > .05$, respectively).

Physical aggression and gender predicting social prominence. Analyses indicated that physical aggression marginally significantly predicted popularity, such that higher levels of physical aggression were associated with higher levels of popularity (see Table 4). In addition, gender negatively predicted popularity, such that girls had higher popularity than boys. The interaction between physical aggression and gender did not significantly predict popularity. As with popularity, gender significantly negatively predicted betweenness centrality. Neither the main effect of physical aggression, nor the interaction between physical aggression and gender significantly predicted betweenness centrality. Again, gender significantly negatively predicted Bonacich centrality. There was no significant main effect of physical aggression on Bonacich centrality. However, the interaction between physical aggression and gender did significantly predict Bonacich centrality (see Table 4). When run separately by gender, regression analyses indicated that physical aggression marginally and positively predicted Bonacich centrality for girls ($\beta = .16$, $p < .10$), but did not predict Bonacich centrality for boys ($\beta = -.04$, $p > .10$).

Multiple Regression Analyses: Victimization

The second aim of this study was to assess whether social prominence predicted relational and physical victimization, and if these associations were moderated by gender. As such, separate regression analyses were conducted including either relational or physical victimization as the outcome variable, and social prominence variables included as predictors (in separate analyses). In the first step of each analysis, the same covariates as above were included (dummy-coded ethnicity and generational status). In the next step, the social prominence predictor variable (either popularity, betweenness centrality, or Bonacich centrality) and the moderator (gender) were entered. In the third step, an

47

interaction term of social prominence and gender was included. However, for some analyses (i.e., girls' social prominence predicting relational and physical victimization), curvilinear relations were expected. Thus, in the third step, a quadratic term was also entered, created by multiplying the social prominence variable by itself. In the fourth step, an interaction between the quadratic term and gender was entered.

Social prominence and gender predicting relational victimization. Popularity significantly positively predicted relational victimization, and gender significantly negatively predicted relational victimization (see Table 5, Panel 1). However, there was also a significant interaction between the quadratic term of popularity and gender. This interaction was probed by running analyses separately for girls and boys. Findings indicated that the quadratic term of popularity significantly negatively predicted popularity for girls ($\beta = -.02$, $p < .05$). That is, girls both high and low in popularity had low levels of relational victimization, and those at mid-levels of popularity were most highly relationally victimized (see Figure 6). Conversely, for boys, the quadratic term of popularity significantly positively predicted popularity ($\beta = .02$, $p < .05$). That is, boys low and high on popularity were most highly relationally victimized, whereas those at mid-levels of popularity had low levels of relational victimization (see Figure 7).

For regression analyses with betweenness and Bonacich centrality, there were significant interactions between centrality and gender, but quadratic terms were not significant (see Table 5, Panels 2 and 3). When analyzed separately by gender, regressions indicated that, for both betweenness and Bonacich centrality, centrality significantly and positively predicted relational victimization for girls ($\beta = .35$, $p < .001$

48

and $\beta = 2.12$, $p < .01$, respectively), but did not significantly predict relational

victimization for boys ($\beta = .08$, $p > .05$ and $\beta = -.07$, $p > .05$, respectively).

Social prominence and gender predicting physical victimization. Popularity

significantly positively predicted physical victimization (see Table 5, Panel 1), but gender

did not significantly predict physical victimization. The quadratic term of popularity also

significantly negatively predicted physical victimization (see Figure 8). Specifically,

those low and high in popularity had the lowest levels of physical victimization, and

those at mid-levels of popularity had the highest levels of physical victimization.

Betweenness centrality positively predicted physical victimization (see Table 5, Panel 2),

but neither gender, nor the quadratic terms significantly predicted physical victimization.

Neither Bonacich centrality, gender, nor the quadratic terms significantly predicted

physical victimization (see Table 5, Panel 3).

Multiple Group Structural Equation Modelling

Model specification. Building upon the multiple regression analyses, multiple

group structural equation modelling (SEM) procedures were used in Mplus 6.1 (Muthén

& Muthén, 2010) in order to determine the simultaneous effects of all indices of social

prominence in association with aggression and victimization.

Aggression. Two models were specified in Mplus, one including relational

aggression and one including physical aggression. In both, paths were specified to allow

covariates (dummy-coded ethnicity and generational status) to directly affect aggression.

Direct paths were also included from aggression to each index of social prominence:

popularity, betweenness centrality, and Bonacich centrality. In addition, the residuals for

the three indices of social prominence were allowed to be correlated. Log-transformed

variables were used for relational aggression, physical aggression, and betweenness centrality.

Victimization. Two additional models were specified in Mplus, with one including relational victimization and one including physical victimization. As before, paths were specified to allow covariates to affect all predictors. Popularity, betweenness centrality, and Bonacich centrality were included as predictors. Because curvilinear associations were expected, quadratic terms for popularity, betweenness centrality, and Bonacich centrality were also included as predictors. All predictors were allowed to be correlated. Paths were specified from each predictor to victimization. A log-transformed variable was used for betweenness centrality.

Multiple group model. For each model, gender differences were tested using a multiple group SEM approach, with gender as the grouping variable. Nested model comparisons (comparing a more constrained model to a nested, less constrained model) were used to examine whether associations between variables varied by gender. To assess whether the less constrained model had better fit than the more constrained model, both a chi square difference test and improvement in model fit were examined. Model fit was assessed using the comparative fit index (CFI), the root-mean-square-error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR), and was considered to be good if the CFI was greater than or equal to .95 and the RMSEA and SRMR were each less than or equal to .05 (Hu & Bentler, 1999). If the less constrained model indicated better fit, this suggested that there were in fact significant differences based on gender, and thus paths should not be constrained to invariance across gender (Knight et al., 2011; Vandenberg & Lance, 2000).

Relational aggression. To test whether gender moderated the associations between relational aggression and multiple indices of social prominence, a first model constrained all path coefficients to be equal across gender (constrained model: χ^2 [31] = 26.85, $p > .05$, CFI = 1.00, RMSEA = .00 [.00 - .05], SRMR = .05). A second model allowed all path coefficients to vary across groups (unconstrained model: χ^2 [24] = 15.14, $p > .05$, CFI = 1.00, RMSEA = .00 [.00 - .02], SRMR = .04). The two models were compared using a chi square difference test ($\Delta \chi^2$ [$\Delta df = 7$] = 11.71, $p = .11$). Although the chi square difference test was not significant, the model fit for the unconstrained model was better than for the fully constrained model, as indicated by a lower SRMR value and 95% RMSEA confidence interval with values closer to 0.

This slight improvement in fit suggested that a partially constrained model might be more appropriate than the fully constrained model (Knight et al., 2011; Vandenberg & Lance, 2000). Thus, a series of constraints were applied to individual path coefficients (one at a time) and chi squared difference tests were conducted on each to determine whether there were gender differences for each path coefficient. This resulted in a final partially constrained model with some paths constrained to be equal across gender and some allowed to vary across gender (final partially constrained model: χ^2 [28] = 16.15, $p > .05$, CFI = 1.00, RMSEA = .00 [.00 - .00], SRMR = .04). The final partially constrained model was then tested against the original fully constrained model, and the chi square difference test indicated that the partially constrained model had better fit ($\Delta \chi^2$ [$\Delta df = 3$] = 10.70, $p < .05$).

The final model indicated that relational aggression positively predicted popularity for girls ($\beta = 2.27$, $p < .001$) and for boys ($\beta = .96$, $p < .05$). In addition,

51

relational aggression positively predicted both betweenness and Bonacich centrality for girls ($\beta = 1.10$, $p < .01$ and $\beta = .14$, $p < .01$, respectively), but not for boys ($\beta = -.43$, $p > .05$ and $\beta = -.05$, $p > .05$, respectively) (see Figure 9 for final unstandardized path coefficients and significance levels for boys and girls).

Physical aggression. As before, to test whether gender moderated the associations between physical aggression and social prominence, a first model constrained all path coefficients to be equal across gender (constrained model: χ^2 [31] = 26.37, $p > .05$, CFI = 1.00, RMSEA = .00 [.00 - .05], SRMR = .05). A second model allowed all path coefficients to vary across groups (unconstrained model: χ^2 [24] = 14.98, $p > .05$, CFI = 1.00, RMSEA = .00 [.00 - .02], SRMR = .04). The two models were compared using a chi square difference test ($\Delta\chi^2$ [$\Delta df = 7$] = 11.39, $p = .12$). Although the chi square difference test was not significant, the model fit for the unconstrained model was better than for the fully constrained model, as indicated by a lower SRMR value and 95% RMSEA confidence interval with values closer to 0.

As with relational aggression, this slight improvement in fit suggested that a partially constrained model might be more appropriate than the fully constrained model. Thus, a series of constraints were again applied to individual path coefficients (one at a time) and chi squared difference tests were conducted on each. This resulted in a final partially constrained model with some paths constrained to be equal across gender and some allowed to vary across gender (final partially constrained model: χ^2 [30] = 22.70, $p > .05$, CFI = 1.00, RMSEA = .00 [.00 - .04], SRMR = .04). The final partially constrained model was then tested against the original fully constrained model, and the

52

chi square difference test indicated that the partially constrained model had better fit ($\Delta\chi^2$

[$\Delta\ df = 1$] = 3.68, $p < .05$).

The final model indicated that physical aggression marginally positively predicted popularity for both girls and boys ($\beta = .78$, $p < .085$). Physical aggression did not significantly predict betweenness centrality or Bonacich centrality (see Figure 10 for final unstandardized path coefficients and significance levels for boys and girls).

Relational victimization. To test whether gender moderated the associations between linear and curvilinear effects of social prominence on relational victimization, a model was assessed constraining all path coefficients to be equal across gender (constrained model: χ^2 [53] = 187.69, $p < .001$, CFI = .82, RMSEA = .12 [.10 - .14], SRMR = .11). A second model allowed all path coefficients to vary across groups (unconstrained model: χ^2 [8] = 12.87, $p > .05$, CFI = .99, RMSEA = .06 [.00 - .12], SRMR = .02). The two models were compared using a chi square difference test ($\Delta\chi^2$ [Δ $df = 45$] = 174.82, $p < .001$), which indicated that the unconstrained model fit better.

Starting from the unconstrained model, a series of constraints were applied to individual path coefficients (one at a time) and chi squared difference tests were conducted on each to determine which paths were different based on gender. This resulted in a final partially constrained model with some paths constrained to be equal across gender and some allowed to vary across gender (final partially constrained model: χ^2 [42] = 54.98, $p > .05$, CFI = .98, RMSEA = .04 [.00 - .07], SRMR = .06). The final partially constrained model was also tested against the original fully constrained model, and the chi square difference test indicated that the partially constrained model had better fit ($\Delta\chi^2$ [Δ $df = 11$] = 132.71, $p < .001$).

The final model indicated that popularity positively predicted relational victimization for all participants ($\beta = .27$, $p < .001$). As in the regression analyses, there was a positive curvilinear association between popularity and relational victimization for boys only ($\beta = .02$, $p < .05$). Betweenness centrality did not linearly or curvilinearly relate to relational victimization. Bonacich centrality marginally positively predicted relational victimization for girls ($\beta = 1.35$, $p < .65$), but there was no curvilinear relation between Bonacich centrality and relational victimization (see Figure 11 for final unstandardized path coefficients and significance levels for boys and girls).

Physical victimization. Finally, to test whether gender moderated the associations between linear and curvilinear effects of social prominence on physical victimization, a model was assessed constraining all path coefficients to be equal across gender (constrained model: χ^2 [53] = 191.29, $p < .001$, CFI = .81, RMSEA = .12 [.11 - .14], SRMR = .11). A second model allowed all path coefficients to vary across groups (unconstrained model: χ^2 [8] = 17.95, $p < .05$, CFI = .99, RMSEA = .09 [.03 - .14], SRMR = .02). The two models were compared using a chi square difference test ($\Delta\chi^2$ [Δ $df = 45$] = 173.34, $p < .001$), which indicated that the unconstrained model fit better.

A series of constraints were applied to individual path coefficients (one at a time) in the unconstrained model, and chi squared difference tests were conducted on each to determine which paths were different based on gender. This resulted in a final partially constrained model with some paths constrained to be equal across gender and some allowed to vary across gender (final partially constrained model: χ^2 [42] = 60.51, $p < .05$, CFI = .98, RMSEA = .05 [.02 - .08], SRMR = .06). The final partially constrained model was also tested against the original fully constrained model, and the chi square difference

test indicated that the partially constrained model had better fit ($\Delta \chi^2$ [$\Delta\ df$ =11] = 130.70, $p < .001$).

The final model indicated that popularity positively predicted physical victimization for girls (β = .12, $p < .01$) and for boys (β = .26, $p < .001$). In addition, there was a negative curvilinear association between popularity and physical victimization for both boys and girls (β = -.01, $p < .05$). Betweenness centrality negatively predicted physical victimization for boys only (β = -.15, $p < .05$), but there was no curvilinear relation between betweenness centrality and physical victimization. Finally, Bonacich centrality did not linearly or curvilinearly relate to relational victimization (see Figure 12 for final unstandardized path coefficients and significance levels for boys and girls).

Chapter 6

DISCUSSION

The purpose of this study was to examine the associations between aggression and social prominence, and between social prominence and victimization in a sample of sixth grade girls and boys. Aggression was expected to predict social prominence, and social prominence was expected to predict victimization, but these associations were expected to differ based on both form of aggression and victimization (relational versus physical) and gender.

Overall, results indicated that relational aggression was associated with high social prominence, particularly for girls, but that physical aggression was much less robustly associated with social prominence. Results for victimization were less clear, but suggested that social prominence (popularity in particular) was curvilinearly related to relational victimization, such that girls at mid-levels of social prominence and boys both very high and very low in social prominence were most highly relationally victimized. Finally, for physical victimization, results indicated that both girls and boys at mid-levels of social prominence were most highly physically victimized. These findings extend current work in the area by considering boys' and girls' relational and physical victimization in addition to relational and physical aggression. Moreover, the current study tested for moderation by gender, and social network analysis was used to calculate indices of social prominence, both of which provide a more nuanced and complete view of early adolescents' social experiences than has been examined in past research. Overall, the findings provide partial support for evolutionary theories of resource control and dominance (Buss & Shackelford, 1997; Hawley, 2003; Hawley et al., 2002; Wilson

& Daly, 1984) as they relate to social prominence and aggressive interactions in early adolescents. Little support was obtained for hypotheses based on gender normativity of aggressive behavior.

Aggressors

Descriptive analyses of the data indicated that 63% of participants were nominated as relational aggressors at least once, and 42% were nominated as physical aggressors. These raw nomination rates appear higher than prevalence rates commonly reported in past research (Berger & Rodkin, 2009; Farmer, Leung, Pearl, Rodkin, & Cadwallader, 2002; Rodkin & Berger, 2008). However, prevalence rates are often calculated using cut-off points to classify individuals as aggressor and victims (i.e., an individual is only classified as an aggressor if nominated by more than 10% of their peers or if an individual's standardized score is greater than .50), resulting in relatively low prevalence rates. In the current study, nominations were retained as a continuous measure of how many peers nominated an individual, rather than employing a classification system. When comparing the nomination rates found in the current study to other raw ranges of aggression and victimization, results are much more similar (Nansel, Overpeck, Pilla, Ruan, Simons-Morton, & Scheidt, 2001).

More interestingly, adolescents nominated more individuals as relationally aggressive than as physically aggressive. This is important to note because relational aggression is thought to be more covert and hidden than is physical aggression (Card et al., 2005; Crick & Grotpeter, 1995). This should make it harder to recognize and, therefore, harder to identify peers as relationally aggressive. Yet, the fact that more youth received nominations for relational aggression than for physical aggression suggests that

peers are indeed aware of who is relationally aggressive. It might also suggest that relational aggression is more widespread than physical aggression at this developmental period (Rivers & Smith, 1994). In fact, early adolescents are more accepting of relational aggression and less accepting of physical aggression, which could lead to differential rates of the two behavioral forms of aggression (Cillessen & Mayeux, 2004). Extrapolating from these findings, there may also be important differences in how and why each form of aggression is used. For instance, if relational aggression is both more acceptable and more common, it may be a more efficient strategy (than is physical aggression) to gain status within the peer group.

Aggression as a means to gain and maintain status: Support for evolutionary theory. A main goal of the current study was to examine how aggressive behaviors related to social status or prominence, and to examine differences based on gender and form of aggression. Although much past research has considered aggression to be predominantly maladaptive (Atlas & Pepler, 1998; Cook et al., 2010; Eron & Huesmann, 1984; Pellegrini et al., 1999), evolutionary theories of dominance and resource control suggest that aggression can, in fact, be evolutionarily adaptive (Buss & Shackelford, 1997; Hawley, 2003; Hawley et al., 2002). That is, aggressors may be using aggression in order to gain access to certain valued and limited resources within the peer group, including social prominence itself. Thus, it was hypothesized that aggression would be associated with high social prominence, with adolescents using aggression as a strategy to gain and maintain higher status within the peer group. However, it was also hypothesized that this may vary based on form of aggression and gender.

58

Findings for relational aggression. Overall, both girls and boys high in relational aggression were found to be high in social prominence. In addition, these results were consistent, regardless of analytic technique. However, results were more robust for girls, with relational aggression consistently associated with popularity, betweenness centrality, and Bonacich centrality, whereas for boys, relational aggression was only associated with popularity.

These findings provide partial support for hypotheses that associations between aggression and social prominence would depend on the gender normativity of the behavior (Heilbron & Prinstein, 2008; Underwood, 2003). Specifically, relational aggression is gender normative for girls. Therefore, for girls, engaging in this form of aggressive behavior may be more accepted by peers, and thus associated with high social prominence (Rose et al., 2004; Xie et al., 2003). Findings support this line of research. However, it was hypothesized that this would not be the case for boys; it was expected that peers would not find boys' use of relational aggression acceptable or attractive, thus relationally aggressive boys would not be socially prominent. Contrary to these hypotheses, however, boys' relational aggression was associated with higher social prominence (although not as robustly as for girls). This suggests that, not only was boys' relational aggression not denigrated, but, in fact, relationally aggressive boys were high in popularity. This may be explained by the fact that there is variation among boys in the use of relational aggression. That is, some researchers have argued that relational aggression is gender non-normative for boys (Heilbron & Prinstein, 2008; Underwood, 2003), but others have found that boys and girls actually use relational aggression at relatively equal rates (David & Kistner, 2000; Pakaslahti & Keltikangas-Järvinen, 2000;

Willoughby et al., 2001). In fact, in the current study, there were no mean level gender differences in relational aggression. Therefore, if boys and girls are engaging in relational aggression at similar rates, perhaps relational aggression is seen as equally acceptable for boys and girls.

Interestingly, the results show more similarities than differences for girls and boys in the associations between relational aggression and social prominence. Together, these positive associations support hypotheses that aggression may be used to increase and maintain high social status and prominence within the peer group (Buss & Shackelford, 1997; Hawley, 2003; Hawley et al., 2002; Wilson & Daly, 1984), and that relational aggression may be particularly useful in doing so. That is, perhaps relational aggression is used as a strategy to gain the power and dominance that accompanies occupying a highly prominent position within the peer network. Although the results of the current study supported these hypotheses, it is important to note that the current study was concurrent, rather than longitudinal in design. Therefore, although theories of dominance and resource control suggest that aggression is used to manipulate an individual's social prominence, it is also possible that high social prominence leads to increases in relational aggression. Longitudinal research is required to more fully assess directionality for this association.

Findings for physical aggression. Interestingly, the same robust results were not found when assessing the relations between physical aggression and social prominence for girls or boys. In fact, analyses indicated only trend level associations between adolescents' physical aggression and social prominence, and then only for one of the

three indices of social prominence. Thus, although relationally aggressive girls and boys were highly prominent, physically aggressive girls and boys were not.

Again, these findings can be examined with regards to the hypothesis that gender normative forms of aggression would be associated with high social prominence. For instance, perhaps physically aggressive girls were not socially prominent because physical aggression is seen by peers as gender non-normative for girls (Heilbron & Prinstein, 2008; Underwood, 2003). This might be seen as evidence in support of the gender non-normative hypothesis. However, it was also expected that a positive relation between social prominence and physical aggression would be obtained for boys, yet this was not the case. This stands in contrast to extant research that has found positive associations between boys' physical aggression and social status or prominence (Xie et al., 2003), and research suggesting that physical aggression in boys represents dominance and sexual prowess (Maccoby, 1998; Nelson et al., 2010). Our conflicting findings may be due to developmental differences (for instance, Nelson and colleagues studied preschool children, and Xie and colleagues included children in 1st and 4th, as well as 7th grade). For instance, Cillessen and Mayeux (2004) found that, between grades 5 and 9, physical aggression decreasingly predicted prominence. Thus, it may be that, by 6th grade, physical aggression no longer represents dominance within the peer group.

This developmental change may be a result of changes in group-level norms concerning aggressive behavior. For instance, classrooms vary based on their overall acceptance of aggressive behavior, which likely affects an individual's use of aggression. Specifically, when classroom-level normative beliefs support the use of aggression, children's use of aggression increases (Henry et al., 2000; Huesmann & Guerra, 1997;

Mercer, McMillan, & DeRosier, 2009). Such group-level norms concerning aggression

likely also play a role in how aggression is responded to by peers. That is, perhaps

physical aggression was not associated with high social prominence for 6th grade boys

and girls because at the classroom (or grade) level, peers were not accepting of the use of

physical aggression.

Taken together, these results suggest that engaging in physical aggression is not

an effective strategy for either boys or girls to increase social status or prominence in

early adolescence. In fact, it may be that girls and boys who are physically aggressive are

not using aggression to manipulate their social prominence, but rather are using

aggression in other ways. For instance, physical aggression may be used in response to

problems at home, or it may be used reactively, to retaliate against incoming aggressive

attacks or to ward off aggression from peers, for instance (Ellis & Zarbatany, 2007; Estell

et al., 2002). Future research could more directly assess the purposes of aggression in

order to further clarify these findings.

The importance of form of aggression. The differences seen between relational

and physical aggression can also be explained by highlighting the social consequences of

relational aggression versus physical aggression. That is, relational aggression targets

peers' relationships, but can leave one's own relationships intact (Card et al., 2005; Crick

& Grotpeter, 1995; Merten, 1997), and thus it can be seen as more directly applicable to

the manipulation of one's own prominence within the peer group. In fact, relational

aggression may even strengthen the relationships of the aggressor (Card et al., 2008;

Cillessen & Mayeux, 2004; LaFontana & Cillessen, 2002; Rose et al., 2004). For

instance, an aggressor who gossips about his or her victim to a third peer may gain the

62

trust of and build a stronger relationship with that third peer, while simultaneously decreasing the victim's status relative to her own. In this way, relational aggression may be a very effective tool to improve one's own status while decreasing the status of others. Physical aggression, on the other hand, not only does not directly target others' relationships, but may frequently negatively impact one's own relationships (at least the relationship between aggressor and victim). For instance, getting in a physical fight with a peer likely damages the relationship between the aggressor and the victim involved in the fight, and may not have benefits to the aggressor's other relationships (i.e., with peers observing the fight).

Thus, relational aggression may be used as an effective strategy for early adolescents to gain and maintain high social prominence, whereas physical aggression may not have this same effect. However, more research needs to be conducted to further clarify this finding. Perhaps peer norms of the acceptability of physical aggression acts as a moderator in this hypothesized association. That is, perhaps in classrooms or schools where physical aggression is seen as unacceptable, physical aggression is no longer used as strategy to gain and maintain status, whereas in classrooms or schools with more positive peer norms against physical aggression, findings may be different.

Victims

Eighty-seven percent of participants were nominated at least once as a victim of relational aggression and 73% were nominated as victims of physical aggression. These nomination rates are quite a bit higher than rates of aggression, discussed above. This suggests that each aggressor might target multiple victims, as opposed to each aggressor having a unique victim. This discrepancy between rates of nominations of aggressors

versus victims was particularly strong for physical forms of aggressive behavior. That is, 63% of participants were nominated as relational aggressors, with 87% nominated as victims, whereas only 42% were nominated as physical aggressors, with 73% nominated as victims. Therefore, aggressors using physical means to attack peers may be more indiscriminate in their targeting of victims, but those using relational means may be more targeted in their attacks on a relatively small number of peers. This can be interpreted in light of dominance theories and resource control theory that suggest that relational aggression is a powerful tool for gaining status and resources and is likely to be used strategically against targeted others to achieve one's goals (Hawley, 2003; Merten, 1997). Although physical aggression may also be used in such a way, it has also been suggested that the use of physical aggression is associated with being less socially skilled and less regulated, and thereby also indicative of lashing out against peers indiscriminately (Ellis & Zarbatany, 2007; Estell et al., 2002). In fact, the results of the current study support this notion; relational aggression was associated with high social prominence, whereas physical aggression was not. Examining the rates of nominations of aggressors and victims provides further support to these ideas.

Status as a determinant of who gets victimized. Although it seems that different forms of aggression may be differentially useful in gaining and maintaining high status, it was also important to consider towards whom that aggression was targeted. That is, it may be that aggression is only successful in gaining and maintaining status if targeted towards peers that occupy certain positions within the peer network. Thus, it was hypothesized that social prominence would also be associated with relational and physical victimization. Although most researchers have suggested that victims should be

64

low in status (Card & Hodges, 2008; Card et al., 2005; Olweus, 1978), arguments based in evolutionary theories could be made to suggest that victims of aggression could be low or high in status (Djikstra, 2012; Pellegrini, 2001).

Findings for relational victimization. Regression analyses indicated that, for both boys and girls, social prominence was related to relational victimization such that higher levels of social prominence were associated with higher levels of relational victimization. SEM procedures expanded on this finding, indicating that this effect was driven largely by popularity (Bonacich centrality was also marginally significant for girls). Thus, it seems that being popular was associated with being relationally victimized by peers. However, testing for curvilinear effects revealed a more complicated pattern of associations.

For girls, regression analyses revealed a negative curvilinear association between popularity and relational victimization, such that girls at mid-levels of popularity were most highly relationally victimized (however no curvilinear results were found using SEM procedures). This curvilinear effect suggests that the linear effect may have been mainly driven by girls at mid-levels of prominence being highly relationally victimized. Curvilinear effects for boys revealed a slightly different pattern of results. Both regression analyses and SEM procedures indicated a positive curvilinear effect (rather than a negative curvilinear effect), such that boys both very high and very low in popularity were highly relationally victimized. These gender differences somewhat parallel past research findings. For instance, Nelson and colleagues (2010) found that both rejected and controversial status boys were most highly relationally victimized. Although these status categories (measured using sociometric nominations) are different

65

than our continuous measure of social prominence, this does suggest that there may be boys at varying levels of social status who are highly victimized. On the other hand, Nelson and colleagues (2010) found that controversial status girls, who have high social impact in the peer group, were more highly relationally victimized than any other social status group. This parallels our findings; that high status girls are most highly relationally victimized.

In the case of both boys and girls, the findings overall seem to contrast past research in which negative associations between victimization and social status have been found (Boulton, 1999; Hodges & Perry, 1999; Nelson et al., 2010; Perry et al., 1988). Perhaps this difference is a methodological one. In the present analyses, continuous indices of social prominence were used. This differs from much of the past research that has utilized sociometric categories as indicators of social status (Hodges & Perry, 1999; Nelson et al., 2010; Perry et al., 1988). Specifically, from peer nominations of 'liked most' and 'liked least', five categories of children's social status are created; thus social status is measured using multidimensional categories. Using observational methods, Boulton (1999) measured status as the number of play partners. Thus, these methods (sociometric categories and observational methods) may indicate different aspects of social status than our measures of social prominence, calculated using social network analysis. For instance, some lower status individuals may resent those at the top of the peer hierarchy, and thus not nominate them as most liked, but still desire to be friends with them (Eder, 1985). Alternatively, this difference in findings may be due to differences in analyses. That is, past research has not tested for curvilinear effects. Thus, although past research has found that rejected boys and girls tend to be higher in

66

victimization (Boulton, 1999; Hodges & Perry, 1999; Nelson et al., 2010; Perry et al., 1988), it is possible that testing for curvilinear effects would have revealed different results.

Findings for physical victimization. As with relational victimization, regression analyses indicated that, for both boys and girls, high social prominence was associated with high physical victimization. Again, the more stringent SEM procedures revealed that this was driven mainly by popularity. For boys, SEM procedures also indicated a negative association between betweenness centrality and physical victimization. However, given that this directly opposes findings with regard to popularity (as well as the results of both the regression and correlation analyses), it is possible that this finding may have been due to a suppression effect that occurred when all indices of social prominence were included in the same SEM model. Thus, overall, there appears to be a positive association between social prominence (popularity in particular) and physical victimization, for both boys and girls.

However, curvilinear analyses again indicated more complicated findings. In this case, regression analyses and SEM procedures revealed negative curvilinear associations between popularity and physical victimization for both boys and girls, such that those at mid-levels of popularity were most highly physically victimized. Once again, these results largely oppose past research findings indicating negative associations between social status and victimization (Boulton, 1999; Hodges & Perry, 1999; Nelson et al., 2010; Perry et al., 1988). In the current study, results concerning relational and physical victimization were fairly similar. Thus, the lack of congruence in findings between the

current study and past literature may involve the same mechanisms, such as measurement

differences and differences in analytic technique, as discussed above.

Aggressors and Victims as Intertwined Social Partners

Just as status within the peer group is integral to the enactment of aggressive

behavior, aggressors and victims themselves are intricately linked in their involvement in

aggressive behavior (Cicchetti, 2006; Craig et al., 2000; Olson, 1992; Salmivalli et al.,

1996; Vaillancourt et al., 2003). In fact, based on Bronfenbrenner's bioecological model,

aggressive interactions among peers can be viewed as an important mechanism for

human development (Bronfenbrenner & Morris, 2006). Thus, it is important not only to

consider the associations between both aggression and victimization to social

prominence, but also to consider links between aggressors and victims themselves. That

is, it may in fact be that an aggressor's actions (and how these actions are responded to by

peers) hinge upon their choice of victim.

For instance, our analyses of aggression indicated that, at least for relational

aggression, aggression is commonly used by highly prominent individuals, particularly

for girls. Our findings for victimization revealed that girls at mid- to high-levels of social

prominence were the most highly relationally victimized. Together, this suggests that

girls' aggression is fairly consistently contained in the upper levels of social prominence.

That is, the results suggest that highly prominent individuals are targeting highly

prominent girls. These patterns are supported by ethnographic research that has carefully

documented patterns' of girls' aggression (Adler & Adler, 1995; Merten, 1997).

Specifically, these researchers found that popular girls aggressed against other popular

girls within their clique, in order to increase their own dominance above that of their

popular peers, while at the same time maintaining a positive image to outsiders (such that other members of the peer group would think of the popular clique members as people with whom they would like to form a relationship; Adler & Adler, 1995; Merten, 1997). However, authors of both ethnographic studies also reported that popular girls aggressed against peers outside of their clique (who presumably had slightly lower status), in order to maintain exclusivity of the popular clique. These ideas are in line with the findings of the current study; it is possible that highly prominent girls are aggressing against other highly prominent girls (potentially those within their immediate peer group), as well as against girls with mid-levels of prominence (potentially those outside their peer group, but close enough to be threatening).

Although highly prominent girls may be aggressing against other prominent girls, aggression is not exclusively same-gender, and the current study did not differentiate aggression directed towards own-gender or other-gender peers. Thus, it is also possible that highly prominent girls are aggressing against boys, or that boys are aggressing against highly prominent girls. In fact, Rodkin and Berger (2008) found that lower status boys bullied higher status girls. Alternatively, high status girls may be relationally aggressive towards boys (or vice versa) in order to develop cross-gender relationships and move into dating relationships (Bukowski, Sippola, & Newcomb, 2000; Pellegrini, 2001; Pellegrini & Bartini, 2000). Future research examining differences between own-gender and cross-gender aggressive interactions would be able to further clarify these complex associations.

For boys, our analyses indicated that aggression was most commonly used by highly prominent individuals, but the associations between prominence and victimization

69

were less clear; boys both high and low in prominence were relationally victimized, and boys at mid- to high-levels of prominence were physically victimized. The findings that highly prominent boys are relationally and physically victimized can be explained by again considering the evolutionary functions of aggression. That is, it can be argued that, in order to gain the maximum possible benefits from use of aggression, one should choose a victim with a high amount of resources (in this case, social status or prominence). A high status individual aggressing against another high status peer may be able to advance their position above that of their peers (Djikstra, 2012). Thus, it is possible that, for the most part, boys are aggressing against mid to high status peers because this offers them the maximum possible gain in benefits from successful aggression. Alternatively, it may be that girls are aggressing against mid- to high-status boys. This again may be explained by Pellegrini's (2001) hypotheses regarding 'pushing and poking' courtship behaviors, wherein boys and girls start to develop heterosexual relationships through teasing and aggressive interactions. Thus, perhaps highly prominent boys are being nominated as being victimized, due to their involvement in 'pushing and poking' courtship behaviors.

However, the current study also found that there were boys low in social prominence being relationally victimized. This may be because, in order to gain valuable resources, individuals are also aggressing against those against whom they have the best chance of being successful (Buss & Shackelford, 1997; Wilson & Daly, 1984). Low prominent boys may not have friends who can support them or retaliate against the aggressors (Hodges et al., 1999). Past empirical research also supports this finding that low status boys are likely to be victimized, although these studies have commonly

examined only physical victimization, or bullying behavior more generally (Boulton, 1999; Card & Hodges, 2008; Card et al., 2005; Hodges & Perry, 1999; Olweus, 1978). Thus, it is particularly interesting that our findings indicated low status victims of relational aggression, but not physical aggression. Unfortunately, extant research on boys' relational victimization in particular is particularly scarce. Although the current study is a first step in uncovering these complex associations, more research needs to be done to further clarify how social prominence and victimization are associated, particularly for boys.

Indices of Social Prominence

For most analyses, similar results were found across all indices of social prominence. However, popularity emerged as the most robust indicator of social prominence, particularly in the more sophisticated structural equation models that considered all three indices simultaneously. This suggests that, overall, popularity was more robustly associated with aggression and victimization than betweenness or Bonacich centrality. As opposed to the two forms of centrality, popularity considers local level prominence, rather than global (grade-level) prominence (Wasserman & Faust, 1994). That is, popularity assesses an individual's number of direct friendships, whereas centrality measures an individual's status within the grade-level peer group. Unlike much past research (Farmer, Estell, Bishop, et al., 2003; Gest et al., 2001; Rodkin & Berger, 2008; Rodkin et al., 2000), students in this study were allowed to nominate friends within their entire grade, so as not to artificially constrain the peer group. However, it may be because of this distinction that popularity emerged as the most robust index of social prominence. For instance, perhaps in such a large reference group (over

300 students at the grade level), relational aggression is only effective in increasing an individual's popularity among their direct relationships and more immediate peer group. It is possible that many of the 339 adolescents did not even know each other, and thus aggression may not be as effective in increasing one's centrality within such a large peer group. Although allowing students to nominate any peer within their entire grade level prevented artificially truncating the network into smaller groups based on classroom (particularly in this middle school, when adolescents are in different classrooms with different peers for each subject), it is possible that a reference group so large makes changing one's global level prominence (particularly by using aggression against particular peers) much more difficult. In addition, the results of the current study suggest that, to some extent, high status aggressors are aggressing against high status peers. This again indicates that one's local peer group is more important in terms of these behaviors and associations.

Strengths and Limitations

Overall, the findings of this study suggest that both aggression and victimization are associated with high social prominence, but that these results are more robust when considering relational aggression and victimization (rather than physical forms), and when involving girls rather than boys. By considering the disparate effects of both relational and physical forms of aggressive behavior, the current study extended extant research that examined only physical aggression or more general bullying behavior (Boulton, 1999; Card & Hodges, 2008; Card et al., 2005; Hodges & Perry, 1999; Olweus, 1978). In addition, testing for moderation by gender revealed important gender differences (social prominence was differentially associated with victimization for boys

72

and girls), as well as suggested some similarities across gender (the association between aggression and social prominence was largely the same for boys and girls). Finally, the current study also added to the extant literature by conceptualizing and measuring social prominence using social network analysis. This allowed for a more sophisticated and nuanced representation of social relations within a peer group. Utilizing three indices of social prominence not only indicated the robustness of certain associations (social prominence and relational aggression, for instance), but also revealed which index of social prominence was responsible for driving these associations (popularity emerged as the most important and robust index of social prominence).

Although this study had several significant strengths, there were also some limitations that should be noted. First, based on extant theoretical and empirical work, it was hypothesized that aggression would predict social prominence, and that social prominence would predict victimization. However, due to the concurrent nature of the data, the directionality of these effects cannot ultimately be determined. That is, it is possible that prominence predicts aggression, and that victimization predicts prominence, rather than the other way around. For instance, there has been research suggesting that popularity acts as a risk mechanism for increased aggressive behavior (Schwartz & Gorman, 2011). That is, popularity may provide increased exposure to negative socializing influences, such that influence from popular peers to conform to group norms and behaviors would cause an increase in aggressive behavior (Santor, Messervey, & Kusumakar, 2000; Schwartz & Gorman, 2011). Alternatively, as mentioned above, at this developmental level, boys and girls start to engage in 'pushing and poking' courtship behaviors with opposite gender peers (Pellegrini, 2001). Thus, at this developmental

level, being victimized (at least by the opposite gender) might signify that the victim is attractive to the opposite gender, thus enhancing their overall status or prominence within the peer group. Therefore, although the theoretical framework utilized provided the current study with a hypothesized directionality of effects, longitudinal work is required to further clarify these patterns and more accurately test directionality.

In addition to longitudinal work focusing on the direction of effects, future work could also be conducted to examine these associations at different age groups. Sixth grade is an optimal time to examine these associations because these sixth graders had just transitioned from elementary school to middle school, and in times of transition, rates of aggression are likely to be higher as individuals need to reestablish dominance hierarchies and positions within the peer group (Pellegrini & Bartini, 2000). However, it is possible that different patterns exist at different ages. For instance, at older ages, once dominance hierarchies are more firmly established, it may be that aggression is no longer as effective in increasing one's social prominence (Pellegrini, 2001). Furthermore, children tend to be more accepting of relational aggression and less accepting of physical aggression as they age (Cillessen & Mayeux, 2004). Thus, it is possible that the lack of robust associations involving physical aggression would not be seen among younger children. Research examining these associations at different developmental levels would be helpful to more fully examine the associations between aggression and victimization and social prominence.

Implications and Conclusions

Overall, the findings in the current study provide support for hypotheses based on dominance theories and resource control theory; that aggression (particularly relational

74

aggression) may be used against high status peers in order to increase the aggressor's social status and prominence relative to others in his or her peer group. These findings have important implications for intervention work focused on decreasing adolescents' use of aggression. For one, they provide information on a group of adolescents upon whom to target interventions. That is, these results suggest that most aggressive interactions are occurring among high status individuals. Thus, interventions targeting this population may be most effective in decreasing aggression. These findings even highlight small changes that could be made at the classroom level. That is, if high status individuals are frequently aggressing against one another, teachers could structure classrooms so as to separate these individuals, or more closely monitor their interactions when they are together.

In addition, the findings generated in the current study suggest that adolescents are using aggression, particularly against other high status peers, in order to increase their own status. This highlights the need to structure interventions to provide adolescents with alternative methods of gaining or maintaining high status or position within the peer network in ways that are less harmful to others. For instance, Hawley's work on bistrategic controllers suggests that some individuals use both coercive and cooperative strategies to gain control of resources. Thus, perhaps interventions could be designed that highlight prosocial control strategies, while discouraging the coercive or aggressive ones. This might help aggressive individuals feel that they can still gain resources and gain influence over their peer group, without using aggression as a strategy to do this. Or, interventions could be designed to create peer environments that are more egalitarian,

rather than hierarchical, in structure. This might reduce the need to vie with peers for power, thus decreasing the overall use of aggression.

Alternatively, from an evolutionary perspective, the ideas formulated in this study suggest that perhaps increasing resources available would lead to decreased use of aggression overall. That is, if adolescents in a peer group are competing with one another to gain resources, increasing the overall resources available would decrease the need for competition. For example, when assigning group work in schools, instead of having children choose their own groups (which encourages individuals to compete to gain access to the 'best' group), perhaps teacher should pick groups, consequently eliminating membership in a certain group as a valued resource. Changes such as these would be easy to implement and may serve as an effective means of decreasing aggressive behavior among early adolescent girls and boys.

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Table 1

Means and Standard Deviations of Study Variables

Variable	Total		Boys		Girls	
	M	*SD*	*M*	*SD*	*M*	*SD*
Relational Aggression	.43	.65	.40	.63	.52	.69
Physical Aggression	.20	.50	.31$_a$	.63	.11$_a$	.33
Relational Victimization	3.63	3.33	2.94$_b$	2.63	4.55$_b$	3.84
Physical Victimization	1.77	1.83	1.91	1.94	1.70	1.65
Popularity	6.42	4.47	5.85$_a$	3.98	7.33$_a$	4.88
Betweenness Centrality	3.14	3.34	2.83$_a$	3.32	4.01$_a$	3.28
Bonacich Centrality	.53	.53	.67$_b$	.41	1.17$_b$	.42

Note. Ns = 171 girls, 168 boys. Log transformed variables were used for relational aggression, physical aggression, and betweenness centrality.

$_a$Means within the same row differ significantly at *p* < .01. $_b$Means within the same row differ significantly at *p* < .001.

Table 2

Correlations of Study Variables by Gender

Variable	1	2	3	4	5	6	7
1. Relational Aggression	—	.36***	.51***	.33***	.32***	.23**	.23**
2. Physical Aggression	.59***	—	.27***	.22**	.15*	.03	.14
3. Relational Victimization	.29***	.34***	—	.54***	.34***	.28***	.23**
4. Physical Victimization	.45***	.49***	.35***	—	.23**	.24**	.20*
5. Popularity	.15*	.08	.37***	.33***	—	.64***	.42***
6. Betweenness Centrality	-.07	-.06	-.09	.06	.57***	—	.39***
7. Bonacich Centrality	-.07	-.10	-.01	-.03	.25**	.51***	—

Note. Ns = 171 girls, 168 boys. Correlations for girls are presented above the diagonal, correlations for boys are presented below the diagonal. Correlations in bold are significantly different for girls and boys.

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

Table 3

Relational Aggression and Gender Predicting Indices of Social Prominence

		Popularity				Betweenness Centrality				Bonacich Centrality			
		β	R²	R²Δ	FΔ	β	R²	R²Δ	FΔ	β	R²	R²Δ	FΔ
Step 1	Generational Status	-.09	.00	.00	.14	-.07	.00	.00	.07	-.01	.01	.01	.83
	Black	-.10				.06				-.10			
	Other	-.09				.25				-.03			
	Hispanic	.22				.03				.02			
Step 2	Relational Aggression	1.72***	.09	.09	16.14***	.44	.04	.04	7.10**	.06	.27	.26	59.49***
	Gender	-1.27**				-1.18**				-.49			
Step 3	Relational Aggression X Gender	-1.32+	.10	.01	3.32+	-1.55**	.07	.02	8.09**	-.19**	.29	.02	7.65**

*Note. N*s = 171 girls, 163 boys. Gender is coded as girls = 0, boys = 1.

+ *p* < .01. * *p* < .05. ** *p* < .01. *** *p* < .001.

Table 4

Physical Aggression and Gender Predicting Indices of Social Prominence

		Popularity				Betweenness Centrality				Bonacich Centrality			
		β	R^2	$R^2\Delta$	$F\Delta$	β	R^2	$R^2\Delta$	$F\Delta$	β	R^2	$R^2\Delta$	$F\Delta$
Step 1	Generational Status	-.09	.00	.00	.14	-.07	.00	.00	.07	-.01	.01	.01	.83
	Black	-.10				.06				-.10			
	Other	-.09				.25				-.03			
	Hispanic	.22				.03				.02			
Step 2	Physical Aggression	.94*	.04	.04	6.49**	-.14	.04	.04	5.85**	-.01	.27	.26	57.64***
	Gender	-1.63**				-1.22**				-.49***			
Step 3	Physical Aggression X Gender	-1.70	.05	.01	2.13	-.57	.04	.00	.44	-.24*	.28	.01	4.78*

Note. Ns = 171 girls, 168 boys. Gender is coded as girls = 0, boys = 1.

+ p < .06. * p < .05. ** p < .01. *** p < .001.

Table 5
Social Prominence and Gender Predicting Relational and Physical Victimization

		Relational Victimization				Physical Victimization			
Panel 1: Popularity		β	R²	R²Δ	FΔ	β	R²	R²Δ	FΔ
Step 1	Generational Status	.20	.01	.01	1.16	-.07	.03	.03	2.91*
	Black	-.39				.67*			
	Other	-1.06				-.29			
	Hispanic	.12				-.21			
Step 2	Popularity	.26***	.19	.17	34.71***	.11***	.11	.08	14.52***
	Gender	-1.20**				.33			
Step 3	Popularity X Gender	-.03	.19	.00	.14	.07	.13	.02	4.03*
	Popularity²	-.00				-.01*			
Step 4	Popularity² X Gender	.04**	.21	.02	9.04**	.00	.13	.00	.12
Panel 2: Betweenness Centrality		β	R²	R²Δ	FΔ	β	R²	R²Δ	FΔ
Step 1	Generational Status	.20	.01	.01	1.16	-.07	.03	.03	2.91*
	Black	-.39				.67*			
	Other	-1.06				-.29			
	Hispanic	.12				-.21			
Step 2	Betweenness Centrality	.21***	.11	.09	17.29***	.08**	.06	.02	3.93*
	Gender	-1.34***				.25			
Step 3	Betweenness X Gender	-.27*	.12	.02	3.29*	-.08	.06	.01	.85
	Betweenness²	.02				.00			
Step 4	Betweenness² X Gender	.06	.10	.00	.42	.05	.06	.00	1.12
Panel 3: Bonacich Centrality		β	R²	R²Δ	FΔ	β	R²	R²Δ	FΔ
Step 1	Generational Status	.20	.01	.01	1.16	-.07	.03	.03	2.91*
	Black	-.39				.67*			
	Other	-1.06				-.29			
	Hispanic	.12				-.21			
Step 2	Bonacich Centrality	1.06*	.08	.07	12.75***	.37	.04	.01	1.58
	Gender	-1.07*				.34			
Step 3	Bonacich X Gender	-2.06*	.10	.02	3.01+	-.87	.05	.01	1.32
	Bonacich²	.08				-.26			
Step 4	Bonacich² X Gender	.36	.10	.00	.04	1.07	.05	.00	1.14

Note. Ns = 171 girls, 168 boys. Gender is coded as girls = 0, boys = 1.
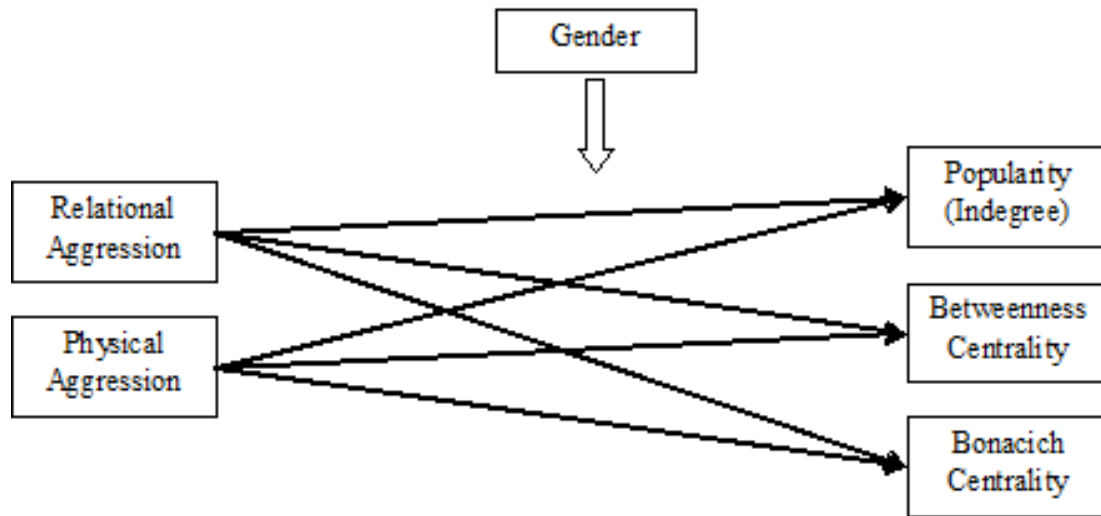*p < .05. **p < .01. ***p < .001.

Figure 1. Conceptual model of relational and physical aggression predicting social prominence, moderated by gender.
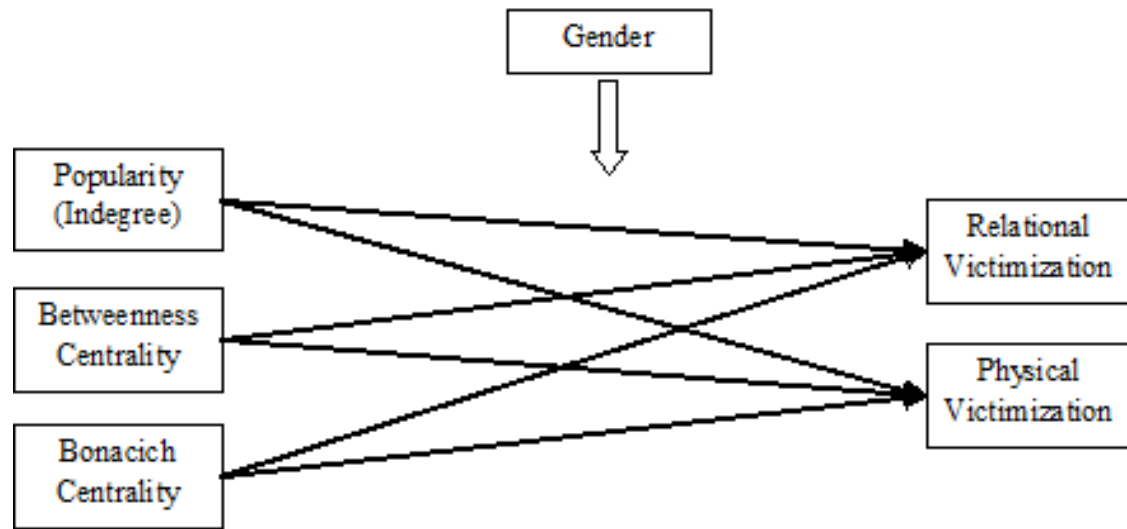
Figure 2. Conceptual model of social prominence predicting relational and physical
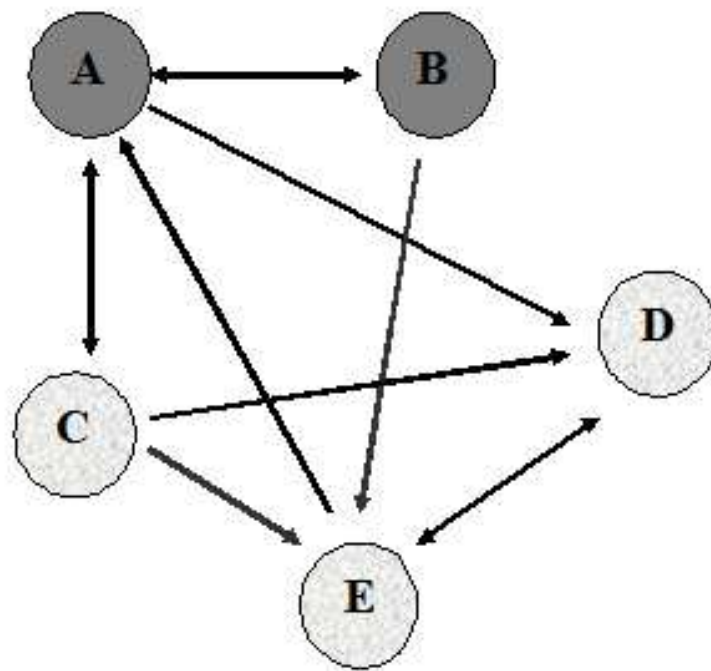
victimization, moderated by gender.

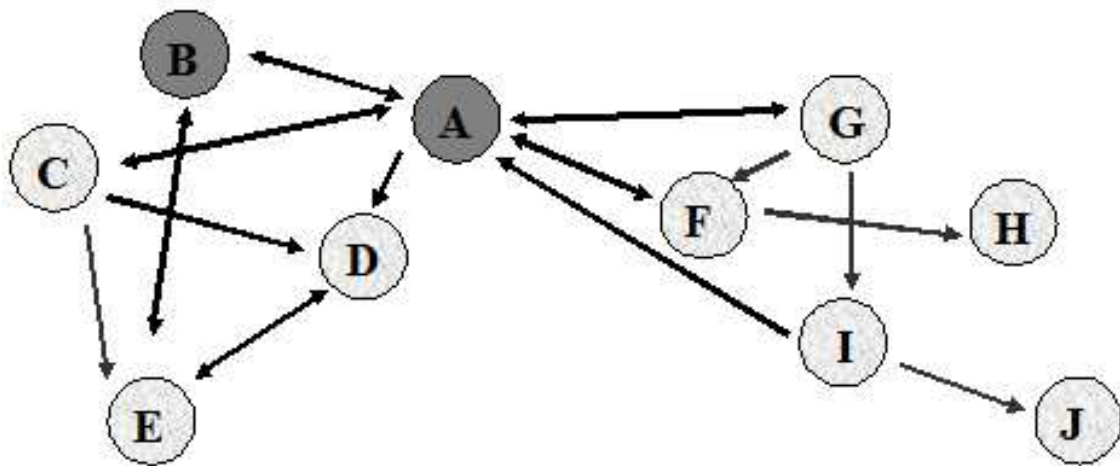*Figure 3.* Social network indices: Example illustrating high and low popularity.

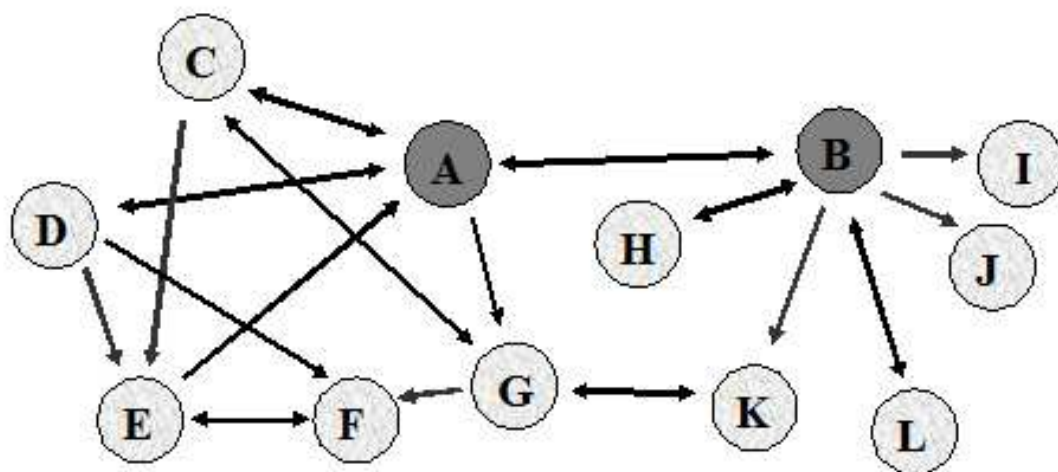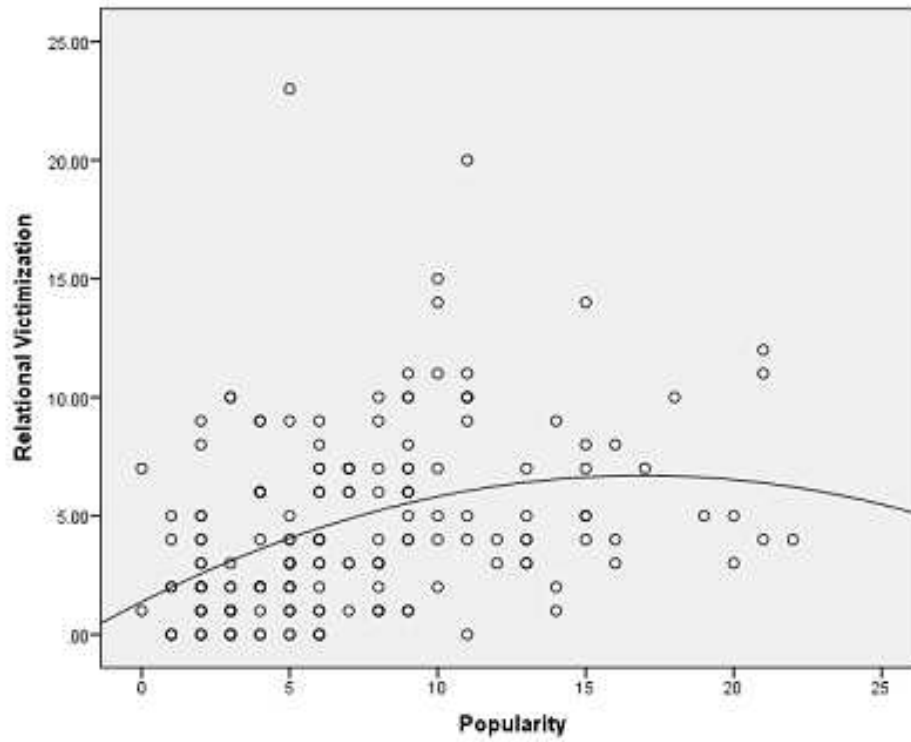*Figure 4.* Social network indices: Example illustrating high and low betweenness centrality.

Figure 5. Social network indices: Example illustrating high and low Bonacich centrality.

Figure 6. Negative curvilinear association between popularity and relational victimization for girls.
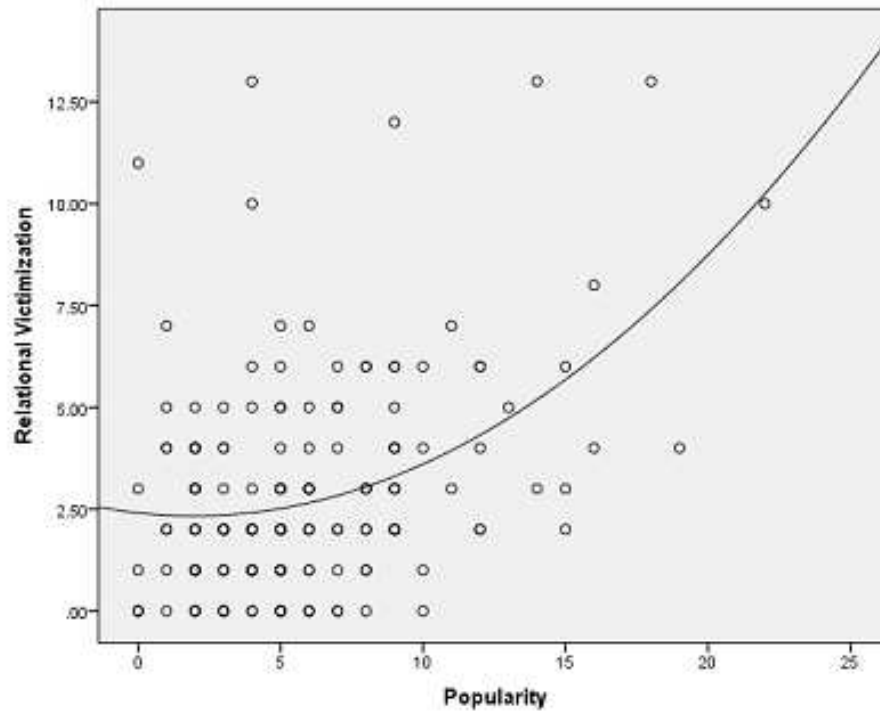
Figure 7. Positive curvilinear association between popularity and relational victimization for boys.
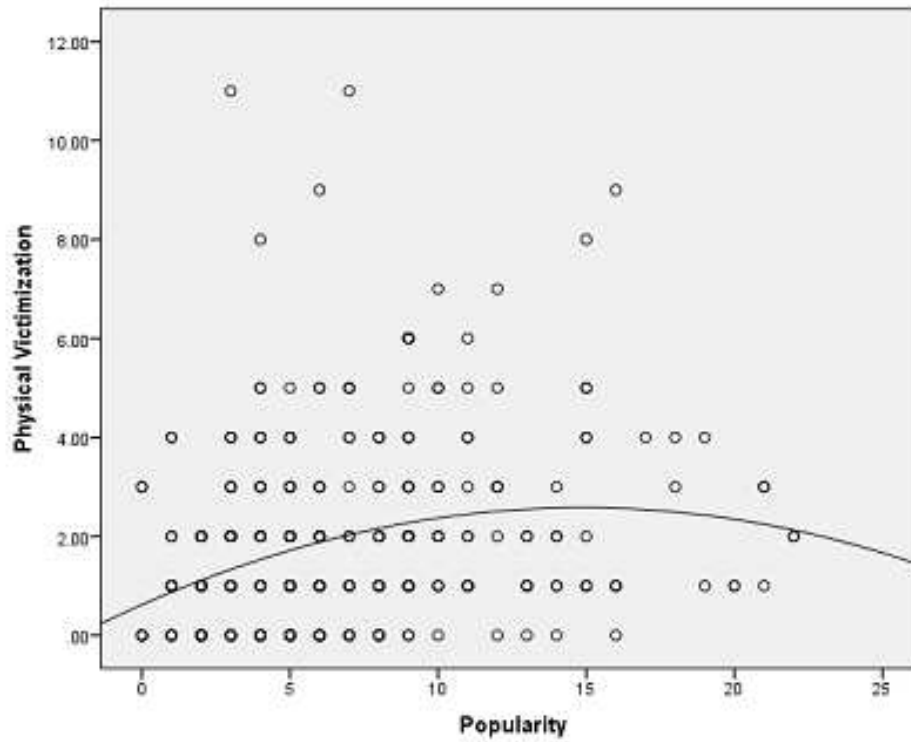
Figure 8. Negative curvilinear association between popularity and physical victimization.
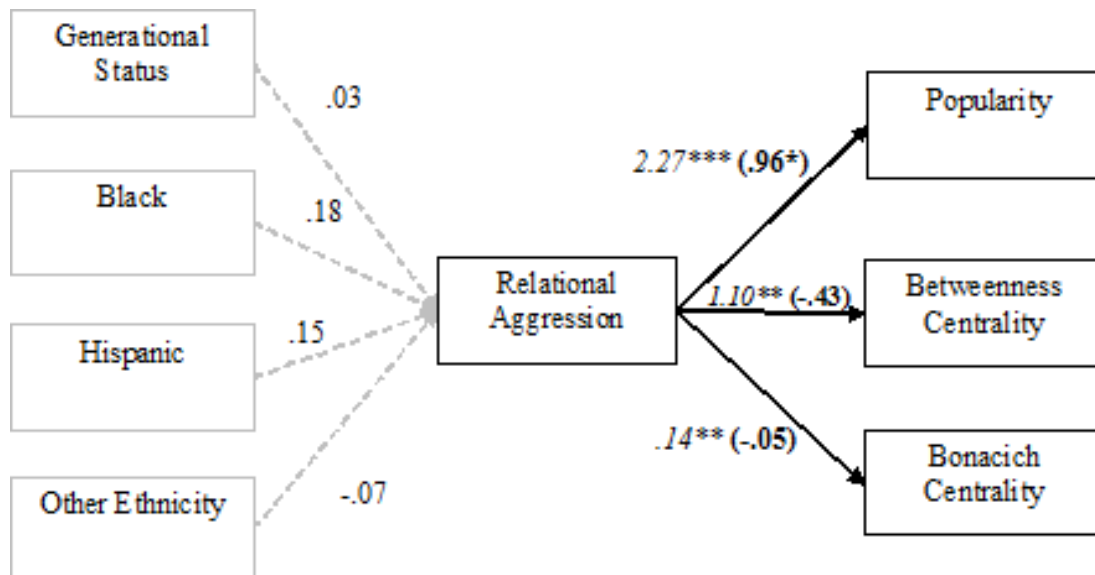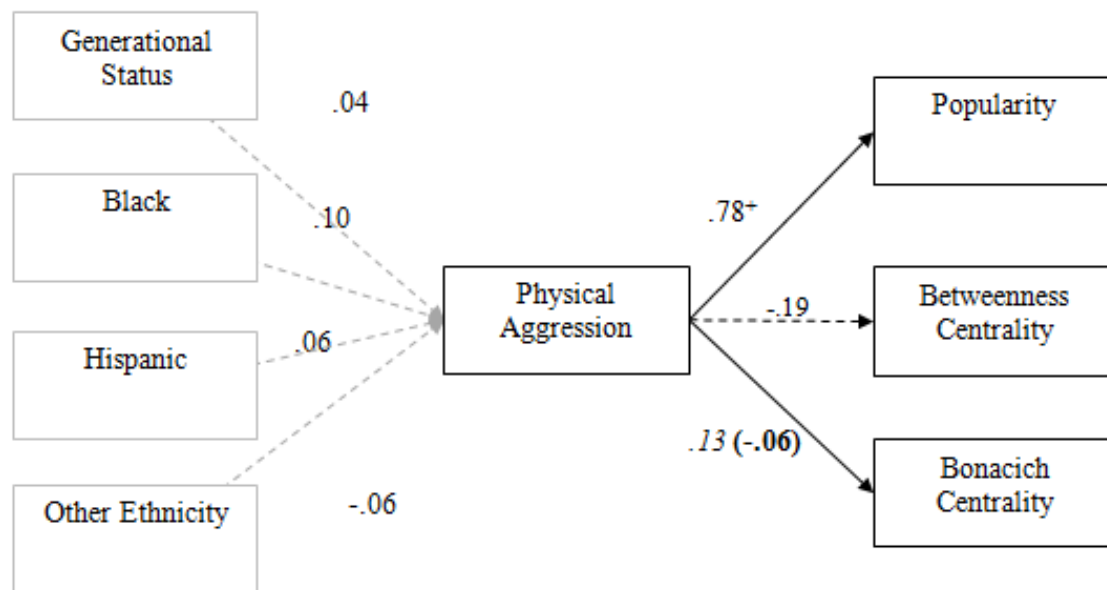
Figure 9. Partially constrained model for relational aggression. Italics indicate path coefficients

for girls, bold indicates path coefficients for boys. All other path coefficients were constrained to

be equal across gender. Dashed lines indicate non-significant paths and black lines indicate

significant paths. Grey lines indicate control variables. All path estimates are unstandardized.

*p < .05. **p < .01. ***p < .001.

Figure 10. Partially constrained model for physical aggression. Italics indicate path coefficients for girls, bold indicates path coefficients for boys. All other path coefficients were constrained to be equal across gender. Dashed lines indicate non-significant paths and black lines indicate significant paths. Grey lines indicate control variables. All path estimates are unstandardized.

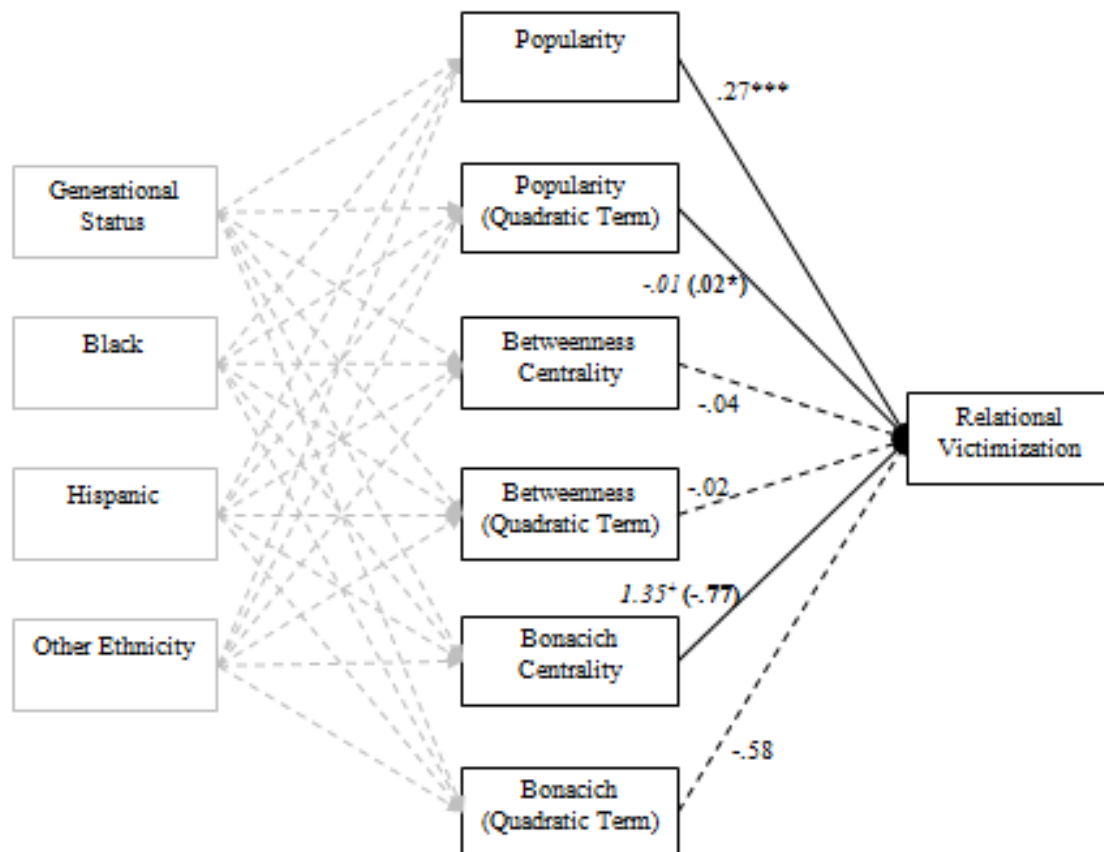$^+p < .085$. $^*p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Figure 11. Partially constrained model for relational victimization. Italics indicate path coefficients for girls, bold indicates path coefficients for boys. All other path coefficients were constrained to be equal across gender. Dashed lines indicate non-significant paths and black lines indicate significant paths. Grey lines indicate control variables. All path estimates are unstandardized. All exogenous variables were specified to be correlated, but for ease of illustration, they are not depicted here.

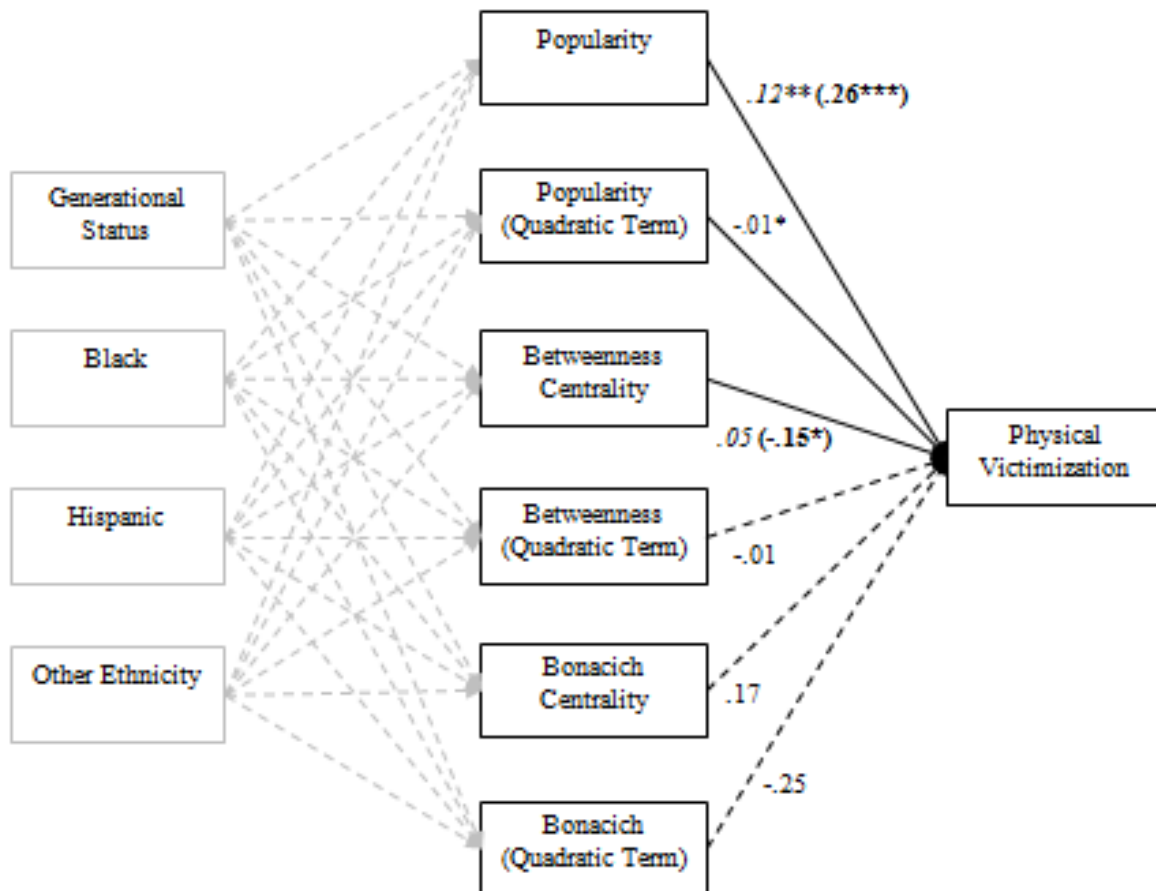$^+p < .065.$ $^*p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$

Figure 12. Partially constrained model for physical victimization. Italics indicate path coefficients for girls, bold indicates path coefficients for boys. All other path coefficients were constrained to be equal across gender. Dashed lines indicate non-significant paths and black lines indicate significant paths. Grey lines indicate control variables. All path estimates are unstandardized. All exogenous variables were specified to be correlated, but for ease of illustration, they are not depicted here.

*p < .05. **p < .01. ***p < .001.

APPENDIX A

WHO BULLIES WHOM

Instructions:

1. Read the descriptions in PART A, and think of a person **IN YOUR GRADE** who fits the description.

2. When you find this person, write down his/her first name and last name initial in the space after the description.

3. After you write their name, look at the list of names on the roster that has been provided to you which contains ID numbers next to your friends' names. Match the person's name to the number and write the number in the ID number box.

   - You can choose up to three people for each description, who are **IN YOUR GRADE**. You cannot choose yourself.
   - You can choose the same person for more than one description.
   - If you cannot find anybody that fits the description, just leave the spaces blank.

4. Once you have chosen someone for a description, fill in the question in PART B, thinking about THAT PERSON.

   - You can choose up to three people **IN YOUR GRADE** for PART B, thinking about the **FIRST PERSON** you listed on that line.
   - If you cannot find anybody to fill all of PART B, just leave the spaces blank.

Do not discuss with others.

Please follow the example below…

PART A	FIRST NAME and LAST INITIAL	ID Number	PART B	FIRST NAME and LAST INITIAL	ID Number
EXAMPLE: *List one person who is nice to others*	*Jose A.*	*1234567*	*Who is Jose nice to? (List up to 3)*	*Maria B.*	*2345678*
				Taylor M.	*3456789*
				Juan H.	*4567890*

DESCRIPTION	FIRST NAME and LAST INITIAL	ID Number		FIRST NAME and LAST INITIAL	ID Number
1. Gossips about others or **excludes** others					
List **one person** who gossips about others or excludes others.			Who does **this person** gossip about or exclude the most? (List up to 3)	1 .... 2 3	
List **a second person** who			Who does **this person** gossip about or exclude	1 2	

DESCRIPTION	FIRST NAME and LAST INITIAL	ID Number		FIRST NAME and LAST INITIAL	ID Number
gossips about others or excludes others.			the most? (List up to 3)	3	
List **a third person** who gossips about others or excludes others.			Who does **this person** gossip about or exclude the most? (List up to 3)	1 .... 2 3	
2. Hits, kicks, or pushes others					
List **one person** who hits, kicks, or pushes others			Who does **this person** hit, kick, or push? (List up to 3)	1 .... 2 3	
List **a second person** who hits, kicks, or pushes others			Who does **this person** hit, kick, or push? (List up to 3)	1 .... 2 3	
List **a third person** who hits, kicks, or pushes others			Who does **this person** hit, kick, or push? (List up to 3)	1 .... 2 3	
3. Calls others names or **laughs at** them					
List **one person** who calls others names or laughs at them			Who does **this person** call names or laugh at? (List up to 3)	1 .... 2 3	
List **a second person** who calls others names or laughs at them			Who does **this person** call names or laugh at? (List up to 3)	1 .... 2 3	
List **a third person** who calls others names or laughs at them			Who does **this person** call names or laugh at? (List up to 3)	1 .... 2 3	

108

APPENDIX B

FRIENDSHIP NOMINATIONS

Instructions:

1. Write the first name and last name initial of your *ten closest friends* starting with your **best friend** in your grade. After you write their name, look at the list of names on the roster that has been provided to you which contains ID numbers next to your friends' names. Match your friend's name to the number and write the number in the ID number box. If you cannot think of ten friends in your class, then leave the extra lines empty.

2. Please write in the **number of months** that you have been friends with this person.

3. Now think about your relationship with each one of your friends, and fill in the bubble that best describes how **satisfied or happy** you are with your relationship with this friend.

Please follow the example below...

	FIRST NAME and LAST INITIAL	ID Number	How many **months** have you been friends with this person?	How **satisfied or happy** are you with the relationship you have with this friend?				
				Not at all	A little	Some	A lot	Very Much
Example	Jose A.	1234567	12 months	O	O	O	O	●
Best Friend				O	O	O	O	O
2.				O	O	O	O	O
3.				O	O	O	O	O
4.				O	O	O	O	O
5.				O	O	O	O	O
6.				O	O	O	O	O
7.				O	O	O	O	O
8.				O	O	O	O	O
9.				O	O	O	O	O
10.				O	O	O	O	O