TheModeratingRoleofCliqueStratificationandIndividualCentralityonCliqueSocializationofOvertandRelationalAggression

Christopher Sciberas
*The University of Western Ontario*

Supervisor
Dr. Lynne Zarbatany
*The University of Western Ontario*

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Abstract

This study assessed the roles of clique stratification (hierarchical organization) and within-clique centrality (status) in clique socialization of overt and relational aggression over six months. Stratification was expected to increase clique socialization of aggression due to clear expectations for behaviour. For overt aggression, high- and low-central individuals were expected to be especially sensitive to stratification effects. Data were collected from 1,033 students ($M_{age} = 11.59$, $SD = 1.37$, 444 boys, 580 girls) in the fall and spring of an academic year. Aggression was assessed via peer nominations. Cliques and individual centrality were identified using the Social Cognitive Map. Multilevel modeling indicated that clique stratification magnified clique socialization of relational aggression, regardless of individual status. However, only high-central members of stratified overtly aggressive cliques increased in overt aggression over time; aggression of low-central members decreased. These results suggest that although stratification may motivate adoption of clique-valued aggressive behaviour, actual behavioural adoption may depend on children’s aggressive competencies.

Keywords: Peer Cliques, Socialization, Individual Centrality, Clique Stratification, Relational and Overt aggression.
Summary for Lay Audiences

In late childhood and early adolescence, youth spend the majority of their free time “hanging out” in cliques, groups of between 3 and 10 peers. Each clique expects specific types of behavior from its members, so that members become more alike in thoughts, values, and actions, a process referred to as clique socialization. For example, members of aggressive cliques become increasingly aggressive over time. The purpose of this longitudinal study was to determine whether the strength of clique socialization of overt (e.g., hitting; threatening) and relational aggression (gossip; rumours; ostracism) was affected by the clique’s hierarchical organization (status equality or inequality), and by children’s status within their cliques. Participants were 1,033 children (444 boys, 580 girls) in Grades 4 to 8 from eight public schools, forming 162 cliques. Children reported on their clique membership and their classmates’ overt and relational aggression in the fall and spring of an academic year. As expected, relationally aggressive cliques that were organized in a hierarchical status structure magnified clique socialization of members’ relational aggression, likely because the hierarchical organization clearly conveyed the behavior expected and likely to be rewarded. The covert nature of relational aggression made retaliation unlikely, so all members could participate, regardless of status. In contrast, only high-status members of overtly aggressive stratified cliques increased in overt aggression over time. Although all members of overtly aggressive cliques may wish to meet clique expectations for overt aggression, only high-status members may have the skill to perpetrate overt aggression and defend themselves against retaliation, raising the aggression “bar” for their clique mates. These results demonstrate that clique socialization of aggressive behavior is nuanced, and depends on characteristics of the clique, the individual members, and type of behavior being socialized.
CLIQUE STRATIFICATION AND CLIQUE SOCIALIZATION OF AGGRESSION

More research is needed to determine whether the aggression in stratified cliques is primarily directed toward members of other cliques or to clique mates.
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Chapter 1

1 Introduction

1.1 Consequences of Aggression

Given the negative consequences of aggression for both the perpetrator and victim, aggression has been one of the most well studied topics in developmental psychology (Casper & Card, 2017; Crick & Dodge, 1996; Mathieson & Crick, 2010). For chronic victims of aggression, risk increases for the development of low self-esteem, depression, substance abuse, suicide ideation and suicide attempts (Prinstein, Boergers, & Vernberg, 2001; Ybrandt & Armelius, 2010). Chronic perpetrators of aggression are at increased risk for alcohol dependence, other externalizing behaviours, including delinquency, and criminal activity (Card, Stucky, Sawalani, & Little, 2008; Farrington & Ttofi, 2011; Moore, Norman, Sly, Whitehouse, Zubrick, & Nabors, 2014). These findings have led to numerous interventions attempting to limit aggression and other forms of anti-social behavior in children and adolescents (Conduct Probl. Prev. Res. Group 1992, 2010; Schonert-Reichl, Oberle, Lawlor, Abbot, Thomson, Oberlander, & Diamond, 2015). However, aggression remains a major concern for both parents and educators.

1.2 Origin of Aggressive Behaviour

Historically, research has focused primarily on the origins and consequences of overt aggression (Crick & Grotpeter, 1995), which refers to direct physical and verbal attempts to cause harm, such as hitting, pushing, name calling, and threatening (Prinstein, Boergers, & Vernber, 2001). These behaviours do not require the involvement of other group members to be effective and tend to occur more frequently (although not exclusively) between two individuals.
(Xie, Cairns, & Cairns, 2002). Efforts to understand the roots of overtly aggressive behaviour point to constitutional and environmental factors (Bandura, 1973; Burt, 2009; Tuvblad, Raine, Zheng, & Baker, 2009). For example, individual differences in genes related to the metabolism of serotonin and dopamine are associated with the development of overtly aggressive behavior (Belsky & Pluess, 2013; Pavlov, Chistiakov, & Chekhonin, 2012; Tremblay, Vitaro, & Cote, 2017), and elevated levels of testosterone are associated with greater instances of overt aggression (Terburg, Morgan, & van Honk, 2009). Environmental factors such as family exposure to aggression and hostile parenting styles also facilitate the development of overt aggression in children (Tremblay, et al., 2017). Specifically, children often model and adopt the aggressive behaviour they observe in parents, and authoritarian parenting styles characterized by punitive discipline tactics, lack of warmth and heavy restrictions of autonomy, are associated with overt aggressive behaviour and impulse control disorders in children (Bandura, 1986; De la Torre-Cruz, Garcia-Linares, & Casanova-Arias, 2014; Kawabata, Alink, Tseng, van Ijzendoorn, & Crick, 2011; Sandstrom, 2007).

Recently, attention has been given to understanding the development of more covert and relationship-focused forms of hostility such as social and relational aggression. Social aggression refers to both overt and covert attempts to damage a peer’s relationships, such as alienation and direct verbal rejection (Archer & Coyne, 2005; Galen, & Underwood, 1997; Underwood, 2003). Relational aggression is a subtype of social aggression and involves covert targeting and manipulating another person’s relationships through gossip, rumor spreading, and ostracism (Archer & Coyne, 2005; Crick & Grotpeter, 1995; Pronk & Zimmer-Gembeck, 2010). These processes often require collaboration of multiple members to successfully damage a person’s reputation or relationships and isolate an individual from peers (Card et al., 2008; Cairns et al.,
Twin studies have demonstrated a strong genetic component to relational aggression (Tackett, Waldman, Lahey, & Benjamin, 2009; Voulgaridou & Kokkinos, 2015). Like overt aggression, relational aggression has been associated with hostile and negative parenting (Kawabata et al., 2011).

As individuals enter late childhood and early adolescence, they begin to spend the majority of their time interacting with peers, and distance themselves from family influences and authority (Allen & Newton, 1972; Brown, 1990; Brown & Larson, 2009). Given the increased importance of peer relationships (Brown & Larson, 2009), and greater susceptibility to peer influence during adolescence (Gardner & Steinberg, 2005), examining the peer context is crucial for understanding the development of both relational and overt aggression during this time (Espelage, Holt, & Henkel, 2003).

1.3 Peer Socialization of Aggression

Peer socialization of aggression has been studied in many social units, ranging from friendship dyads to larger peer groups such as classrooms (Brown 1990; Brown & Larson, 2009; Ellis, 2005; Espelage et al., 2003; Rubin, Bukowski, & Parker, 1998; Shi & Xie, 2014). For instance, past work has demonstrated that friendship dyads tend to feed off each other and increase their levels of deviancy through discussion and reinforcement (Hartup & Stevens, 1997; Piehler & Dishion, 2007). The process of motivating and supporting the anti-social behavior of friends has been termed “deviancy training,” and has been shown to predict socialization of relational aggression, school misconduct and juvenile delinquency (Dishon, Nelson, Winter, & Bullock, 2004; Dishon & Tipsord, 2012; Piehler & Dishon, 2007; Snyder, Schrepferman, Bullard, McEachern, & Patterson, 2012). Further, coercive exchanges between peers has been shown to lead to increases in individuals’ overt aggression (Snyder et al., 2008).
In late childhood and early adolescence, social relationships become increasingly complex, and youth begin to spend more time interacting in social clusters called “cliques” (Brown & Laursen, 2009; Rubin, Bukowski, & Parker, 2006). Peer cliques are groups of normally three to 10 individuals who regularly interact with each other (Brown & Dietz, 2009). Over time, these groups establish norms and conventions that help define the type and range of acceptable behaviours (Rubin et al., 2006). Longitudinal work has demonstrated that members of cliques with aggressive norms tend to become more aggressive over time (e.g., Espelage et al., 2003). This relationship holds true for other types of anti-social behaviour such as deviancy, school misconduct, relational and physical aggression, and drug use (Berger & Rodkin, 2012; de la Haye, Green, Kennedy, Pollard, & Tucker, 2013; Ellis, & Zarbatany, 2007; Haynie, 2001; Shi & Xie, 2011, 2014).

Extant findings point to a clear influence of aggressive peer cliques on children’s aggressive and anti-social behaviour. However, less is known about child and clique characteristics that might moderate clique influence on aggression, and about how these moderating effects might vary depending on the type of aggression involved (i.e., relational, overt). Both theory and research support examination of child within-clique status and clique stratification as two factors likely to influence clique socialization of overt and relational aggression.

1.4 Child Status as a Moderator of Clique Influence on Aggression

Optimal Distinctiveness Theory (ODT) postulates that individuals are governed by needs for assimilation and distinctiveness (Brewer, 1991; Leonardelli, Picket, & Brewer, 2010).
Assimilation refers to the need for inclusion in groups and to be connected to others, which often manifests itself in greater adoption of group norms (Pickett, Bonner, & Coleman, 2002; Leonardelli et al., 2010; Schmitt & Branscombe, 2001). Distinctiveness refers to a desire to be different and separate from others, which motivates individuals to view themselves in terms of characteristics associated with their unique self-concept (Leonardelli, et al., 2010). Brewer (1991, 1993) proposed that these two drives work in direct opposition to each other to ensure that individuals are neither isolated from others, nor lack a unique identity (Leonardelli et al., 2010). However, it has also been suggested that context affects the optimal balance individuals strive for (Leonardelli et al., 2010).

One context that might influence management of needs for assimilation and distinctiveness is the security of the individual’s group membership. According to ODT, high status and prototypical group members are less concerned with adopting group values and may experience greater opportunity to break away from group conventions and assert their uniqueness because their group membership is secure (Leonardelli et al., 2010; Schmitt & Branscombe, 2001). However, low status/peripheral group members often operate in a state of threatened group membership and must be hyper vigilant to expectations for “acceptable” behaviour to signal that they belong (Pickett et al., 2002). Thus, low status individuals may have greater responsibility to conform to the group standard, and paradoxically, be the most ardent supporters of group values (Brewer & Pickett, 2005; Pickett, Bonner, & Coleman, 2002; Schmitt & Branscombe, 2001). Cohen and Prinstein (2006) were among the first to demonstrate experimentally that high status adolescents exert more influence on their peers than their low status counterparts. Subsequent research has replicated this effect in peer cliques and has also demonstrated that low-status individuals were particularly vulnerable to the influence of high-
status peers (Shi & Xie, 2012). Shi and Xie, (2012) found that it was primarily the social and physical aggressive behaviour of high-status clique members that led to clique socialization of social and physical aggression.

The Popularity Socialization Hypothesis (Allen, Porter, McFarland, March, & McElhaney, 2005) also has been used to describe the relation between status and susceptibility to peer influence. The Popularity Socialization Hypothesis suggests that high-status rather than low-status individuals may be particularly motivated to adhere to group values to maintain their power and privileged access to resources within the group (Allen et al., 2005; Laursen, 2018). This is supported by research demonstrating that over time, socially dominant classmates were more likely than low-dominant members to adopt deviant peer behaviour (Muller, Hofmann, & Arm, 2016). High-status group members may also feel responsible for depicting group norms to preserve the values and behaviours that distinguish their group from others (Hornsey & Jetten, 2004). As other group members socialize to the prototype, high-status group members may feel the need to differentiate themselves by pushing the boundaries of group norms, “raising the bar” to establish more extreme group standards (Hornsey & Jetten, 2004; Laursen, 2018).

Although both high-status and low-status individuals may feel the need to adopt or push the boundaries of group typical behaviour, the adoption of new behaviours depends on the individual’s ability to successfully execute them (Bandura, 1986). For overt aggression, physical strength may be needed to carry out the agonistic act, and/or to successfully defend against retaliation (Bjorkqvist, Osterman, & Lagerspetz, 1994). In overtly aggressive cliques, high-status members are more likely than low-status members to possess physical strength that enables effective initiation of overtly aggressive behaviour and deterrence of reprisals. Further, high-status group leaders may ramp up the frequency and intensity of overt aggression to
maintain control over their peers and promote greater cohesion among their group members (Hawley, 2003; Volk, Camilleri, Dane, & Marini, 2012). For relational aggression, social power may facilitate initiation of attacks against others’ social relationships (e.g., starting a rumor or excluding a peer). However, social power is not needed to participate in relational aggression (e.g., spread a rumor), making it possible for both high-status and low-status clique members to participate.

1.5 Clique Stratification as a Moderator of Clique Influence on Aggression

To date, three clique characteristics have been shown to influence clique socialization processes. First, cliques with negative and hostile interaction styles enhance clique socialization of deviancy and school misconduct (Ellis, Zarbatany, Chen, Kinal, & Boyko, 2018). Second, clique cohesion, or the degree to which all group members interact with each other, increases clique socialization of aggression and delinquency in adolescence (Haynie, 2001; Shi & Xie, 2014). Finally, clique centrality, or prominence of the clique within the larger peer network, increased clique socialization of aggressive, deviant, and pro-social behaviour (Ellis & Zarbatany, 2007; Xie & Shi, 2014). To date, the socialization effects of clique stratification, or the degree to which cliques are organized hierarchically (Closson, 2009), have not been assessed, in spite of the fact that hierarchies are a natural and common group feature (Fournier, 2009). Group stratification reflects the level of inequality in the status of clique members, and their ability to acquire social and material resources and influence clique mates (Closson, 2009, Hawley, 1999, 2003). The ability to secure group resources determines individuals’ status and influence within the group (Closson, 2009, Hawley, 1999, 2003).
Groups that are organized in a hierarchy provide three advantages to members. First, they provide clear examples of behavior that does and does not lead to good social and material outcomes (i.e., behavior of high-status individuals). According to Bandura (1986), social learning relies on four processes: attention, retention, production, and motivation (Xie & Shi, 2012). Researchers have suggested that high status group members exert more influence because they affect attention and motivation processes of groupmates (Xie & Shi, 2012). This is supported by research demonstrating that high status adolescents receive more visual attention during social interactions compared to their low status peers (Foulsham, Cheng, Tracy, Henrich, & Kingstone, 2010; Lansu, Cillessen, & Karremans, 2014). As delineated in the resource control theory literature, high status group members control desirable resources, which may make it crucial to attend to them (Hawley, 1999; Lansu, & Troop-Gordon, 2017). Individuals may model themselves after high status group members to access resources and improve their own social standing (Xie & Shi, 2012).

Second, not only does hierarchy provide instruction in the type of social behavior likely to be personally successful, but the behavior exhibited by high-status members may contribute to the internalized group identities of all members (Tajfel & Turner, 1979; Turner, Hogg, Oakes, Reicher, & Wetherell 1987). According to Self-Categorization Theory (Turner et al, 1987), individuals conceptualize groups in terms of a prototype, or a set of attributes that reflect the perceptions, attitudes, and behaviours that separate one group from another (Hogg, Abrams, & Brewer, 2017; Hogg & Reid, 2006; Turner et al, 1987). These prototypes function in many of the same way as norms, in that they are shared expectations of the range of acceptable and appropriate behaviours for members of a group (Hogg & Reid, 2006). Past research has shown that individuals compare themselves to the prototypes (Hogg & Reid, 2006), and are fairly
accurate when judging their own “prototypicality” (Haslam, Oakes, McGarthy, Turner, & Oontorato, 1995). Comparison with the prototype, combined with the inherent need to secure group membership and maintain a positive social identity, often leads to adherence to group norms (Baumeister & Leary, 1995; Ellis, 2005; Hogg & Reid, 2006; Tajfel & Turner, 1979). High status and prominent group members often serve as real life proxies for these idealized prototypes and become the primary focus of attention within the group (Hogg & Reid, 2006). Given the influence of high-status individuals on the behaviour of group members, it is likely that group contexts that provide less ambiguous and more clearly defined prototypes, such as hierarchically organized groups, lead to stronger socialization of group norms than groups without clear prototypes.

Finally, group hierarchies provide incentives for group norm adoption (Anderson & Willer, 2014; Halevy, Chou, & Galinsky, 2011; Magee & Galinsky, 2008). Specifically, by providing differential access to resources, hierarchies create an incentive structure that motivate group members to contribute and behave in group-typical ways (Halevy et al., 2011). Traditionally, the incentive structure produced in stratified cliques has been shown to have a stabilizing influence on group interactions and reduce conflict among group members (Halevy et al., 2011; Pattiselanno, Dijkstra, Steglich, Vollebergh, & Veenstra, 2015; Savin-Williams, 1979; Zwaan, Dijkstra, & Veenstra, 2013).

Although hierarchy may have a dampening effect on within-group aggression (Savin-Williams, 1979; Zwaan et al., 2013), high levels of aggression, likely toward outgroup members, continue to be expected of aggressive clique members. Successful aggression perpetrated by aggressive clique members would help to affirm their identity in the group, earn access to clique resources, and lead to rises in rank. These outcomes may be particularly gratifying in stratified
aggressive groups where in-group identification is elevated (Halevy et al., 2011). This could explain why past work has demonstrated that high status individuals are more aggressive in stratified structures (i.e., classrooms), and that aggression is only associated with status loss in egalitarian peer systems (Ahn, & Rodkin, 2014; Ahn, Garandeau, & Rodkin, 2010; Garandeau, Ahn, & Rodkin, 2011; Garandeau, Lee, & Salmivalli, 2014).

In summary, through the inherent benefits associated with status, stratification produces an incentive structure that motivates group members to adopt group valued behaviours (Halevy et al., 2011; Magee & Galinsky, 2008). The incentive structure present in stratification structures, coupled with greater group identification and clear boundaries of acceptable behaviour established by dominant group leaders, likely results in greater socialization of both relational and overt aggression in more stratified cliques.

1.6 Differential Effects of Status and Stratification on Clique Socialization of Relational and Overt Aggression

The impact of status and clique stratification on clique socialization of aggression may vary for the different subtypes of aggression due to different social mechanisms involved in their enactment. As indicated earlier, overt aggression does not require the direct involvement of other group members to be effective and tends to occur more frequently (although not exclusively) between two individuals (Xie et al., 2002). The dyadic nature of overt aggression, with individual winners and losers, makes possible differential movement of individual group members through the ranks. Theoretically, any clique member can gain status in an overtly aggressive clique by executing aggression with sufficient skill. However, aggressive skills are unlikely to be evenly distributed among group members (Hawley, 1999). Low- and high-status
members may be equally motivated to increase their overt aggression, but low-status members may be unable to do so.

In contrast, successful execution of relational aggression relies on cooperation and participation of other social network members (Neal & Cappella, 2012; Xie et al., 2002). Even if relationally aggressive behaviour, such as spreading a rumor or excluding a classmate, is initiated by high status individuals to control their peers, its success depends on the participation of other clique members (Xie et al., 2002). Due to its secretive and anonymous nature (Coyne, Robinson, & Nelson, 2010), the costs associated with engaging in relational aggression are far lower than those in overt aggression (Bjorkqvist et al., 1994), making it feasible for both high status and low-status clique members to carry out. For instance, in some acts of relational aggression, such as rumor spreading, the identity of the perpetrator may remain unknown to the victim. Further, individuals may fear the consequences (e.g., becoming the next target) of not engaging in relationally aggressive behaviour initiated by clique mates (Adler & Adler, 1995; Juvonen & Galvan, 2009). Participation in relational aggression may demonstrate commitment to and solidarity with the group (Adler & Adler, 1995; Garandeau & Cillessen, 2006). If the majority of clique members are needed, able, and willing to engage in relational aggression in stratified cliques, differential socialization outcomes would not be expected for high and low status children.

1.7 Current Study and Hypotheses

The purpose of the current study was to examine clique stratification (hierarchal organization) and individual status within cliques as moderators of clique influence on aggression in late childhood and early adolescence (ages 8 to 14 years). Data were collected in two waves over the course of six months, first in the fall and second in the spring of the same
academic year. Past research has demonstrated that six months is a sufficient length of time for detecting clique socialization of aggression (Ellis & Zarbatany, 2007; Shi & Xie, 2012). Within-clique centrality, or social prominence, was used as the proxy measure of status (Gest, Graham-Bermann, & Hartup, 2001). Clique stratification was assessed using the standard deviation of individual centrality scores within cliques (Garandeau et al. 2014; Zwaan et al., 2013), with higher scores signifying greater group stratification.

Four main hypotheses were tested in the current study. First, as a replication of prior research, it was expected that clique relational and overt aggression at Time 1 would predict individual relational and overt aggression at Time 2, respectively, controlling for individual aggression at Time 1 (Ellis & Zarbatany, 2007; Espelage et al., 2003). Second, due to the presence of clearer prototypes and inherent incentive structure, it was expected that the effect of clique aggression at Time 1 on individual aggression at Time 2 would be greater as clique stratification increased, for both relational and overt aggression. Finally, two hypotheses were tested regarding possible effects of clique stratification on clique socialization of overt aggression in high- and low-central clique members: (a) the clique stratification effect would be primarily accounted for by low-central members because of their susceptibility to peer influence (Cohen & Prinstein, 2006; Xie & Shi, 2012), and need to secure group membership (Leonardelli et al., 2010), and (b) following the Popularity Socialization Hypothesis (Allen et al., 2005), the clique stratification effect for overt aggression would be primarily accounted for by highly-central members who need to embody group values to maintain their position and power in the group. Individual centrality was not expected to moderate the clique stratification effect for relational aggression because relational aggression involves participation of multiple individuals.
to be successfully executed, and all clique members were expected to be influenced similarly (Neal & Cappella, 2012; Xie et al., 2002).

All analyses included tests for grade and gender differences in the expected effects. Given the increased importance of peer relationships (Brown, 1990, Brown & Larson, 2009), and greater susceptibility to peer influence (Gardiner & Steinberg, 2005) during adolescence, it was possible that clique socialization of aggression would be greater in older students (age 13-14-years) than younger students (age 8-12 years). Further, due to the increased importance of status during adolescence (LaFontana & Cillessen, 2010), it was possible that low- or high-status adolescents would be more vulnerable to influence than their younger counterparts.

Strong gender differences favoring boys have been observed in overt aggression (Card et al., 2008), but gender differences in relational aggression are small or nonexistent (Card et al., 2006). Some research has demonstrated that boy cliques tend to be more stratified than girl cliques (Rose & Rudolph, 2006), but gender differences in clique structure has received mixed support (Xie & Shi, 2009). Although some research indicates that boys are more vulnerable to peer influence than girls (Steinberg & Monahan, 2007; Steinberg & Silverberg, 1986), and that boys might be more affected by stratification than girls given the greater importance they place on status (Rose & Rudolph, 2006; Zarbatany, Ellis, Chen, Kinal, & Boyko, 2019), there was no empirical basis for expecting that clique stratification would interact with gender in the socialization of overt or relational aggression (Xie & Shi, 2012). Indeed, Pattiselanno et al. (2015) demonstrated that clique stratification related more strongly to the aggressive behaviour of high-status girls than high-status boys. Therefore, all analyses involving gender were exploratory.
Chapter 2

2 Methods

Data for this study were derived from a pre-existing short-term longitudinal study assessing peer clique influences on behavioral development and adjustment (Ellis, Chen, & Zarbatany, 2008). Data were collected in the 2008-09 and 2009-10 academic years.

2.1 Participants

The sample included 1,033 (444 boys, 580 girls) students in Grades 4-8 from eight elementary schools (6 public, 2 Catholic) in Southwestern Ontario. Participants came from 52 classes from three schools in small towns and five from a midsized city. Overall, 66.6 percent of the sample was European Canadian, 8.5% were Asian Canadian, 3.4% were Hispanic Canadian. Other ethnicities (African Canadian, Arab Canadian, East Indian Canadian, First Nations), each accounted for less than 2% of the sample, and 16% of participants did not indicate their ethnicity. The age range of participants was 7.94 to 14.66 in the fall (Mean = 11.81, SD = 1.53). Out of all participants, 74% lived with their biological mother and father, 10% only lived with their mother, and 8.4% lived with their mother and a stepfather. In total, 76.1% of participants provided parental consent and assent to participate. The within-class participation rate ranged from 35%-100% per classroom; only seven classes had participation rates below 60%. 
2.2 Measures

2.2.1 Clique identification: Social Cognitive Map

The Social Cognitive Map (SCM) was used to identify peer cliques (Cairns, Perrin, & Cairns, 1985). Using free recall, participants were instructed to write the names of the members of their own peer group and up to five other peer groups in their school (i.e., “kids who regularly hang out together”) (Appendix A). After responses were gathered, a four-step quantitative process established by Cairns, Cairns, Neckerman, Gest, & Gariepy, (1988) was carried out.

First, participants’ raw scores were tabulated to create a matrix that included the number of times students within a grade were nominated to each group. Second, based on these initial matrices, a co-occurrence matrix was constructed to identify the number of instances each student was nominated to the same clique as the other students in their grade (Cairns et al., 1988). Third, a correlation matrix was calculated to indicate the relationship between individuals’ cluster membership. For instance, if Student A, Student B and Student C all obtained a positive correlation in patterns of co-occurrence with each other, then it is likely that they were frequently perceived to spend time together and thus were grouped in the SCM procedure (Cairns et al., 1988). Fourth, based on the initial clusters identified by the correlation matrix, a final analysis was carried out to confirm the composition of each cluster. This was done because data for this study were collected as part of a larger project where children were observed in groups, which necessitated assigning participants to a single group. Therefore, students who were members of multiple groups \((n = 230)\) were placed in the group in which they shared a .50 correlation with at least half of the members (Cairns et al., 1988). Data from
individuals who were part of dyads, but not members of any group, or social isolates, were not included in this study (n = 34).

Past observational research affirmed the validity of the SCM grouping approach, demonstrating that children interact four times more often with members of their SCM “group” than with other classmates (Cairns et al., 1985; Gest, Farmer, Cairns & Xie, 2003). Because participants are asked to identify members of their own and other peer groups, SCM does not suffer from the same self-enhancement biases present in self-report accounts of clique membership (Leung, 1996; Gest et al., 2003). Further, because participants report on members of all cliques, the SCM is able to map the relationships among individuals who did not provide any information regarding their own clique affiliations (Cairns et al., 1988; Gest et al., 2003).

2.2.2 Individual centrality

An individual centrality index (CI) was calculated based on the number of times each child was named by classmates as members of a clique (Gest et al., 2001). Each participant’s centrality score was calculated by comparing the number of nominations they received to the average number of nominations given to the two clique members who collected the highest number of nominations ($C_{Li}$) (Cairns, Leung, Buchanan, & Cairns, 1995). Participants who received centrality scores that were greater than $(0.7 \times C_{Li})$, were considered nuclear members (high centrality) (Shi & Xie, 2011; Zarbatany et al., 2019). Those who had centrality scores less than or equal to $(0.3 \times C_{Li})$, were considered peripheral (low centrality), and individuals with centrality scores in between 0.3 and 0.7 were classified as secondary members.
2.2.3 Clique stratification

The clique stratification score was the standard deviation (SD) of individual centrality scores within cliques. The SD of within clique centrality was used to reflect the within clique variation in clique centrality/status. Larger differences among individuals (large SD) indicated greater clique stratification. This method has been used to assess hierarchies and stratification in both classrooms and cliques (Garandeau et al. 2014; Pattiselanno et al., 2015; Zwaan, Dijkstra, & Veenstra, 2013) using measures of popularity rather than measures of centrality.

2.2.4 Overt and relational aggression

Aggression was measured using a modified version of the Revised Class Play (Masten, Morison, & Pellegrini, 1985). Participants were asked to nominate up to three students (from a list of participating classmates) who would best be able to portray a particular role in a play. Among several other items, three items measured overt aggression ("gets into a lot of fights; picks on others; teases other people too much"), and two items measuring relational aggression, ("tries to keep certain people from being in his/her group during activities or playtime; says mean things or spread rumors about the other kids when he/she is mad at them;" Crick & Grotpeter, 1995). Participants’ score on each item was standardized within the class to control for differing numbers of nominators, averaged for overt aggression (α T1 = .88 and T2 = .89) and relational aggression (α T1 = .78 and T2 = .79), and restandardized.
2.3 Procedure

After being approved by the Research Ethics Review Committee of King’s University College (see Appendix B), data for this study were collected between 2008 and 2010. Parental consent and child assent were obtained for all participants (see Appendix C). Four schools were tested during the 2008-2009 school year, and the other four schools were tested during the 2009-2010 school year. Participants filled out a questionnaire booklet during two-hour sessions in their classroom, first during mid-October to early-December and again between late-May and early June. A research assistant read the questions out loud for students in the younger grades (Grades 4 and 5), and students in Grades 6-8 completed the questionnaires on their own following brief instructions for each. During all sessions, at least one additional research assistant was present to provide assistance to children who had difficulties reading, and answer questions. At the end of the study, students were given a $10.00 gift certificate to a bookstore or superstore. Finally, a $500.00 honorarium was given to participating schools.

Chapter 3

3 Results

3.1 Analytic Procedure

Due to the nested nature of the data set, all hypothesis were testing using multilevel modeling (MLM) (Nezlek, 2008; Raudenbush & Bryk, 2002) using SPSS mixed models with the maximum likelihood estimator. Separate analyses were conducted to test the effects of clique stratification on clique socialization of relational and overt aggression. Significant interaction terms were followed by tests of simple slopes using Preacher (Preacher, Curran, & Bauer, 2006).
Finally, all gender and age effects were examined. The following sections present descriptive statistics, including characteristics of the identified cliques and zero order correlations among all Level 1 and Level 2 predictions, as well as the outcomes of all hypothesis tests.

3.2 Descriptive Statistics

The SCM procedure identified 999 out of 1033 children (96.71%; 425 boys and 574 girls) in 162 peer cliques ranging from 3 to 17 members ($M = 6.19$ members, $SD = 2.80$). Fifty-one cliques were all-male, 69 were all female, and 42 were mixed gender. Thirty-four individuals were not members of any clique. Non-clique members tended to be younger ($M_{age} = 11.10$, $SD = 1.68$) than clique members ($M_{age} = 11.84$, $SD = 1.52$), $t(1029) = -2.76, p = .006$. A complete breakdown of the number of boys and girls, and boy, girl and mixed-gender cliques in each grade are presented in Table 1, taken from Zarbatany, Tremblay, Ellis, Chen, Kinal, and Boyko, (2017).

The results of a one-way MANOVA demonstrated that members of cliques were not significantly different from non-clique members on relational or overt aggression, Wilks’ Lambda = .995, $p > .05$. Because aggression scores were standardized to a mean of 0 and SD 1 within classrooms at each time point, it was not possible to compare aggression rates across time.

Zero order correlations among all variables included in the final models predicting relational and overt aggression are presented in Table 2. Relational aggression, overt aggression, clique relational aggression and clique overt aggression at Time 1 were significantly positively correlated with individual relational and overt aggression at Time 2. Individual centrality was negatively related to relational aggression (recall that lower centrality scores signify greater centrality), and unrelated to overt aggression. Finally, clique stratification was significantly
positively related to clique size. It is important to note that these correlations represent both Level 1 and Level 2 influences.

3.3 Hypothesis Testing

To determine the unique contribution of every individual predictor, all Level 1 predictors were grand mean centered (Enders & Tofighi, 2007; Zarbatany et al., & 2017). Past work has demonstrated that grand mean centering variables can create artificial interactions between Level 1 and Level 2 predictors (Hofman & Gavin, 1998) because Level 1 coefficients contain both between and within cluster variance (Enders & Tofighi, 2007). In particular, it was important to avoid producing a significant interaction between individual centrality (Level 1), clique stratification and clique aggression (Level 2), that did not really exist. To address this problem, clique centrality (Level 2 version of individual centrality) was included in the analyses to create coefficients that represent the unique contribution of the Level 1 predictors (Enders & Tofighi, 2007). This is consistent with work showing that introducing Level 2 versions of Level 1 predictors produces coefficients that properly partition the within and between cluster variance (Enders & Tofighi, 2007).

All analyses conformed to the model building approach established by Bryk and Raudenbush, (1992), starting first with an unconditional model, then entering each additional level and interaction term separately. The unconditional model contains no predictors at either Level but provides estimates of the Level 1 and 2 variances (i.e., estimates of the within- and between- group variance) (Nezlek, 2008). Next, a Level 1 model was included predicting relational or overt aggression at Time 2, from individual relational or overt aggression, gender and individual centrality at Time 1. Following the Level 1 model, a Level 2 model was included,
containing clique scores for centrality, relational or overt aggression, stratification, and grade at Time 1.

To test the moderating effect of clique stratification on the socialization of relational or overt aggression, the two-way interaction term involving clique stratification and clique relational or overt aggression was added. Two additional two-way interaction terms, individual centrality X clique overt or relational aggression, and individual centrality X clique stratification were also included. To determine whether increased socialization of aggression in stratified cliques was differentially accounted for by low-central or high-central clique members, the three-way interaction between clique relational or overt aggression, clique stratification, and individual centrality was entered last. Finally, simple slopes analyses (Preacher et al., 2006) were conducted following significant interaction effects to test the direction of the relationships. Full model coefficients and standard errors are presented for both relational and overt aggression in Tables (3-7). The tables also include the deviance statistic for each model, an indicator of how well the model fits the data (Peugh, 2010), with larger values suggesting better fit between the model and data. When using the model building approach, the deviance statistic is compared across models to determine whether each subsequent model better explains the data.

3.4 Predicting Relational Aggression at Time 2

The ICC score produced by the fully unconditional model indicated that there was no significant variation between cliques on relational aggression. This was likely due to use of standardized aggression scores (.03, p = .163). Although the ICC score was non-significant, past work has suggested that the nested nature of the data set ultimately determines whether a multilevel analysis is warranted (Nezlek, 2008).
At Level 1, relational aggression at Time 1, gender and individual centrality were all significant predictors of relational aggression at Time 2 (see Table 3). Specifically, higher relational aggression at Time 2 was associated with higher relational aggression at Time 1, higher centrality, and girls. At Level 2, clique mean relational aggression was not a significant predictor of relational aggression at Time 2, but the two-way interaction between clique relational aggression and clique stratification was a significant predictor (see Table 3). The significant interaction is shown in Figure 1. The test of simple slopes revealed that clique relational aggression predicted individual Time 2 relational aggression in more highly stratified cliques ($z = 2.9231, p = < .01$) but not in low-stratified cliques ($z = 0.4056, p = .69$). This relationship was not further moderated by gender or clique grade (see Appendix C, Table 5). Thus, clique socialization of relational aggression was only significant in stratified cliques.

Traditionally, random slopes are included in any multilevel analysis that involves a cross-level interaction. However, given that the slopes for individual centrality did not significantly vary between groups ($p = .605$), only random varying intercepts (fixed effects) were included in the analysis. As expected, individual centrality did not further moderate clique socialization of relational aggression. The final model, including a test of the three-way interaction involving individual centrality, is presented in Table 3. Finally, clique gender did not predictor relational aggression at Time 2 ($t = 1.23, p = .22$), and did not further moderate the interaction between clique stratification and clique relational aggression ($t = 1.08, p = .28$).
3.5 Predicting Overt Aggression at Time 2

The ICC score for overt aggression demonstrated that a significant portion of the variance for overt aggression varied between cliques (.05, \( p = < .05 \)). Similar to relational aggression, the slopes for individual centrality did not significantly vary between cliques (\( p = .332 \)). Therefore, only random varying intercepts (fixed effects) were included in the analysis. The lack of significant variation between cliques on individual centrality justified removing the random slope component from the analysis.

At Level 1, only individual overt aggression at Time 1 was a significant positive predictor of individual overt aggression at Time 2 (see Table 4). At Level 2, clique overt aggression at Time 1 was a significant positive predictor of individual overt aggression at Time 2 (see Table 4). The two-way interaction between clique overt aggression and clique stratification was not significant (see Table 4). However, the cross-level analysis revealed a significant three-way interaction between clique stratification, clique overt aggression and individual centrality (Table 4). The significant three-way interaction was not further moderated by clique grade or gender (see Appendix C, Table 6). The full model for overt aggression is presented in Table 4, and the interaction is depicted in Figure 2.

Tests of simple slopes revealed that clique overt aggression predicted greater aggression in more central members of stratified cliques (\( z = -2.6343, p < .01 \)), and less aggression in low-central members of stratified cliques (\( z = 2.0852, p < .05 \)). Thus, socialization of overt aggression in stratified overtly aggressive cliques was primarily accounted for by highly central rather than low-central clique members. Finally, clique gender did not predict overt aggression at Time 2 (\( t = .73, p = .47 \)), and did not further moderate the interaction between clique
stratification and clique overt aggression ($t = 1.64, p = .10$) or the three-way interaction between individual centrality, clique stratification, and clique overt aggression ($t = -.24, p = .82$).

Finally, to ensure that the unexpected effect for low central members was not due to over-attrition of low-status members from cliques, a chi square analysis was run to compare central, secondary, and peripheral clique members on retention of clique membership over the school year. This analysis revealed that a significant portion of the individuals who left or changed cliques were in fact low-status clique members, $X^2 (2, N = 999) = 48.15, p < .001$. Specifically, 79.5 % of central, 66% of secondary, and 47.7% of peripheral clique members retained membership in the same clique at the end of the school year (Table 5). In view of these differential attrition rates, the MLM analysis on overt aggression was repeated including stability of clique membership as an additional Level 1 control variable. In this analysis, the three-way interaction between clique overt aggression, clique stratification and individual centrality remained significant (Appendix C, Table 7).

Chapter 4

4 Discussion

Preadolescents and early adolescents place great importance on being accepted by their peers and attaining status within the peer system (Brown, 1990; Brown & Larson, 2009; LaFontana & Cillessen, 2010). As a consequence, peer group norms have a large impact on the development of their behaviour. Not surprising, members of cliques with aggressive norms have been shown to become more aggressive over time (Ellis, & Zarbatany, 2007; Espelage et al., 2003). Research has also demonstrated that clique features such as status and cohesion magnify clique socialization of aggression (Ellis, & Zarbatany, 2007; Shi & Xie, 2014). The goals of the
present study were to expand on prior work by examining the role of clique stratification in clique socialization of relational and overt aggression and determining whether stratification differentially influenced the overt aggression of high- and low-central clique members. As expected, clique stratification increased clique socialization of relational aggression. However, only high-status members of stratified cliques demonstrated an increase in overt aggression; low-central members actually became less aggressive. Different findings for relational and overt aggression likely reflect differences in social mechanisms involved in each and emphasize the importance of examining subtypes of aggression separately. These points are elaborated in the following discussion.

4.1 Relational Aggression

In addition to establishing a clear standard for behaviour, hierarchical structures have been shown to induce greater group identification among members (Halevy et al., 2011). In relationally aggressive cliques, hierarchy likely incentivized adoption of relationally aggressive behaviour to affirm clique membership and avoid repercussions. Successful ostracism of a peer, sullying of another’s reputation, and severing an individual’s relational ties requires a joint effort (Pronk & Zimmer-Gembeck, 2010; Neal, 2009; Xie et al., 2002). Given the collaborative nature of relational aggression, involvement of clique members may have been a requirement for continued group membership. Failure to cooperate may have signalled disapproval of the clique’s goals and values, and thereby increased the likelihood of becoming the clique’s next target (Juvonen & Galvan, 2009).

As expected, high-central members of relationally aggressive cliques were not more likely than others to increase relational aggression. Although high-status individuals may be better equipped to initiate relationally aggressive behaviour (Neal & Cappella, 2012), they rely
on the engagement of other group members to successfully carry it out (Pronk & Zimmer-Gembeck, 2010; Neal, 2009; Xie et al., 2002). Given the covert and relatively anonymous nature of relational aggression, even low-central members may willingly participate without fear of retaliation, at least when relational aggression is directed toward out-group members. Low-status individuals may be eager to participate to avoid retaliation and ingratiate themselves to group leaders (Salmivalli, Lagerspetz, Bjorkqvist, Osterman, & Kaukiainen, 1996; Xie, et al., 2002).

4.2 Overt Aggression

Consistent with past research, an overall group socialization effect for overt aggression was observed (e.g., Espelage et al., 2003). However, clique stratification did not magnify clique socialization of overt aggression uniformly across members. Rather, overt aggression of highly central clique members in stratified cliques increased, whereas overt aggression of more peripheral members declined over the school year. These findings support the Popularity Socialization Hypothesis (Allen et al., 2005) rather than Optimal Distinctiveness theory (Brewer, 1991). Higher-status clique members may increase their levels of overt aggression to maintain their privileged position in the clique. They also may feel responsible for embodying the values that separate their group from others (Hogg & Reid, 2006).

Even though stratified cliques establish clear expectations for behaviour, not all clique members may be able to effectively and consistently carry out overt aggression. Low-status or peripheral group members may be motivated to adopt more aggressive behavior, but they may not possess sufficient skill and power to directly engage someone using overt aggression (Hawley, 1999), or to defend themselves if targets retaliate. Over time, as the clique hierarchy stabilizes and low-status individuals become aware of their ineffectiveness, they may avoid confrontations with peers (Closson, 2009; Hawley, 2003). It remains to be determined what role
low-status passive members come to play in overtly aggressive cliques (e.g., scapegoat; supporter).

Although the current data do not identify the targets of aggression, it is possible that low status clique members are victimized by their high-status counterparts. Dominant clique members may target other members to crystalize the status hierarchy (Closson, 2009; Pellergrini & Long, 2002; Savin-Williams, 1979). There are two main reasons why high-status individuals may target their low-status peers. First, high-status individuals often look for easy victims who may have fewer friends willing to defend them (Andrews, Hanish, Updegraff, Martin, & Santos, 2016; Hodges, Boivin, Vitaro, & Bukowski, 1999). Peripheral clique members may not have strong supporters within their cliques. Second, targeting low-status peers provides dominant clique members an opportunity to demonstrate their power without sacrificing coveted relationships (Veenstra, Lindenberg, Munniksma, & Dijstra, 2010). Ultimately, the subjugation of low-status peers by their own clique leaders may lead to a decline in their overt aggression.

Once the clique hierarchy stabilizes, it is likely that aggression towards in-group members generally declines (Pellergrini, & Long, 2002; Savin-Williams, 1979). This is consistent with work suggesting that the majority of aggression and victimization occurs between groups rather than within groups (Cillessen & Mayeux, 2007). Often high-status group members target out-group members to both increase the status of their group and improve group cohesion (Volk et al., 2012). By targeting out-group members, group leaders are able to solidify group boundaries and attack the reputation of other groups in the peer system. Despite not having the physical tools to directly target out-group members, low-status members may support and reinforce the overt aggression of their clique leaders towards out-group members much as lower status individuals often act as reinforcers of or assistants to bullies (Salmivalli et al., 1996).
Low-status members may provide an audience for the aggressive behaviour and engage in relational aggression such as spreading rumors and gossip. Ultimately, low-status peers may contribute to the group by indirectly supporting the overt aggression of their high-status peers and even engaging in more covert forms of hostility (Salmivalli et al., 1996).

Supporting the overtly aggressive behavior of clique leaders may have the added benefit of allowing low-status members to retain group membership and thus dissuade other classmates from targeting them (Hodges, Malone, & Perry, 1997). This is consistent with work demonstrating that victimized peers who are members of aggressive cliques become less victimized over time (Hodge et al., 1997; Zarbatany et al., 2017). If weaker members are protected (or believed to be protected) by their higher status clique-mates, clique membership may have value, even if low-status clique mates are occasionally targeted by higher status members of their cliques.

Although low-status members of stratified cliques may be precluded from increasing aggressive behavior due to strength or other limitations, they may still strongly identify with their aggressive cliques (Halevy et al., 2011). According to Uncertain-Identity theory (Hogg, 2007), low-status members are motivated to remove the psychological uncertainty associated with their peripheral group membership by identifying more strongly with the group and its values. Strong group identification may encourage low-status individuals to remain in the group (Van Vugt & Hart, 2004), and efforts to ingratiate themselves with their high-status peers may increase their own rank and privileges (Halevy et al., 2011).

In summary, in addition to work suggesting that hierarchies foster aggression among group members (Ahn, & Rodkin, 2014; Ahn, Garandeau, & Rodkin, 2010; Garandeau, Ahn, & Rodkin, 2011; Garandeau, Lee, & Salmivalli, 2014), the current findings demonstrate that clique
stratification magnifies the socialization of overt and relational aggression. Due to the clear expectation for aggressive behaviour established by high-status members, and identification associated with membership in stratified cliques, individuals may have a greater understanding of and greater motivation to behave in clique typical ways (Magee & Galinsky, 2008). However, clique stratification effects are nuanced rather than general, and depend on the type of aggression that characterizes the clique. For relational aggression, a covert and somewhat safer method of harming others, clique stratification magnifies clique socialization of relational aggression, regardless of individual status. For overt aggression, where perpetrators are easily identified and strength is necessary to defend against retaliation, only high-status members of stratified cliques increase their overt aggression.

4.3 Gender and Grade Effects

Although past research has demonstrated significant gender differences in overt aggression (Card et al., 2008), gender did not moderate the impact of clique stratification on clique socialization of overt aggression. It is likely that male and female high-status members of overtly aggressive stratified cliques are obliged by comparable behavioral norms to engage in high rates of overt aggression to maintain their position in the hierarchy. Past research has suggested that the greater intimacy and self disclosure that characterized friendships among girls create the ideal environment for relational aggression (Grotpeter & Crick, 1996; Neal, 2009); however, empirical work has demonstrated that boys and girls engage in similar rates of relational aggression (Card et al., 2008). This is consistent with our findings demonstrating that gender did not moderate the increased socialization of relational aggression in stratified cliques.
The current results were also not moderated by participant grade. Although, overt aggression becomes less predictive of status later in adolescence (Cillessen & Mayeux, 2004), status in overtly aggressive cliques is likely achieved by engaging in overt aggression, regardless of age. Further, although the desire for status may increase over the course of adolescence (LaFontana & Cillessen, 2010), individuals of all age groups are motivated to secure their position in the group and improve their social standing. Ultimately, gender and age did not moderate any of the major findings, indicating that clique stratification and within-clique status worked the same way for girls and boys in the age group under investigation.

4.4 Limitations

This was the first study to demonstrate the moderating effect of clique stratification on the socialization of overt and relational aggression, and many of the findings emerged as predicted. However, interpretation of the findings is somewhat constrained by lack of information regarding the targets of clique members’ aggression. It is unclear whether individuals increased their overt and relational aggression towards in-group members, out-group members, or both. It is possible that in accordance with evolutionary theory, hierarchies reduce aggression among clique-mates (Pattiselanno et al., 2015), but encourage members to victimize individuals outside the peer clique to obtain additional resources for their clique. Further, members of stratified cliques may target out-group members to ingratiate themselves to group leaders and secure their position in the group. Alternatively, it is possible that stratification creates “easy victims” within cliques, creating more opportunities for both relational and overt aggression directed towards in-group members (Garandeau et al., 2014). Ultimately, conclusions regarding the role of hierarchy in clique socialization of aggression awaits additional research in which targets of aggression are identified.
A second limitation pertains to use of the Social Cognitive Map (SCM) procedure to identify peer cliques (Cairns et al., 1988; Cairns et al., 1995; Gest et al., 2001). Although considerable fruitful research has been conducted using SCM, the SCM algorithm has recently been criticized as potentially creating errors in assignments of individuals to groups. The final analytic stage of the SCM may allow two individuals who were never nominated to the same clique to be placed in the same cluster (Neal & Neal, 2013). Because children are grouped together based on the correlation between the number of times they are nominated with every other child in the sample, it is possible for person A to be placed in a clique with person B if they have a high co-nomination correlation, even if they were never nominated together (Neal & Neal, 2013). Confidence in the SCM grouping procedure is provided by observational research demonstrating that adolescents interact substantially more often with members of their SCM “group” compared to other classmates (Cairns, Pernin, & Cairns, 1985; Gest et al., 2003). However, future work would benefit from utilizing an additional method of identifying social clusters, such as the mapping technique available within the Strata software (Neal & Neal, 2013), and comparing findings to those obtained with SCM.

A third limitation concerns claims made about peer socialization effects in the current study. Because data were only collected at two time points, and clique formation preceded the study, not enough information was available to distinguish between peer selection and socialization effects. Selection refers to the choice of peer affiliates based on pre-existing similarity in values and behaviour. Socialization refers to changes in values and behaviour observed as a result of the association over time. Newer modeling procedures such as the Simulation Investigations for Empirical Network Analyses (SIENA) (Snijders, Steglich, Schweinberger & Huisman, 2007) involve assessment of behavior and social network affiliations.
at least three time points, and concurrently model changes in both individual behaviour and network structure (Veenstra & Dijkstra, 2011). This process enables assessment of unambiguous socialization effects (e.g., becoming new friends with an aggressive peer) on behaviour.

4.5 Future Directions

Future research should attempt to elucidate the potential mechanisms that produce greater socialization of overt and relational aggression in stratified cliques. It was suggested that stratified cliques provide unambiguous prototypes that convey clear expectations for behaviour. However, in the current study, members of stratified cliques were not compared to members of egalitarian cliques on group norm expectations. Additionally, it would be useful to confirm that stratification produces greater group identification among members (Halevy et al., 2011), ultimately making group members more vigilant and hostile towards norm violators. Further, it would be useful to determine whether leaders of stratified cliques monitor the behaviour of other members and sanction rule breakers to maintain group norms and their own status within the group (Juvonen & Galvan, 2009).

Further work is also needed to determine whether increases in relational aggression in stratified relationally aggressive cliques are directed towards out-group or in-group members. In relationally aggressive cliques, clique members may act as a unit to protect their group boundaries, or to preserve the hierarchical structure of their group. In both cases, clique members may willingly participate to avoid being the next target and to improve their own status. It also would be useful to know whether central clique members are the primary instigators of relational aggression; this seems likely due to their greater vested interested in ensuring the distinctiveness/uniqueness of the clique, and the loyalty and dependence of their subordinates (Adler & Adler, 1995).
An interesting question for the future concerns the role of status-related self-esteem in behavior related to navigation of hierarchies in aggressive cliques. According to Hierometer Theory (Mahadevan, Gregg, Sedikides & de Waal-Andrews, 2016), humans developed self-esteem to monitor their levels of status, and use this information to navigate dominance hierarchies. The low self-esteem of low status group members (Mahadevan et al., 2016), motivates them to adopt more accommodating and pacifying behavioural strategies. In contrast, high self-esteem associated with being a high-status group member may motivate individuals to confidently adopt more aggressive and hostile behavioural strategies.

The current study found that high-status peers in stratified cliques were the only individuals to experience an increase in overt aggression. However, more work is needed to identify conditions that motivated this behaviour change. It is possible that high-status clique members raised the bar and engaged in more overt aggression to fend off rival clique mates to maintain their status within the group (Closson, 2009; Garandeau et al., 2013), or to dissuade challenges from rival groups. Further efforts should determine whether high-status individuals feel the need to distinguish themselves by being the “most aggressive clique member” in order to support their unique identity (Hornsey & Jetten, 2004).

The significant correlations between clique size, clique stratification, and clique centrality indicate that hierarchies are more likely to form in larger cliques, and larger cliques are more socially prominent in the larger peer network. Although clique centrality was never a significant predictor of aggressive behavior, the mechanisms involved in the confluence of these three factors remain to be revealed. For example, stratified relationally aggressive cliques may have more clout because they have more participants to ensure that the relational aggression is carryout effectively, because they are more visible in the larger peer network, and/or because
their position in the network is more highly valued by members. Similarly, high-status members of stratified cliques may engage in more overt aggression because they have a greater number of supporters who encourage the aggressive behaviour and protect them from retaliation from outsiders.

To more fully elaborate the effects of clique stratification on clique members’ behavior, future work should examine clique socialization of other types of social behavior, including anti-social behaviours that do not require the perpetrator to possess physical power, such as drug or alcohol consumption. These behaviours may be more feasible for low-status members to carry-out to signal that they belong and secure group membership. If self-defence skills are not required, predictions of Optimal Distinctiveness Theory that low-status individuals would exert effort to adopt group values to justify their membership might be supported (Brewer, 1991; Leonardelli et al., 2010). However, high-status clique members may still attempt to distinguish themselves and “raise the bar” for expected behaviour to maintain their status in cliques defined by the behavior (Allen et al., 2005).

In addition to examining clique stratification effects on anti-social norms, future work should examine whether clique stratification moderates the socialization of prosocial norms, such as academic achievement and prosociality. Past research has demonstrated that highly stratified classrooms dampen the socialization of academic motivation and achievement, ostensibly by fostering hostility among classmates and inhibiting academic cooperation such as the formation of peer study groups (Wilson, Karimpour & Rodkin, 2011). However, high prosocial or academic standards set by high status members of pro-social or academic cliques may also magnify the socialization of these behaviours (Ellis, Volk, Gonzalez, & Embry, 2016). Members
may feel motivated to engage in prosocial behaviours to both maintain group membership and increase their position in the group.

4.6 Practical Implications

The results of the current study indicate that central members of stratified overtly aggressive cliques (Cillessen & Mayeux, 2004) are at risk for increasing overt aggression. Efforts to reduce aggression should especially target these individuals, perhaps by promoting more prosocial strategies to achieve status (Ellis et al., 2015). One such strategy is reflected in the Meaningful Roles initiative, which offers bullies and aggressive adolescents opportunities to engage in school related vocations (Ellis et al., 2015). Students are given an opportunity to become contributing members of the school, achieving status by behaving prosocially rather than aggressively.

Although it is unclear whether stratified cliques encourage individuals to engage in more relational aggression towards in-group or out-group members, the present findings, combined with the work done on classrooms, suggests that educators should promote more egalitarian and cooperative peer ecologies (Ahn & Rodkin, 2014; Garandeau et al., 2013). Past research has demonstrated that teachers can play a large role in affecting classroom norms and hierarchal structure (Gest & Rodkin, 2011). For instance, in an attempt to reduce inter-group relational aggression, teachers could encourage students to form new friendships with out-group members. This could be done by creating new classroom seating arrangements that allow for individuals to connect with new potential friends (Garandeau, 2013; Gest & Rodkin, 2011). Perhaps exposing adolescents to more members of the class will lead to more inter-group friendships and less inter-group relational and overt aggression. Further, forming connections with out-group members
may counteract some of the negative effects of victimization if the aggression in stratified cliques is directed towards in-group members (Zarbatany et al., 2017).

4.7 Conclusion

The goal of the present study was to assess the role of clique stratification and within-clique status in the socialization of relational and overt aggression in preadolescence and early adolescence. Different findings were obtained for the two types of aggression. Clique stratification increased socialization of relational aggression by relationally aggressive cliques, regardless of within-clique status, possibly because successful execution of relational aggression relies on the participation of many clique members. In contrast, only high-status members of stratified overtly aggressive cliques increased in overt aggression, perhaps because high-status individuals need to continually raise the aggressive bar to dissuade challenges from rivals or differentiate their clique from other cliques. Further work is needed to determine how clique stratification influences aggressive behavior toward in-group and out-group members. The current findings emphasize the importance of examining these influence mechanisms separately for overt and relational aggression.
### Tables

Table 1. Number of boys and girls, and male, female and mixed-gender SCM cliques

<table>
<thead>
<tr>
<th>Grade</th>
<th>Boys</th>
<th>Girls</th>
<th>All</th>
<th>Male</th>
<th>Female</th>
<th>Mixed</th>
<th>All</th>
</tr>
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<tbody>
<tr>
<td>4</td>
<td>84</td>
<td>104</td>
<td>188</td>
<td>12</td>
<td>13</td>
<td>7</td>
<td>32</td>
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<tr>
<td>5</td>
<td>97</td>
<td>115</td>
<td>212</td>
<td>11</td>
<td>12</td>
<td>12</td>
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<td>139</td>
<td>219</td>
<td>10</td>
<td>16</td>
<td>10</td>
<td>36</td>
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<tr>
<td>7</td>
<td>87</td>
<td>106</td>
<td>193</td>
<td>10</td>
<td>12</td>
<td>7</td>
<td>29</td>
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<tr>
<td>8</td>
<td>77</td>
<td>110</td>
<td>187</td>
<td>8</td>
<td>16</td>
<td>6</td>
<td>30</td>
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<tr>
<td>All</td>
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<td>574</td>
<td>999</td>
<td>51</td>
<td>69</td>
<td>42</td>
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Table 2. Zero Order Correlations among Study Variables

<table>
<thead>
<tr>
<th>Time 1 RA</th>
<th>Time 2 RA</th>
<th>Time 1 OA</th>
<th>Time 2 OA</th>
<th>Individual Centrality</th>
<th>Clique RA</th>
<th>Clique OA</th>
<th>Clique Stratification</th>
<th>Clique Grade</th>
<th>Clique Centrality</th>
<th>Clique Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.65**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 OA</td>
<td>.69**</td>
<td>.56**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
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<td>.70**</td>
<td>.81**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual</td>
<td>-0.07*</td>
<td>-0.11**</td>
<td>0.03</td>
<td>-0.01**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centrality</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<td>.30**</td>
<td>.28**</td>
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<tr>
<td>Clique OA</td>
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<td>.23**</td>
<td>.48**</td>
<td>.42**</td>
<td>.09**</td>
<td>.63**</td>
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<tr>
<td>Clique Strat.</td>
<td>.00</td>
<td>.02</td>
<td>.03</td>
<td>.02</td>
<td>.33**</td>
<td>.00</td>
<td>.06*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clique Grade</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>-.08**</td>
<td>.02</td>
<td>.00</td>
<td>-.24**</td>
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<td></td>
</tr>
<tr>
<td>Clique Cent.</td>
<td>-.09**</td>
<td>-.10**</td>
<td>.02</td>
<td>-.03</td>
<td>-.05</td>
<td>-.20**</td>
<td>-.05</td>
<td>-.07*</td>
<td>-.01</td>
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</tr>
<tr>
<td>Clique Size</td>
<td>.02</td>
<td>.05</td>
<td>.48</td>
<td>.00</td>
<td>.19**</td>
<td>.17</td>
<td>.05</td>
<td>.35**</td>
<td>-.11**</td>
<td>-.35**</td>
</tr>
</tbody>
</table>

* p < .05  ** p < .01  ***p < .001. Note: RA and OA refer to Relational Aggression and Overt Aggression, respectively. Clique Strat and Clique Cent refer to Clique Stratification and Centrality. Centrality was coded as 1 = central, 2 = secondary and 3 = peripheral.
Table 3. Model Summaries Predicting Relational Aggression: Unstandardized regression coefficients and (standard errors).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Unconditional</th>
<th>Level-1 Predictors</th>
<th>Level-2 Predictors</th>
<th>Level-2 Interactions</th>
<th>Cross Level Interactions</th>
</tr>
</thead>
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<tr>
<td><strong>Regression coefficients (fixed effects)</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Intercept ($\gamma_{00}$)</td>
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<td>.01(.2)</td>
<td>.01(.2)</td>
<td>.02(.3)</td>
<td>.02(.3)</td>
</tr>
<tr>
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<td>.65(.2)***</td>
<td>.61(.3)***</td>
<td>.61(.3)***</td>
<td>.61(.3)***</td>
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<tr>
<td>Time 1 Individual Centrality</td>
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<td>-.11(.4)***</td>
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<tr>
<td>Individual Gender</td>
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<td>.12(.5)*</td>
<td>.13(.5)*</td>
<td>.13(.5)*</td>
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<td><strong>Level 2 Predictors</strong></td>
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<tr>
<td>Time 1 Clique Relational Aggregation</td>
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<tr>
<td>Time 1 Clique Centrality</td>
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<td>-.07(.5)</td>
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<tr>
<td>Time 1 Clique Stratification</td>
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<td>.08(.10)</td>
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### Parameters

<table>
<thead>
<tr>
<th>Parameters</th>
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<th>Level-1 Predictors</th>
<th>Level-2 Predictors</th>
<th>Level-2 Interactions</th>
<th>Cross Level Interactions</th>
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<tr>
<td>Clique Grade</td>
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<td>.01(.02)</td>
<td>.01(.02)</td>
<td>.01(.02)</td>
<td></td>
</tr>
</tbody>
</table>

#### Two-way Interactions

- Clique Stratification x Clique Relational Aggression: .39(.18)*
- Clique Stratification x Individual Centrality: -.17(.17)
- Clique Relational Aggression x Individual Centrality: -.16(.09) - .14(.10)

#### Three-way Cross Level Interaction

- Individual Centrality x Clique Stratification: -.14(.32)

#### Model summary
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unconditional</th>
<th>Level-1 Predictors</th>
<th>Level-2 Predictors</th>
<th>Level-2 Interactions</th>
<th>Cross Level Interactions</th>
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<tr>
<td>Deviance statistic</td>
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<td>2192.55</td>
<td>2184.13</td>
<td>2176.16</td>
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<td>Number of estimated parameters</td>
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<td>6</td>
<td>10</td>
<td>13</td>
<td>14</td>
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</table>

*p < .05 ** p < .01 ***p < .001. Centrality was coded as 1 = central, 2 = secondary and 3 = peripheral. Gender was coded 0 = boys, 1 = girls.
Table 4. Model Summaries Predicting Overt Aggression: Unstandardized regression coefficients and (standard errors).

<table>
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<tr>
<th>Parameters</th>
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<th>Level-2 Predictors</th>
<th>Level-2 Interactions</th>
<th>Cross-Level Interactions</th>
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</thead>
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<tr>
<td><strong>Intercept (γ₀₀)</strong></td>
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<td>.00 (.02)</td>
<td>.00 (.02)</td>
<td>.01(.02)</td>
<td>.01(.02)</td>
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<td>Time 1 Individual Overt Aggression</td>
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<td>.80(.02)***</td>
<td>.80(.02)***</td>
<td>.80(.02)***</td>
<td>.80(.02)***</td>
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<td>-.05(.03)</td>
<td>-.03(.04)</td>
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<tr>
<td>Individual Gender</td>
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<td>.04(.04)</td>
<td>.04(.04)*</td>
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</tr>
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<td><strong>Level 2 Predictors</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 Clique Overt Aggression</td>
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<td>.10(.05)*</td>
<td>.08(.05)</td>
<td>.10(.05)</td>
<td></td>
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<tr>
<td>Time 1 Clique Centrality</td>
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<td>-.02(.04)</td>
<td>-.02(.04)</td>
<td>-.02(.04)</td>
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<td>.00(.01)</td>
<td>.00(.01)</td>
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</tr>
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<td><strong>Two-way Interactions</strong></td>
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<td></td>
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</table>
### CLIQUE STRATIFICATION AND CLIQUE SOCIALIZATION OF AGGRESSION

<table>
<thead>
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<th>Level-2 Predictors</th>
<th>Level-2 Interactions</th>
<th>Cross-Level Interactions</th>
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</thead>
<tbody>
<tr>
<td>Clique Stratification x Clique</td>
<td></td>
<td></td>
<td>-.25(.14)</td>
<td>-.28(.14)*</td>
<td></td>
</tr>
<tr>
<td>Overt Aggression</td>
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</tr>
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<td>Clique Stratification x Individual</td>
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<td></td>
<td>-.23(.13)</td>
<td>-.22(.13)</td>
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</tr>
<tr>
<td>Clique Overt Aggression x</td>
<td></td>
<td></td>
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<td>.14(.07)*</td>
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<tr>
<td>Individual Centrality</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Three-way Cross Level**

**Interaction**

| Individual Centrality x Clique   |               |                    | -.48(.24)*          |                       |                          |

| Overt Aggression x Clique        |               |                    |                    |                       |                          |

| Stratification                  |               |                    |                    |                       |                          |

**Model summary**

| Deviance statistic             | 2723.89       | 1671.01            | 1665.94            | 1656.89               | 1652.98                  |
| Number of estimated parameters | 3             | 6                  | 10                 | 13                    | 14                       |
*p < .05 ** p < .01 ***p < .001. Centrality was coded as 1 = central, 2 = secondary and 3 = peripheral. Gender was coded 0 = boy, 1 = girl.
Table 5.

**Frequency and Percentage of Individuals Who Remained In the Same Clique over the School Year**

<table>
<thead>
<tr>
<th>Time 1 Individual Centrality</th>
<th>Different groups at Time 1 and 2</th>
<th>Same Group at Time 1 and Time 2</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Central</td>
<td>Frequency</td>
<td>120</td>
<td>465</td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>20.5 %</td>
<td>79.5 %</td>
</tr>
<tr>
<td>Secondary</td>
<td>Frequency</td>
<td>111</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>34.0%</td>
<td>66.0%</td>
</tr>
<tr>
<td>Peripheral</td>
<td>Frequency</td>
<td>46</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>52.3%</td>
<td>47.7%</td>
</tr>
<tr>
<td>Total</td>
<td>Percentage Total</td>
<td>4.6%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Frequency</td>
<td>277</td>
<td>722</td>
<td>999</td>
</tr>
</tbody>
</table>
Figure 1. Predicting Individual Relational Aggression at Time 2 from Clique Relational Aggression and Clique Stratification at Time 1.
Figure 2. Predicting Individual Overt Aggression at Time 2 from Clique Overt Aggression, Clique Stratification, and Individual Centrality at Time 1.
References


insiders, and outsiders: Comparing Hierometer and Sociometer theories of self-regard.


Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data*
CLIQUE STRATIFICATION AND CLIQUE SOCIALIZATION OF AGGRESSION


Savin-Williams, R. C. (1979). Dominance hierarchies in groups of early adolescents. *Child...


do: 10.1016/j.avb.2015.05.006.


Appendices

Appendix A: Friend and Peer group Nominations

**Friends and Peer Groups**

**MY FRIENDS**

Do you have friends in your school? (Circle your answer)  
Yes  No  
If yes, how many? __________

Please tell us about your best friends below, and circle whether they are a boy or girl:

1. Name:_________________________________________  Boy  Girl
2. Name:_________________________________________  Boy  Girl
3. Name:_________________________________________  Boy  Girl
4. Name:_________________________________________  Boy  Girl
5. Name:_________________________________________  Boy  Girl
6. Name:_________________________________________  Boy  Girl
7. Name:_________________________________________  Boy  Girl
8. Name:_________________________________________  Boy  Girl
9. Name: ___________________________________________ Boy  Girl

10. Name: ___________________________________________ Boy  Girl

**MY GROUP**

Do you have a group in your school you hang around with together a lot? (Circle your answer)

Yes  No

If yes, who are they? (List their names below, and circle the group leader(s) if there are any)

______________________________________________________________________________
______________________________________________________________________________

For each of the questions, circle the answer that best describes how you feel about your group:

a. How much do you really enjoy being with people in your group?

   Not at all   Little   Somewhat   Mostly   Extremely

b. How often do people in your group argue with each other?

   Never   Rarely   Sometimes   Often   Almost all the time

c. How happy are you to be a member of your group?

   Not at all   Little   Somewhat   Mostly   Extremely

d. How important is your group to you?

   Not at all   Little   Somewhat   Mostly   Extremely

e. How well do you feel you fit into your group?

   Not at all   Little   Somewhat   Mostly   Extremely

f. How much do you feel that you belong to your group?

   Not at all   Little   Somewhat   Mostly   Extremely

g. If you couldn’t be a member of this group anymore, how much would this bother you?

   Not at all   Little   Somewhat   Mostly   Extremely
OTHER GROUPS

Are there other people in your school who hang around together a lot? List the names of the children in each group and circle the leader(s) if there are any. Also circle the answer that best describes how much you like this group and how popular this group is.

Group 1:____________________________________________________________________________________
____________________________________________________________________________________
1. How much do you like this group?
   Not at all   Little   Somewhat   Mostly   Very much
2. How popular is this group?
   Not at all   Little   Somewhat   Mostly   Very

Group 2:____________________________________________________________________________________
____________________________________________________________________________________
1. How much do you like this group?
   Not at all   Little   Somewhat   Mostly   Very much
2. How popular is this group?
   Not at all   Little   Somewhat   Mostly   Very

Group 3:____________________________________________________________________________________
____________________________________________________________________________________
1. How much do you like this group?
   Not at all   Little   Somewhat   Mostly   Very much
2. How popular is this group?
   Not at all   Little   Somewhat   Mostly   Very
Group 4:________________________________________________________________________________________

1. How much do you like this group?
   Not at all  Little    Somewhat    Mostly    Very much
2. How popular is this group?
   Not at all  Little    Somewhat    Mostly    Very

Group 5:________________________________________________________________________________________

1. How much do you like this group?
   Not at all  Little    Somewhat    Mostly    Very much
2. How popular is this group?
   Not at all  Little    Somewhat    Mostly    Very
Appendix B: Ethics Approval

June 26, 2008

Dr. Wendy E. Ellis
Department of Psychology (FB203)
King’s University College
266 Epworth Avenue
London, ON
N6A 2M3

Dear Dr. Ellis,

The Research Ethics Review Committee of King’s University College approves your project, *Children's Peer Group Interactions: Implications for Social, Psychological and Academic Adjustment* (to be conducted along with Lynne Zarbatany and Xinyin Chen). Good luck with this interesting research.

Sincerely,

Donald R. Gorassini Ph. D.
Professor and Chair
King’s University College Research Ethics Review Committee

CC: Dr. C. Desmond Dutrizac
Academic Dean
Appendix C: Invitation to Participant and Participant Consent/Assent Forms

**Invitation to Participate in Research**

Hi Everyone, my name is (name) and this is (name) and we’re from the University of Western Ontario. Does everyone know where that is? We’re here today to ask you if you would like to be in a research project that we’re doing. The project is about your friends and peer groups. We want to know more about how you and your classmates work on things together.

If you decide to be in our project, you will be asked to fill out two surveys here in your class. The first one will happen in a few weeks and the second one will happen close to the end of the year. In these surveys we will ask you questions about your behavior, attitudes, feelings and relationships. We will also ask about your friends and classmates. Does anyone have any questions so far?

We’ll also ask you to play some games and work on some problems with a few of your classmates and/or friends. While you are working on these games and puzzles we’ll be videotaping you. This will happen here at your school in a few months time. We’ll study the videotapes later to learn about how kids ….

Does anyone have any questions so far?

You don’t have to do this project if you don’t want to. This is just for kids who want to do it. If you decide you want to do the project, and then change your mind, you can stop any time you want. If you don’t want to answer some questions on the survey, you can leave them out. No one will see your answers except for us—we won’t show them to the other kids, your teachers, or your parents. We’ll keep all of your answers private.

If you want to be in this project, you need to take this letter home to your parents. They have to read and sign saying that it’s OK for you to do it. But everyone should bring back this form, even if your parents don’t want you to do it because the first class in each grade that gets all their forms back in and signed by their parents will get a pizza party.

If your parents say that it’s OK for you to be in the project and you would like to do it you will get a $10 movie gift certificate (or Chapters) at the end of the project.

Any questions?

If you want to do our project, please bring your letter back very soon so we can start right away. Thanks, everyone, and see you soon!
Information letter and consent form for your child to participate in a research study titled:  

*Implications of Children’s Peer Group Interaction for Social, Psychological and Academic Adjustment*

Dear Parent or Guardian,

My colleagues and I, at *The University of Western Ontario* and *King’s University College*, are writing to request permission for your child’s participation in a research study that we are conducting on the influence of children peer groups on adjustment in childhood. We are inviting students in Grades 4 to 8 from several schools within the Thames Valley District Board of Education to participate. As you know, friends and friendship groups become increasingly important to children as they move from childhood to early adolescence, and friends can have both positive and negative effects. In our study we hope to identify the ways in which peer groups influence children’s behaviour and adjustment. We are interested in studying how aggressive groups and prosocial/kind peer groups are able to influence the behaviour and adjustment of other group members. We believe that this research will help us to identify the ways in which peer groups may help children who are experiencing problems, as well as situations in which children might require assistance dealing with the more negative influence of friends involving peer bullying and aggression.

Our study will begin in the Fall of 2009 and will continue until the end of the academic year. We will ask students to complete a series of questionnaire as a group in their classrooms on two occasions (e.g., once in the fall and again in the spring). We will also ask students to participate in a 45-minute video-taped observational study with their group of friends. All parts of the study will take place at your child’s school. To show our appreciation, each child who participates in this research study will receive a $10 gift card for *Chapters* or a local movie theater.

Each questionnaire session will be conducted at times your child’s teacher decides are convenient and will take approximately 60-90 minutes to complete. We will read the questions
out loud, if necessary, so that all students can follow along. The students will be asked to identify their school friends and friendship groups, and report their satisfaction with their current friendships. They also will report on their adjustment in several different areas, including self esteem, loneliness, depression, attitudes toward school, problem behaviour at school and physical health. We also will ask them to identify students in their grade who have certain behavioural characteristics such as those who are leaders, are helpful to others, start fights, and are picked on by other children. Similarly, your child will be rated by his or her classmates. To obtain additional information about children’s adjustment in school, we will ask your child’s teacher to report on your child’s behaviour at school.

At some point after the first questionnaire session, we will ask students to participate in a video-taped interaction with their peer group. These sessions will take place at your child’s school during the school day at a times your child’s teachers decides are most convenient and will take approximately 45 minutes. Children will be asked to work on several projects with their peer group in 5-10 minute increments. For example, they will be given age-appropriate toys to share for 10 minutes, asked to work on a model-building problem together for 10 minutes and asked to discuss describe their group for 5 minutes.

All information will be kept confidential to the extent permitted by law. Your son or daughter never will be mentioned by name in our reports of our results. All of the questionnaire information and video tapes will be kept confidential and access will be restricted to those researchers directly involved in the project. All information will be destroyed five years after the study is completed.

There are no known risks associated with participation in this study. Participation in this study is completely voluntary and had nothing to do with school performance. Your child may refuse to participate, refuse to answer any questions, or withdraw from the study at any time. You also may withdraw your consent at any time. If you would like to see a summary of the results of this study, please include your address on the attached form and we will send one to you as soon as it is available.

Thank you very much for your consideration. Please fill out the attached form and have your son or daughter return it to his or her teacher. We will be awarding a pizza party to the first class to return all of their forms, whether or not they agree to participate in the study.
you have any questions or comments about the study, you are more than welcome to contact me at number listed below. This letter is yours to keep.

Sincerely,

Wendy Ellis, Ph.D
Assistant Professor, King’s University College

Xinyin Chen, Ph.D
Professor, The University of Western Ontario

Lynne Zarbatany, Ph.D
Associate Professor, The University Of Western Ontario

PLEASE HAVE YOUR CHILD RETURN THIS FORM TO HIS or HER TEACHER
I HAVE READ THE INFORMATION PROVIDED ABOUT THIS PROJECT AND HAD MY QUESTIONS ANSWERED TO MY SATISFACTION. I VOLUNTARILY AGREE TO ALLOW MY CHILD TO PARTICIPATE IN THIS STUDY.

__________________________________________  ___________________________________________
Your Name (please print)                       Name of child (please print)

__________________________________________  _____________________________
Signature of parent or guardian                Date

__________________________________________
Signature of child

If you would like a summary of the results of the study, please PRINT your name and address below. Please provide a permanent address if you anticipate a move within the next year or two.
OR I do not wish to have my child ____________________ participate

(Name of child)
Appendix D: Tables Including Gender, Grade and Group Membership Stability

Table 5. Model Summaries Predicting Relational Aggression Including Gender and Clique Grade

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<tr>
<th>Parameters</th>
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<th>Level-2 Predictors of Intercepts</th>
<th>Level-2 Interactions</th>
<th>Grade and Gender Interactions</th>
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**Two-way Interactions**

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<td>.01 (.04)</td>
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</table>
Gender x Individual Centrality  & -.09(.08) & -.09(.08)  
Clique Grade x Individual Centrality & .00(.03) & .00 (.03)  

**Three-way Cross Level**

*Interaction*

Gender x Clique Relational & .58(44)  
Aggression x Clique Stratification  
Clique Grade x Clique Relational & .02(.16)  
Relational Aggression x Clique Stratification  

**Model summary**

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*p < .05 ** p < .01 ***p < .001. Centrality was coded as 1 = central, 2 = secondary and 3 = peripheral. Gender was coded 1 = girl and 0 = boys.
### Table 6. Model Summaries Predicting Overt Aggression Including Gender and Clique Grade

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<th>Level-2 Predictors of Intercepts</th>
<th>Level-2 Interactions</th>
<th>Two-way Gender and Grade Interactions</th>
<th>Three-way Gender and Grade Interactions</th>
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<td>.80(.02)***</td>
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<td>.80(.02)***</td>
<td>.80(.02)***</td>
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<td>Gender x Clique OA x Clique Stratification</td>
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Clique Grade x Clique OA x Clique Stratification

**Four-way Interaction**

Clique Grade x Clique Stratification x Individual Centrality x Clique OA

Gender x Clique Stratification x Individual Centrality x Clique OA

---

**Model summary**

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* *p < .05 ** p < .01 ***p < .001. Note OA refers to Overt Aggression. Centrality was coded as 1 = central, 2 = secondary and 3 = peripheral. Gender was coded 1 = girl and 0 = boys.
Table 7. Model Summaries Predicting Overt Aggression with Group Membership Stability

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Two-way Interactions

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</table>

Three-way Cross Level Interaction

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Model summary

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*p < .05 ** p < .01 ***p < .001. Note OA refers to overt aggression. Centrality was coded as 1 = central, 2 = secondary and 3 = peripheral. Gender was coded 1 = girl and 0 = boys.
Appendix E: Curriculum Vitae

Chris Sciberas
Department of Psychology
Western University

Education
Bachelors of Science, (2010-2015) University of Toronto
- Double Majors in Psychology and Political Science
Masters of Science (expected 2019) Western University
- Masters in Psychology

Honours and Awards
Western Graduate Research Scholarship (2017-2018)
Western Graduate Research Scholarship (2018-2019)

Research Experience
Social Ecology Lab University of Toronto (2015-2018)
- Narrative coding
- Lab Manager
- Administrative and lab maintenance tasks
- Recruitment of research assistants
Parent-Infant Research Lab University of Toronto (April 2016- August 2017)
- Running participants in EEG studies
- Data Entry for Theory of Mind tasks
- Conducting participant questionnaires

Teaching Experience

Conference Presentations