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Why are some aggressive adolescents popular: Subgroups of Chinese aggressive youth

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By Li Niu

Entitled
WHY ARE SOME AGGRESSIVE ADOLESCENTS POPULAR: SUBGROUPS OF CHINESE AGGRESSIVE YOUTH

For the degree of Master of Science

Is approved by the final examining committee:

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Head of the Departmental Graduate Program Date
WHY ARE SOME AGGRESSIVE ADOLESCENTS POPULAR: SUBGROUPS OF
CHINESE AGGRESSIVE YOUTH

A Thesis
Submitted to the Faculty
of
Purdue University
by
Li Niu

In Partial Fulfillment of the
Requirements for the Degree
of
Master of Science

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West Lafayette, Indiana
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ABSTRACT

Niu, Li. M.S., Purdue University, May 2016. Why Are Some Aggressive Adolescents Popular: Subgroups of Chinese Aggressive Youth. Major Professor: Doran French.

This study examined the heterogeneity of Chinese aggressive adolescents to assess why some aggressive youths are popular and others are not. The sample included 1548 adolescents from eighth and eleventh grade in China and data were obtained from self-reports, teacher reports, and peer assessments. Results from a subgroup analysis in which aggressive youths were classified into high, average, and low popularity subgroups and a k-means cluster analysis indicated that there were two heterogeneous subgroups of aggressive youths who exhibited distinct behavioral profiles. Popular aggressive youths differed from less popular aggressive youths in their higher levels of aggression, prosocial behavior, self-regulation, academic achievement, athleticism, and attractiveness. These results revealed the existence of a small group of popular aggressive youth in Chinese school who differ in multiple ways from those aggressive youths who are not popular.
CHAPTER 1. INTRODUCTION

1.1 Overview

The prevailing opinion prior to the last decade was that it was possible to identify subgroups of children who differed in their social status and that youth in each of these subgroups displayed different levels of aggression (Coie, Dodge, & Coppotelli, 1982). Specifically, there was assumed to be a group of children who were rejected by others and were aggressive and another group who were liked by others (i.e., high in social preference) that were labeled “popular” and were not aggressive. Rodkin, Farmer, Pearl, and Van Acker (2000) showed, however, that a subset of this group identified as popular were aggressive.

There is now a large body of research, most of which was conducted in the US and Europe, revealing that children identified as popular by other children are more aggressive than those who are high in social preference. The finding that there is a group of popular children who are aggressive diverges from the previous view that aggression was uniquely characteristic of those with low social status (Crick & Grot彼得, 1995; Parkhurst & Asher, 1992).

Most aggressive youth, however, are not popular. This leads to the important question of what characteristics differentiate aggressive youth that are popular from those
who are not. The purpose of this thesis is to explore this question using data from a large study of Chinese adolescents.

1.2 Popularity and Aggression

Much of the research on children’s peer status in 1970s and 1980s focused on understanding behavioral correlates of children who are classified into distinct sociometric groups. The most commonly used classification system was developed by Coie and his colleagues (1982), in which children were grouped into five sociometric categories (i.e., popular, rejected, neglected, controversial, and average) based on the extent to which they were liked and disliked by peers. Children who received high scores on social preference (i.e., high in liked score and low in disliked score) were labeled as popular and tended to be kind, trustworthy, prosocial and non-aggressive. Aggressive children tended to be classified into rejected and controversial groups. While children in the rejected group were aggressive and low on social preference (i.e., high in disliked score and low in liked score), those in the controversial group received high scores on social impact (i.e., high in both liked and disliked score). These controversial children tended to be more aggressive than the rejected children and yet were perceived as social leaders similar to that of popular children (Coie et al., 1982; Newcomb, Bukowski, & Pattee, 1993).

These sociometrically popular children differed from the ethnographic portrait of popular adolescents. Ethnographers who observed popular children described them as dominant, sometimes aggressive, and socially manipulative (Adler & Adler, 1995; Adler, Kless, & Adler, 1992). Thus, Parkhurst and Hopmeyer (1998) suggested an alternative approach to identifying popular children based on asking children directly to nominate
those who they think are “popular”. It has been found that these children, identified henceforth as “popular” differ from those that are identified using traditional sociometric methods as being popular, henceforth identified as *socially preferred*. Many researchers adopted this approach and have found that perceived popular children and adolescents are athletic, cool, kind, influential and dominant (LaFontana & Cillessen, 2002; Rodkin et al., 2000; Rose, Swenson, & Waller, 2004).

The most surprising and consistent finding about popular youth is that they exhibit both physical aggression and relational aggression (Andreou, 2006; Cillessen & Mayeux, 2004; Puckett, Aikins, & Cillessen, 2008; Rose et al., 2004). Theorists have attempted to make sense of this finding, and the most compelling explanation was provided by social dominance theory. Hawley, Little, and Card (2007) suggested that aggression can be used to attain or control social resources in the peer groups, which consequently are associated with popularity as peers tend to be attracted by the resources of the dominating children (Babad, 2001). Specifically, children may achieve social dominance through physically intimidating others directly, or through relationally manipulating social power and excluding competitors from popular groups (Cillessen & Rose, 2005). There is now consensus that North American popular youth are aggressive and prosocial as well as athletic and successful with dating (Arnocky & Vaillancourt, 2012; Eder & Kinney, 1995; Houser, Mayeux, & Cross, 2015; Shakib, Veliz, Dunbar, & Sabo, 2011). They have a mixed profile with respect to academic achievement, with some popular youth high on this dimension whereas others are low (Rodkin et al., 2000; Schwartz, Gorman, Nakamoto, & McKay, 2006; Troop-Gordon, Visconti, & Kuntz, 2011).
1.3 Popularity in Chinese Youth

A few researchers have been interested in the development and adjustment of aggressive children and adolescents in countries with collectivist value systems such as China (Chen, Rubin, & Li, 1995; Schwartz, Chang, & Farver, 2001; Xu & Zhang, 2008). Aggression is controlled by adults within Chinese schools as it is seen as an infringement of group harmony and a failure to appropriately regulate one’s emotions (Bond & Wang, 1981). There is consistent evidence that aggression is not well received in China and that aggressive children are typically rejected by peers and have low levels of peer acceptance (Chang, 2004; Chen, Cen, Li, & He, 2005).

Some researchers have sought to determine whether Chinese popular children are also aggressive, with the emergence of mixed results. In two cross-cultural studies assessing the characteristics associated with hypothetical popular peers, researchers found Chinese children and adolescents perceived both physical and relational aggression less favorably than those in the US (Li, Xie, & Shi, 2012) and Australia (Owens, Feng, & Xi, 2014). Tseng, Banny, Kawabata, Crick, and Gau (2013) in a study of fifth grade children in Taiwan found that both relational and physical aggression were negatively associated with popularity. In contrast to findings of negative association between aggression and popularity, three other studies have found positive association between aggression and popularity in a sample of fifth grade children in Hong Kong (Schwartz et al., 2010) and a sample of eighth grade adolescents in northwestern China (Niu, Jin, Li, & French, 2015). In another unpublished study on seventh and tenth grade adolescents followed over the course of three years of middle school or high school, positive concurrent associations
between popularity and both forms of aggression were found for each cohort at all time points (Lu, Niu, & French, 2016).

The findings from some studies that popularity is associated with aggression among Chinese middle and high school students suggest that aggressive behavior may be adaptive even in China. According to the evolutionary perspective, social dominance is a species-wide process that likely exists across cultures (Hawley et al., 2007; Schwartz et al., 2010). This suggests that some aggressive children may achieve power and dominance through attaining popularity and do so by skillfully and strategically using a combination of aggression and prosocial behaviors.

1.4 Diversity of Aggressive Youth

It is apparent that only a limited number of aggressive children are popular. Researchers have recognized that there is heterogeneity in aggressive children and have attempted to differentiate them in a variety of ways. These have included differentiating those who are proactive versus reactive in their aggression (Card & Little, 2006; Dodge, 1991; Xu & Zhang, 2008). Others have differentiated between those who start aggression early in life and those who begin to exhibit aggression during adolescence (Patterson, DeBaryshe, & Ramsey, 1989). Another group of researchers have looked at the question of regulation, noting that aggressive youth differ on this dimension (Eisenberg et al., 2001; Eisenberg, Spinrad, & Eggum, 2010; Frick & Morris, 2004). Finally, others have identified children who use primarily overt aggression and those who use primarily relational aggression (Card, Stucky, Sawalani, & Little, 2008; Crick & Grotpeter, 1995).

Some researchers classify aggressive kids into proactive and reactive subtypes according to differences in the functions of aggression. Whereas proactively aggressive
children use aggressive acts deliberately to attain various goals and resources, reactively aggressive children are often driven by an outburst of anger after being provoked (Dodge, 1991; Dodge & Coie, 1987). A number of researchers have also found differences in outcomes associated with these two types of aggression. Compared with proactive aggression, reactive aggression tends to be associated with more negative reactions from peers, including peer rejection, low acceptance, and lack of friends (Card & Little, 2006; Dodge, Coie, Pettit, & Price, 1990). Thus, it is likely that proactive aggressive youth are more popular than reactive aggressive youth.

In addition to differences in the functions of aggression, Patterson et al. (1989) differentiated youths with early aggressive onsets from those with late onsets, suggesting that early starters may experience more serious adjustment problems. He noted that children who behave aggressively and engage in delinquent activities at an early age (i.e., in late childhood or early adolescence) may be at risk for more serious juvenile delinquency during adolescence and adulthood; those who start aggression late (i.e., in middle to late adolescence), however, tend to desist from delinquency more easily (Brennan, Hall, Bor, Najman, & Williams, 2003). Patterson and his colleagues speculated that the persistent pattern of aggression associated with early starters might result from peer rejection, which prevented them from forming positive social relationships. Late starters, on the other hand, lack early training for antisocial behavior and may not experience similar risks in peer relationships. This speculation, if supported, suggests that early aggression is associated with more negative social consequences including low popularity compared with aggression that occurred later.
Researchers have also focused on differentiating aggressive youth based on individual differences in regulation. Studies of young children as well as school-aged children and adolescents have shown that aggression is often associated with anger, impulsivity, and inadequate regulation (Eisenberg et al., 2010). Some researchers suggest, however, that not all aggressive children have difficulties in self-regulatory processes, and there exists a group of aggressive children who are emotion-driven and another group that are goal-oriented and have at least adequate regulatory abilities (Eisenberg et al., 2010; Frick & Morris, 2004). It is unknown how differences in self-regulation are associated with children’s popularity. It is reasonable to assume, however, that aggressive children youth high in regulatory skills will be more popular than aggressive youth who are low on this dimension.

The most extensively used way to differentiate aggressive children has focused on findings that aggressive children may engage in overt, relational, or a combination of both overt and relational aggression. Early studies of aggression focused on overt forms enacted mostly by boys, and included physical and verbal attacks such as hitting, pushing, name calling, and threatening (Card et al., 2008). Later researchers expanded their investigations to relational aggression, sometimes conceptualized as indirect or covert aggression; this form of aggression includes the manipulation of relationships and hurting others’ social positions, and may be more typical of girls than of boys (Crick, 1995; Crick & Grotpeter, 1995). Researchers have shown that both forms of aggression are associated with peer rejection and low acceptance, but recent studies have revealed positive associations between both forms of aggression and popularity. Several researchers suggest that relational aggression appears to account for more unique variance in the
positive association with popularity than does physical aggression (Andreou, 2006; Rose et al., 2004). Explanations for this are likely two-fold. First, unlike physical aggression, relational aggression does not always involve direct confrontation, thus these behaviors may effectively establish dominance without eliciting hostile social reactions (Ettekal & Ladd, 2015). Second, the use of relational aggression requires at least average to positive peer status because the use of such methods requires the perpetrator to have some control over others and to be a member of a group that others seek to join. Popular youth, compared to their low status counterparts, are more prone to use relational aggression since they are more likely to have a well-established social network to exert influence on; low status peers, however, tend to be precluded from the use of relational aggression and may resort to physical aggression instead (Puckett et al., 2008; Salmivalli, Kaukiainen, & Lagerspetz, 2000). Despite the distinctiveness of these two forms of aggression, some researchers noticed that some children may use both overt aggression and relational aggression, and these children experience the most problematic peer relations including peer rejection, low acceptance, and lack of friends (Ettekal & Ladd, 2015). It is possible that the excessive use of multiple forms of aggression may reflect the inability of these children in the strategic and effective use of aggression, and may likely lead to low popularity as well.

1.5 Heterogeneity of Aggressive Youth with Respect to Popularity

A handful of researchers in the US have sought to determine why some aggressive youth are popular and others are not and have typically approached this in two ways. Some researchers have used moderation analysis to determine those factors that impact the association between aggression and popularity. An alternative approach has
been to adopt a person-centered analysis in which subgroups of aggressive youth, some popular and others not, are identified and the characteristics of these youth in these subgroups are explored. While the former focuses on determining conditions upon which the positive association between aggression and popularity become weakened or strengthened across the entire sample, the latter stresses the importance of uncovering groups of similar people across variables and is particularly sensitive at identifying heterogeneity in aggression (Ettekal & Ladd, 2015; Rodkin et al., 2000). Findings using each of these approaches will be discussed below.

1.5.1 Variable-Centered Approaches

Researchers using a variable-centered approach have typically sought to explore moderators to explain the parameters that affect the association between aggression and popularity. Theorists have suggested two possible reasons that some aggressive children can achieve popularity: they may either have social skills that allow them to use their aggressive acts effectively, or possess peer-valued characteristics that evoke positive affect from peers and increase the likelihood of others approaching and affiliating with them (Dijkstra, Lindenberg, Verhulst, Ormel, & Veenstra, 2009; Hawley et al., 2007). Consistent with these perspectives, aggressive adolescents who possess social skills (such as self-efficacy, leadership, prosocial behaviors, and sociability) or other peer-valued characteristics (such as athleticism and attractiveness) tend to be perceived as more popular than those low in these characteristics (Dijkstra et al., 2009; Puckett et al., 2008; Rosen & Underwood, 2010; Vaillancourt & Hymel, 2006). For example, Puckett and his colleagues (2008) examined the moderating role of social self-efficacy, leadership, cooperation, and social sociability in the association between relational aggression and
popularity in a sample of seventh grade adolescents. They found that relationally aggressive adolescents high in these socially competent characteristics were perceived as more popular than those low in these characteristics. Similarly, Vaillancourt and Hymel (2006) in their study on a sample of 585 adolescents from grades six to ten formed a composite variable to reflect peer-value characteristics (e.g., athleticism and attractiveness) and found that aggressive adolescents with greater peer-valued characteristics had higher popularity than those with fewer peer-valued characteristics. Most research using this approach, however, examined the moderators separately whereas in actuality these often occur in combinations. Moreover, the moderating effects reflect relations among variables within a sample of persons, and could possibly mask the existence of a distinct group of people (Rodkin et al., 2000). In both circumstances, a person-centered analysis can reveal the presence of subgroups of people similar on a set of variables, and can be a necessary complement to findings yielded from the variable-centered approach.

1.5.2 Person-Centered Approaches

Researchers who adopt a person-centered approach identify subgroups of children who exhibit distinctive behavioral profiles. One approach to doing this is to use cluster analysis. For example, Rodkin and his colleagues (2000) used cluster analysis to identify subgroups of 465 elementary school boys based on their teacher ratings. They identified six subgroups of boys, among which 59 boys, referred to as “tough” boys, had high levels of aggression and were among the most popular children, while 98 boys, also high on aggression, were perceived to be unpopular by teachers and peers. “Tough” boys were characterized by athletic competence and physical attractiveness, which may differentiate
them from unpopular-aggressive boys who were low on these physical competence indicators and also low on affiliative skills. This is the only study could be located that examined the heterogeneity of aggressive children with regard to popularity. However, note that this study assessed popularity by asking teachers and children to rate in a seven-point scale on three items (i.e., “popular among boys”, “popular with girls”, “lots of friends”), differing from most studies on popularity that asked peers to nominate who are “popular”.

In a recent study, growth mixture modeling, a type of person-centered approach, was used. Although the researchers did not examine the heterogeneity of popularity, they compared subgroups of aggressive children on their acceptance and rejection (Ettekal & Ladd, 2015). In this study of fourth to eighth grade children, researchers identified multiple subgroups of children based on their co-occurring physical and relational aggression trajectories, and then linked these heterogeneous aggression trajectories to distinct peer status. The most important findings from their study is that a subgroup of children who were high in both physical aggression and relational aggression were more rejected and less accepted than those in subgroups high in either form of aggression over the five years of the study. This and other findings of subgroup differences within aggressive children can otherwise be masked when using variable-centered approaches.

Although this study yielded important findings regarding subgroup differences on levels and subtypes of aggression, it has several limitations. First, the authors identified subgroups of aggressive children based on their levels of physical aggression and relational aggression, but overlooked the possibility that a larger repertoire of behaviors may play a role in the heterogeneity of aggressive children. Moreover, as the authors
acknowledged, their study did not examine popularity, an important aspect of children’s relational development. Finally, whether findings from this study and the Rodkin study (2000) can be generalized to a country with different cultural norms needs to be examined in order to provide further insights into the process of aggression and peer status. While studies on the association between aggression and popularity are emerging in the Chinese peer contexts, a study on the heterogeneity of popularity in aggressive children will be a timely complement to ongoing investigations.

1.6 Variation by Age and Gender

Evidence from several studies suggests that there are developmental changes in the association between physical and relational aggression and popularity. Cillessen and Mayeaux (2004) in their study of 10- to 14- year old students found that as children transition into late childhood and early adolescence, relational aggression increasingly predicted high popularity, while physical aggression was increasingly less disliked but decreasingly predictive of popularity. Cillessen and Borth (2006), in another study that used growth curve models to assess changes the association between aggression and popularity, found that while overt aggression predicted decreases in popularity from fifth to ninth grade, it predicted increases in popularity from ninth to twelfth grade; relational aggression consistently predicted high levels of popularity over time. Perhaps as children transition from primary school to middle school, they develop more advanced social cognitive abilities, which allows the use of relational aggression to be more feasible and even normative (Bosacki, 2003). At this time, children who continue to use physical aggression are seen as deficient in social skills and may be associated with negative social consequences (Björkqvist, Lagerspetz, & Kaukiainen, 1992). But as they move
into high school with an increasingly strong pursuit for autonomy and independence, the
use of overt aggression is less negatively perceived, and both forms of aggression become
admired by peers.

This study will also consider the role of gender in the association between
aggression and popularity, owing to the extensive literature related to the prevalence of
physical aggression among boys and relational aggression among girls (Crick, 1996;
Crick & Grotpeter, 1995). According to the gender normativity theory of aggression, the
behaviors violating gender norms will lead to more serious social sanctions (Crick &
Dodge, 1994). From this perspective, physical aggression for girls and relational
aggression for boys, which are considered gender non-normative, are discouraged and
negatively evaluated by peers during adolescence. On the other hand, gender normative
aggression, viewed as somewhat inevitable, may not be associated with equivalent social
sanctions, or may even be viewed as desirable. There is empirical evidence for this
perspective. For example, it was found that overt aggression appeared to be more
strongly linked to popularity for boys (Cillessen & Mayeux, 2004; Rose et al., 2004; Xie,
Li, Boucher, Hutchins, Cairns, 2006) and relational aggression appeared to be more
strongly linked to popularity for girls (Cillessen & Mayeux, 2004; Rose et al., 2004;
Puckett et al., 2008). Given the existence of similar gender norms in the Chinese context,
gender differences are also expected in this study.

1.7 The Current Study

In this study, I explored why some Chinese aggressive youths are popular while
others are not. The participants in this study were adolescents from eighth and eleventh
grades who participated in a three-year longitudinal study on the adjustment of Chinese
adolescents. The sample consists of adolescents from three middle schools (eighth grade) and two high schools (eleventh grade) from Lanzhou, Gansu, China, a major industrial city with a population of approximately 3.6 million located at northwestern China. The selected data came from the second year of this study. The decision to focus on this group was because this was the initial year in which a composite operational definition of popularity was used.

Popularity is typically assessed with a single word “popular” in studies in the US and Europe. There is, however, no direct counterpart to the word *popular* in Chinese and researchers have suggested several terms as possible translations. Each of these terms overlaps with popularity to a certain degree, yet not completely capturing the meaning of the English term. Given the difficulty in translation, this study will include two terms to assess popularity same as two prior studies: “受欢迎” (shou huan ying) and “人气高” (ren qi gao) (Lu et al., 2016; Niu et al., 2015). The first word was commonly used in the study of popularity in China (Tseng et al., 2013; Li et al., 2012; Owens et al., 2014), and the second word was recommended by peer relationship experts from China. In order to make the analyses consistent with the results from two other studies from this dataset (Lu et al., 2016; Niu et al., 2015), a similar approach was adopted in which a composite of the two words was formed, as these were highly correlated. In a prior study, popularity was only moderately correlated with likeability and that it correlated with multiple adjustment characteristics with patterns similar to those that have emerged in the US studies of popularity (Niu et al., 2015).

The main goal of this study was to explore why some aggressive adolescents are popular while others are not. It was expected that popular aggressive adolescents exhibit
high levels of prosocial behavior, self-regulation, academic achievement, athleticism, and attractiveness. In contrast, unpopular aggressive adolescents were expected to be low in these characteristics. In addition, it was expected that the association between aggression and popularity would differ across grade and gender. It was uncertain, however, whether the pattern of heterogeneity among aggressive youth would appear to be the same for both boys and girls and would replicate in middle school and high school.

Two analytic procedures were used to explore the heterogeneity of aggressive youth with respect to popularity. In the first set of analyses, subgroups of aggressive adolescents (i.e., high popularity, average popularity, and low popularity) were formed and the characteristics associated with these groups were assessed. In the second set of analyses, a cluster analysis was conducted across the entire population of participating adolescents to determine the extent to which meaningful subgroups of aggressive youth emerged.
CHAPTER 2. METHOD

2.1 Participants

The sample included 1548 adolescents (780 boys and 768 girls) from two middle schools and three high schools in Lanzhou, Gansu, China. There were 923 students from eighth grade (\(M\) age = 14.27 years, \(SD = 8.86\) months) and 625 students from eleventh grade (\(M\) age = 17.59 years, \(SD = 8.88\) months). The students in the schools were residents in the neighborhoods in which the schools were located. Almost all participants, 97\%, were of the majority Han nationality. Among the adolescents in this sample, 42.9\% of mothers and 41.5\% of fathers had a junior high school education, 28.1\% of mothers and 32.6\% of fathers had a senior high school education, and 8.3\% of mothers and 11.9\% of fathers had a post high school education. The sample appeared to be typical of middle and high school students in provincial cities in China.

2.2 Measures

2.2.1 Peer-reported popularity

Students nominated up to five students who were popular using the two items (受欢迎 and 人气高) discussed previously. The proportion of the number of nominations received for each item divided by the number of possible nominators was computed and standardized within classrooms. Since these two scores are highly correlated \((r = .92)\), they were averaged to form a composite popularity score. Because the distribution of this
value was skewed, a square root transformation was applied and the results were then standardized within classrooms.

2.2.2 Peer Nominations of Overt Aggression, Relational Aggression, Overall Aggression, Prosocial Behavior, Attractiveness, and Athleticism

Students were presented with a list of classmates and asked to nominate up to five classmates who displayed each of these characteristics. Nominations were restricted to classmates because students in Chinese schools have few opportunities to interact and familiarize themselves with peers outside their own classrooms. *Overt aggression* (*α* = .91) included three descriptors: “get into a lot of fights with others”, “pick on others”, and “are cruel to others”. *Relational aggression* (*α* = .88) included three items: “keep certain people from being in their group during activities or play time”, “spread rumors”, and “say mean things about others behind their back”. *Overall aggression* (*α* = .86) included all six items that assessed either overt aggression or relational aggression. *Prosocial behavior* (*α* = .89) included three items: “show care and concern for others”, “help others”, and “are kind to others”. *Attractiveness* and *athleticism* were each indicated by one item: “good-looking”, and “good at sports”. Nominations received from all classmates were converted to proportions to compute each item score for each child, and the item scores were standardized within each class to adjust for differences in the number of nominators. Mean scores were computed across contributing items to form the composite variables, and then standardized again within the entire sample so that all variables were distributed with a mean of zero and a standard deviation of one. These procedures were used by Chen, Rubin, Li, and Li (1999) in studies of Chinese children.
2.2.3 Self- and Teacher-Rated Self-Regulation

Adolescents’ self-regulation was assessed using the Early Adolescent Temperament Questionnaire (EATQ, Capaldi & Rothbart, 1992). The student and teacher questionnaires included three subscales (inhibitory control, activation control, and attention) from the EATQ related to adolescent self-regulation. The self-report version consisted of 24 items and the teacher-report version included 12 items. Students were asked to respond to 24 statements (e.g., “it is easy for me to concentrate on a problem” and “I have a hard time waiting for my turn to speak when excited”) using a 5-point scale ranging from 1 (almost always untrue of you) to 5 (almost always true of you). Nine statements assessed inhibitory control, eight items assessed activation control, and seven items assessed attention. The average scores of their responses were calculated, with higher scores indicating greater self-regulation. Internal reliability was .71 in this study (α = .57 for inhibitory control, α = .48 for activation control, and α = .42 for attention).

Similarly, teachers were asked to respond to 12 statements that were reduced from the student version. Statements that pertained to classroom behaviors or behaviors that were observable by teachers were retained, which led to a final teacher questionnaire including two items assessing inhibitory control, five items assessing activation control, and five items assessing attention. Internal reliability was .85 for the teacher report (α = .70 for inhibitory control, α = .76 for activation control, and α = .17 for attention). The questionnaire tapped the student’s ability to control his or her attention and activation as well as to inhibit impulsivity, and has been shown to be a reliable measure of self-regulation (Ellis & Rothbart, 2001).
2.2.4 Academic Achievement

Adolescents’ spring semester grades in Chinese, mathematics and English were obtained from school records. The mean of the scores from the three subject areas were computed to yield a composite score, $a = .80$, and then standardized within each grade to form the academic achievement variable.

2.3 Analytic Plan

As noted earlier, two analytic procedures were used to explore the heterogeneity of aggressive youth with respect to popularity. In the first set of analyses, three subgroups of aggressive adolescents were identified (i.e., aggressive popular, aggressive average popular, and aggressive non-popular) and the characteristics associated with these groups were assessed. In the second set of analyses, a cluster analysis was used to determine whether meaningful subgroups of aggressive youth emerged. Each of these will be described below.

2.3.1 Subgroups of Aggressive Adolescents

Aggressive adolescents who received an overall aggression score greater than .5 SD were identified. The .5 SD cutoff was adopted by prior researchers who suggested that this was likely to ensure a sufficient number of children for analysis while selecting those who are relatively aggressive (Schwartz et al., 2010). Among the selected aggressive adolescents, those who received a popularity score of .5 SD or higher were assigned into the Aggressive Popular subgroup, those with a popularity score of less than -.5 SD were assigned into the Aggressive Non-Popular subgroup, and those with a popularity score greater than -.5 SD and less than .5 SD were assigned into the Aggressive Average-Popular subgroup. Using these procedures, a total of 249 aggressive adolescents were
identified. Among these, 90 were in the Aggressive Popular subgroup, 69 were in the Aggressive Non-Popular subgroup, and 90 were in the Aggressive Average-Popular subgroup. Chi-square tests revealed nonsignificant gender and grade differences in the number of adolescents identified into each subgroup.

2.3.2 Cluster Analysis of Chinese Adolescents

The cluster analysis was performed using overall aggression, prosocial behavior, teacher-rated self-regulation, and academic achievement. Three of these variables (i.e., prosocial behavior, aggression, and academic achievement) were chosen because of extensive research in both the US (LaFontana & Cillessen, 2002; Puckett et al., 2008; Rodkin et al., 2000; Rose et al., 2004) and China (Li et al., 2012; Niu et al., 2015; Schwartz et al., 2010) in which these variables have emerged as the most salient dimensions that are associated with popularity. Self-regulation has not been studied as this pertains to popularity. Self-regulation was included because of the hypothesis outlined previously that it may be a salient dimension differentiating aggressive youth who are popular from those who are not. Only these four variables were included in the cluster analysis because of their theoretical relevance and because of their conceptual independence of one another, which may avoid misleading the cluster solution in any one particular direction.

A cluster analysis was conducted using $k$-means algorithm, which minimizes the sum of squares of differences between each adolescent and the mean of his or her cluster. The four variables used in the cluster analysis were standardized with a mean of zero and a standard deviation of one to reduce potential bias towards variables with larger ranges. Two- to ten-cluster solutions were examined. In the choice of the number of clusters to
retain, cluster size, the interpretation of each cluster, and the ability to replicate the solution were considered. To assess the extent to which the cluster solution was robust, this method was applied separately for each grade. In addition, a hierarchical cluster analysis was conducted to assess the concordance between the results using different clustering techniques. Post hoc comparisons focused on clusters characterized by high aggression scores, given that the research question of this study focuses on the heterogeneity of aggressive adolescents. In particular, ANOVAs were performed to determine whether the aggressive clusters differ on the four classifying variables. In addition, three-way univariate analyses of variance (cluster membership by grade by gender) were performed to assess variables that are correlates of the clusters (i.e., popularity, athleticism, attractiveness) and gender and grade effects. Statistical analyses were conducted using SPSS software, version 20.
CHAPTER 3. RESULTS

3.1 Characteristics of Aggressive-Popular, Aggressive Non-Popular, and Aggressive Average-Popular Subgroups

A series of 3 (subgroup) by 2 (gender) by 2 (grade) ANOVAs were conducted to test subgroup differences in the behavioral correlates characterizing aggressive adolescents and the interaction effects between subgroup and grade and gender. Popularity, overt aggression, relational aggression, overall aggression, prosocial behavior, student- and teacher-rated self-regulation, academic achievement, athleticism, and attractiveness were entered as dependent variables in separate analysis. Means and standard deviations of the variables in each subgroup were presented in Table 1.

As expected, the univariate analysis revealed that the three subgroups differed in their levels of popularity, $F(2, 252) = 398.83, p < .001, \eta^2 = .76$. Post hoc comparisons using the Tukey HSD adjustment revealed that adolescents in the aggressive popular subgroup had significantly higher popularity than did those in either aggressive non-popular ($d = 3.84$) or aggressive average-popular ($d = 2.47$) subgroups. The interaction between subgroup and gender was significant, $F(2, 252) = 3.08, p < .05, \eta^2 = .02$. Post hoc tests showed that popular aggressive boys had significantly higher popularity than popular aggressive girls ($d = 0.41$).
Table 1 Standardized Means and Standard Deviations for Subgroup Comparisons of Aggressive Adolescents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Aggressive Popularity (n = 90)</th>
<th>Aggressive Average-Popularity (n = 90)</th>
<th>Aggressive Non-Popularity (n = 69)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>sd</td>
<td>m</td>
</tr>
<tr>
<td>Popularity</td>
<td>1.63a</td>
<td>0.90</td>
<td>0.00b</td>
</tr>
<tr>
<td>Overall aggression</td>
<td>2.10a</td>
<td>1.52</td>
<td>1.62b</td>
</tr>
<tr>
<td>Overt aggression</td>
<td>1.52a</td>
<td>1.83</td>
<td>1.16ab</td>
</tr>
<tr>
<td>Relational aggression</td>
<td>1.33a</td>
<td>1.73</td>
<td>1.34a</td>
</tr>
<tr>
<td>Prosocial</td>
<td>0.46a</td>
<td>1.09</td>
<td>-0.35b</td>
</tr>
<tr>
<td>Self-rated self-regulation</td>
<td>-0.06a</td>
<td>1.05</td>
<td>-0.01a</td>
</tr>
<tr>
<td>Teacher-rated self-regulation</td>
<td>-0.13a</td>
<td>1.07</td>
<td>-0.48b</td>
</tr>
<tr>
<td>Academic achievement</td>
<td>0.07a</td>
<td>1.07</td>
<td>-0.27b</td>
</tr>
<tr>
<td>Athleticism</td>
<td>0.54a</td>
<td>1.46</td>
<td>0.13b</td>
</tr>
<tr>
<td>Attractiveness</td>
<td>0.84a</td>
<td>1.41</td>
<td>-0.08b</td>
</tr>
</tbody>
</table>

Notes. N = 249. Across rows different superscripts letters indicate significant differences between clusters at \( p < .05 \) with Tukey HSD adjustment.

The three subgroups differed in their levels of overall aggression and overt aggression, \( F (2, 252) = 6.94, p < .01, \eta^2 = .05, \) and \( F (2, 252) = 4.58, p < .05, \eta^2 = .04, \) respectively. Post hoc tests revealed that those in the aggressive popular subgroup had significantly higher overall aggression scores than did those in the aggressive non-popular subgroup \( (d = 0.52) \) or the aggressive average-popular subgroup \( (d = 0.34) \), and they had significantly higher overt aggression than the aggressive non-popular subgroup \( (d = 0.37) \). The three subgroups did not differ significantly in levels of relational aggression.

The three subgroups differed significantly in their levels of prosocial behavior, \( F (2, 252) = 49.97, p < .001, \eta^2 = .28. \) Post hoc tests revealed that those in the
aggressive popular subgroup were higher in prosocial behavior than adolescents in either the aggressive non-popular subgroup \( (d = 0.96) \) or the aggressive average-popular subgroup \( (d = 1.23) \).

The three subgroups differed significantly in their teacher-rated self-regulation, \( F (2, 243) = 3.03, p < .05, \eta^2 = .02 \). Post hoc tests revealed that youths in the aggressive popular subgroup had higher teacher-rated self-regulation than youths in the aggressive average-popular subgroup \( (d = 0.32) \). There was marginal difference between the aggressive popular subgroup and the aggressive non-popular subgroup in teacher-rated self-regulation. The three subgroups did not vary significantly in their levels of self-rated self-regulation.

The three subgroups differed significantly in their levels of academic achievement, \( F (2, 247) = 4.29, p < .05, \eta^2 = .03 \). Post hoc tests revealed that the aggressive popular subgroup had higher academic achievement than either the aggressive non-popular subgroup \( (d = 0.36) \) or the aggressive average-popular subgroup \( (d = 0.33) \).

There were significant effects for subgroup membership, \( F (2, 252) = 4.67, p < .05, \eta^2 = .21 \), and Subgroup x Gender interaction, \( F (2, 252) = 5.13, p < .001, \eta^2 = .04 \), on athleticism. Post hoc tests revealed that the aggressive popular subgroup had higher athletic skills than did those in the aggressive non-popular subgroup \( (d = 0.43) \) or the aggressive average-popular subgroup \( (d = 0.31) \). In addition, aggressive popular boys were higher in athleticism than popular aggressive girls \( (d = 0.92) \), and aggressive average-popular boys were higher in athleticism than aggressive average-popular girls \( (d = 0.60) \).
The three subgroups differed significantly on attractiveness, $F(2, 252) = 32.66, p < .001, \eta^2 = .04$. In addition, the interaction between subgroup and grade was significant, $F(2, 252) = 3.08, p < .05, \eta^2 = .02$. Aggressive popular subgroup had higher attractiveness than did those in the aggressive non-popular subgroup ($d = 1.11$) or the aggressive average-popular subgroup ($d = 0.78$). Moreover, aggressive popular youths in middle school were higher on attractiveness than those in high school ($d = 0.30$).

3.2 Cluster Analysis

In order to further examine whether the heterogeneous patterns of aggressive youth exist, a cluster analysis was conducted with the entire sample. Specifically, four variables were included in the cluster analysis to classify adolescents: overall aggression, prosocial behavior, teacher-rated self-regulation, and academic achievement. An initial cluster analysis was conducted using a $k$-means method. To determine whether this solution was robust, this analysis was replicated separately for 8th and 11th grades. Finally, a hierarchical cluster analysis was used to determine the correspondence between solutions resulting from the application of different methods.

3.2.1 K-Means Cluster Analysis

Two- to ten-cluster solutions were examined. After considering cluster size, the interpretation of each cluster, and the ability to replicate the solution, the five-cluster solution was selected as the best solution. In the final five-cluster solution from the $k$-means solution, Cluster 1 contained 24 adolescents (2%), Cluster 2 contained 80 adolescents (5%), Cluster 3 contained 145 adolescents (10%), Cluster 4 contained 680 adolescents (47%), and Cluster 5 contained 531 adolescents (36%).
Chi-square test revealed nonsignificant gender and grade differences in the number of adolescents classified into each cluster.

To aid the interpretation of the five clusters, 95 percent confidence intervals were calculated to determine if the five clusters differed significantly from zero on each of the four classifying variables. Means were considered high if they were significantly greater than zero (the mean), average if they were not significantly different from zero, and low if they were significantly lower than zero. Cluster 1 was characterized by high aggression, prosocial behavior, self-regulation, and academic achievement. Cluster 2 was marked by high aggression, and low prosocial behavior, self-regulation and academic achievement. Cluster 3 was marked by low aggression, and high prosocial behavior, high self-regulation and high academic achievement. Cluster 4 was marked by low aggression, low prosocial behavior, high self-regulation, and high academic achievement. Cluster 5 was characterized by low levels of aggression, prosocial behavior, self-regulation and academic achievement. Because the research question of this study is on the heterogeneity of aggressive adolescents, the interpretation of the results focuses on comparing Cluster 1 and Cluster 2, the two clusters characterized by high aggression scores.

To further describe the two clusters that are high on aggression, a series of one-way analysis of variance analyses (ANOVAs) were conducted to test for cluster differences in the means of each classifying variable. In each analysis, cluster membership was used as a two-level independent variable and each of the four classifying variables were used as the dependent variable. There were significant cluster differences on aggression, prosocial behavior, teacher-rated self-regulation,
and academic achievement, $F(1, 102) = 7.30, p < .01, \eta^2 = .07$, $F(1, 102) = 19.70, p < .001, \eta^2 = .16$, $F(1, 102) = 69.40, p < .001, \eta^2 = .41$, and $F(1, 102) = 83.92, p < .001, \eta^2 = .45$, respectively. As seen on Table 2, Cluster 1 had higher scores on aggression ($d = 0.61$), prosocial behavior ($d = 0.82$), teacher-rated self-regulation ($d = 2.02$), and academic achievement ($d = 1.77$) than Cluster 2.

Table 2 Standardized Means and Standard Deviations for Cluster Comparisons of Aggressive Adolescents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cluster 1 (N=24)</th>
<th>Cluster 2 (N=80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall aggression</td>
<td>3.53 (1.30)</td>
<td>2.78 (1.15)</td>
</tr>
<tr>
<td>Prosocial</td>
<td>0.63 (1.36)</td>
<td>-0.23 (0.59)</td>
</tr>
<tr>
<td>Teacher-rated self-regulation</td>
<td>0.68 (0.75)</td>
<td>-0.96 (0.87)</td>
</tr>
<tr>
<td>Academic achievement</td>
<td>1.17 (0.87)</td>
<td>-0.58 (1.09)</td>
</tr>
</tbody>
</table>

Notes. $N = 104$

In order to address the research goal of this study, a 2 (cluster) by 2 (gender) by 2 (grade) univariate analysis of variance was conducted to assess cluster differences in popularity as well as gender and grade interaction effects. Athleticism and attractiveness were included as additional dependent variables to test whether the two clusters also differed on those dimensions.

The analysis revealed significant effects for cluster membership, $F(1, 96) = 16.77, p < .001, \eta^2 = .15$, Cluster x Gender interaction, $F(1, 96) = 12.80, p < .001, \eta^2 = .12$, and Cluster x Gender x Grade interaction, $F(1, 96) = 5.77, p < .05, \eta^2 = .06$, on popularity. As seen in Table 3, adolescents in Cluster 1 had significantly higher popularity than those in Cluster 2 ($d = 0.79$). In addition, Cluster 1 had higher popularity than Cluster 2 for boys, but not for girls, and the difference between Cluster 1 and Cluster 2 was greater at Grade 8 than Grade 11.
Table 3 Standardized Means and Standard Deviations for Cluster Comparisons of Popularity, Athleticism, and Attractiveness by Gender and Grade

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cluster 1 (n=24)</th>
<th></th>
<th>Cluster 2 (n=80)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grade 8</td>
<td>Grade 10</td>
<td>Grade 8</td>
<td>Grade 10</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td>Popularity</td>
<td>3.16(0.61)</td>
<td>0.51(0.62)</td>
<td>2.09(1.53)</td>
<td>0.95(1.28)</td>
</tr>
<tr>
<td></td>
<td>0.23(1.12)</td>
<td>0.99(1.22)</td>
<td>0.65(0.86)</td>
<td>0.17(0.99)</td>
</tr>
<tr>
<td>Athleticism</td>
<td>4.07(1.54)</td>
<td>-0.38(0.32)</td>
<td>0.31(0.74)</td>
<td>-0.13(0.49)</td>
</tr>
<tr>
<td></td>
<td>0.56(1.18)</td>
<td>0.07(1.14)</td>
<td>0.58(1.76)</td>
<td>-0.08(1.00)</td>
</tr>
<tr>
<td>Attractiveness</td>
<td>2.36(0.62)</td>
<td>0.52(0.71)</td>
<td>0.79(1.01)</td>
<td>1.08(2.07)</td>
</tr>
<tr>
<td></td>
<td>-0.04(0.95)</td>
<td>-0.12(0.26)</td>
<td>0.12(0.88)</td>
<td>0.00(0.77)</td>
</tr>
</tbody>
</table>

Notes. N = 104. Standard deviations are in parenthesis.
For athleticism, there were significant effects for cluster membership, $F (1, 96) = 4.26, p < .05, \eta^2 = .04$, Cluster x Gender interaction, $F (1, 96) = 7.94, p < .01, \eta^2 = .08$, Cluster x Grade interaction, $F (1, 96) = 6.56, p < .05, \eta^2 = .06$, and Cluster x Gender x Grade interaction, $F (1, 96) = 10.00, p < .01, \eta^2 = .09$. Post hoc tests revealed that Cluster 1 had higher athletic skills than Cluster 2, which was further moderated by gender and grade: this pattern of cluster difference was significant in middle school boys, but not in girls or in high school.

With respect to attractiveness, there was significant main effect for cluster membership, $F (1, 96) = 18.44, p < .001, \eta^2 = .16$. Cluster 1 had significantly higher attractiveness than Cluster 2 ($d = 0.84$).

3.2.2 Cluster Solutions Separately by Grade

To examine whether the final solution was replicable, $k$-means cluster analyses were applied separately to each grade. The adolescents were split into 8th grade and 11th grade, and cluster analyses with five-cluster solution selected a priori were performed in each grade. Crosstab examination between the whole sample solution and solutions with separate grade suggested high correspondence ($\chi^2 (16) = 1618.34, p < .001$ for Grade 8, and $\chi^2 (16) = 2341.62, p < .001$ for Grade 10).

3.2.3 Hierarchical Cluster Analysis

To determine whether the cluster pattern found with $k$-means method was robust, a hierarchical cluster analysis was conducted on the entire sample with five-cluster solution selected a priori. The analyses were performed using a Ward’s method and squared Euclidean distance. Crosstab examination between the hierarchical solution and the $k$-mean solution again suggested high correspondence ($\chi^2 (16) = 2916.07, p < .001$).
Across the two methods, 86% of the youths were identified as belonging to similar clusters.

Table 4 Crosstabulation of Cluster Membership of Aggressive Youth across K-Means and Hierarchical Methods

<table>
<thead>
<tr>
<th>Hierarchical Methods Clusters</th>
<th>K-Means Methods Clusters</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster A</td>
<td>0</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Cluster B</td>
<td>11</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Cluster C</td>
<td>13</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

Notes. Chi-square = 39.95, p < .001

Similar to \( k \)-means methods, two aggressive clusters were identified by the hierarchical cluster analysis: Cluster A \((n = 45)\) and Cluster B \((n = 202)\) were high on aggression, \(M_s = 3.92\) and \(.65\), respectively. Cluster A was also high on popularity \((m = .65)\), but Cluster B was below average on popularity \((m = -.15)\). Both clusters were low on prosocial behavior, self-regulation, and academic achievement, with Cluster B being lower on all three variables than Cluster A. Three other clusters were also identified: Cluster C \((n = 634)\), Cluster D \((n = 137)\), and Cluster E \((n = 442)\). Cluster C was characterized by average levels of aggression and prosocial behavior, and high levels of teacher-rated regulation and academic achievement. Cluster D was characterized by low levels of aggression, and high levels of prosocial behavior, teacher-rated regulation, academic achievement and popularity. Cluster E was low on all variables. As seen in Table 4, among youths in the two aggressive clusters yielded by \( k \)-means methods, 45 \((43\%)\) of them were identified into Cluster A, 44 \((42\%)\) were identified into Cluster B, and 17 \((16\%)\) were identified into Cluster C. A Chi-square test showed that these
aggressive youths were identified with similar cluster memberships across the two methods, $\chi^2 (2) = 39.95, p < .001$. Among the popular-aggressive cluster (Cluster 1), 11 members (46%) were identified into Cluster A, and 13 (54%) were identified into Cluster C. Among the less popular aggressive cluster (Cluster 2), 34 (43%) were identified into Cluster A, and 42 (53%) were identified into Cluster B.

3.2.4 Cluster Membership and Subgroup Membership

A crosstabulation was conducted to explore the extent to which the two clusters of aggressive adolescents identified by $k$-means cluster analysis were in correspondence with subgroup memberships identified using the cutoff score. As shown in Table 5, among the 24 popular aggressive adolescents (Cluster 1), 17 (71%) were in the Aggressive Popular subgroup, 6 (25%) were in the Aggressive Average-Popular subgroup, and 1 (4%) was in the Aggressive Non-Popular subgroup. Among the 80 unpopular aggressive adolescents (Cluster 2), 30 (37%) were in the Aggressive Popular subgroup, 32 (40%) were in the Aggressive Average-Popular subgroup, and 18 (23%) were in the Aggressive Non-Popular subgroup. Chi-square test revealed high correspondence between aggressive adolescents identified from the two sets of analysis aggressive youths, $\chi^2 (2) = 9.07, p < .05$.

Table 5 Crosstabulation of Cluster Membership of Aggressive Youth across Aggressive Subgroups

<table>
<thead>
<tr>
<th>Aggressive Subgroups</th>
<th>K-Means Methods Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cluster 1</td>
</tr>
<tr>
<td>Aggressive popular</td>
<td>17</td>
</tr>
<tr>
<td>Aggressive average-popular</td>
<td>6</td>
</tr>
<tr>
<td>Aggressive non-popular</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
</tr>
</tbody>
</table>

Notes. Chi-square = 37.32, $p < .001$
CHAPTER 4. DISCUSSION

The consistent findings that popular children in both the US and China exhibit high levels of aggression have surprised researchers. This is particularly so for researchers who have spent decades using the Coie et al. (1982)’s social status classification scheme in which popular status was indexed by high likability and associated with low aggression. Not all aggressive children are popular and consequently the primary goal of this study was to examine heterogeneity with regard to popularity within aggressive youth in China. It was expected two groups of aggressive youth would be found that exhibited varying levels of popularity and each characterized by distinct behavioral profiles. Consistent with these hypotheses, subgroup differences were found in the extent to which aggressive youth are associated with popularity.

4.1 Characteristics of Aggressive-Popular, Aggressive Non-Popular, and Aggressive Average-Popular Subgroups

The first set of analyses focused on determining the characteristics of aggressive youths who were of high, average, and low popularity. Analyses showed that aggressive youths with high popularity had significantly higher popularity, overall aggression, prosocial behavior, teacher-rated self-regulation, academic achievement, athleticism, and attractiveness scores than those with either average or low popularity, and had significantly higher levels of overt aggression than those with low popularity. These findings are consistent with the argument that aggressive youth may achieve popularity
through strategically alternating between aggression and prosocial behaviors in addition to possessing peer-valued characteristics to increase their affiliative attractiveness (Dijkstra et al., 2009; Hawley et al., 2007). The findings have implications about the heterogeneous nature of aggressive youth, and the processes through which they attain high standing within peer groups.

4.1.1 Aggression

The findings revealed that aggressive youths with high popularity had higher overall aggression and overt aggression than those with low popularity. Despite these differences, aggressive youths exhibited high relational aggression across high, average, and low levels of popularity. These results are consistent with investigations both in the US and China suggesting that popular children and adolescents exhibit both overt and relational aggression (Andreou, 2006; Cillessen & Mayeux, 2004; Niu et al., 2015; Puckett et al., 2008; Rose et al., 2004; Schwartz et al., 2010). The finding that aggressive youth with high popularity were more aggressive than those with low or average popularity is surprising. It appears be inconsistent with findings from Ettekal and Ladd (2015), in which subgroups with both high overt and relational aggression experienced more severe peer rejection than subgroups with moderate or form-specific aggression. It is important to interpret these findings while noting how aggression was assessed in the study. Peers nominated adolescents who they perceive to be aggressive, and when someone receive high nominations on aggression, it may mean that one is perceived by a large portion of one’s peers to be aggressive but not necessarily that one uses extreme forms of aggression. Thus while these findings indicate the positive association between
aggression and popularity, it is uncertain whether high levels of aggression, rather than moderate or low levels, is more typical of popular aggressive adolescents.

4.1.2 Prosocial Behavior

The findings showed that aggressive youths with high popularity had higher levels of prosocial behavior than those with low popularity. These results are consistent with investigations that have found significant moderating effects of prosocial behaviors in the association between aggression and popularity (Dijkstra et al., 2009; Puckett et al., 2008). These findings are also concordant with the social dominance theory, according to which social resources are universally achieved by skillfully and strategically using a combination of aggression and prosocial behaviors (Hawley et al., 2007). Nevertheless, the effects of prosocial behavior may need to be understood in the Chinese context. According to Confucian principles, status is accrued through behaving in a morally responsible manner and by treating others with respect and maintaining interpersonal harmony (Gabrenya & Hwang, 1996). Chinese adolescents who offer help in classroom duties and schoolwork and attend to others’ needs tend to attain prestige among peers (Chen, Kaspar, Zhang, Wang, & Zheng, 2004). Thus, although aggression is strongly discouraged by teachers and parents, if Chinese aggressive youth can compensate the negative consequences of aggressive acts by alternating with prosocial behaviors, they tend to maintain high standing within peers.

4.1.3 Self-Regulation

Adolescents in all three subgroups performed below the school average on teacher-rated self-regulation, but those in the aggressive popular subgroup were better regulated than those in the aggressive average-popular or non-popular subgroups. These
results are consistent with findings that aggression is often associated with anger, impulsivity, and inadequate regulation (Eisenberg et al., 2010). In Chinese society in particular, aggression is conceptualized as a failure to appropriately regulate one’s emotions (Bond & Wang, 1981). Nevertheless, these results suggest that perhaps aggressive youths vary in their abilities to regulate emotions: aggressive adolescents who have high popularity are better regulated than less popular ones. There were no statistical differences in the levels of self-rated regulation among the three subgroups. It is unknown what might account for this. Perhaps adolescents are poor judges of their levels of self-regulation, or adolescents are reluctant to accurately report on this aspect of their behavior.

4.1.4 Academic Achievement

Youths in the aggressive popular subgroup had higher academic achievement than those in either average-popular or low-popular subgroups. These results are consistent with the argument that high achieving Chinese youth are afforded popular status as well as empirical evidence regarding the positive association between academic achievement and popularity (Li, 2012; Li et al., 2012; Niu et al., 2015). These results are inconsistent with some findings from the US and Europe suggesting that academic achievement is not a significant predictor of popularity (Boyatzis, Baloff, & Durieux, 1998; Meijs, Cillessen, Scholte, Segers, & Spijkerman, 2010). The inconsistent findings across cultural contexts highlight the need to understand the effects of academic achievement on popularity aggressive youths within the specific setting. In China, the attainment of academic achievement is the most important task for school-aged students (Li, 2012). In particular, middle school and high school students are being prepared for the Zhongkao (Senior
High School Entrance Exam) and the *Gaokao* (National Higher Education Entrance Exam) from the first day they enter school. As such, adolescents who perform well academically are often cast as role models by teachers and parents and admired by their peers (Phillipson & Phillipson, 2007). Given the strong emphasis on academic achievement in China, aggressive adolescents who perform well academically may receive approval and support from parents and teachers, and consequently they may carry out aggressive acts without sanctions from adults (Chen, Yang, & Wang, 2013). Despite the aggressive behavior of these high achieving aggressive adolescents, peers may be inclined to interact with them to obtain help for schoolwork. This creates opportunities for them to display their strength in both academic and social spheres and thus attain high status. Results from this study provide further evidence that academic achievement is a significant phenomenon in middle and high schools in China that affords aggressive youth popular status. The Fast Track intervention program, which included an academic tutoring component, was found to be effective in reducing aggressive behavior and improving positive adjustment outcomes for high-risk children in the US (Bierman et al., 2004). Results from this study suggest that similar strategies (i.e., improving the academic achievement of aggressive children) may not be useful in China, because enhancing academic competence may increase the popularity of aggressive children, and whereby allow the enactment of aggressive acts by these socially dominant students to be of greater influence to their peers.

4.1.5 Attractiveness and Athleticism

Youths in the aggressive popular subgroup had higher attractiveness and athletic skills than those in the aggressive non-popular or average-popularity subgroups. These
results are consistent with findings from the US showing moderating effects of athleticism and attractiveness in the association between aggression and popularity (Rosen & Underwood, 2010; Vaillancourt & Hymel, 2006). These findings are also consistent with the argument that possessing peer-valued characteristics may allow aggressive children and adolescents to be popular figures with whom to affiliate. Interestingly, the findings regarding the role of athleticism challenge the argument that athletic success is minimally relevant to popularity in Chinese schools and contrast findings showing nonsignificant association between athletic ability and popularity of Chinese youth (Dong, Weisfeld, Boardway, & Shen, 1996). Perhaps with the ongoing Westernization occurring in Chinese urban areas, athleticism has become one important aspect to evaluate the well-development of students in school. Chinese youth who are good at sports are therefore increasingly admired by peers.

4.1.6 Grade and Gender Effects

There were no grade or gender effects in the number of aggressive youths identified into aggressive popular, aggressive average-popular, or aggressive non-popular subgroups. Boys in the aggressive popular subgroup had higher popularity and athleticism than boys in the aggressive non-popular subgroup; these effects did not emerge for girls. In addition, the difference between the aggressive popular subgroup and the aggressive non-popular subgroup on attractiveness was more evident in middle school than in high school. These results showing the heterogeneous effects as more prominent among boys and middle school students may indicate the presence of a small group of highly popular aggressive boys in middle school. These appear to be consistent with the findings from LaFontana and Cillessen (2010) showing that popularity status was more
strongly prioritized in boys than in girls and in early adolescence than in childhood or in late adolescence.

4.2 Clusters of Aggressive Youth

The $k$-means cluster analysis using the entire sample revealed a subgroup of popular aggressive youths (Cluster 1) who exhibited high levels of aggression, prosocial behavior, regulatory abilities, and academic achievement, and a subgroup of less popular aggressive youths (Cluster 2) who exhibited high aggression and low levels of prosocial behavior, regulatory abilities, and academic achievement. Results from the hierarchical cluster analysis also showed two clusters of youths, one (Cluster A) more popular than the other (Cluster B). In both methods of cluster analyses, the heterogeneity with regard to popularity of aggressive youths was found. Moreover, results were consistent that the popular aggressive cluster had higher levels of aggression, prosocial behavior, self-regulation, and academic achievement than the less popular cluster.

Despite these similarities of the methods, several discrepancies emerged. Although the cluster solution yielded by the $k$-means method did not vary significantly from that of the hierarchical cluster analysis, the clusters identified by $k$-means methods included fewer members than those identified by hierarchical methods. In addition, the behavioral profiles associated with the aggressive clusters were not completely equivalent in the two cluster techniques. For example, youths in the popular aggressive cluster identified by the hierarchical cluster analysis were below average on prosocial behavior, regulation, and academic achievement, whereas those identified by the $k$-means method were high on these variables. The difficulty of replicating the cluster solutions is likely because only very few popular aggressive youths exist in the Chinese culture. Given the
strong emphasis on group harmony within Chinese society, students may feel reluctant to
nominate people who are aggressive even with assured anonymity, which may lead to
less variability in terms of aggression in the sample. Future investigation may conduct
cluster analyses using a sample with greater variability in terms of aggression, perhaps in
the US, to determine whether the heterogeneous pattern of aggressive youth replicate in
other studies. In this study, the hierarchical cluster analysis was conducted for replication
purposes, thus the interpretation of the results will focus on findings of the $k$-means
methods.

The cluster of popular aggressive youth (Cluster 1) identified by $k$-means method
is similar to the “controversial” children identified by Coie et al. (1982) and the “tough”
boys identified by Rodkin et al. (2000). Using the sociometric classification system, Coie
et al. showed that controversial children (i.e., high on both liked and disliked scores) were
highly aggressive, cooperative, and perceived as popular leaders. Similarly, Rodkin and
his colleagues showed that tough boys were aggressive, popular, and high in physical
competence (e.g., athletic skills and facial attractiveness).

The findings that the popular aggressive cluster was characterized by prosocial
behaviors are concordant with Hawley et al. (2007)’s portrait of “bistrategic controllers”
or “Machiavellian”, who strategically use aggressive and prosocial acts to solidify their
social positions and gain access to resources. Adler et al. (1992) also described in their
ethnographic study how popular youth alternate strategically between showing favors to
peers and initiating attacks against them. The results showing that adolescents in the
popular aggressive cluster were high in self-regulation are consistent with the argument
that some aggressive youths are goal-oriented and have at least adequate regulation
ability (Eisenberg et al., 2010; Frick & Morris, 2004). To successfully and effectively shift between aggressive and prosocial strategies and obtain popular status, one may necessarily be equipped with regulatory abilities to resist impulsivity and anger in confrontations and remain unprovoked to achieve one’s goal. This cluster of popular aggressive youth also had high academic achievement. As discussed earlier, academic competence may afford aggressive youth approval from parents and teachers and create opportunities for interactions in academic settings, where they may obtain social status through the use of aggressive and prosocial strategies (Chen et al., 2013).

In contrast to this cluster of popular aggressive youth, a larger cluster of aggressive youth with lower popularity (Cluster 2) was identified. These youths were high on aggression but low on prosocial behavior, self-regulation, and academic achievement. This cluster of youth was similar to the “rejected” children identified using the sociometric classification system by Coie et al. (1982) who were high on aggression and low on cooperative behaviors. The group of aggressive-rejected children with low prosocial skills was also found in Rodkin et al. (2000; labeled as “troubled” boys), Cillessen, Van IJzendoorn, Van Lieshout, and Hartup (1992), French (1988), and French (1990). Results in the current study are consistent with findings from Rodkin et al. (2000) who found that this group of aggressive-rejected children had poor academic achievement and low physical competence (e.g., athletic skills and facial attractiveness), and from French (1988; 1990) who found that aggressive-rejected children had low self-control. This cluster of less popular aggressive youth was similar to the aggressive-rejected children in their low status and multiple behavioral characteristics. One may expect this cluster of less popular aggressive youth to be rejected by peers. These suggest
that while some aggressive youth can be popular, the majority of them have low social status and experience multiple adjustment difficulties.

Given that the Chinese society emphasizes group harmony, socialization of ren (inhibition of emotions), and discouragement of aggression, this cluster of less popular aggressive youth may be of particular risk for later adjustment problems. In Chinese schools, students engage in regular public evaluations in which their academic and social performances and moral values were evaluated by teachers, peers, and themselves (Chen, Huang, Wang, & Chang, 2012). Negative feedback received by this group of aggressive youth may likely lead to negative self-feelings, internalizing problems, and school difficulties (Chen et al., 2012).

Whether youth in the popular-aggressive cluster are at serious risk is less certain. Although high standing in the peer group may be associated with social competence, positive peer relationships and self-esteem (Bukowski, Pizzamiglio, Newcomb, & Hoza, 1996; Coie, Dodge, & Kupersmidt, 1990), there is also evidence from US and Europe that suggests that popular youth may be at risk for alcohol and tobacco use (Killaya-Jones, Nakajima, & Costanzo, 2007; Mayeux, Sandstrom, & Cillessen, 2008; Sandstrom & Cillessen, 2006), sexual behaviors (Prinstein, Meade, & Cohen, 2003), and academic difficulties (Schwartz et al., 2006; Wentzel, 2003). Given that Chinese schools are characterized by stronger focus on academic achievement and greater adult supervision, it is not clear whether similar maladjustment would be associated with popular aggressive youth in China.

In terms of grade and gender effects, no grade and gender effects in the number of aggressive youths identified into the popular-aggressive vs. the less popular aggressive
clusters were found. However, youths in the popular aggressive cluster had higher popularity and athletic skills than those in the less popular aggressive cluster among boys but not among girls, and more so in middle school than in high school. In addition, the difference between the two aggressive clusters on attractiveness was more evident in middle school than in high school. These grade and gender effects are consistent with those found in the first set of analysis, and may indicate the importance of popularity among middle school boys in particular.

4.3 Summary of the Two Sets of Analyses

4.3.1 Common Features

Both sets of analyses support the hypotheses that two groups of aggressive youth exist and that these vary in their levels of popularity. In addition, the behavioral profiles of these groups are consistent with past research focused on popularity with findings that the popular aggressive youth differentiated from less popular aggressive youth in that they had higher levels of aggression, prosocial behavior, academic achievement, athleticism, and attractiveness. Similar results were obtained across these two analytic methods enhances our confidence in these results.

In addition, the grade and gender effects showing the prominence of the popular aggressive boys in middle school were consistent across the two sets of analyses. This was shown in the findings that boys in this group had higher levels of popularity and athletic skills than either girls or those in high school. These consistent grade and gender effects may reveal the existence of a small group of highly popular aggressive boys in middle school.
4.3.2 Discrepancies

There are a few inconsistent findings across the two sets of analyses. These involve discordant findings regarding the effect of teacher-rated self-regulation and inequivalent group sizes.

First, inconsistent findings were found regarding the role of teacher-rated self-regulation in differentiating between popular and unpopular aggressive youth. In the subgroup analysis, youth in aggressive popular, aggressive average-popular, and aggressive non-popular subgroups were below average on self-regulation; those in the popular aggressive subgroup were better regulated than the aggressive average-popular subgroup, but marginally different from the aggressive non-popular subgroup. Results from the cluster analysis showed the presence of a small group of youth who were highly aggressive but nevertheless were high in self-regulation. This inconsistency may be due to the possibility that only very few aggressive youths are well regulated. While the cluster analysis is able to detect the small group of well-regulated aggressive youth, the subgroup analysis is not; this may raise concerns about the arbitrary nature of using cutoff scores in the subgroup analysis. The results across the two sets of analyses partially support the argument that not all aggressive children have difficulties in self-regulatory processes (Eisenberg et al., 2010; Frick & Morris, 2004), and there may be a small number of adolescents who are well regulated, perhaps goal-oriented, and effective in their use of aggression to attain popularity.

Second, the group sizes of the popular aggressive and less popular aggressive youth differed across the two sets of analyses. In the first set of analysis, the aggressive popular subgroup contained 90 adolescents, the aggressive average-popular subgroup
contained 90 adolescents, and the aggressive non-popular subgroup contained 69 adolescents. In the cluster analysis, however, only 24 adolescents were identified as popular aggressive youth, and another 80 were identified as less popular aggressive youth. This discrepancy may reflect the arbitrary nature of the cutoff score: should a cutoff score other than \( .5 \ SD \) was adopted, subgroup sizes would change substantially. Given that only a smaller number of aggressive youth were identified by cluster analysis than the current cutoff score method, future studies may consider adopting a more stringent criteria to identify aggressive youth.

4.4 Limitations and Suggestions for Future Research

4.4.1 Limitation

There are several weaknesses and limitations in this study. Here, five of them are discussed below. First, cluster analysis was performed using aggression, prosocial behavior, self-regulation, and academic achievement as clustering measures. There is a good case that three of the variables, with the exception of regulation, have been consistently associated with popularity in studies in the US and elsewhere. Other dimensions that might contribute to different status of aggressive youth were not assessed in the current study. Given that the cluster solution tends to be affected by the selection of classifying variables, if variables other than the ones used in the current study were included, different results would likely be obtained. Thus future research should replicate findings from this study by including other important dimensions related to aggression and popularity (e.g., the onset of aggression, and whether aggressive youth predominantly uses proactive or reactive aggression) and examine their roles in the heterogeneity of aggressive youth.
Second, future research may include longitudinal data to distinguish not only the behavioral patterns of aggressive youth but also developmental pathways of aggression and popularity. Lu et al. (2016) in an unpublished paper found bidirectionality between aggression and popularity with middle and high school students in China. Based on findings from the current study and Lu et al. (2016), future researchers could closely examine the stability and changes of the heterogeneity of adolescent aggression to enhance understanding of developmental processes of aggressive behavior across adolescence.

Third, this study examined the heterogeneity with regard to popularity. Future investigations could examine how these diverse aggressive groups fared in terms of psychological, social, and school outcomes to provide insights about the extent to which these groups are qualitatively distinguishable and whether they follow distinct developmental trajectories.

Fourth, the study was conducted in a sample of eighth and eleventh grade adolescents in middle and high schools. It remains to be examined whether the results can be generalized to children in other developmental periods. It is unclear whether similar heterogeneous patterns of aggressive children will be found in elementary school children or in college students.

Finally, this study was conducted in China. One needs to be cautious in generalizing the results to other cultural contexts. Garandeau, Ahn, and Rodkin (2011) showed that aggression was more disliked in classroom contexts with greater emphasis on academic achievement. One would expect that in contexts where academic
achievement is less emphasized than in China, it may not contribute to the popularity of aggressive youth.

4.4.2 Implications

This evidence of heterogeneity within aggressive adolescents in China has substantial implications for the design of intervention programs targeting deviant behaviors. To design intervention programs that are maximally effective, interventionists may consider different programs for youth displaying these different behavioral profiles. More important, interventionists may consider targeting the small group of popular aggressive youth as effective change agents to shape peer norms and discourage deviant behaviors among their peers. There is evidence that school-based programs focusing on popular opinion leaders are effective in preventing HIV and reducing obesity and tobacco use (Edler, Wildey, de Moor, & Sallis, 1993; Stevens, Leybas-Amedia, Bourdeau, McMichael, & Nyitray, 2006). Further studies are needed to determine how interventions can use this group of popular-aggressive youth to reduce deviant behaviors in targeted and effective ways.
CHAPTER 5. CONCLUSION

Despite some salient limitations, this study adds to the growing evidence regarding the heterogeneity of aggressive youth, and is the first investigation that delves into this topic in China. Results from this study provide support that two distinct groups of aggressive youth exist with varying levels of popularity. These results indicate that aggression can be effective in attaining popularity within Chinese youth when embedded in a larger behavioral repertoire that includes prosocial behavior, self-regulation, and academic achievement. These findings are found consistently in both the cutoff method and the cluster analysis, and are validated with both grades and multiple cluster algorithms.

Within the context of accumulating evidence that aggression is a prominent aspect of popularity in China (Li et al., 2012; Lu et al., 2016; Niu et al., 2015; Owens et al., 2015; Schwartz et al., 2010), the results reported here provide new insight into the existence of a group of popular aggressive youth in Chinese peer contexts that had been overlooked by Chinese researchers and the processes through with aggression is associated with popularity. Continued work that replicates these finding with a different sample and a wider span of ages would be valuable for the identification of popular aggressive adolescents who may be particularly effective change agents for the implementation of interventions targeting deviant behaviors.
REFERENCES
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