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Friendships and Networks in Chinese Adolescents: Academic Achievement and Academic Engagement

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FRIENDSHIPS AND NETWORKS IN CHINESE ADOLESCENTS: ACADEMIC
ACHIEVEMENT AND ACADEMIC ENGAGEMENT

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of

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of

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TABLE OF CONTENTS

	Page
ABSTRACT.....	iv
CHAPTER 1. INTRODUCTION	1
CHAPTER 2 REVIEW OF THE LITERATURE	3
2.1 Friendships.....	3
2.2 Networks.....	4
2.3 Friendships and Networks and Academic Success in Adolescence	6
2.4 Academic Success and the School Environment in China	11
2.5 Academic Success and Peer Relationship of Chinese Children	11
2.6 Conclusions.....	13
2.7 The Current Study.....	14
CHAPTER 3 METHOD	15
3.1 Participants.....	15
3.2 Procedure	16
3.3 Measures	17
3.4 Analytic Strategy	18
CHAPTER 4 RESULTS	20
CHAPTER 5 DISCUSSION.....	28
LIST OF REFERENCES	36

ABSTRACT

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This longitudinal study examined the associations between Chinese adolescents' academic adjustment (i.e., academic achievement and academic engagement) and network affiliates and friends' academic adjustment. Seven hundred and twenty seventh grade students (Mean age= 13.24, 382 boys and 338 girls) participated in the study. They were followed into the eighth grade (Mean Age = 14.26, 343 boys and 312 girls). Adolescents' academic achievement was highly correlated with that of their friends and network affiliates at both grades. Adolescents' academic engagement was not, however, correlated with their friends and network affiliates' academic engagement. First year friends' academic achievement significantly predicted second year adolescents' academic achievement after controlling gender and first year adolescents' academic achievement.

CHAPTER 1. INTRODUCTION

During the past several decades, researchers have developed a better understanding of the complex nature of peer associations and their effects on students' academic engagement and achievement at schools (Altermatt & Pomerantz, 2003; Kindermann, 2007; Ryan, 2001). Much of this research has focused on two types of peer relationships. One examines friendships, which are dyadic relationships that incorporate mutual liking, coordinated action, and similarity of affect and behavior (Bukowski, Motzoi & Meyer, 2009). A second focus has been on networks, which are groups of individuals who spend time together but may or may not include close friends. Peers in both friendships and networks have an effect on students' academic development at schools (e.g., Altermatt & Pomerantz, 2003; Cairns, Perrin, & Cairns, 1985; Kindermann, 2007; Kindermann & Gest, 2009; Ryan, 2001). Much of the research on friendships and networks has been independent. Few studies have compared friendship and networks to obtain a more comprehensive understanding map of the relation between peers and adolescents' academic engagement and achievement.

Most of the research on peer relationship and students' academic life in schools has been conducted in United States (e.g., Kindermann, 2007; Kindermann & Gest, 2009; Ryan, 2001); little is known about the associations between peer relationships and academic engagement and achievement in other cultures.

The purpose of this study is to investigate the role of the friendships and networks in the development of academic achievement and engagement in Chinese adolescents. The study of this in China provides an excellent test of the generalizability of findings that have been obtained from the United States. In China, grades have been highly valued because of limited higher education resource. Therefore, students are expected to perform well and work hard for their grades by parents and teachers (Stevenson et al., 1990; Pomerantz & Wang, 2008). Nevertheless, teachers and parents tend to encourage students to engage in cooperative relationship with peers in academic group or activities. Meanwhile, students are naturally building friendships during interactions (Chen, Chang, Liu & He, 2008).

CHAPTER 2. REVIEW OF THE LITERATURE

2.1 Friendships

Friendships have been defined as dyadic, intimate, and voluntary emotional connections between peers (Berndt & Murphy, 2002; Rubin, Bukowski & Laursen, 2009). Friendships begin during early childhood and they provide opportunities for children to communicate, share intimacies, and resolve conflicts (Hay, Caplan & Nash, 2009).

The most basic measure of friendships needs to capture both the level of reciprocity and the closeness that occurs between two individuals (Bukowski, Motzoi & Meyer, 2009). Friendships are optimally defined by mutual nomination. For example, most researchers identify friendship using students' nominations as "someone you talk with, hangout with, and do things with" or "three closest friends in your school or grade" (French, Purwono & Rodkin, 2014; Kindermann, 2007).

As suggested by Berndt and McCandless (2009), by measuring "close friends", researchers aim to study relationships that emphasize mutual knowledge and likeness. When children name each other as mutual friends, it may mean that they know each other and like each other, but the degree of their affection toward each other and their knowledge of each other varies. Thus, the concepts of friendships range from just friends, good friends, best friends, to the best of friends. However, there are unclear boundaries

between these types of friends and researchers should decide what level of friends they wish to study. In addition, other characteristics of friendships include companionship, mutual responsiveness and intimacy in both affect and behavior (Berndt & McCandless, 2009; Bukowski, Motzoi & Meyer 2009). Before you convert to PDF, carefully review our Sample Thesis Pages and our Formatting Checklist, and then double check the formatting of your entire document, page by page.

2.2 Networks

Researchers have often found that friendships overlap or are nested within larger peer groups; this will be henceforth be referred to as networks. Networks may or may not include close friends and have unique characteristics such as size, cohesiveness, density and structure (Hartup, 1996; Ryan 2001). Much of children's peer interactions occur in these networks. Activities include shared time and shared activities such as sports, academic pursuit or problem behaviors including smoking and drinking alcohol.

A number of researchers have also found that friendships and networks share similar functions but that adolescents have greater levels of intimacy, emotional warmth and reciprocal trustworthiness with their friends than with their network members (Kindermann, 1993; Kindermann, 2007; Kindermann & Skinner, 2012). Although children are likely to be more similar to their friends on many dimensions, it has been suggested that they might be as similar as or perhaps more similar to their network associates than friends on some characteristics such as recreational interests or substance use (French et al., 2012).

One way to identify networks has been to use the Social Cognitive Map (SCM) procedure developed by Cairns, Perrin, and Cairns (1985). Using this procedure, students

are required to list their own and other groups of students who frequently hang out in a group (French et al., 2012; Kindermann, 2007). The advantages of SCM are that the nominations of network members comes from classmates as well as network members. Thus, the identification of peer groups is based on information from multiple sources.

The first step in analyzing the SCM result is to form a co-occurrence matrix as a square matrix with all the students in a class (Chen, 2008). Each student's group membership is created based on the frequencies of nominations of group membership with every other child in the class. Then, a similarity index is calculated by correlating each individual's group membership. Thus, student who shares a similar group membership are counted as belonging to the same group using a correlation of .40 as a cutoff. A computer program developed by Leung (1998) is used to assign students to groups and to identify their centrality status in this group. Using this method, it is possible for students to be identified as members of multiple groups.

Friendships are often nested with the networks defined by the SCM method because SCM method identifies interacting individuals. Nevertheless, some friends were not part of networks. In order to maintain independence between friends and network affiliates, we eliminated friends from networks. Thus, we can refer to these as non-friend network affiliates. For example, French et al. (2010) eliminated friends from network affiliates and found that friends and network affiliates' religiosity showed distinct functions in terms of predicting adolescents' antisocial behaviors. Friends predicted greater variances of antisocial behaviors as compared to network affiliates.

2.3 Friendships and Networks and Academic Success in Adolescence

Homophily, selection, and influence. Much of the interest in understanding friendships and networks has focused on how these peer relationships are associated with adjustment. Of interest in this study is to understand how friendships and network affiliations are useful in understanding the academic success of adolescents.

Fundamental to understanding how peers are involved in promoting academic success begins with the observation that children are similar in a number of aspects, including academic success, to their friends and network affiliates. This phenomenon has been labeled homophily (Altermatt & Pomerantz 2003; Kindermann 2007; Prinstein & Dodge, 2008), and arises out of two processes: selection and influence.

Selection has been defined as the extent to which peers with similar attitudes and behavior tend to select each other as friends. Students may select friends who are similar to themselves in terms of their academic adjustment (Farmer et al., 2011). For example, Shin and Ryan (2014) examined sixth graders' and their friends' academic adjustment and they found that early adolescents tended to select friends who were similar to themselves on academic self-efficacy and achievement.

Influence is defined as the degree to which friends become more alike in attitudes and behavior because of their friendship ties and frequent interaction (Veenstra & Steglich, 2012). It is theorized that students tend to influence each other on their academic engagement and academic success (Kindermann & Gest, 2009). Hence, youth share more similar behaviors and beliefs with their friends and network affiliates; they are more likely to be encouraged and to receive positive feedback (Prinstein & Dodge,

2008). The current study will focus on examining the peer influence procedure instead of peer selection procedure due to the analytic plan.

Academic engagement. Academic engagement has been defined as students' enthusiastic and active participation in the learning context and the degree to which students commit to school activities (Jimerson, Campos & Greif, 2003; Kindermann & Skinner, 2012; Skinner et al., 2009).

Engagement plays an important role in predicting students' academic achievement and preventing their academic failure or drop-out (Kindermann & Skinner, 2012; Wang & Pomerantz, 2009). There are variations in the measurement of the school engagement construct. Some researchers tend to emphasize attachment (e.g. "I like school") and commitment (e.g. "school is important to me") to teachers, classroom environments, and schools (Murray & Greenberg, 2001). Other studies focused on different facets of engagements such as effortful and disruptive behaviors: "I try very hard in school" or "I listen carefully in class" (Shin & Ryan, 2014). Most researchers have focused on how teachers and parents influence students' engagement. Only a few researchers have investigated how peer relationship is associated with academic engagement (Cheung & Pomerantz, 2012; Strambler & McKown, 2013).

In the current study, the engagement scale included five questions: "I like school a lot", "I try hard at school", "School bores me", "I don't think I belong to school", "I do not do well at school". Thus, the scale includes questions related to two aspects of academic engagement: school attachment and effortful behaviors.

Friendships and academic success. The types of relationships children have in the classroom and the nature of the interaction that transpires within these relationships

affect children's learning and achievement (Ryan, 2012). Recent research has focused on investigating how the characteristics of close friends influence changes in students' academic achievement and engagement at school. For example, Berndt and Keefe (1995) examined seventh- and eighth-graders students' involvement and disruption at school. Students whose friends were more disruptive increased their levels of disruption during the school year, whereas students whose friends were more involved in school reported increased positive involvement during the school year. In another study, Altermatt and Pomerantz (2011) found that fourth, fifth, and sixth grade students' achievement-related beliefs (e.g., "Can I do this task?", "Do I want to do this task and why?") could be predicted by their friends' competence perceptions. This study suggested that reciprocal friends influenced children's thinking and perception on their own academic standards. Thus, friends' competence-related and motivational beliefs predicted changes in children's academic beliefs over period. In a recent study by Shin (2014), researchers found that students were more likely to initiate friendships with students who had a similar level of academic mastery goals. Thus, it appears that students are typically attracted to friends with similar mastery goal and they become more similar over time.

Networks and academic success. Although there is evidence that friendships and networks overlap to some extent, they have distinct structures and may exert different effects on children's academic outcomes (Molloy, Gest, & Rulison, 2011). For example, Kindermann (2012) examined both network and friends on academic functioning in sixth grade at one school. Fifty-two percent of students' mutual friends were included in the network and 29% students' network affiliates were included in the mutual friends. Similar findings have emerged from research that used SCM method to examine the

relation between network affiliates and engagement and achievement in the classroom setting. (e.g., Chen, Chang, & He, 2003).

One example of the influence of network affiliates with regard to academic success comes from Kindermann (1993). He examined the influence of networks on the fourth and fifth grade students' academic adjustment. Engagement in these SCM identified networks predicted children's changes in engagement across the school year. In a similar study of sixth grade students, Kindermann (2007) replicated previous studies in order to examine the effects of network on changes in students' classroom engagement. Engagement of networks predicted changes in students' engagement across school year when parental and teacher involvement of students were controlled.

Ryan (2001) used multilevel modeling to predict seventh grade students' academic achievement and intrinsic motivation from their network affiliates' scores. Unlike ordinary least squares (OLS) regression analysis, HLM analysis divides the variances of students' motivation and achievement into within- and between-group. Thus, it further explains how shared network influences children's academic outcomes. Ryan (2001) found that young adolescent students tended to affiliate with other network members who had similar academic characteristics after controlling the selection effect. With respect to different facets of motivation, however, the results were mixed. The characteristics of network members predicted changes in students' intrinsic motivation for school such as they liked and enjoyed school. There was no network effect for changes in students' school utility motivation such as the usefulness and importance of school.

Two recent studies examined the relations of both friends and networks on children's academic adjustment. Molloy, Gest and Ruilson (2011) compared friends and networks on fifth and seventh-grade students' academic self-concept, effort, and academic skills. Both network members and friends predicted changes in students' academic effort at fifth and seventh grades. For fifth grade children, only friends' characteristics predicted changes in students' academic effort. For seventh grade children, both network and friendships types predicted changes in students' academic effort; whereas only friends' academic self-concepts predicted changes in students' scores.

Kindermann and Skinner (2012) found a similar effect of network affiliates and friends on sixth grade children's academic adjustment. The highest impact on students' academic outcomes has been found when students' peers were included both in network and friendship at the same time. The similar effect of friends and network affiliates in academic adjustment might depend on the extent of overlapping.

Early adolescence. Early adolescence is an important period for the study of the role of friends and network members in academic life. Many researchers have found that adolescents spend more time with friends and build increasing intimacy and trust with their friends. Also, peer influence usually peaks during adolescence (Berndt, Hawkins & Jiao, 1999; Ryan, 2001; Molloy et al., 2011). Researchers have focused on early adolescents' academic achievement and engagement because the transition from elementary school to middle school brings lots of pressure on students to adapt to the new environment and more competitive academic setting. Those changes might influence adolescents to apply greater attention to peer approval and advice (Arnett, 2000).

2.4 Academic Success and the School Environment in China

There is evidence that Chinese children are more engaged in school and achieve more in their academic subjects than do U.S. children (e.g., Pomerantz et al. 2008; PISA 2012; Stevenson et al. 1993). Numerous studies have been conducted in China to understand the factors that explain the differences between Chinese and American students' academic achievement and engagement. Cheung (2012), for example, investigated parents' involvement in children's learning in the United States and China and found that American parents' involvement was focused less on control and more on promoting autonomy. In another study of Chinese American families, it was found that Chinese parents tend to correct children's homework and provide guidance for questions, which was less common in U.S. families. Chinese-American parents were more directive in teaching and focused on the correctness of children's work (Huntsinger, Jose, Larson, Krieg, & Shaligram, 2000).

Generally, Chinese parents spend more time helping their children on homework or providing feedback on exams and they tend to be more controlling and exert pressure on children to influence their feelings, thoughts, and behaviors about academic success than do American parents (Ng, Pomerantz, & Deng, 2014). This likely contributes to Chinese children's better performance on academic achievement and their higher level of engagement at school.

2.5 Academic Success and Peer Relationship of Chinese Children

In U.S. schools, students who are high academic achievers sometimes experience pressure from peers to be less academically successful (Rentzsch & Schröder-Abé, 2011; Wong et al., 2012). For example, it is common that American students define themselves

and others into specific social groups (e.g., nerd, punker, cool, etc.) based on stereotypes in schools (Brown, 1996; Brown & Klute, 2003). Highly academically engaged children are more likely seen as less “cool” in middle school compared to elementary school (e.g., Galvan et al., 2011). Especially for students labeled as “low sociable, less athletic capacity and physical attraction, high academic engaged” are often described as nerd, which is one of least favored groups at school.

In China, school culture related to “nerd” in East Asian is different. Due to the pressure of the college examination, parents and teachers generally place greater value on students’ academic grade than on their athletic or social abilities. Therefore, high achievers in East Asian culture are often viewed as academic role models to be admired and they are less likely to be targeted as “not cool” or “nerdy.” High achieved students are also often selected by teachers to serve as representatives to provide academic mentorships to other students in class. Other students are encouraged by teachers and parents to be friends with high achieving peers and consequently high achieved students are more likely to be perceived favorably by other students and tend to have positive influences on other students (Li, 2012).

Similar to children in Western countries, Chinese children also form peer groups at schools (Chen, Chang & He, 2003). However, the group norms are unlike the Western counterpart that includes groups such as nerd, punker and populars (Brown, 1996). Chen, Chen and Kaspar (2001) suggested instead that peer group of Chinese children are divided into two types: prosocial-cooperative and antisocial-destructive groups.

Furthermore, the classroom and school setting in China differs from that in U.S. schools. Chinese students tend to stay in the same classroom for various subjects and

these same groups stay together from year to year. Therefore, students spend the majority of their time with the same small group of classmates. The classroom size in China (approximately 40 – 60 students) is often larger than is typical in the United States. Of interest in the present study is how friendship and peer influences on academic engagement and motivation exist within this school context that differs from that typical in the U.S.

2.6 Conclusions

In summary, the above findings suggest that both friendships and networks are important in explaining variation in students' academic adjustment. As noted above, students who are academically engaged and academically achieving tend to self-select into groups that share a similar academic motivation and achievement. Those similar orientations also tend to become stronger across the school years due to the influence effect (Kingermann, 1993; Kindermann, McCollam, & Gibson, 1996; Kindermann & Skinner, 2012). Molloy and her colleagues (2011) found that friends were more important for influencing youths engagement in school across time than were their network members.

Previously, research indicates that student's academic life is associated with student's peer relationships (Altermatt & Pomerantz, 2003; Kindermann, 2007; Ryan, 2001). However, almost all of research on friendships and networks has been done in the United States or Europe. There are no published studies that have examined both friendships and network influence in China (Chen et al., 2005; Chen et al., 2008). Even in the work conducted in the U.S., very few studies have compared the effects on friendships and network during early adolescents (Molloy et al., 2011).

2.7 The Current Study

The purpose of the current study was to (a) study how much adolescents' friendships' and networks' characteristics influence changes in adolescents' academic engagement and academic achievement at school, (b) compare the relative effect of friendships and networks on adolescents' academic adjustment. The following two questions and hypotheses were investigated:

Question 1. What are the relations among Chinese adolescent friendships' academic characteristics, Chinese adolescents' networks characteristics, and Chinese adolescents' own academic development from seventh grade to eighth grade? Based on the literature reviewed above, it is hypothesized that both friendships and network's academic achievement and engagement will significantly predict changes in adolescents' own academic engagement and achievement across one year.

Question 2. Do Chinese adolescent friendships' academic characteristics and Chinese adolescent networks' characteristics differently influence on adolescents' own academic achievement and academic engagement? It is hypothesized that both friends and network affiliates will predict engagement and achievement from seventh to eighth grade. Based on Molloy's findings (2011), it is expected that friendships and networks have distinct role on influencing adolescents' academic adjustment.

CHAPTER3. METHOD

3.1 Participants

Data for the current study came from the first two years of a three-year cohort-sequential longitudinal study investigating many aspects of Chinese adolescents' development including academic adjustment, problem behaviors, and relationship with peers. The longitudinal study began in April of 2013. Participants were enrolled in seventh grade from two schools in Lanzhou, the capital and largest city of Gansu province. This is a major industrial city with a population of approximately 2.1 million that is located at the northwest of China. All the students at school were Chinese and 99% of them were Han nationality, which is the predominant ethnic group in China.

The current analyses were conducted with data from the 720 subjects participating in the first year. In the sample, there were 67 subjects who participated only in the first year and did not participate in second year. An independent-samples t-test was conducted to compare whether students who participated in the both years and students who only participated in the first year study differed in their academic achievement and engagement scores. There was no a significant difference in the scores between the two groups for academic engagement. However, there was a significant difference in the academic achievement scores between the two groups: $t(718) = -4.66, p < .001$. Students who only participated in the first year had lower grades.

The first year sample consisted of 720 students from seventh grade (Mean age=13.24, 382 boys and 338 girls). The students were in eight classes in Grade 7 with 28 to 55 students in each class. The second administration was conducted one year later at the same schools in April of 2014. There were 720 students from eighth grade (Mean Age = 14.26, 343 boys and 312 girls). Within the sample, 43.2% of mothers and 41.7% of fathers had a junior high school education, 28.1% of mothers and 32.6% of fathers had a senior high school education, and 7.9% of mothers and 11.3% of fathers had a post high school education.

The school curriculum included the main subjects of Chinese, Mathematics, English, and other subjects such as biology and chemistry. The schedule of courses and the amount of time spent in the classroom were almost identical for every student. Furthermore, we did not find significant differences between students who participated in the eighth grade and those who did not.

3.2 Procedure

At years one and two, materials and consent procedures were approved by the IRB of Purdue University. Dr. Jin Shenghua from Beijing Normal University and Dr. Li Ling from Lanzhou Normal University collaborate with us on the project. The English measures were translated and checked by a faculty member and graduate students who were fluent in both English and Chinese at Beijing Normal University and Purdue University. They translated measures and assessed the comprehensibility and cultural appropriateness of items. Back translation was conducted to ensure the accuracy of the translation.

Dr. Li Ling met with middle school presidents and collaborated with them on sending parental letters and visiting schools for collecting surveys. School principals from the four participating schools sent letters to parents introducing the study; these were accompanied by detailed information about the study, a consent form, and the demographic questionnaire. Signed parental permission and adolescent assent forms were obtained with a participation rate of 88% for the first year and 91% for the second year. The Purdue University Institutional Review Board approved these forms.

Graduate students from Beijing Normal University and undergraduate psychology research assistants administered assessment materials. Students who participated in the study were provided with small school supplies such as notebooks and pens.

3.3 Measures

Friendships. Students were provided with a roster of all students along with their research IDs in their classroom. Students were required to list their friends' name and research ID in their grade (up to 5 friends). If they listed friends who were in the same classroom, they could write down their friends' name and ID number. If students chose to list any friends who were in other classrooms, they were asked to list their friends' name and their classroom number(s). A computer program was used to identify mutual friendships. In the first year, 85.31% of them had mutual friends; the mean number of mutual friends was 1.99 ($SD=1.29$). In the eighth grade, 81.92% of the adolescents had mutual friends; the mean number of mutual friends was 1.89 ($SD=1.32$).

Networks. Students were asked, "Which kids are in the group that you belong to?", and also to list members of five groups that other students in their classroom

belonged to. There was no limitation of group members and students were encouraged to list as many groups as they wanted. SCM version 4.0 (Leung, 1998) was used to identify networks from these data. The mean number of students in the network was 3.51 ($SD = 1.39$) in seventh grade, respectively, at Time 1, and 3.63 ($SD = 1.45$) in eighth grade.

Academic achievement. Adolescent's school achievement was assessed by their final grades in Chinese, Mathematics, and English. These scores were standardized within each school. The means of the final grades across the three subject areas were computed to yield an academic achievement score, and then standardized within each grade to form an index of *academic achievement*.

Academic engagement. Students' academic engagement is a subscale of a 19-item measure of school commitment that was developed by Conger for the Iowa Youth and Families Project. The Cronbach alpha of the school commitment scale was previously found to be .70 and .90 (Simons & Conger, 2007; Simons, Johnson, Conger, & Elder, 1998). The current academic engagement scale consisted of five items (e.g. "I like school a lot", "I try hard at school", "School bores me", "I don't think I belong to school", "I do not do well at school"). Higher scores reflected a stronger academic engagement. Internal consistency in the present study was .70 for academic engagement at Time 1, and .72 for academic engagement at Time 2.

3.4 Analytic Strategy

The first step was to compute bivariate correlations between first year and second year networks' and friendships' academic achievement and academic engagement and adolescents' academic achievement and engagement.

In order to examine the function of friendships and networks on adolescents' own academic adjustment, a series of hierarchical regression analyses were conducted to predict second year academic achievement and academic engagement of seventh grade students. In all analyses, students' own first year grades or academic engagement scores and gender are included as control variables.

CHAPTER 4 RESULTS

The means, standard deviations and the bivariate correlations among friends' and network affiliates' academic characteristics (academic achievement and academic engagement), networks' academic characteristics, and adolescents' own academic characteristics are present in Table 1. The mean score of academic achievement were .06 ($SD = .89$) for seventh grade students; and .04 ($SD = .97$) for eighth grade students. The mean scores of academic engagement were 3.76 ($SD = .65$) for seventh grade students; and 3.77 ($SD = .49$) for eighth grade students.

As predicted, friends' and network affiliates' academic achievement and academic engagement were correlated (r s ranged from .50 to .81). At seventh grade, the friends and network affiliates' academic achievement were highly correlated: $r = .79, p < .01$, but the correlation between friends and network affiliates' academic engagement was moderate: $r = .50, p < .01$. At eighth grade a similar pattern was found that the friends and network affiliates' academic achievement were highly correlated: $r = .81, p < .01$, whereas the correlation between friends' and network affiliates' academic engagement was moderate: $r = .53, p < .01$.

At seventh grade, adolescents' academic achievement was highly correlated with that for friends, $r = .68, p < .01$, and with network affiliates $r = .74, p < .01$. The correlation, however, between adolescents' academic engagement and their friends'

academic engagement was small: $r = .20, p < .01$. Adolescents' academic engagement was not correlated with their network affiliates' academic engagement. At eighth grade, the adolescents' academic achievement was highly correlated with that of friends' $r = .64, p < .01$, and with network affiliates: $r = .76, p < .01$. The correlations, however, between adolescents' academic engagement and their peer's academic engagement were small; $r = .19, p < .01$ with friends and $r = .15, p < .05$ with network affiliates.

Adolescents' academic achievement at seventh and eighth grades were highly correlated, $r = .93, p < .001$. Adolescents' academic engagement was also significantly correlated from seven to eight grade: $r = .50, p < .001$. Both friend and network affiliates also showed high levels of stability in academic achievement ($r = .68, p < .01$ for friends and $r = .84, p < .01$ for network members). Weaker correlations were found between the academic engagement of adolescents and their friends, $r = .24, p < .01$, and between adolescents and their network affiliates, $r = .28, p < .01$ across the two years (See Table 1 and Table 2).

Table 1

Correlations among the Friendships and Networks for Academic Engagement and Achievement at Time 1(N=720)

	1	2	3	4	5	6
Seventh Grade						
1. Academic achievement	-					
2. Academic engagement	.23**	-				
3. Friends' academic achievement	.68**	.13**	-			
4. Networks' academic achievement	.74**	.16**	.79**	-		
5. Friends' academic engagement	.14**	.20**	.22**	.18**	-	
6. Networks' academic engagement	.24**	.05	.23**	.34**	.50*	-
<i>M</i>	.06	3.76	.15	.06	3.77	3.78
<i>SD</i>	.89	.65	.74	.76	.49	.40

Note: * $p < .05$. ** $p < .01$.

Friends were removed from networks to maintain independence.

Table 2

Correlations among the Friendships and Networks for Academic Engagement and Achievement at Time 2(N=720)

	1	2	3	4	5	6
Eighth Grade						
1. Academic achievement	-					
2. Academic engagement	.33**	-				
3. Friends' academic achievement	.67**	.22**	-			
4. Networks' academic achievement	.74**	.25**	.81**	-		
5. Friends' academic engagement	.26**	.22**	.36**	.31**	-	
6. Networks' academic engagement	.35**	.24**	.31**	.45**	.53**	-
<i>M</i>	.04	3.52	.16	.09	3.50	3.52
<i>SD</i>	.97	.64	.83	.84	.49	.39

Note: * $p < .05$. ** $p < .01$.

Friends were removed from networks to maintain independence.

Hypotheses Testing

Multiple regression analyses were used to examine if the first year peer academic characteristics (academic achievement and academic engagement) significantly predicted second year adolescents' academic characteristics after controlling first year students' gender and academic achievement or engagement.

For all regression analyses, adolescents' gender was entered at Step 1. First year adolescents' academic profiles were entered at Step 2 and first year academic achievement or academic engagement was entered at Step 3. Table 3 presents the results of regression models predicting adolescents' second year academic achievement.

For model 1, friends' first year academic achievement predicted second year adolescents' own academic achievement. A significant positive association was found between first year friends' academic achievement and second year adolescents' academic achievement after controlling gender and first year adolescents' academic achievement, $\beta = .09, p < .001$. That is, there was a positive effect of friends' academic achievement on adolescents' academic scores changes across year, so one unit increase in friends' academic achievement at seventh grade was related to .09 unit increase in adolescent academic achievement at eighth grade. First year friendships' academic achievement explained .4% of unique variances in eighth grade adolescents' academic scores after controlling gender and first year adolescents' academic achievement.

For model 2, the first year academic achievement of networks affiliates did not significantly predict second year adolescents' academic achievement, $\beta = .04$. Similar analyses were conducted to predict adolescents' second year academic engagement. As seen in Table 4 (model 3 and model 4), neither friends nor network affiliates' academic

engagement significantly predicted adolescents' second year academic engagement after controlling for gender and seventh grade academic achievement.

Table 3

Summary of Hierarchical Regression Analysis for Predicting Adolescents' Second Year Academic Achievement (N=720)

Variables	Model 1 Friendships				Model 2 Networks			
	<i>B</i>	<i>SE B</i>	β	R^2 change	<i>B</i>	<i>SE B</i>	β	R^2 change
Step1								
Gender	-.03	.03	-.02	.04	-.05	.03	-.03	.06
Step2								
First year academic achievement	.95	.02	.86***	.83	.98	.02	.90***	.81
Step3								
1. First year friendships' academic achievement	.11	.03	.09***	.004				
2. First year networks' academic achievement					.05	.03	.04	.00
R^2		.87				.86		

Note: *** $p < .001$.

Friends were removed from networks to maintain independence.

Table 4

Summary of Hierarchical Regression Analysis for Predicting Adolescents' Second Year Academic Engagement (N =720)

Variables	Model 3 Friendships				Model 4 Networks			
	<i>B</i>	<i>SE B</i>	β	R^2 change	<i>B</i>	<i>SE B</i>	β	R^2 change
Step1								
Gender	-.04	.05	-.03	.01	-.06	.05	-.05	.01
Step2								
First year academic engagement	.49	.04	.49***	.25	.48	.03	.49***	.25
Step3								
1.First year friendships' academic engagement	.03	.05	.02	.00				
2.First year networks' academic engagement					.002	.07	.001	.00
R^2		.25				.25		

Note: *** $p < .001$.

Friends were removed from networks to maintain independence.

CHAPTER 5 DISCUSSION

This longitudinal study assessed the extent to which academic achievement and engagement were predicted from the academic achievement and engagement of friends and network affiliates.

Concurrent Relations

As expected, adolescent's academic achievement was highly correlated with that of their friends and network affiliates. This is consistent with findings from U.S. studies. Ryan (2001) found that students' academic levels were similar to group's academic levels with the correlations ranging from .36 to .58. Also, in another study, Ryan et al. (2013) found that students' GPA was associated with friends' GPA across the first year in middle school. In a recent study conducted by Shin and Ryan (2014) found that students' academic achievement was similar to their friend's academic achievement and that they became more similar over time.

Our expectation of significant correlation between Chinese adolescents' academic achievement and their peer's academic achievement was largely supported by the results. As mentioned before, parents and teachers generally place great value on students' academic life and they influence students' group activities and arrange group membership to maximize o students' academic status. Teachers try to arrange academic groups for students to work on homework and projects together and select students for

these groups who achieve at a similar level. Parents tend to socialize their children to be friends or group members with higher academic achieving peers to ensure children would learn values or good academic habits from peers. Hence, teachers and parents encourage children to seek high-achieving students to help or spend time together. Teachers and parents believe that children will improve grades when they have good peer influences (Li, 2012).

The lack of significant correlation between adolescents' academic engagement and their network affiliates' academic engagement is not consistent with previous literature. For example, Molloy and colleagues found that two different peer groups: friends and network's academic engagement correlated from $r = .46$ to $r = .85$ (Molloy et al., 2011). Furthermore, Kindermann (2012) found that individual students were similar to their friends ($r = .33$) and their group members ($r = .44$) regarding to academic motivation.

The divergence of our results from those of others may be explained by differences between our measure of academic engagement and that used by others (Kindermann & Skinner, 2012; Molloy et al., 2011). We used a five-item scale of academic engagement ("I like school a lot", "I try hard at school", "School bores me", "I don't think I belong to school", "I do not do well at school"). Other studies tended to access multiple aspects of academic engagement such as: intrinsic value, utility, expectancy for success, academic effect, and academic self-concept, etc.). The major concern is that we might not accurately access students' academic engagement by using five questions in the current study, which in turn suggests that it is necessary to apply more questions to access students' multiple aspects of academic engagement. For

example, we have one item “I try hard at school” representing “effortful behaviors.” However, if we included more items on students’ effortful behaviors, then we could more reliably access this dimension of academic engagement. Moreover, the data showed low variation in student’s academic engagement. If all students were academically engaged, there could be little variation and consequently the correlation could be low. I suspect that the variability of engagement is greater among U.S. than among Chinese students.

Almost all previous studies related to peer and academic adjustment had been done in Western countries. A study using Chinese student samples conducted by Chen et al. (2008) examined whether group academic performance moderated the relations between individuals’ academic performance and social functions. Chen and colleagues found that individual’s academic performance positively predicted students’ social functions in high-achieving group, but not for low-achieving group. This finding suggests that there are stronger relationships between students’ social competence and academic adjustment in high-achieving group. However, to the author’s knowledge, there has been no study so far that compares the potentially distinct functions of network and friends on students’ academic adjustment using Chinese data.

We hypothesized that there should be moderate correlations between academic engagement of adolescents and their peers in China. The reason is that Chinese students are encouraged by teachers and parents to focus on their academic performance since elementary schools due to the high college-entrance competitions. Students are also encouraged to hang out with high-achieving friends (Li, 2012). However, the results from

the current study showed that the correlations between academic engagement of adolescents and their peers were unexpectedly small.

One possible reason to explain the low correlation between adolescents' academic engagement and peer's academic engagement might be that students have different friends and network organizations in Chinese schools compared to US schools. In China, students usually stay at one classroom for three years at secondary schools. All of them have the same subject schedule. Thus, the network and friends in Chinese school might be more stable compared to US schools because Chinese students have limited choices to move from classroom to classroom. In such case, students' academic engagement may be less dependent on their friends' and network affiliates' academic engagement because as students are familiar with peers, their behaviors may demonstrate to be more independent and stable as compared to a situation where students are engaged with short-term relationship with other students on class-to-class basis in US schools.

Another reason of the low correlation between adolescents' and peers' academic engagement may be that that school is only one part of a student's academic environment. Families may be a very important part of student's academic engagement as parents oftentimes express high expectations of a student's academic performance in China and also try to engage in students' academic life such as providing advices on homework (Pomerantz et al., 2008; Pomerantz and Moorman, 2010). Thus, it is possible that students' academic engagement may not be influenced by the behaviors or beliefs of the students' peers as much as students' parents because peers are less likely to impose clear and firm expectations on students' academic performance compared to parents in China.

Finally, the possible reasons for the low correlation between individual and peer's academic engagement might be that Chinese student tended to rate themselves high in the academic engagement scale. In the current study, the mean scores of academic engagement were 3.76 ($SD = .65$) for seventh grade students; and 3.62 ($SD = .64$) for eighth grade students. The distribution of the engagement scores was skewed to positively, suggesting that most of the students were academically engaged.

First year friends' academic achievement significantly predicted second year adolescents' academic achievement this effect, however, explained only a small percentage of variance in the adolescents' academic achievement. The possible reasons for the small accounted variance might be that most of variances were contributed to the stability of achievement from first year to second year and there was very little variance left over to predict; first year academic achievement contributed 83% of the variances in the second year academic achievement.

Although first year friends' academic achievement contributed a small proportion of the variance in predicting second year adolescents' academic achievement, friends still accounted for small unique variances explaining adolescents' academic achievement after controlling gender and first year academic achievement. This finding provide evidences that friendship influence in explaining early adolescents' academic achievement can be generalized to China, which is under different cultural context from U.S.

Surprisingly, network members' academic achievement did not significantly predict adolescents' own academic achievement. It is likely that first year academic achievement and second year academic achievement are highly correlated. Thus, there is

limited extraneous variance for first-year adolescents' academic achievement.

Furthermore, adolescents might be more similar to their friends on academic achievement than they are with their network affiliates. The result suggests that despite networks and friendships overlap, they still exert different functions in explaining adolescents' academic achievement. Therefore, the friendships and network are not identical relationships (Rodkin & Ahn, 2009). Friends and network affiliates' academic engagement also did not significantly predict adolescents' academic engagement. Again, because the concurrent relation between the engagement of friends and adolescents was low, it is understandable that the longitudinal relations were not significant.

Limitations and Implications for Future Studies

One limitation lies in the academic engagement scale. Engagement is very important for predicting students' academic achievement and for preventing their academic failure or drop-out (Kindermann & Skinner, 2012; Wang & Pomerantz, 2009). Perhaps, future study should pay attentions in the multiple measurements of the academic engagement constructs, and add teachers' report on students' academic engagement to minimize the self-report measurement error.

The second limitation is that we were unable to disentangle the effects of selection and influence. However, the selection of friends or network affiliates is also essential for fully understanding of the relationships between friends, network affiliates and academic adjustment. In the current study, we followed students at two time points. At the time 2, the selection of participants' friends and network affiliates was likely to change from time 1. Thus, future research might need to provide analytic procedures such as stochastic actor-based modeling (SIENA) to disentangle the two procedures in

explaining the complex nature of peer associations and their effects on students' academic engagement. SIENA analysis has been used recently in research on students' academic adjustment (e.g., Shin & Ryan, 2014). This approach provides well-rounded analyses on peer and individual's characteristics and network structures/features such as density, size and reciprocity. SIENA can also disentangle the effects of selection and influence.

Another noteworthy limitation is that the students who participated in the first year survey but did not participate in the second year survey had lower academic achievement than their counterparts (i.e., those who participated in both surveys). In other words, students who selected to participate in the second year survey were generally better in grade than those who dropped out. However, this difference did not influence the overall regression results as the results from participants who finished both first year and second year surveys did not differ from the results from all first year participants.

Lastly, the present study was conducted in Lanzhou, Gansu, China. There might be some specific culture or value regarding to students' academic achievement and engagement in Lanzhou. It should be noted when we tried to interpret the result of the current study. Future studies could be conducted in other areas of China to examine whether the result will be generalized.

Conclusion

By measuring friendships and networks influence using multiple regressions, our study contributed new information about peer relationships and Chinese adolescents' academic development. The achievement of friends was more strongly associated with adolescents' academic achievement than was the association between network affiliates' achievement. This indicates that networks and friendships are distinct relationship types in roles of influencing adolescents' academic adjustment. As mentioned before, friendships and networks are conceptually and methodologically different types of peer relationship. More broadly, the study provide unique insights of peer influence process on academic adjustment from East Asian cultural background and highlight that we still need to explore and learn more about peer relationship regarding to early adolescents' academic adjustment.

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