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The Structure of Adolescent Peer Networks

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Structural aspects of school-based peer networks of adolescents in 6th to 12th grade were mapped in 3 school systems. Female students were more connected to the peer network than were male students, and peer networks became more exclusive with increasing grade. The results also suggest that numeric minorities usually are less connected to school peer networks than the majority group. There was mixed evidence for hierarchical organization of the peer network. Best friends were highly embedded in friendship groups, but neither friendship group nor best friendship was highly embedded in social crowd. Adolescents name friends who are not in their friendship group and usually do not name everyone in the friendship group as a friend.

Adolescents are embedded in a rich network of peer relations (Furman, 1989), including best friendships, other close friends, cliques or friendship groups, social crowds, and perhaps a romantic relationship. Studies of adolescent peer relations have primarily focused on single aspects of the network such as best friend or chum (Berndt, Miller, & Park, 1989), friendship groups or cliques (Gavin & Furman, 1989), and social crowds (Brown, 1990), although it is probable that most adolescents are involved simultaneously in several of these relationships.

Descriptions of child and adolescent friendship networks have focused primarily on characteristics of the adolescent's friendships such as reciprocity, the numbers of choices made and received, and the gender, grade, and ethnicity of those to whom the choices are directed (Epstein, 1983a; Oliveri & Riess, 1987; Reisman & Shorr, 1978; Shrum, Cheek, & Hunter, 1988). Information on the likelihood of an adolescent having a best friend and participating in a friendship group or a social crowd is scarce, and relatively little is known about gender, grade, and ethnic differences in these aspects of the friendship network. It is also not known whether adolescents are typically part of some or all of these aspects of the network, nor whether the aspects are hierarchically organized, so that best friends may be nested within cliques and cliques within crowds.

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The goal of this article is to provide descriptions of a variety of relationships found in adolescent friendship networks and to examine the characteristics of the list of friends, the presence or absence of a best friend, and whether or not the adolescent participates in a friendship group or social crowd. We examined the role the adolescent plays in the network as a whole and explored the relationship of the network aspects to one another. The data were also examined for gender, grade, and ethnic differences in each aspect of the friendship networks.

There is reason to expect gender, grade, and ethnic differences in adolescent friendship networks. Studies that have found gender differences typically found more social participation on the part of girls. When friendship lists have been examined, girls are found to make or receive more friendship choices (Berndt & Hoyle, 1985; Epstein, 1983b) or no gender differences are found (Crockett, Losoff, & Petersen, 1984; Oliveri & Riess, 1987; Reisman & Shorr, 1978). Mutuality or reciprocity of friendship choices has been found to be more frequent for girls than for boys in several studies (Eder & Hallinan, 1978; Epstein, 1983b; Hansell, 1981).

Girls are consistently found to report more intimacy in their friendships than boys (Berndt, 1982; Buhrmester & Furman, 1987), and intimacy, according to Sullivan (1953), is a defining characteristic of the relationship with the chum or best friend. Accordingly, in this study, we expected that girls will be more likely to report a best friendship than will boys. Cohen (1977) found more female cliques than male cliques, and he also found a larger proportion of girls than boys were members of cliques. We expected then to find girls participating at a higher level than boys in all aspects of the network.

Gender differences in size have been reported for groups in elementary school children (Benenson, 1990; Eder & Hallinan, 1978; Waldrop & Halverson, 1975), with boys associating with larger groups of peers and girls preferring dyadic interactions. However, in an observational study of adolescents in and out of school, Montemayor and Van Komen (1985) found no gender differences in the size of male and female groups. In the present study, we expected that the differences found for children may be no longer present for adolescents.

Developmental differences are also likely in peer networks. Increases in social cognitive skills (Selman, 1981) and changes

in concepts of friendship (Bigelow & La Gaipa, 1980; Youniss, 1980) result in a more mature awareness of who really is a friend. This should lead to an increased emphasis on mutuality and to more selectiveness in who is considered to be a friend.

Research does not unequivocally support the view of increasing selectiveness in friendships with increasing grade. The number of friendship choices made has been found both to decrease with grade through high school (Epstein, 1983b) and to increase with grade up through 10th grade, remaining constant then through adulthood (Reisman & Shorr, 1978).

In an examination of friendship cliques, Shrum and Cheek (1987) found that the percentage of adolescents belonging to cliques declined with grade after peaking in early adolescence, whereas the percentage of liaisons (adolescents who were links between cliques or part of a chain of links but were not themselves members of cliques) increased. This results in older adolescents being more likely to have friends who were not friends with each other than were younger adolescents. They called this the *degrouping process.* It is not clear whether this degrouping process reflects increasing selectivity. We make no specific predictions about grade trends.

Ethnicity may also be a factor in adolescents' social networks. Giordano, Cernkovich, and Demaris (1993) found African American adolescents to be less peer-oriented and to put less importance on having friends who were similar to them compared with White adolescents. DuBois and Hirsch (1990) found differences between African American and White adolescents in the amount of socializing done at school and in the extensiveness of neighborhood-based networks. Where possible, the data are examined for ethnic differences in school-based friendship networks, but no predictions are made.

There is little evidence about the extent of overlap or hierarchical organization of the different relationships within peer networks, because few studies have examined multiple aspects of the network in a single study. The question of overlap of network aspects is not only substantively interesting but also crucial to the design of studies examining the effects of the peer network on adolescent development. Does the list of friends a participant provides adequately represent the important, supportive, or influential people in their school-based friendship network, or do we gain more information if we also look at friendship groups? Are best friends usually or always in the same friendship group or social crowd such that effects at one level are confounded with effects at another? If best friends are usually within the friendship group, a study that examined only the friendship group and found it a source of support or influence would have confounded, unwittingly, best friendship and friendship group.

A determination of whether social crowds are made up of predominantly single-sex male and female cliques will help answer the currently unresolved issue of the nature of the social crowd construct. Dunphy (1963) viewed social crowds as relatively large groups of older adolescents who come together for parties and recreational get-togethers. These crowds are the result of the merging of several single-sex cliques. The purpose of the crowds, in his view, is to facilitate heterosexual socialization. Here crowds are interaction-based entities, in which members know one another and socialize together. Brown (1990), on the other hand, viewed crowds as large, reputation-based collections of individuals who are assigned to the same stereotype category by their peers. Brown suggested that clique and crowd may overlap to the extent that people with similar reputations may choose each other as friends, or people who associate together may acquire the same reputation, but there is no necessity for persons in the same crowd to even know one another. Thus, according to Dunphy's view, male and female cliques should be nested within crowds, although not all cliques would necessarily be part of a crowd. Any pattern could be consistent with Brown's view.

We examined in order the following network aspects: the adolescents' list of friends, best friend, friendship group, and social crowd, as well as the role the adolescent plays in the network, followed by an examination of the relationships between the network aspects. The three school systems studied were treated as independent replications because there is evidence that there are school and classroom effects (Hallinan & Smith, 1989) on some of the aspects of peer network that we were examining. With only three school systems, these effects could not be studied adequately. Thus, we chose to focus on robust effects that were relatively independent of school.

Method

Sample

The data were gathered as part of a larger, longitudinal study examining peer influence in adolescent substance use. The school systems were in working- to lower-middle-class suburbs of a major Midwestern city, and they varied on ethnic background. Demographic information is presented in Table 1 for each school system. The number of male and female participants was approximately equal in all ethnic groups in all systems.

The first school system was used to pilot the method of mapping networks. Data were gathered in Grades 6 (elementary school), 8 (junior high school), 10, and 12 (high school). The majority group was White,

Table 1
Description of Participants in Each System

Variable	African American	White	Chaldean	Other
Ethnic background (%)				
System 1 (N = 752)	27.7	69.0	0	3.3
System 2 (N = 1,330)	77.3	6.5	11.7	4.5
System 3 (N = 1,215)	0.1	91.6	0	7.8
Mean parent education				
System 1				
Father	3.7	3.3	0	3.2
Mother	3.8	3.3	0	3.2
System 2				
Father	4.1	4.0	3.8	4.1
Mother	4.0	3.9	3.3	3.8
System 3				
Father	0	3.5	0	3.2
Mother	0	3.1	0	3.0
Family intact (%)				
System 2	41.0	54.3	91.6	60.0
System 3	0	66.7	0	63.9

Note. For parent education, 3 = *completed high school,* 4 = *some college.*

with a large African American minority. The *other* group consisted of Hispanic, Asian, and Native Americans and was too small to analyze separately; therefore, it was dropped for the analyses involving ethnic background.

In the other two school systems, Grades 6 through 8 (middle school) and Grades 9 through 12 (high school) were studied. In System 2, African Americans were the majority, with Chaldean (a Christian group recently immigrated from Iraq), White, Asian, Hispanic, and mixed as the minorities. African American, Chaldean, and *other* were used for analyses involving ethnicity. In System 3, Whites were the majority, and the *other* group was primarily Hispanic and Asian.

Procedure

All adolescents whose parent or guardian did not refuse permission, and who consented to participate, filled out a questionnaire during class. The parental refusal rate varied from 1% to 3% in the three systems. Less than 1% of participants in any system refused or gave unusable questionnaires. In each system, 5% to 8% of the participants were absent on the study day and the follow-up day. Participants were assured of confidentiality.

Measures

Friendship list. Following Hallinan (1981), 10 spaces (11 in the pilot system) were provided for listing friends. In System 1 (the pilot system), participants were asked for the name of their best friend, their other close friends, and whether each friend attended their school. For Systems 2 and 3, participants were asked to write down the name of their best friend *in school* and then to list "your other good friends *in school*, the people you hang around with." In Systems 2 and 3, the participants were asked what percentage of their friends attended their school, with their responses rated on a 5-point scale (1 = *all*, 5 = *none*).

Network role. The NEGOPY computer program (Richards & Rice, 1981) and sociograms were used to assign individuals to groups. The NEGOPY program uses the friend nominations to categorize participants as group members or to several other overlapping, less-connected categories. NEGOPY's group definition was used to define our cliques. With each mutual choice considered a link, a group member had at least two links to the group, the majority of his or her links within the group, and there was some path, direct or indirect, along the links from each member to every other member.

The NEGOPY program gives the option of making the one-way choices symmetrical or using mutual choices to define the groups. We used mutual choices, because methods using the symmetrical one-way links created groups of 80 or more members. Sociograms were drawn to verify the groups, because occasionally NEGOPY did not follow its own rules in creating groups.

Examination of sociograms revealed that nonmembers of cliques also appeared to form groups. These more loosely interconnected friendship groups are called *loose groups*. Some were only a link or two short of being a clique, whereas others were minimally connected. When the most distant members of a group were separated by more than five links, we did not feel confident in calling them part of the same group, and the group was divided. To avoid dividing groups that were moderately connected, even though many of the choices were not mutual, we counted one-way choices in deciding if a group needed to be divided. Percentage agreement for the loose groups by two coders ranged from 78% to 84% in the three systems.

The remaining students were marginally connected to the school peer network and were categorized as unconnected. These mutually exclusive and exhaustive categories—*clique member*, *loose group member*, and *unconnected*—are called the *network role*.

To validate the role assignment, we performed a multivariate analysis of variance (MANOVA) in each system with choices made, choices received, and mutual choices as the dependent variables and network role as the independent variable. In all three systems, for all three dependent variables, the multivariate and all univariate role effects were significant, multivariate $F(6, 752) = 109.00$, $F(6, 1325) = 179.00$, and $F(6, 1247) = 88.42$ in Systems 1, 2, and 3, respectively (all $ps < .01$). In all cases, clique members made and received more choices and had more mutual choices than loose group members, who in turn had more than the unconnected participants.

Social crowd. At least 20 students were interviewed about social crowds present in each school. Crowds named by at least five respondents were included, and students were asked to mark the crowd they thought "most people would say they belong to." In System 2, which was predominantly African American and Chaldean, social crowd names could not be elicited and were not included.

Results

Many significance tests were done in the following analyses, and the sample sizes are quite large. Thus, to minimize Type I errors and to focus on robust results, we only report results that are significant in two of the three school systems and use $p < .01$ as the criterion for significance. In the pilot system, System 1, data were gathered only in Grades 6, 8, 10, and 12. To facilitate comparisons across systems, we grouped the grades as follows for Systems 2 and 3: Grade 6; Grades 7 and 8; Grades 9 and 10; and Grades 11 and 12. The pattern of results did not change in analyses in which all seven grades were used. Analyses involving friendship group used grade comparisons that were based on middle versus high school in Systems 2 and 3, and that were based on Grade 6 versus Grade 8 versus Grades 10–12 in System 1.

In these systems, the ethnic composition varied from system to system, such that not every ethnic group was present in each system and some ethnic groups were present in such small numbers that ethnicity by grade by gender analyses could not be done within each system. We present only a limited number of ethnicity analyses because of these difficulties. Each aspect of the network is examined for ethnic differences in each system, and further analyses examining grade and gender effects and the relationship between network aspects do not consider ethnicity.

Percentage of Friends in School

Because we were examining school-based networks, we first examined what proportion of the adolescent's friendships were school-based. In System 1, analyses of variance (ANOVAs) showed that the percentage of friends in school was not a function of ethnicity in System 1, $F(1, 719) = 2.466$, $p = .117$; System 2, $F(1, 1151) = 0.913$, $p = .339$; or System 3, $F(1, 1208) = 0.049$, $p = .825$.

In these systems, 2 (gender) × 4 (grade) ANOVAs with percentage of friends in school as the dependent variable found a significant effect of grade, $F(3, 736) = 9.38$, $F(3, 1230) = 11.82$, and $F(3, 1202) = 10.84$, $ps < .01$, in Systems 1, 2, and 3 respectively. In System 1, 6th graders had a larger percentage of their friends in school ($M = 89\%$) compared with the other grades ($M = 72\%$). In Systems 2 and 3, 11th and 12th graders had a significantly smaller percentage of their friends in school compared with students in other grades. The means are 2.9 (11/12th

grades) and 2.3 (all other grades) in System 2, and 2.4 (11/12th grades) and 1.9 (all others) for System 3 (2 = *most*, 3 = *about half*). For all systems, a majority of the student's friendships are in the school.

Aspects of the Network

We first determined whether there were ethnic or gender and grade differences in any of the network aspects. Using MANOVA, we examined the friendship list for differences in mutual choices, choices made and received, and the percentage of mutual choices. Chi-square and log-linear analyses were used to examine best friendships, friendship group, network role, and social crowd for ethnic, gender, and grade differences.

Friendship list. For ethnic background, the multivariate *F*s were significant in System 1, $F(1, 723) = 4.05$, $p < .01$, and System 2, $F(2, 1325) = 4.28$, $p < .01$, but not in System 3. The univariate *F*s and the means can be seen in Table 2. In System 1, African American students, a minority in that system, had fewer mutual choices and made and received fewer choices than White students, the majority. In System 2, African American students, the majority, did not differ from Chaldean students, a minority, and both had more mutual choices and made and received more choices than White or other minority students.

The multivariate grade effect was significant, $F(9, 2226) = 13.20$, $p < .01$; $F(9, 3945) = 13.82$, $p < .01$; and $F(9, 3621) = 8.43$, $p < .01$, for Systems 1, 2, and 3, respectively. The multivariate gender effect was significant for System 2, $F(3, 1313) = 45.62$, $p < .01$, and for System 3, $F(3, 1205) = 66.31$, $p < .01$. No interactions were significant. The significant univariate effects, post hoc comparisons, and means are presented in Table 3.

Older students made and received fewer choices, but a larger percentage of their choices were mutual. Female students made and received more choices and had more mutual choices compared with male students. The relatively low percentage of mutual choices (33% to 50%) appeared to be a consequence of the large number of choices allowed. First choices were more apt to be reciprocated than choices at the end of the friendship list. Allowing only three choices would have resulted in a higher percentage of mutual choices.

Best friends. Overall, 70% of System 1 students, 54% of System 2 students, and 76% of System 3 students reported having a best friend in their school. Ethnic differences in the probability of naming a best friend were not found in any of the three systems: System 1, $\chi^2(1, N = 751) = 1.76$, $p = .186$; System 2, $\chi^2(2, N = 1{,}330) = 6.39$, $p = .061$; and System 3, $\chi^2(11, N = 1{,}215) = 0.230$, $p = .63$.

Log-linear analyses were used to examine grade and gender differences in the proportion of participants who reported having a best friend for each system. The final model in System 1 included the grade effect, $\chi^2(16, N = 727) = 15.86$, $p = .319$. For System 2, the final model included the effects of grade and gender, $\chi^2(66, N = 1{,}330) = 44.28$, $p = .982$. For System 3, the final model included a gender effect, $\chi^2(39, N = 1{,}215) = 36.0$, $p = .607$. The direction of the grade effect was not consistent in the two systems in which the effect was found. Female students in two of the three systems were more apt than male students to name a best friend: System 2, male = 47%, female = 62%; and System 3, male = 72%, female = 79%.

Friendship groups. In System 1, African Americans, the minority, were significantly underrepresented among clique members and overrepresented in the unconnected category, $\chi^2(2, N = 727) = 18.3$, $p = .001$. In System 2, $\chi^2(4, N = 1{,}330) = 55.2$, $p = .000$, Whites/other, a minority, were less likely to be clique members and more likely to be unconnected. Chaldeans, also a minority, were more likely to be clique members and less likely to be loose group members. There were borderline significant differences in System 3 between White students and the *other* group in the school, $\chi^2(2, N = 1{,}172) = 5.2$, $p = .07$. The minority students were less likely to be clique members and more likely to be unconnected. Thus, except for Chaldeans, within-school minorities were less likely to be clique members and more likely to be unconnected.

We examined network role as a function of gender and grade using log-linear analyses. In System 1, the analysis indicated a gender by grade interaction, $\chi^2(6, N = 727) = 13.5$, $p = .23$). In System 2, the analysis indicated a gender and a grade effect, $\chi^2(9, N = 1{,}330) = 14.4$, $p = .10$. For System 3, the analyses indicated a grade by gender interaction, $\chi^2(6, N = 1{,}172) = 44.7$, $p = .18$. Percentages for these significant gender and grade effects and interactions can be seen in Table 4.

In general, female students were somewhat more likely to be clique members than male students, and male students were more likely to be unconnected than female students. In Systems 1 and 3, female students declined in clique membership with grade, whereas male students increased, but in System 2 the grade effect was not significant. For loose groups, there was no detectable pattern to the grade differences. In all systems, the percentage unconnected increased with grade.

Friendship group size was highly variable, ranging from 3 to 30. There were no differences in size as a function of group type (clique or loose group), grade, or gender that were consistent for two or more systems. The mean size ranged from about 5 to 8.

Social crowd. Five to seven crowds, in addition to the average crowd, were identified in both Systems 1 and 3, the only systems in which we could elicit crowd names. Size of the crowds ranged from 3 to 98 members in System 1, and from 4 to 159 members in System 3.

Participants were categorized as belonging or not belonging to a crowd. Average crowd membership was included with no crowd membership. There was no relationship between belong-

Table 2
Means and F Values for Significant Ethnic Differences in the Friend Choice Variables

Variable	*F*	African American	White	Chaldean
System 1				
Choices made	7.2	3.80	4.41	
Choices received	5.9	3.02	3.59	
Mutual choices	11.2	1.29	1.74	
System 2				
Choices made	11.3	4.55	3.45[a]	4.98
Choices received	5.2	3.79	2.92[a]	3.82
Mutual choices	5.4	1.50	1.08[a]	1.58

[a] In System 2, White includes *other*.

Table 3
Means and F Values for Significant Friend Choice Variables

Variable	Grade				Gender		
	F^a	6	7/8	9/10	11/12	F^b	Male	Female
Mutual								
System 1	22.2	2.8_a	1.5_b	1.4_c	1.3_c	ns	—	—
System 2	16.1	1.5_b	1.8_a	1.4_b	1.0_c	110.1	1.0	1.9
System 3	6.2	2.8_b	3.2_a	2.7_b	2.7_b	173.4	2.2	3.6
Choice out								
System 1	22.7	6.1_a	4.4_b	3.6_c	3.6_c	*ns*	—	—
System 2	28.6	4.9_a	5.3_a	4.2_b	3.4_c	86.7	3.7	5.2
System 3	16.9	6.7_b	7.5_a	6.2_b	6.3_b	83.2	6.0	7.4
Choice in								
System 1	25.5	5.4_a	3.7_b	2.6_c	2.8_c	*ns*	—	—
System 2	24.0	4.2_a	4.5_a	3.4_b	2.6_c	22.7	3.3	4.1
System 3	12.8	6.1_a	6.6_a	5.3_b	5.2_b	39.7	5.1	6.4
Mutual percentage								
System 1	5.3	$51.9_{a,b}$	46.2_a	47.4_a	58.3_b	*ns*	—	—
System 2	5.1	37.8_a	42.7_a	42.2_a	44.0_a	*ns*	—	—
System 3	3.2	46.3_a	48.6_a	$51.2_{a,b}$	54.5_b	*ns*	—	—

Note. Means differ ($p < .01$) unless they share a subscript. Dashes indicate that the means do not differ significantly.
[a] Degrees of freedom varied from 3, 742 to 3, 1315 for grade. [b] Degrees of freedom varied from 1, 742 to 1, 1315 for gender.

ing to a crowd and ethnicity in either System 1, $\chi^2(1, N = 727) = 0.337$, $p = .84$, or System 3, $\chi^2(1, N = 1{,}172) = 0.011$, $p = .91$. Log-linear analyses examined the relationship between belonging to a crowd and grade and gender. The final model in System 1 included a grade effect, $\chi^2(11, N = 727) = 20.0$, $p = .09$. In System 3, there were no significant grade or gender effects. Thus, there were no consistent effects in the two systems. Percentage crowd membership was 32% in System 1 and 51% in System 3.

Table 4
Percentage of Network Role Participation: Significant Effects

Network Role	Grade				Gender	
	6	7/8	9/10	11/12	Male	Female
Cliques						
System 1						
Male	62.0	25.5	26.0	33.3	32.6	32.73
Female	65.2	42.7	19.4	20.6		
System 2	21.4	25.6	28.9	22.6	17.7	33.1
System 3						
Male	25.6	19.4	39.3	36.5	29.4	55.8
Female	62.9	71.0	49.4	47.1		
Loose groups						
System 1						
Male	6.0	14.1	16.3	12.1	13.3	24.8
Female	8.7	18.2	38.0	24.5		
System 2	30.5	34.2	20.9	15.4	24.4	30.5
System 3						
Male	51.1	56.1	30.0	37.2	44.0	32.3
Female	25.8	18.1	35.2	33.1		
Unconnected						
System 1						
Male	32.0	60.0	57.7	54.5	54.1	42.6
Female	6.1	39.2	42.6	54.9		
System 2	48.2	40.2	50.3	62.0	60.0	38.7
System 3						
Male	22.9	22.5	31.9	27.8	26.6	11.8
Female	9.4	10.1	13.5	13.2		

Relationships Between Levels

Best friends with friendship groups and crowds. Best friends were highly likely to be in the same clique or loose group. The percentage of participants whose best friend was in the same friendship group was 92%, 97%, and 94%, for Systems 1, 2, and 3, respectively. Chi-square analyses showed that being in the same group was not a function of grade or gender in any system.

Best friends were moderately likely to be in the same social crowd (System 1, 47%; System 3, 39%). Chi-square analyses indicated that being in the same crowd was not consistently associated with gender or grade in either system.

Relationship between friendship groups and crowds. For the two systems for which we had social crowd data, we examined the friendship groups to determine the extent of agreement on social crowd membership. Friendship groups of both types varied from 0% to 100% agreement on social crowd. The average percentage agreement for cliques was 62% and 60% in Systems 1 and 3, respectively. For loose groups, the average agreement was 56% and 62% for Systems 1 and 3. The average number of crowds mentioned per friendship group varied from 2.2 to 3.3 across system and group type. *Prep/Popular, Jock,* and *Burnout* were the only crowds with more than one friendship group nested within social crowd. Only the Prep/Popular and Burnout crowds had at least one male and one female friendship group nested within them. This was true in both middle school and high school.

Relationship between friendship list and groups and crowds.

For each participant, we calculated the percentage of the friendship list that belonged to the adolescent's clique, loose group, or crowd and the percentage that had the same network role. We performed a 2 × 4 (Gender × Grade) MANOVA in each system, using these percentages as dependent variables, to determine if the list similarity on each network aspect was a function of gender or grade. The effect of gender was significant for network role in System 2, $F(1, 1299) = 20.93$, $p < .01$, and in System 3, $F(1, 1135) = 32.49$, $p < .01$. The gender effect was also significant for crowd in System 1, $F(1, 710) = 7.66$, $p < .01$, and in System 3, $F(1, 1135) = 46.96$, $p < .01$. The average list similarity can be seen in Table 5, along with the significant gender differences. Female students listed more same role and crowd friends than did male students.

Discussion

This study presents the most comprehensive data to date on the structure of school-based peer networks. We have data from 90% or more of the population of three school systems, with each participant naming up to 10 friends. Because participants were matched to friends, mutuality could be assessed, and data from multiple sources could be used to assess friendship groups. The results presented are robust, replicating in at least two of the three systems.

Gender Effects

The most robust finding is that female students are more integrated into school social networks than male students. Girls made and received more choices and had more mutual choices than boys. Of course, if girls make most of their choices toward girls, they are also likely to receive more choices and to have more mutual choices as a result. However, girls were also more likely than boys to have a best friend and to be a clique member, were less likely than boys to be unconnected to the school network, and a larger percentage of their friendship list had the same network role and the same social crowd affiliation compared with boys. Girls, then, participate more in the school networks and are more similar to their friends in the type of participation they have compared with boys. The diversity in role and crowd on the friendship list of boys suggests a greater tolerance for, or enjoyment of, diversity in their friends. Diversity may be less disruptive in friendships in which intimacy is not high.

Girls did not have smaller friendship groups than boys. Our finding, based on the construction of friendship groups from friendship lists, is consistent with the observational findings of Montemayor and Van Komen (1985) and the conclusion of Epstein (1983b). This convergence suggests that the size differences observed in children's groups disappear by adolescence.

Table 5
Percentage of Friend List With Same Network Relation

Group	System 1	System 2	System 3
Clique	71.3	63.5	63.8
Loose group	63.5	58.0	47.7
Network role	61.0	52.4	59.1
Male	*ns*	48.0	53.9
Female	*ns*	57.0	64.2
Crowd	21.8	NA	33.6
Male	18.1	—	21.7
Female	23.4	—	33.6

Note. NA = not applicable; crowd data could not be collected in this system.

Grade Effects

With increasing grade, adolescents appear to become more selective in naming friends. They make and receive fewer choices and have fewer mutual friends, although mutual friends become a larger proportion of the friendship list. This increased selectivity is probably a result of the social–cognitive changes reported in adolescence, such as definitions of friendship that increasingly emphasize reciprocity and intimacy (Youniss, 1980), as well as improved social–cognitive skills (Selman, 1981) that may allow the adolescent to make more accurate inferences about who likes them.

We did not see evidence of the degrouping process reported by Shrum and Cheek (1987), because there were no consistent grade differences in clique or loose group membership. The difference in methodology may account for part of the lack of replication. Shrum and Cheek used only three nominations and used one-way choices to define their links. We used all choices made up to the limit of 10 and defined our links with mutual choices. We believe our method more completely represents the friendship networks. It is also possible that regional or community factors account for the difference.

Ethnic Effects

In this study, many ethnicity effects were confounded with school effects. However, there were suggestions of ethnic effects. In the one system in which we could examine differences between African American and White students, African Americans were less connected to the school network than were Whites. In addition, the school with an African American majority had the lowest level of school network participation and the highest percentage in the unconnected group of any of the three systems. This lack of connection to the school network could be a consequence of more neighborhood peer involvement by African American adolescents (DuBois & Hirsch, 1990). The results also suggest that in all systems, for almost all ethnic groups, groups that were in a numeric minority in a school were less integrated into school peer networks than the majority group. The minority group to which these generalities did not apply was the Chaldean group. They differed from the other ethnic groups in language and degree of acculturation. Perhaps their separateness from mainstream culture accounted for their high degree of connectedness with one another.

Relationships Between Network Aspects

Fifty to 70% of the members of adolescents' friendship lists were persons from their friendship group. The cliques, while highly interconnected, rarely involved everyone in the group

choosing everyone else as a friend. Loose groups were sometimes sparsely connected. Best friends were in the same clique about 90% of the time, but only about 50% of the time in the same social crowd. Clique members were only in moderate agreement on social crowd, and there was even less agreement among loose group members. The average clique or loose group had members with two to four different, self-nominated crowd affiliations.

These results are more consistent with Brown's (1990) view of social crowds than with Dunphy's (1963) model. Only two of the crowds, excluding the average crowd, could be the result of the merging of single-gender cliques. The other crowds were either very small or were primarily single gender, conditions that do not match Dunphy's descriptions of crowds.

The possibility should be considered, however, that crowds as Dunphy (1963) described them may exist, but not as the named entities such as *Nerd, Prep,* or *Brain* examined in this study. We did not detect large mixed-gender groups that would match Dunphy's crowd description. However, because we did not ask explicitly about friendship groups of male and female students who socialize together, we would not necessarily have detected them. Finally, it should be noted that clique and social crowd are measured quite differently. Cliques were measured by the converging reports of the adolescents in them. Social crowds were measured by self-reports. There may have been more convergence between clique and crowd if crowd had been measured by nominations of others.

The evidence, then, for hierarchical nesting of structural aspects of the network is mixed. Adolescents list more friends than the members of their school friendship group, and they usually do not list all of the persons in their friendship group as friends. Best friends are highly likely to be embedded within friendship groups, but best friendships and friendship groups are not highly embedded in social crowd.

Implications

These findings have implications for the assessment of peer adjustment and for the study of peer effects on any aspect of adolescent development. We find that adolescent peer networks are complex, with multiple aspects, none of which in isolation gives a complete picture of an adolescent's connections to their social network. Lack of friendship group membership, for example, does not imply that the adolescent does not have mutual friends or is not a member of a crowd. It becomes important, then, to try to determine whether the different network aspects serve different functions for the adolescents and whether the significance of these aspects changes over time.

The incompletely overlapping nature of the different aspects of the network adds complexity to the study of peer support and peer influence. For example, best friendships are almost completely nested within friendship groups. Bryk and Raudenbush (1992) pointed out that standard statistical techniques are not appropriate for analyzing nested levels of data, and they recommended hierarchical linear modeling rather than ordinary regression techniques for comparing effects with nested levels of data.

Because the friendship list does not completely overlap the friendship group, a possibly influential member of a friendship group may not be identified if only the friendship list is used as a measure of influential persons in the adolescent's life. This finding also suggests that many adolescents have ties into other friendship groups, so that moving from one group to another may be fairly easy if the adolescent is expelled from or decides to leave a group. To explore these suggestions, we need to examine similarity among adolescents across network aspects, selection into the various network aspects, and the stability of these aspects. We are currently conducting analyses to begin addressing these issues.

In describing the structural aspects of the networks, many significant ethnic, grade, and gender results were found, but relatively few replicated across the three systems. This strongly suggests that there are school-level and community-level variables that have an impact on the organization of peer networks. Determining what these variables are is an important topic for further study. In the present research, ethnicity, minority status in the community, community mobility, and predominant family organization all varied with school system. With only three school systems in the present study, the effects of these variables cannot be identified here. These results argue for more attention to contextual variables and warn that replication in more than one system is necessary before any results on adolescent peer networks can be generalized.

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