Friendship ties and exclusionary ties in classroom. The social structure among eight years old children

Tuire Palonen, University of Turku, Centre for Learning Research,
Assistentinkatu 5. Fin-20014 University of Turku,
Marita Neitola, University of Turku, Department of Teacher Education in Rauma.
Assistentinkatu 5, Fin-20014 University of Turku,
Kaarina Laine, University of Turku, Department of Educational Science.
Assistentinkatu 5, Fin-20014 University of Turku,
Email: tuire.palonen@utu.fi, marita.neitola@utu.fi, kaarina.laine@utu.fi

Abstract: Friendship and peer acceptance contribute uniquely to positive social and emotional adjustment whereas low status within the peer group has been found to produce rejection, loneliness and harassment. We have studied how the exclusionary ties and friendship ties are distributed among first grade pupils in the classroom. The basic question was whether girls' and boys' networks are different from each other in regards to the density and centrality of the ties. Further, the size of the class and the effect of the level of multicultural heterogeneity to the tie distribution were studied. All analyses were made at class level. Surprisingly, no remarkable differences were found. The size of the class was found as an important factor influencing on the amount of exclusionary ties. The multicultural heterogeneity did not either have big influence on the composition of different types of social ties. The sample is large (738 children, 50 school classes) and therefore, the results can be generalized to similar cultural environments.

Introduction

Children's social status and social relations with peers and friends as a part of their social competence have received much attention in recent research literature (e.g., Ladd, 1999; Hartup & Abecassis, 2004). In these studies, the importance of remarkable developmental effects of peer relations and friendships on children's life has been highlighted. Friendship and peer acceptance contribute uniquely to positive social and emotional adjustment whereas low status within the peer group has been found to produce maladaptive properties of poor peer relations, rejection, loneliness and harassment. Peers and friends have important role in children's developmental process. Friendship represents strong, affective, equal, mutual tie, or commitment between two children. Participation and belonging to peer group enriches children's social, emotional and academic competence (Bagwell, 2004).

According to several studies, negative outcomes are often observed for children left outside the peer groups (Hymel, Vaillancourt, McDougall & Renshaw, 2004). Children's close relationships can have two different sides, bright and dark. According to Hartup and Abecassis (2004) most relationships have dark sides and the developmental impact is determined by the manner in which darker side elements intertwine with brighter elements. They suggest that negative relationships are also developmentally significant at least by middle childhood (Hartup & Abecassis, 1998, 2004).

Gender and children's peer relations are closely related (Underwood, 2004). Children prefer to interact with peers of their own gender from the third year of life (Serbin, Moller, Gulko, Powlishta & Colbourne, 1994). Consequently, the Two Cultures Theory proposes that boys and girls mostly interact in same-gender groups, which differ on many important dimensions (Maccoby, 1990). Among preschoolers opposite-sex friendships occur in relatively small numbers. The lack of gender attention among peer-relation-researchers has led to mixed evidence for gender differences in peer relations (Underwood, 2004).

Theories concerning girls' and boys' social networks differ from each other. It has been claimed that boys' networks are larger and more hierarchically organized whereas girls' networks are described as smaller and more horizontal in structure (Daniel-Bierness, 1989; Maccoby, 1998). Peer relations research argues that girls' and boys' networks are of equal size (see Cairns & Cairns, 1994). Also, peer cliques have been found to not differ in size and both genders are equally likely to be central members of their respective cliques (Bagwell, Coie, Terry & Lochman, 2000). Regarding to peer status across many different studies children nominate more same-gender peers for more positive items and more other-gender peers for negative items (Daniel-Bierness, 1989). Recently, more advanced sociometric tests have become an influential method of studying social status and peer relations.

Cultural differences among children's background can have remarkable effect on peer relations and friendships. There is lot of evidence based on research that cross-race friendships appear to be less numerous than same-race ones for both black and white students (e.g., Boulton & Smith, 1996; Clark & Ayers, 1988;

Graham & Cohen, 1997; Howes & Wu, 1990; Dubois, 1990.) However, research focusing on children' s within-school friendships has pointed out that children attending integrated elementary schools are likely to develop friendships with children from other racial groups (Fletcher, Rollins & Nickerson, 2004). Clark and Ayers (1988) argue that children typically form friendships with other children who are located in close proximity to themselves, such as in their classrooms at school. However, there are differences between races in this respect and nature of these differences varies across studies (e.g. Hallinan & Williams, 1987; Hallinan & Smith, 1985; Graham & Cohen, 1997; Hallinan & Teixeira, 1987).

Aboud and her colleagues (2003) drew a conclusion that racial prejudice relates most strongly to the number of excluded classmates. Children tend to have more same- than cross-race companions. Further, although racial attitude was not a factor in friend selection, selectivity on the basis of race was evident at both companion and friend levels, but more common at the companion level where grade, gender and participant's race had no moderating effects. Children with higher levels of prejudice were more likely than their tolerant classmates to exclude cross-race classmates, but not less likely to be friends with them (Aboud, Mendelson & Purdy, 2003). When examining students' same-ethnicity preferences in peer nominations Bellmore with her research group found that students made more nominations to same-ethnicity peers when there were larger numbers of same-ethnicity peers in the classroom. In addition, students who gave more acceptance nominations to same-ethnicity peers were more accepted among same-ethnicity peers and less accepted among other-ethnicity peers (Bellmore, Nishina, Witkow, Graham & Juvonen, 2007).

Research problems

We aim to study how the exclusionary ties and friendship ties are distributed among first graders. We examine whether girls' and boys' networks are different from each other regarding the density and centralization of the ties and whether multicultural background or class size has an influence on the social structure among children. The analyzing unit is at class level. Research problems for the study can be stated in the following way:

1. What is the density of exclusionary ties, positive ties, and friendship ties in the classroom? How much are the social ties centralized in the classroom? Are there differences between classes? If there are differences, how these can be explained? Is the size of the class having influence on the density or centralization of the exclusionary ties or friendship ties?
2. How are the friendship ties and exclusionary ties distributed inside and between gender groups? Are there differences in cohesion in equally distributed, male dominated or female dominated classes? If the social structure is different in boys' and girls' group, this should be seen as comparing male-dominant classes with female-dominant classes.
3. How multicultural heterogeneity influences on friendship ties and exclusionary ties in the classroom? Are there more exclusionary ties among pupils coming from different cultural environments? Is the social structure of multicultural classes different from culturally homogeneous classes?

Method

Participants

The study is part of Origins of Exclusion Project, which is a Finnish longitudinal study of children's risk of social and academic exclusion in childhood. In this sub study, there are 738 participants of 7- to 8- year-old children from 50 classes at 35 public schools on the western coast of Finland (population 175, 354). In Finland, the school is generally started at the age of seven years and all participants are first graders. Parental consent to take part in the study was received for 354 girls and 384 boys. This is about 80% of all children of the target group. Most participants have Finnish origin, only 10 percent of the pupils have some other ethnic background. For the study, the multicultural heterogeneity has been defined based on the home language of the children. Three variables have been built: 1) the amount of home languages spoken in the classroom (Finnish and Swedish are calculated as different languages even if they both are official languages in Finland) and 2) the amount of children speaking a language other than Finnish or Swedish in the class. Further, 3) the grouping variable at class level has been built in which all the classes consisting of only the children speaking Finnish or Swedish with at maximum one child speaking some other language as their home language, have been classified as a homogenous class and all classes having at least two children speaking a language other than Finnish or Swedish have been classified as multicultural classes.

Data gathering

Sociometric peer rating has been used to collect the data. The assessments of peer relations were conducted by interviewing children. All of the children were interviewed in individual testing sessions by trained female experimenters in the spring of their first school year. Each child was told to rate all of his or her classmates according to how much he/she liked to play or be with the particular pupil. The choices were: 'I would like to play with him/her always' (friendship tie), 'I would sometimes like to play with him or her'

(positive tie) or 'I would not at all like to play with him/her' (exclusionary tie). All measurements were administered by using the group photograph of each school class. The photographs were used in order to overcome any memory problems that might occur by relying on names only (cf. Asher, Singleton, Tinsley, & Hymel, 1979; Howes, 1987; Maassen, Steenbeek, & van Geert, 2004.) Interviews lasted approximately 30 minutes, and subjects were assured of the confidentiality of their responses to all research questions.

Analysis and SNA measures

For social network analysis (SNA), the peer evaluations gathered by interviews were organised in the case by case matrix for all 50 classes, in which the columns and rows were organised in equal order, covering the friendship networks of all 738 children. The square matrices (N=50) contain the information as self report (in rows) and peer reports (in columns).

In SNA, density and centrality are basic concepts.

Density. Density shows how many ties exist in the network compared to the maximum number of possible ties. The density measure is used to analyse the cohesiveness and interaction within classes.

Centralization: While density describes the general level of cohesion, centralization refers to a different aspect of the overall compactness of the graph. Centralization describes the extent to which the connections are organized around particular actors. Freeman's indegree and outdegree measures are calculated. Indegree value indicates how many times a child has been rated (e.g. as a friend) by his or her classmates, while outdegree is the number the ties (e.g. friends) she or he has reported her/himself.

Results

The sizes of the classes participating in the study are reasonable small as the first grade children are the target group for the study. The children who were not allowed to take part in the studies are not reported in the numbers presented here (see Table 1). The share of these children is low, only 2-4 children in each class. As being absent is related to their parent's general request not to let their children take part in studies, and not opposing on this study as such and as the share of these children is reasonably low, it is plausible that this does not cause any bias of the results.

Table 1: Descriptive statistic related to classes.

	Min	Max	Mean (Std. Deviation)
Size of the class (N=50)	9	22	15,4 (3,67)
% of the males	0,20	0,80	0,53 (,136)

We first present some descriptive statistic related to how the friendship ties and exclusionary ties are distributed at classroom level. Density values indicate how many ties there are compared to maximal number of the possible ties. As the children belong to the same class community, it is taken for granted that there always is a tie (exclusive, positive or friendship tie) between two children in the same class. We begin by presenting results in which the exclusionary ties are distinguished from positive and friendship ties. In some analysis positive ties and friendship ties are added together. As there always is a tie between each children pair (dyad) and as the density values are calculated for dichotomic matrices, the sum of the density values of exclusionary ties, positive ties and friendship ties is 1 for each class. The centralization values can be though of as percents, which show how much the ties are focused around the most central pupil. The statistics for density and centrality values of the ties are presented in Table 2.

Table 2: Descriptive statistics of exclusionary ties, positive ties and friendship ties at class level

	Min	Max	Mean (Std. Deviation)
Centralization of the mutual exclusionary ties	0	71	32 (13,26)
Density of the mutual exclusionary ties	0	0,38	0,20 (0,01)
Centralization of the exclusionary out-ties (self-report)	18	72	36 (11,36)
Centralization of the exclusionary in-ties	12	54	31 (10,09)

(peer-reports)			
Density of the exclusionary ties	0,03	0,49	0,33 (0,10)
Centralization of the positive out-ties and friendship out-ties (self-report)	12	50	31 (8,12)
Centralization of the positive in-ties and friendship in-ties	12	40	22 (6,73)
Density of the positive ties and friendship ties	0,51	0,89	0,66 (0,09)
Centralization of the friendship out ties (self-report)	14	76	32 (12,87)
Centralization of the friendship in-ties (peer reports)	13	50	27 (8,85)
Density of the friendship ties	0,14	0,41	0,27 (0,05)
Centralization of the mutual friendship ties	2	41	21 (8,64)
Density of the mutual friendship ties	0,05	0,28	0,15 (0,05)

The results show that the mean value for exclusionary tie density in the classroom is 0,33, i.e. that every third tie is exclusionary. The share of the friendship ties is on average 0,27. There are some differences among classes. It is plausible to expect that most exclusionary ties are reported between gender, and the most neutral and strong positive ties are inside gender.

We first examine how the size of the class influences the density and distribution of the social ties. Pearson's measure indicates negative correlation between the size of the class and density of the mutual friendship ties ($r=-0,292$; $p<0.05$) and friendship ties ($r=-0,349$; $p<0.05$). So, the share of friendship ties and mutual friendship ties is smaller in big classes than in small classes (see Table 3).

Table 3: Pearson's correlations between the size of the class and the density of the social ties (N= 50).

	Density of mutual exclusionary ties	Density of the exclusionary ties	Density of positive and friendship ties	Density of friendship ties	Density of mutual friendship ties
Size of the class					
Pearson Corr.	0,145	0,251	-0,233	-0,349	-0,292
(Sig. (2-tailed)	0,314	0,078	0,104	0,013*	0,040*

*$p<0.05$

Further, the size of the class is having influence on the way the observed ties are distributed among children. The negative correlation is high especially as regarding the friendship out-degree values ($r=-0.465$; $p<0.01$), i.e. in big classes reporting about friendship is more equally found among children compared to the small classes in which some children report more friendship ties than other do. However, peer evaluation measures (in-degree values) regarding friendship or positive ties do not vary much along the size of the class. Regarding exclusionary ties, the size of the class is having the most effect on the centralization of the ties. There is rather high negative correlation both for out-degree values ($r=-0,291$; $p<0.05$) and in-degree values ($r=-0,409$; $p<0.01$). Thus, the results show that in smaller classes some students report more, and especially receive more, exclusionary ratings from their peers compared to other in the same class whereas in bigger classes these are more equally distributed. To conclude, even if the amount of exclusionary ties is less in smaller classes

compared to big classes, these are more focused on some children and reported more often by some pupils (see Table 4).

Table 4: Pearson's correlations between the size of the class and the centralization of the social ties (N= 50).

	Mutual excl. ties (degree)	Excl. ties (out degree)	Excl. ties (in degree)	Positive and friends. ties (out degree)	Positive and friends. ties (in degree)	Friends. ties (out degree)	Friends. ties (in degree)	Mutual friends. ties (degree)
Size of the class Pearson Corr.	-0,242	-0,291	-0,409	0,258	-0,108	-0,465	-0,018	-0,228
Sig. (2-tailed)	0,094	0,041*	0,003**	0,070	0,454	0,001**	0,900	0,111

*p<0.05, ** p<0.01

Regarding gender distribution, no statistically significant correlation can be found between the densities of social ties and the share of males (females) in the classroom. Moreover, there is only one centralization value indicating any correlation with the share of males (females) in the classroom. The share of males (females) in the classroom is somewhat correlating with exclusionary outdegree values indicating that in the male dominated classes the exclusionary ties are more equally distributed than in the classes having the female dominance. The Pearson's correlation (r=-0,265) found is, however, not statistically significant. To conclude, on the contrary to expectations based on previous research, no differences are found depending on whether the class is having a girl majority, or a boy majority.

Table 5: Social ties in equally and unequally gender distributed classes

Centralization and density	Gender share in the class (number of classes)	Mean rank	Chi-Square(df)	Asymp. Sig.
Mutually excluded (centralization)	Female majority (6) Equal (35) Male majority (9)	0,32 0,22 0,31	1,97(2)	,372
Density of the mutually exclusionary ties	Female majority (6) Equal (35) Male majority (9)	0,18 0,26 0,28	4,52(2)	,105
Centralization (out degree) of the exclusionary ties	Female majority (6) Equal (35) Male majority (9)	34,0 24,1 25,4	2,38(2)	,304
Centralization (in degree) of the exclusionary ties	Female majority (6) Equal (35) Male majority (9)	33,9 21,2 36,7	10,29(2)	,006**
Density of the exclusionary ties	Female majority (6) Equal (35) Male majority (9)	0,11 0,28 0,26	6,55(2)	,038*
Centralization (out degree) of the friendship ties	Female majority (6) Equal (35) Male majority (9)	25,2 25,8 24,7	3,205(2)	,201
Centralization (in degree) of the friendship ties	Female majority (6) Equal (35) Male majority (9)	11,4 27,9 25,6	0,04(2)	,980
Density of the friendship ties	Female majority (6) Equal (35) Male majority (9)	0,32 0,24 0,26	1,24(2)	,537
Mutual friendship ties (centralization)	Female majority (6) Equal (35) Male majority (9)	23% 27% 21%	1,263(2)	,532
Density of the mutual friendship	Female majority (6) Equal (35)	0,24 0,26	1,124(2)	,940

ties	Male majority (9)	0,25		

*p<0.05, ** p<0.01

Therefore, we continue the analysis by dividing the classes into female majority classes (boys less than 35% of all children, N=6), equally distributed classes (boys from 35-65% of all children, N=35), and male dominated classes (boys more than 65% of the children, N=9). In the following table (see Table 5), we compare these groups of classes with each other to see how much there are mutual exclusionary ties, exclusionary ties, positive ties, friendship ties, and mutual friendship ties and how these are centralized among children.

The results indicate that there are some differences that are statistically significant. In the female dominant classes, there are less exclusionary ties than in the equally distributed or the male dominant classes. However, these ties are more centralized to certain children. According to the results, the mutual positive ties are as common in each class groups and equally centralized, which was not expected. The main differences seem to be in exclusionary ties. In female dominated classes, excluding is focused more on some children but these nominations are only little reported, i.e. there are less exclusionary ties than in those classes having more boys. Consequently boys report more exclusionary ties than the girls. The result is consistent with earlier research.

We now go on to study in which way cultural heterogeneity in the classroom influences social ties. No correlation can be found at class level density and centrality values with any social network density or centralization measure (mutual exclusionary ties, exclusionary ties, positive ties, friendship ties, or mutual friendship ties) and variables built for cultural diversity (number of home languages spoken in the class or number of children in the class speaking other than official Finnish languages). Therefore, we continue analysis by dividing the classes into culturally heterogeneous classes (with more than one child in the class speaking a home language other than Finnish or Swedish) and other classes. The results of the analysis are presented in Table 6.

Table 6: Social ties and cultural diversification in classrooms.

Centralization and density	Cultural diversity (Homogeneous N=37, Heterogeneous N=13)	Mean rank	Mann-Whitney U measure	Asymp. Sig. (2-tailed)
Mutually excluded (centralization)	Homogeneous Heterogeneous	25,0 25,2	231,5	,955
Density of the mutually exclusionary ties	Homogeneous Heterogeneous	0,24 0,28	203,0	,406
Centralization (out degree) of the exclusionary ties	Homogeneous Heterogeneous	24,5 28,4	202,5	,400
Centralization (in degree) of the exclusionary ties	Homogeneous Heterogeneous	25,1 26,7	225,0	,731
Density of the exclusionary ties	Homogeneous Heterogeneous	0,25 0,28	207,5	,465
Centralization (out degree) of the friendship ties	Homogeneous Heterogeneous	22,8 33,1	142,00	,029*
Centralization (in degree) of the friendship ties	Homogeneous Heterogeneous	23,7 30,6	174,5	,144
Density of the friendship ties	Homogeneous Heterogeneous	0,24 0,30	182,0	,194
Mutual friendship ties (centralization)	Homogeneous Heterogeneous	22,0 35,6	109,5	,004**
Density of the mutual friendship ties	Homogeneous Heterogeneous	0,24 0,29	191,5	,276

*p<0.05, ** p<0.01

The results indicate that only two statistically significant differences can be found between these groups of classes. The density (amount) of the friendship ties or exclusive ties does not differ in a statistically significant way when comparing culturally diversified classes to the classes with only Finnish or Swedish

speaking children. However, the distribution of mutual friendship ties and how friendship ties are reported (out degree values for both asymmetric and mutual friendship ties) differ in the classrooms. This means that in culturally heterogeneous classes some children have more friendship ties and some have less, and this difference is bigger on average than in the classes consisting only of one cultural group. When interpreting the results we have to remember that the share of cultural diversity is rather small in Finland and that in the environment in which there are more children coming from different cultural backgrounds the effect might be stronger. It would also be important to study how gender and multicultural aspects have co-variance.

Conclusions

To sum up the results, we can see that there are less exclusionary ties in female dominant classes than in male dominant or equally gender distributed classes. These ties are more centralized toward some children in the classes where there are less exclusionary ties. Further, we have to remember that the results only refer to the social structure at class level, not with the content of the activities or relationships as such. The next step in our study is now to go on to level of individual pupils, and to examine e.g. the size of boys' and girls' egocentric networks in the classroom. More detailed analyses are needed to get a better understanding of the relationship of friendship ties and exclusionary ties among children's gender group.

Due to large sample we can observe some differences among classes. On the basis of the first results it is plausible to expect that cultural homogeneity could cause differences among classes. In culturally homogenous classes ties are distributing in different way than in culturally heterogeneously classes.

To conclude, it seems that the social structure among first graders is varying at class level measurements but the explanations for this are not known. The data set of the study is strong enough to enable some generalization regarding the results presented in the paper, at least within culturally similar school environments. The contribution of our research is, therefore, to bring a large peer reported study to the area which very often has been based only on rather tiny number of participants, and looking at the phenomena at a level of individual children.

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