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Ethnic boundaries and personal choice. Assessing the influence of individual inclinations to choose intra-ethnic relationships on pupils' networks

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Abstract

The existence of ethnic boundaries in 20 pupils' networks is tested by comparing the proportion of intra-ethnic to inter-ethnic relationships, while controlling for the distribution of intra- and inter-ethnic dyads in pupils' networks. Also, we tested if those boundaries are affected by the inclinations of network members in choosing intra-ethnic group relationships. We used the p_2 model for each school network and combined these results in a two-step procedure. Our results supported the hypotheses.

Keywords: Inter-ethnic relationships; Intra-ethnic relationships; School network

1. Introduction

Desegregation of school classes has been a topic of political debate in many multi-ethnic countries in the USA and Western Europe. In the USA an extensive debate started in 1954 when the Supreme Court ruled that black people were not only entitled to 'equal' schooling facilities, but also to desegregated facilities. They reasoned that separation in the schools

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'generates a feeling of inferiority (in black children) that may affect their hearts and minds in a way unlikely ever to be undone' (Brown v. Board of Education of Topeka, 1954). In 1957, the US army had to escort a group of nine black children to their school in Little Rock, through an angry crowd of white people. Although a lot has changed, school segregation is still a political issue, for instance, in The Netherlands (Dors et al., 1991; Gramberg, 1998, 2000; Leeman and Veendrick, 2001; Overmaat and Ledoux, 2002; SCP, 1995; Teunissen, 1998; Vermeulen, 2001).

One important reason for the political unease is that the ethnic composition of the school environment is strongly believed to have social effects. Advocates of school desegregation reason that inter-ethnic contact is needed to prepare young people for a life in a multicultural society. Friendly, day-to-day contact with classmates of other ethnic backgrounds is argued to break down existing inter-ethnic prejudice and thereby reduce inter-ethnic tension and antagonism. This should reduce pupils' inclination to restrict their personal relationships to people of the same ethnic group, and thus generate more intra-ethnic relationships. But these ideas are not undisputed; some authors (Allport, 1954; Brewer and Miller, 1984; Hewstone and Brown, 1986; Howes and Wu, 1990) have stated that contact reduces prejudice only under specific conditions. Others (Epstein, 1983; Schofield, 1991) have observed that pupils of mixed school classes tend to spontaneously establish ethnic boundaries between themselves. As we will show, research on this topic has not been conclusive and this is partly because most researchers neglected the network aspects in their theory, design and method of analysis. In our study we tried to overcome some of these problems, and we therefore present the results of a social network study on classes in 20 high schools, using a special model for dyadic data, the p_2 model (Lazega and Van Duijn, 1997). We concentrate on two topics in this article. First, we examine the existence of ethnic boundaries, i.e. the distribution between intra- and inter-ethnic relationships, controlled for the opportunity structure given by the ethnic distribution of pupils' networks. Second, we explore the extent to which ethnic boundaries are affected by pupils' inclinations to choose own-group relationships, while recognizing that ethnic boundaries may also be due to other mechanisms.

1.1. Theory

A common feature in theories on the emergence of inter-ethnic relationships is the idea that inter-ethnic relationships can only arise when people from one ethnic group have contact with people from another group. Authors like Allport (1954) and Pettigrew (1986) have argued that contacts within a cooperative framework diminish prejudices and strengthen positive attitudes about the other group. This will enhance the chance that people will engage in relationships. It should be noted that schools generally provide cooperative frameworks for contacts between pupils and it could be argued that the chance that friendships develop runs parallel to the chance that pupils have contact. Along this line of thinking, the chance that pupils have contacts with pupils of other ethnic groups should completely predict the chance that they establish inter-ethnic relationships. Because only contact opportunity plays a decisive role here, this hypothesis is called the 'opportunity hypothesis' (Hallinan, 1982).

However, the opportunity hypothesis has been criticized by some authors who state that the process of transition from availability into positive relationships (such as friendships) is not neutral to ethnic background. It has been argued (Kandel, 1978; McPherson et al.,

2001) that people prefer to interact with people who are like themselves. Members of the same ethnic group can be alike with respect to cultural values, traditions, experiences or opportunities. Thus, a preference for intra-ethnic relationships could be explained by the social identity theory (Tajfel and Turner, 1979), which states that people need to belong to a group with a special identity. For many people, ethnicity serves this purpose. A social identity generally motivates people to accentuate their differences with people in other groups rather than their similarities, augmenting prejudice rather than diminishing it, and thus preventing inter-ethnic relationships from developing.

While most of the literature refers to preferences as the causal factor for intra- and inter-ethnic relationships, this is not generally accepted. For instance, Granovetter (1986) argued that there are many reasons that might cause pupils to refrain from inter-ethnic relationships. He stated that peer pressure, for instance, might prevent those relationships from developing, even if some pupils liked (certain) others with a different ethnicity. However, while the mechanism and causes might differ, the outcome remains the same: pupils have an individual inclination to engage more in intra-ethnic than in inter-ethnic relationships. Because we are interested primarily in the effects of behavior (choice of relationships) on networks, we will not discriminate between the processes underlying these choices but rather focus on pupils' inclinations.

1.2. Hypotheses

When studying pupils' networks, we might assume that the opportunity for each pupil to engage in a positive relationship (such as friendship or support) with any other pupil in the network is the same for any pair of actors, irrespective of either actor or dyadic characteristics. However, assuming that individual pupils have an inclination to engage more in intra-ethnic than in inter-ethnic positive relationships, the chance that two pupils actually have a positive relationship is larger for intra-ethnic than for inter-ethnic pairs of actors. Thus, the first hypothesis is as follows.

Hypothesis 1. The probability that two pupils will have a positive relationship is larger for intra-ethnic than for inter-ethnic pairs of actors.

Using the definition by Wasserman and Faust (1994), "A dyad consists of a pair of actors and the (possible) tie(s) between them," we conclude that hypothesis 1 concerns variables on the dyadic level, because it refers to ethnic differences or similarities between pairs of actors and to the relationships between them. For hypothesis 1 the total number of dyads is divided into inter- and intra-ethnic dyads. The intra-ethnic density is defined as the number of intra-ethnic relationships divided by the total number of intra-ethnic pairs of actors. The inter-ethnic density is defined in a similar way. Consequently, ethnic boundaries between pupils occur when the intra-ethnic density is larger than the inter-ethnic density. If hypothesis 1 is supported for one network, an ethnic boundary exists in that network and vice versa.

Ethnic boundaries might also develop without individual inclinations for intra-ethnic relationships. For instance, if a class includes three girls of an ethnic minority, an ethnic boundary might develop because pupils tend to engage in same-sex relationships. Also, ethnic boundaries might be amplified by pupils' dispositions to reciprocate relationships

whatever their ethnic status. Our aim was to test the effects of individual inclinations for intra-ethnic relationships on ethnic boundaries, controlling for some of the other causes. This resulted in hypothesis 2.

Hypothesis 2. An ethnic boundary is caused by individual inclinations to engage more in intra-ethnic than in inter-ethnic relationships.

Hypothesis 2 has a dependent variable on the dyadic level. The independent variable, formulated as an individual inclination, and therefore easily mistaken as an actor characteristic, is a dyadic characteristic, because it is based on the characteristics of both actors in the dyad. In our analysis we will allow the effects of various other variables, both on the dyadic and on the individual actor level.

It should be noted that neither hypothesis competes with the opportunity hypothesis, but rather includes it. While arguments underlying individual inclinations to engage in intra-ethnic relationships are often put forward as criticism to the opportunity theory, none of the critics would negate the importance of opportunity for a network structure. In fact, it does not make sense to test for ethnic boundaries without taking into account the opportunity structure of intra- and inter-ethnic relationships. We have therefore incorporated this structure directly into our hypotheses.

1.3. Previous research

In testing the existence of ethnic boundaries and the effect of intra-ethnic inclinations, empirical research has not been conclusive. Some authors (Howes and Wu, 1990; Saharso, 1995; Smith and Schneider, 2000; Woods and Grugeon, 1990) found evidence for many inter-ethnic relationships. However, this cannot be seen as an argument against ethnic boundaries (hypothesis 1), because there are also many intra-ethnic relationships. Other authors (for example, Clark and Ayers, 1992; DuBois and Hirsch, 1990; Schofield, 1979; Schofield, 1982; Schofield, 1986) concluded that the preference for developing relationships with members of the own-ethnic group is strong. However, these results cannot be interpreted as conclusive support for hypothesis 2 because of methodological reasons which will be outlined below.

Some studies have tried to measure in-group preferences using questionnaires. For example, Kinket and Verkuyten (1999) asked pupils to rate different ethnic groups on several attributes, such as honesty and smartness. Verkuyten et al. (1996) asked pupils to rate different ethnic groups on how much they would like to interact with a representative of these groups. Patchen (1982) questioned pupils on a wide range of attitudes towards their own group and other groups. Although these studies clarify some of the processes regarding the formation of intra-ethnic preferences, they do not add to the explanation of ethnic boundaries. It is not clear how people's preferences relate to actual behavior since, depending on the circumstances, they may act very differently from their expressed attitudes, for instance, when they are pressured by others (Granovetter, 1986). And as we have already reasoned, opportunity can have a strong influence on segregation, even leading to ethnic segregation between people who would prefer inter-ethnic relationships above intra-ethnic ones. Thus, neither hypothesis 1 nor 2 was tested by these studies.

To avoid the problems of interpreting the consequences of attitudes, many studies focus directly on actual relationships. DuBois and Hirsch (1990) asked respondents whether or not they had other-ethnic friends. Patchen (1982) asked respondents how much they interacted with other-ethnic peers. Sometimes a personal network approach was used to determine the prevalence of inter-ethnic relationships. In these studies respondents were asked to name their (for example, three) best friends and were then asked to indicate which ethnic group each friend belonged to (Fong and Isajiw, 2000; Smith and Schneider, 2000). The main limitation of these studies is that the number of other-ethnic friends or the ratio of other-ethnic friends to same-ethnic friends says nothing about the respondents' individual inclinations because the studies did not control for the opportunities for relationships. Because schools, neighborhoods, working places, etc. are often segregated, people often have more opportunities to engage in relationships within their own group. They might, for instance, prefer inter-ethnic relationships but still have more intra-ethnic than inter-ethnic relationships because they live in a mono-ethnic neighborhood or visit a mono-ethnic school.

Researchers have tried to control for opportunity structures by studying entire networks, such as school classes or entire school populations, with the advantage that the ethnic composition could be used as a proxy for opportunity. However, in many cases, the analysis was conducted only on the group level (such as school class). Shrum et al. (1988) used classroom segregation scores, while others used several different group-level measures as control variables (Dors, 1987; Joyner and Kao, 2000; Rícan, 1996; Schofield, 1979; Schofield and Sagar, 1977; Shaw, 1973). These approaches were limited in the sense that they aggregated over all pupils in the network and ignored the individual and dyadic levels. In order to test our first hypothesis, examining the existence of ethnic borders, we also aggregate, not over all pupils, but over subgroups. For the second hypothesis, testing possible explanations from individual and dyadic characteristics, aggregating was no longer possible since we needed to analyze dyadic relationships. Our aim was to distinguish several, possibly competing, explanations, such as the effect of ethnic background controlling for gender effects. There is no agreement on the relative importance of these effects. Some authors (Kistner et al., 1993; Schofield, 1982; Schofield and Sagar, 1977; Smith and Schneider, 2000) reported that ethnic similarity is more important for girls than for boys. On the other hand, Patchen (1982) found that boys show more negative inter-ethnic behavior. Gender was also shown to be a stronger divider than ethnicity (Baerveldt and Snijders, 1994; Hallinan and Smith, 1985; Hallinan and Williams, 1989; Rícan, 1996; Schofield, 1982; Schofield and Sagar, 1977; Shrum et al., 1988; Smith and Schneider, 2000). Thus, ethnic boundaries within a network could be caused by a preference for same-sex relationships rather than ethnicity.

Unfortunately, dyadic studies are rare. Although Clark and Ayers (1992) used a dyadic approach, they omitted the dyads that did not result in a friendship and their data were restricted to only one school. More sophisticated studies in the field of inter-ethnic relationships among pupils were conducted by Hallinan and her colleagues. Her earlier studies examined cross-sectional and longitudinal sociometric data of all pupils in 16–20 multi-ethnic school classes, resulting in complete networks (Hallinan, 1982; Hallinan and Smith, 1985; Hallinan and Teixeira, 1987a,b; Hallinan and Williams, 1987). Later studies were based on a large national survey among high school pupils (Hallinan and Williams, 1989; Kubitschek and Hallinan, 1998). The latter authors used weighted logistic regression to model the presence or absence of a dyadic relationship, using individual and dyadic explanatory variables.

To avoid the problem of dependence between dyads, caused by the fact that the relationships reported by one pupil cannot be regarded as independent from each other, they took a sample from the many available dyads; this sample was subsequently corrected by the weighted analysis. In these dyadic studies no distinction was made between dyads derived from the same or from different school networks, so that the opportunity structure was ignored.

In his analysis of 130 school networks, Moody (2001) used a two-step approach: first he analyzed all networks with a dyadic model and then he analyzed the results from the first analysis using explanatory variables at the network (i.e. school) level. We followed a similar approach for the 20 school networks in our data, using a different dyadic model.

We concluded that the presence of ethnic boundaries (hypothesis 1) and the effect of personal inclinations to engage more in intra-ethnic than in inter-ethnic relationships (hypothesis 2) should be tested by standardizing for the opportunities for contact. One way of standardizing is to study entire networks in which opportunities between members can be regarded as equal, as in pupils' networks. If the association between opportunity and actual relationship is stronger between members of the same ethnic group than between members of different groups, hypothesis 1 is supported. In testing hypothesis 2, ethnic boundaries have to be accounted for by explanations other than personal inclinations. The association between opportunity, inclinations, and actual relationships could be influenced by personal features, such as relationships outside the studied network, or dyadic features, such as different sex. In addition, endogenous network effects, in particular the inclination to reciprocate a relationship, might interact with effects of ethnic inclinations on the emergence of relationships. The analysis should therefore include not only the status (existence or magnitude of a positive relationship) of dyads as a dependent variable, but also independent variables at the individual and dyadic level.

2. Methods

Data from the Dutch Social Behavior Study (DSBS) (Baerveldt, 2000; Baerveldt and Snijders, 1994; Houtzager and Baerveldt, 1999) were used. The participants comprised 1317 pupils from 20 urban high schools, aged 16–18 years with an equal number of boys and girls. High schools in The Netherlands are usually tracked: pupils can choose between several levels of secondary education. Most schools cover several tracks, but the classes in a school consist of pupils from the same track. The DSBS respondents were all students in the senior year of an intermediate level of secondary education, the so-called MAVO. MAVO-level pupils study languages, sciences and some basic technical subjects.

In many North American studies, a simple distinction is made between one majority (whites) and one minority group (blacks), but this is not appropriate for The Netherlands. The 17% of the Dutch population that is considered to comprise minority members (first- and second-generation immigrants) originate from many countries. The three largest groups (i.e. people from Turkey, Surinam and Morocco) together account for less than one-third of all minority members. The inclination to segregate differs for the various groups (Fong and Isajiw, 2000; Joyner and Kao, 2000). Cultural, religious and linguistic similarities between groups might facilitate satisfying interaction between members (Lee and Gudykunst, 2001; Van Oudenhoven and Eissen, 1998; Redmond, 2000) Surinamese people may, for example,

interact more easily with native Dutch because the school system in Surinam is largely based on the Dutch example, and the Dutch language and culture are relatively familiar. In the same manner, people of Turkish and Moroccan descent might be closer because both countries are Islamic and both groups have a similar immigration history. We therefore distinguish several major ethnic groups in the present study.

Ethnicity was measured as the country of birth of both parents. For example, a respondent was considered to be Turkish only when both his or her parents originated from Turkey. We restricted our analyses to the four largest groups, i.e. indigenous Dutch, Turkish, Moroccans, and Surinamese. Because ethnic groups might include people with varying levels of acculturation, this level was measured by a scale of four items refering to the use of the Dutch language and Dutch newspapers and television at home (Van Hemert et al., 2001). Cronbach's alpha for this scale was 0.74. The scale was one-dimensional: a factor analysis resulted in one factor explaining 59.4% of the variance (eigenvalue = 2.38). However, the scale was distributed in an extremely skewed way. Most respondents scored maximally on all items of the scale because they were highly acculturated. A small group scored very low, indicating a serious distance from the dominant culture, whereas a group of pupils could also be recognized as partially acculturated. Thus, the respondents were split into three categories: low acculturation ($n = 114$), medium acculturation ($n = 371$) and high acculturation ($n = 767$).

The actual existence of different types of relationships was measured by the social network items in the questionnaire. A network consisted of all MAVO students in their senior year within a given school (network size varied between 42 and 102 pupils). Because all pupils in these networks take classes together, we assumed that all pupils are equally available to each other. Therefore, all the network items focused exclusively on relationships with other MAVO pupils in the same grade. Before filling in the questionnaire, each pupil was given a personal code and a code list for all fellow pupils in the same year. The pupils filled in their own identification code on the form. For the network items, the respondents were instructed to give the codes of other involved pupils (up to a maximum of 12) for each item. If, for instance, pupil A (ego) had given emotional support to fellow pupils (alters) B (with code 78) and C (with code 85), pupil A (ego) filled in codes 78 and 85 with regard to this item.

The network items concerned six positive relationships, which were presented in order of intimacy (Houtzager and Baerveldt, 1999). Best friend relationships were indicated by the item 'who are your best friends?' Giving practical support was measured by 'which pupils do you help with practical problems such as doing homework, organizing a party or completing a difficult form?' and receiving practical support by 'which pupils help you . . . ' Giving emotional support was indicated by 'which pupils have you helped when they were depressed, for example, after the end of a love affair or in a conflict with other people?' and receiving emotional support by 'which pupils help you . . . ' Finally, intimate friendship was measured by 'who do you talk to about personal problems?' The questionnaire also included one negative relationship, concerning strong avoidance: 'who do you absolutely not want to associate with?'

Pupils could nominate anyone on the list of pupils, including alters who were not in school at the time the questionnaire was answered, for instance, because they had changed schools, were sick or playing truant. The nominations of these alters were excluded from our analysis, thereby reducing the number of nominations by about 10%. All

Table 1
Test of the reliability of social support items

Practical social support	Ego reports that (s)he receives practical social support from alter		
	No	Yes	Total
Alter reports that (s)he gives practical social support to ego			
No	44138 (99.1%)	271 (16.4%)	44409 (96.2%)
Yes	381 (0.8%)	1381 (83.6%)	1762 (3.8%)
Total	44519 (100%)	1652 (100%)	46171 (100%)
Emotional social support	Ego reports that (s)he receives emotional social support from alter		
	No	Yes	Total
Alter reports that (s)he gives emotional social support to ego			
No	44586 (99.7%)	314 (22.0%)	44900 (97.2%)
Yes	156 (0.3%)	1115 (78.0%)	1271 (2.8%)
Total	44742 (100%)	1429 (100%)	46171 (100%)

Comparison of item scores for ego about receiving, and for alter about giving social support.

reported frequencies were corrected for nominations of pupils who did not fill in a list themselves. Apart from the reported frequencies, the reduction did not alter our results substantively.

The support items were formulated both in terms of receiving and giving, which facilitates the possibility of checking the reliability by comparing the scores of the responses for egos and alters. Table 1 shows that about 80% of the support relationships received by an ego from an alter were also reported as being given by an alter, and vice versa. If egos reported no received support, the chance that alters reported given support was less than 1%. We therefore concluded that the reliability of the items was satisfactory.

3. Results

3.1. Descriptives

Of all pupils, 89.8% nominated at least one best friend, 66.7% nominated at least one intimate friend and 73.9% reported receiving practical support. In total, 95.3% of the pupils nominated at least one fellow pupil for a positive relation. Thus, pupils were not secretive about their relationships. This was also illustrated by the fact that 63.2% of the pupils reported having at least one fellow pupil whom they avoid. The frequencies of the positive items roughly reflect the emotional value of the relationships. As Table 2 shows, girls have more social support relationships and intimate friendships, but boys nominate more best friends. There were no significant differences between boys and girls with regard to avoidance relationships.

For most pupils their friends at school were important. For 61.7% of the pupils friends at school and friends outside school were equally important, and for 10.1% friends at school

Table 2
High school pupils and their relationships

Relationship of ego with alter	Girls ($n = 651$)	Boys ($n = 663$)	t-value difference
(1) Negative relationship			
Avoidance	2.62	2.38	1.41
(2) Positive relationships			
Best friend	3.27	4.00	−4.80**
Practical support given	2.80	2.26	3.90**
Practical support received	2.90	2.36	3.87**
Emotional support given	2.67	1.64	8.43**
Emotional support received	2.36	1.45	8.51**
Intimate friendship	1.71	1.04	8.28**

*$P < 0.01$; **$P < 0.001$, two-tailed. Average numbers of nominees, per sex, for negative and positive relationships.

were more important. However, for 28.2% of the pupils, friends outside school were more important. These pupils nominated a significantly lower number of fellow pupils for items about positive social relationships (t varies between 3.76 and 5.66, d.f. $= 1294$, $P < 0.001$ two-tailed). They also tended to nominate more pupils they avoided ($t = 2.73$, d.f. $= 1294$, $P < 0.01$ two-tailed).

With respect to the pupils' cultural backgrounds, 64.5% of all respondents had two parents who were born in The Netherlands, 4.7% had Moroccan origins, 5.7% had Turkish parents, and 7.6% could be considered Surinamese. Of all respondents, 6.7% had parents with other origins, and 10.7% of the pupils came from mixed marriages. The parents of the Dutch pupils were mainly non-religious (58.6%) or Christian (35.3%), while 98.4% of the Moroccan and 91.9% of the Turkish pupils had Islamic parents. Just over half of the Surinamese pupils (52.6%) came from Hindu families, while the rest were Christian, Islamic, or non-religious. The Dutch respondents lived in smaller families than the Turkish and Moroccan pupils. Half of the Turkish parents were born in non-urban areas, while two-thirds of the parents of other ethnic groups grew up in urban areas. The five largest ethnic groups (Dutch, Moroccan, Turkish, Surinamese and 'others') did not differ significantly with respect to relationships. However, using another distinction, non-Dutch pupils reported significantly ($P < 0.01$, two-tailed) more received practical support, received emotional support and given emotional support than the Dutch pupils.

3.2. Hypothesis 1: the existence of ethnic boundaries

Table 3 shows the ethnic distribution of received emotional support. The table shows that the highest percentages of support relationships were in the diagonal, indicating that intra-ethnic relationships are the most important sources of received support for each ethnic category. However, while most support relationships were intra-ethnic for the Dutch (79%) and Turkish (59%) pupils, most were inter-ethnic for Moroccan and Surinamese pupils. Moroccan pupils even received almost as much support from Dutch as from Moroccan pupils. Most support relationships of the 'others' category were with Dutch pupils, which reflects the fact that most pupils in this category were from mixed (Dutch and non-Dutch) parentage.

Table 3
Emotional support received from fellow pupils by ethnicity of the source

Received support from pupils of different origins	Pupils from the ethnic origins				
	Dutch	Moroccan	Turkish	Surinamese	Others
Dutch ($n = 850$)	79	24	11	21	47
Moroccan ($n = 62$)	2	27	8	4	5
Turkish ($n = 75$)	2	19	59	8	6
Surinamese ($n = 100$)	3	8	8	44	12
Others ($n = 230$)	13	22	14	23	30

The number of relationships per ethnic category, in percentages of the total number of relationships in the personal network.

Similar analyses on the other relationships led to the same results: intra-ethnic relationships were most important, but pupils from minorities have more inter-ethnic relationships than the Dutch pupils. The ethnic distribution of support relationships is in itself an important social phenomenon, because it illustrates how ethnic integration differs between the majority and minorities. Integration seems mainly an activity for minority members. However, this does not mean that ethnic boundaries exist. Table 3 could merely reflect the balance of available relationships, which of course is dominated by the majority, i.e. the Dutch pupils. One indication for this is that most of the Dutch pupils' avoidance relationships were also with other Dutch. To test the existence of ethnic boundaries we need to compare the number of actual relationships with the number of potential relationships or dyads in the networks.

Table 4 shows received emotional support among and between ethnic categories. For each ethnic category the density is shown, i.e. the probability that dyads (potential relationships in the class) are actual relationships. The number of these relationships was compared with the respective number of all potential relationships or dyads. For instance, the number of among-Dutch dyads was 31,802 and the number of received emotional support relationships was 1016, thus, the among-Dutch density of received emotional support was $100 \times 1016/31{,}802 = 3.19\%$. The table shows that generally the densities were highest on the diagonal, where the relationships within ethnic categories lie, whereas the densities for inter-ethnic dyads were lower.

When comparing Dutch and non-Dutch rather than the five ethnic categories, the results (not presented here) remained virtually the same. The density of social support relationships

Table 4
Emotional support received from fellow pupils by ethnicity of the source

Received support from pupils with different origins	Pupils from the ethnic origins				
	Dutch	Moroccan	Turkish	Surinamese	Others
Dutch ($n = 850$)	3.19	1.65	1.19	1.40	2.52
Moroccan ($n = 62$)	1.25	7.36	4.98	2.08	2.58
Turkish ($n = 75$)	0.47	2.49	13.55	1.70	1.72
Surinamese ($n = 100$)	1.00	1.62	2.46	9.97	2.96
Others ($n = 230$)	1.93	2.24	2.33	3.55	3.91

The number of actual relationships in percentages of the number of potential relationships (dyads) per category.

within the heterogeneous non-Dutch category remained higher than the density of relationships between Dutch and non-Dutch, and even higher than the between-Dutch relationships. When comparing levels of acculturation, the densities were also highest for the dyads among the pupils with the highest level of acculturation and among those with the lowest level.

The results on received emotional support are typical for the other five types of positive social relationships (not presented here). The same pattern occurred for all these types: inter-ethnic positive relationships had lower densities than intra-ethnic ones, indicating that ethnic boundaries do exist. In addition, the densities of the negative relationships (avoidance) did not differ. This might suggest that either ethnic boundaries between pupils exist, but that they are not extreme, or that avoidance is not an issue because pupils ignore each other completely. In either case, it is not probable that school classes face an outright inter-ethnic war.

3.3. Hypothesis 2: the effect of individual inclinations on ethnic boundaries

As already mentioned, the existence of ethnic boundaries does not automatically mean that the pupils have a greater inclination to choose intra-ethnic rather than inter-ethnic relationships. Ethnic boundaries can emerge for other reasons, and therefore we have to control for several important variables on the individual level (for instance, sex, or the importance of school friends compared to other friends), the dyadic level (for instance, sex differences or the inclination to reciprocate positive relationships), or the network level (network size, density, network composition). In our analysis, we used a method that incorporates the important variables on the individual and dyadic level. The number of networks (20) was too small to control for a specific network level variable such as ethnic composition, but we can give indications about the size of the effects of these kinds of variables.

In choosing an appropriate method of analysis, we encountered several problems. The analysis was complicated because the dependent variables, i.e. the relationships between pupils, are dyadic. Moreover, these variables are dichotomous. This study comprised 20 networks, constituting a multi-level network dataset, which not only complicated the analysis but also led to practical problems. There are no standard models available for these multiple and multiplex networks. Below, we discuss the complications in more detail, and how we proceeded with the analysis.

The (multivariate) data had a cross-nested three-level structure: 20 networks of seven interdependent dichotomous network variables. If we could consider the seven network questions as items on a scale (‘degree of friendship’), we could sum the variables and obtain one continuous variable. This would remedy the dichotomous and the multivariate nature of the data. A way to analyze these multiple networks would then be the Social Relations Model (Snijders and Kenny, 1999), extended with an extra level for the schools. However, since the networks were rather sparse, as is often observed in friendship networks, this solution does not work. The scale scores would have a very skewed distribution, violating the assumption of normality made in the Social Relations Model. We therefore chose to analyze one network relation: received emotional support. We chose this relation because we knew that it was reliable (Table 1), and considered it to be close to the concept of friendship.

For the analysis of a network containing dichotomous relationships we used the p_2 model (Van Duijn et al., in press; see also Lazega and Van Duijn, 1997). Although the data were also suitable for analysis with the p^* model (Wasserman and Faust, 1994), and this was

used for a study similar to our own by Moody (2001), we did not use this model since its estimation properties are doubtful (Snijders, 2002). The p_2 model was developed to explain the relationships between actors in a network, using characteristics of both actors and dyads. The p_2 model can be viewed as an extension of the well-known p_1 model (Holland and Leinhardt, 1981) that distinguishes so-called sender, receiver, density and reciprocity effects in the network. The p_2 model extends the p_1 model by adding a regression part with a random component reflecting the dependence between relationships from and to the same pupil in the network. The 'explanatory' variables are individual characteristics (to explain sender and receiver effects, i.e. outgoingness and popularity) as well as dyadic characteristics related to pairs of individuals (to explain density and reciprocity). The only type of dyadic characteristic used in the analysis is similarity with respect to a certain characteristic. Thus, a dyadic characteristic is based on individual characteristics (for instance, dyads of two boys are similar with respect to gender). In the p_2 model, a positive effect of a certain individual or dyadic characteristic can always be interpreted as having a positive effect on the probability of a relationship. For instance, a positive sender effect of gender (where boys are coded as 1, girls as 0), implies that boys have a higher probability to 'send', i.e. to report received support from others (either boys or girls). Likewise, a positive density effect of similarity with respect to gender means that the probability of a relation between pupils with the same gender (boys–boys, or girls–girls) is higher than between boys and girls. A positive density effect of similarity with respect to ethnic background also means that the probability of a tie between pupils with the same ethnicity is higher than between pupils with different ethnic backgrounds.

The interpretation of reciprocity effects is the most difficult, because reciprocity can be viewed as a sort of interaction effect, in addition to the 'main' effects of density, and sender and receiver effects. The reciprocity effect represents the extra effect of a mutual relation in addition to the sum of two asymmetric relationships that already contain sender, receiver and density effects. The reciprocity effect is therefore meaningless without taking into account the accompanying density effect, and possibly sender and receiver effects.

In Table 5, which contains the results, all the model parameters are listed. Although we are mainly interested in the effects of ethnicity on the networks, a number of other effects are specified. One could consider this study as investigating the effect of ethnicity while 'controlling for' other effects, namely gender, acculturation and the indicated importance attached to having friends at school. The effect of ethnicity was formulated as a dyadic (similarity) characteristic. Four ethnic groups were distinguished: Dutch, Moroccan, Turkish and Surinamese. The probability of relationships between Turkish and Moroccan pupils was also specifically investigated by the definition of a Turkish–Moroccan density and reciprocity effect. Gender was used both as an individual and dyadic characteristic. The same was true for acculturation with three degrees of acculturation being distinguished: low, medium, and high. Two dummy variables were formed, in which 'low' and 'high' were contrasted with the 'medium' category, respectively. The importance of friends was viewed as an individual characteristic, used to explain sender and receiver effects.

The p_2 model analyzes one network. There are no methods (as yet) for analyzing multiple networks. We therefore decided to analyze all 20 networks with the p_2 model and to combine the results in a kind of meta-analysis. We used a standard multi-level modeling approach (see, for example, Bryk and Raudenbush, 1992, Chapter 7), in which the estimates of the

Table 5
Meta-analysis of p_2 analyses of emotional support relationships in 20 pupil networks/schools

Parameter in the p_2 model	Values over schools	
	Mean*	S.D.
Density (overall)	**−6.12**	0.30
Similarity gender ($n = 19$)	**0.63**	0.12
Similarity girl ($n = 20$)	**1.01**	0.21
Similarity Dutch ($n = 19$)	**0.44**	0.10
Similarity Moroccan ($n = 7$)	**1.03**	0.31
Similarity Turkish ($n = 9$)	**1.72**	0.24
Similarity Surinamese ($n = 11$)	**1.62**	0.21
Similarity Turkish/Moroccan ($n = 5$)	**0.90**	0.30
Similarity acculturation ($n = 20$)	0.08	0.10
Similarity low acculturation ($n = 9$)	0.63	0.37
Similarity high acculturation ($n = 11$)	0.28	0.35
Reciprocity (overall)	**4.32**	0.40
Similarity gender ($n = 15$)	**−1.04**	0.31
Similarity girl ($n = 19$)	**1.03**	0.23
Similarity Dutch ($n = 16$)	−0.22	0.24
Similarity Moroccan ($n = 2$)	−1.35	1.39
Similarity Turkish ($n = 5$)	**−1.48**	0.62
Similarity Surinamese ($n = 5$)	−1.06	0.79
Similarity Turkish/Maroccon ($n = 2$)	−1.82	1.23
Similarity acculturation ($n = 16$)	−0.34	0.26
Similarity low acculturation ($n = 3$)	0.13	1.17
Similarity high acculturation ($n = 8$)	0.92	0.56
Sender		
Gender ($n = 20$)	**0.53**	0.17
Relative importance of friends at school ($n = 20$)	**0.26**	0.08
High acculturation ($n = 15$)	−0.42	0.24
Low acculturation ($n = 20$)	−0.12	0.17
Receiver		
Relative importance of friends at school ($n = 20$)	0.10	0.07
High acculturation ($n = 16$)	**−0.47**	0.21
Low acculturation ($n = 20$)	**−0.49**	0.13

* Bold figures indicate significant ($P < 0.05$) estimates.

different schools were combined taking into account their precision (see also Snijders and Baerveldt, 2003) who combined the results of different networks. To achieve maximal comparability, we decided to estimate the same p_2 model, i.e. a model containing the same sender, receiver, density and reciprocity effects for each network. This implies that the estimated effects were not all significant in each network. For a number of networks it proved impossible to estimate all the specified effects, mostly because they were too small. In those cases a restricted model was estimated in which the inestimable effect was left out of the analysis or fixed at a certain plausible value.

In principle this multi-level or meta-analytic approach made it possible to investigate the influence of school characteristics on the parameter estimates. Although there was rather a

lot of variation in the parameter estimates between the schools, the available explanatory variables for the schools (number of pupils, percentage of boys, percentage of Dutch pupils, and mean importance of friendship) did not explain the differences very well. These analyses are not reported here. Moody (2001) was able to explain effects found in the dyadic analyses using school characteristics. He found a non-linear effect of racial heterogeneity on so-called 'same race friendship preference' (which is comparable to a density similarity effect with respect to ethnicity).

Table 5 shows the results of the estimation of the p_2 model for all the school networks. The first column contains the name of the parameter, for instance, the gender similarity effect on density. In brackets we have indicated the number of networks in which this parameter was estimated. Non-estimability of a certain effect can usually be explained by lack of information. For example, if there were very few Turks and/or Moroccans at a certain school, there would be few relationships between Turks and Moroccans. This made it impossible to estimate the above-mentioned density effect, i.e. whether it is more likely that there are relationships between Turks and Moroccans than between pupils with different ethnic backgrounds. In the second column, the means of the estimated parameters over all networks are given with their standard errors (in parenthesis). These were obtained with a meta-analysis performed in MLwiN (Rasbash et al., 1998), using the estimated parameter's standard error in each network.

Three major results emerged from the p_2 analysis. First, some statistics in Table 5 can be interpreted as the result of controlling for important effects. Two parameters represent two general network effects always included in the p_2 model: the overall density effect and the overall reciprocity effect. The overall density effect was negative, indicating that the networks were all rather sparse, and the overall reciprocity effect was positive, indicating that symmetric relationships were more likely than asymmetric ones. We controlled for the importance of school friends, because it is related with the number of relationships at school. While it is possible that school friends are less important because pupils already have a satisfying number of relationships at school, it might also be the case that the individual need for relationships at school is less because friends outside school are more important. Therefore, we included this variable as sender and receiver effect in the model. Table 5 shows that this variable was only important for the explanation of the sender effect. Not surprisingly, pupils who find it important to have friends at school, tend to report more relationships than those who attach less importance to having friends at school. The table further shows the individual and dyadic gender effects. The positive estimate of the similarity effects of gender and of girls indicate that, in general, there were more relationships between pupils of the same gender, and especially between girls. Boys tended to report more received support from girls than girls from boys (the positive sender effect of boy). The relationships between girls tended to be symmetric in view of the positive effect of the similarity reciprocity effect of girls that offsets the negative effect of the similarity reciprocity effect of gender. This implies that symmetric relationships between boys were less likely to be reported than symmetric relationships between girls.

Second, while taking into account the effects presented above, Table 5 shows the effects of ethnicity. These effects were fairly strong: the five density effects included for the four ethnic groups and the Turkish–Moroccan dyads were all positive and significant, even though only the density and reciprocity effect of Dutch dyads were estimable for almost all networks and

the other effects for relatively few networks. This means that there was a clear individual inclination for relationships between pupils with the same ethnic background. This effect was weaker for Dutch dyads than for other ethnic dyads. Although the negative reciprocity effects are only significant for the Turkish dyads, they are larger in absolute value than the accompanying density effects. This implies that the relationships within the different ethnic groups were not more mutual than inter-ethnic relationships. Thus, reciprocity did not explain why intra-ethnic dyads turn into support relationships more than inter-ethnic dyads.

Third, Table 5 shows the effects of acculturation. It should be noted that ethnicity and acculturation are highly correlated (for instance, nearly all native Dutch have the highest acculturation level). The table shows the individual effects of acculturation, while taking into account similarity effects of acculturation and ethnicity. Acculturation seemed to be especially important for the explanation of the receiver effect. Pupils with high or low degrees of acculturation had a lower probability of receiving choices from fellow pupils than pupils in the middle category. Although the sender effect was not quite significant, it seems that pupils with a high degree of acculturation also tended to send fewer relationships.

4. Conclusions and discussion

In this study we tested two hypotheses using data from the Dutch Social Behavior Study on the social relationships between 1317 pupils in 20 high schools. We first tested the emergence of ethnic boundaries by assessing if the chance that dyads in a complete network turn into actual positive relationships was larger for intra-ethnic than for inter-ethnic dyads. Second, we tested whether those ethnic boundaries were affected by the inclinations of network members to choose intra-ethnic group relationships.

In network research, positive relationships between pupils are generally studied by items which ask pupils to write down names of friends or codes for them. However, the concept of friendship is rather vague, as is illustrated in our study by the fact that boys indicated having more ‘best friends’ than girls, whereas girls indicated that they had more intimate friendships. In this study, we therefore concentrated on relationships of received emotional support, which can be better interpreted and were proved to be reliable.

The emergence of ethnic boundaries was tested by comparing the proportion of intra-ethnic dyads that turned into actual relationships of received emotional support to the same proportion for inter-ethnic dyads. The effects of personal inclination for intra-ethnic relationships were tested with a p_2 model, with dyadic outcomes (concerning received emotional support) as the dependent variable, and variables on the dyadic and personal level as independent variables. We used the p_2 model in a two-step procedure, for each school network in the first step and then relating these results to school characteristics in the second step. Using the p_2 model was fruitful because it allowed us to test the effects of personal inclinations on ethnic boundaries, while controlling for other influences. We used a two-step approach because there are no appropriate multi-level models for this kind of data.

Our analysis showed that the Dutch native pupils had the most support relationships with other natives. Turkish pupils also had most support from pupils of their own ethnic group. However, Moroccan and Surinamese pupils had most of their relationships with pupils from other categories, in particular with native Dutch. This suggests that Dutch

and Turkish pupils have stronger ethnic boundaries than Moroccan and Surinamese pupils. However, the number of intra- and inter-ethnic relationships mainly reflects the opportunity for establishing these relationships, i.e. the number of intra- and inter-ethnic dyads. When controlling for opportunity, we saw that for each ethnic category, the chance that intra-ethnic dyads turn into positive relationships was greater than the chance for inter-ethnic dyads. This chance was much larger for minority members (especially for Turkish pupils) than for Dutch pupils, contrary to the suggestion that the majority members were less inclined to have inter-ethnic relationships than minority members. Thus, controlling for opportunity completely changes the picture when comparing the relationships of the Dutch and non-Dutch pupils. The same pattern emerged when comparing pupils by level of acculturation.

Ethnic boundaries may or may not be caused by personal inclinations (such as preferences and effects of pressure) to choose intra-ethnic relationships. The p_2 model showed that the emergence of social support relationships was affected by many variables on both the individual and dyadic levels. The chance that a dyad will turn into an actual relationship is greater for girls, or when pupils find their friends at school important. This chance is also greater when pupils are of the same gender, especially when both are female, as girls reciprocate relationships more than boys. However, when controlling for these effects, intra-ethnic dyads have more chance of containing actual relationships than inter-ethnic dyads. Reciprocity within ethnic groups cannot explain these effects. Because the focus was only on one educational track, differences in achievement between minority and majority members should be largely ruled out as an explanation for intra-ethnic inclinations. We have thus ruled out the most important alternative explanations for ethnic boundaries as given in the literature and we must therefore conclude that the ethnic boundaries are at least partially caused by personal inclinations for intra-ethnic relationships. These inclinations seem to be weaker for Dutch pupils than for minority members.

The present study supports the existence of ethnic boundaries and the effects of individual inclinations on those boundaries in Dutch urban high schools. Several arguments might lead to the prediction that ethnic boundaries in The Netherlands could be less prevalent than in other countries, such as the USA, since most minority groups in The Netherlands migrated here voluntarily. According to Ogbu (1990, 1992) voluntary minority groups are less likely to show oppositional relationships to the majority and majority institutions than involuntary minorities like the native Americans and Afro-Americans in the USA. The inter-ethnic context in The Netherlands is also more diverse, which might facilitate inter-ethnic friendliness (Smith and Schneider, 2000). Moreover, The Netherlands often claims a long tradition of inter-ethnic tolerance (Pettigrew and Meertens, 1996), but Pettigrew (1998b) has argued that the relatively new immigrant groups in Europe are less accepted as ‘ belonging’ and they show larger cultural differences with the majority.

In testing hypothesis 2 using the p_2 model, we controlled automatically for the effects of the opportunities for relationships by setting those opportunities as equal to the dyads of complete networks. This ruled out many of the problems which other authors encountered. However, we mainly ignored possible non-linear effects of the opportunity structure. Following the arguments of Granovetter (1986), the analysis should incorporate cross-level hypotheses: the structural differences between networks might lead to different effects on the link between inclinations and actual relationships. Other authors have argued that the opportunity structure may also directly affect the inclination to favor contact with the in-group,

leading to different hypotheses. For instance, based on the contact hypothesis, it can be argued that friendliness from majority members will develop more easily when the minority group is large (Allport, 1954; Cook, 1984; Pettigrew, 1998a). However, others (Blalock, 1982; Evans and Giles, 1986; Giles and Evans, 1986; Hallinan, 1985; Kalin, 1996) have argued that inter-group friendliness is diminished when the other group is large and more threatening. It was also argued that competition between groups is strongest when those groups are well-matched in size, thus resulting in a curvilinear relation between ethnic composition and inter-ethnic friendliness (Giles and Evans, 1986; Longshore, 1982; Patchen, 1982; see Moody (2001) for some empirical evidence). Other authors have pointed at other aspects of the social structure than ethnic composition alone. Blau (1977) argued that the inclination to maintain ethnic boundaries may be weaker when they are intersected by other, for instance, socioeconomical, boundaries. Future research should aim to shed more light on the relation between social structure and the actual relations among pupils. We would like to stress that this structural research should also take into account the individual inclinations in choosing relationships.

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