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Doctoral Thesis

Relational Integration

as The Analysis of Friendship, Negative Ties and Ethnic Identity Among Adolescents

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Declaration of Authorship

I, Bálint NÉRAY, declare that this thesis titled, 'Relational Integration' and the work presented in it are my own. I confirm that:

- This work was done wholly or mainly while in candidature for a research degree at Corvinus University of Budapest.
- The research carried out in Chapter 5 and 6 is based on the work done by myself and Zsófia Boda; both authors contrubuted equally to the work.
- Where I have consulted the published work of others, this is always clearly attributed.
- Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work.
- I have acknowledged all main sources of help.

Signed:

Date:

"Not, then, men and their moments. Rather moments and their men."

Erving Goffman (1967, p. 3)

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Abbreviations

ERGM	**E**xponential **R**andom **G**raph **M**odels
GLM	**G**eneralised **L**inear **M**odel
GoF	**G**oodness of **F**it
OR	**O**dds **R**atio
SE	**S**tandard **E**rror
SIT	**S**ocial **I**dentity **T**heory
SNA	**S**ocial **N**etwork **A**nalysis
SAOM	**S**tochastic **A**ctor - **O**riented **M**odels
PROSPER	**PRO**moting **S**chool - community - university **P**artnership to **E**nhance **R**esilience
RECENS	**R**esearch **C**entre for **E**ducational and **N**etwork **S**tudies

To my parents who taught me to care about the world...

Chapter 1

Introduction

1.1 Context of the research

Although racial diversity has notably increased in almost all western societies during the past decades, the social problems originated from racial tension are somewhat different – and exist between different groups – in North-America, in Western and in Eastern Europe. In the *U.S.*, several minority groups are in disadvantaged positions (Alon and Haberfeld, 2007; Black et al., 2006; Cohen, 1999; Neal and Johnson, 1995; Trejo, 1997). While many minorities living together with the majority for a long time are still seriously underprivileged, the proportion of foreign-born population has been still persistently increasing since the 1960's, making the situation even more difficult (Perlmann and Waters, 2002). The wage of black people is significantly low comparing to those of White people, however Hispanic migrants earn even less (Cohen, 1999). Other results suggest that Mexican American men whose family migrated three or more generations ago, earn about 20% less (Trejo, 1997), Black men earn 24% less (Neal and Johnson, 1995) than White men of non-Hispanic origin. The difference between these groups remains significant even among college educated men (Black et al., 2006). Asian minorities, however, are unique in the sense that they do not have to face with significant earnings disadvantage compared to White people with similar levels of education (Greenman, 2011). While lower wages of Hispanic people can also mostly be explained by preliminary differences in language proficiency and formal education, for Blacks these factors only explain one-quarter to one-third of the wage gap (Black et al., 2006; Espinosa and Massey, 1997; Neal and Johnson, 1995; Trejo, 1997). Among college educated women, longitudinal research found constant racial wage gap, and widening gap among women with no college degrees (Alon and Haberfeld, 2007).

In *Western Europe*, even before the most recent outburst of immigration, there was a high

increase in the trend of immigration at the beginning of the 21st century, which has become modest in recent years (Eurostat, 2015). This high trend is a relatively new phenomenon in Europe: while the proportion of foreign born populations of Germany and Spain now is similar to that of the U.S. (14.5% and 13%, respectively), this share in West Germany before 1960 and in Spain even before the early 1990s was below 1% ((Dustmann and Frattini, 2011). High immigration rates have often been accompanied by many immigrants being in an economically disadvantaged position in their host society. Though the patterns of immigration and the composition of immigrant groups are very heterogeneous across countries, a comprehensive analysis of European countries showed that immigrants - and especially immigrants from non-EU countries - are disadvantaged in all European countries compared to natives in different terms: employment probabilities, occupational distribution, and their representation in the bottom deciles of the national earnings distribution (Dustmann-Frattini, 2011). Previous research has also revealed that immigrants tend to earn lower wages than natives, and the unemployment rate is much higher among them (Neal and Johnson, 1995; Trejo, 1997). As it was also found in case of Germany, differences in human capital explain more than 75% of the wage gap between natives and foreign nationalities (Lang, 2000).

In *Eastern Europe*, very similar tendencies can be described, however the main driving force behind them is not migration, but the increasing fertility rate of certain ethnic groups. Roma groups constitute the biggest and poorest of these groups (Kertesi and Kezdi, 2011a; Kostadinova, 2011). Nearly 80% of them live in Central and Eastern Europe and their history has always been characterized by exclusion (Goldberg, 2006; Kertesi and Kezdi, 2011a; Pogany, 2006).

Due to higher birth rates, Roma population has continued to grow in the last decades in *Hungary* as well (Janky, 2006). As a consequence, Roma minorities are currently estimated to constitute 5-6% of the total population and 10-12% of adolescent population (Kertesi and Kezdi, 2011a). Roma people are in a seriously disadvantaged position in the Hungarian society. Here we focus on this phenomenon from an educational point of view, because we believe that equal opportunities in schooling, along with other policy interventions, can help overcoming the adverse effects of long-term poverty.

The Roma constitute one of the biggest and poorest ethnic minorities in Europe (Kertesi and Kezdi, 2011a). Their situation in Hungary is an illustrative example for the seriously underprivileged status of minorities, the broad prejudice towards them and for the growing interethnic tensions. Traditionally, Roma people constitute the largest minority group in Hungary, and they have always been living on the periphery of the society (Goldberg, 2006; Kertesi

and Kezdi, 2011a). After the fall of the communist regime in Hungary, the job market collapsed, resulting in a 23% employment rate among Roma people. By 1994, the gap in employment rates between Roma people and the majority group reached almost 40 percentage points, with an employment rate of 29% for Roma men and 17% for Roma women (Janky, 2006). Since then, the gap has widened even further (Kertesi and Kezdi, 2011a). Despite their deprived position their population has continued to grow in the last decades due to high birth rate (Janky, 2006). Currently, the proportion of Roma minorities is estimated to be 5-6% of the total population, and 10-12% of the adolescent population (Kertesi and Kezdi, 2011a).

The disruption of the labour market resulted in permanent poverty among Roma people, which has been partly responsible for the widening ethnic gap in education (Kertesi and Kezdi, 2011a). As Kertesi and Kezdi (2011b) pointed out, the long-term poverty of the Roma is strongly associated with their high drop-out rate after the 8th grade. Vast majority of young Hungarian Roma leave the schooling system without graduating from secondary school, and only a negligible fraction take part in tertiary education. At the same time, a large proportion of non-Roma Hungarians completes secondary school, and 50% of them continue their studies pursuing a college degree (Kertesi and Kezdi, 2011b). Regarding academic performance of 8th-grade students, the gap between Roma and non-Roma children is substantial. The gap between test scores for both reading skills and mathematics is approximately one standard deviation, which is similar to skill gap between African-American and White students of the same age group in the U.S. in the 1980s (Kertesi and Kezdi, 2011b). It was concluded that health conditions, parenting, and schooling explain most of the discrepancy, and ethnic differences are almost entirely accounted for by differences in parental education and income.

These findings illustrate that the Hungarian educational system is visibly unable to eliminate the inherited disadvantages of Roma children. There is more than one possible underlying mechanism behind this latter argument. Firstly, the matching of students and the quality level of education is mediated by the school choice process. If the school choice is free as it is in Hungary, and if enough people believe that low academic performance of a school or a school class is related to the high proportion of minority and disadvantaged students, then parents of talented/high achiever students who tend to have high bargaining power will engage in "white flight" from these schools (Berenyi, 2008; Coleman, 1975; Kertesi and Kezdi, 2013; Logan et al., 2008).

Secondly, in order to stop this natural phenomenon, schools tend to induce institutional processes as tracking based on students' certain characteristics (such as performance, social background or ethnic characteristic). Both mechanism results in ethnic segregation either

within the classroom or through separate classes and schools (Acton, 1998) and the phenomenon becomes especially crucial when disadvantaged status is so highly correlated with ethnic minority background as it is in Hungary (Kertesi and Kezdi, 2005a,b). Consequently, schools and classes of Roma students may differ considerably from those of non-Roma students which deprive Roma students of equivalent quality education (Kertesi and Kezdi, 2011b).

The second mechanism is related to the matching of students and the quality level of education, the latter of which is highly influenced by the quality of teachers. Teachers' tasks become increasingly difficult as the proportion of disadvantaged / minority students increases in the class. At the same time education of elementary- and high school teachers in Hungary is highly contra-selected and the current incentives of the education system are explicitly unable to compensate for the extra effort (Varga, 2007).

All these macro-level phenomena can lead to a self-fulfilling prophecy: the higher proportion of disadvantaged and /or Roma students in the class can spuriously cause low academic achievement for every student in the class which can serve as an argument supporting segregation in the educational system. After the overview of these structural and institutionalised mechanisms, in the next section we provide theoretical background in order to enhance better understanding of those micro-mechanisms that can results in relational segregation in small groups and may hinder schools increasing minorities' social and human capital.

1.2 Relational integration

The disadvantaged position of immigrants and racial minorities in their host society can be described from a human and a social capital perspective (Coleman, 1988; Stark, 2011). From the first perspective we can argue that minorities' low level of education in association with insufficient knowledge of the native tongue prevent them from securing jobs. Following social capital perspective, researchers claimed that minorities are in disadvantaged positions as they rarely have any relationships with natives, consequently they have less opportunity to receive information on the norms of the host society as well as about the labour market (De Vroome and Van Tubergen, 2010; Kanas and Van Tubergen, 2009).

In order to ameliorate the social and the human capital of minority groups, policy makers urge integration in the host society as a resort. For this reason, it is often recommended that integration should already take place during early childhood and adolescence, because experiences from these periods have been found to influence both aspects of school success (Ellison and Powers, 1994; Patchen, 1982). Accordingly, it has become a desirable goal to

have desegregated schools that mirror the racial composition of the neighbourhood they serve (Karsten et al., 2003; Moody, 2001).

There is a growing consensus that true racial integration requires more than merely putting people of different categories into proximity: true integration occurs not just when people are in similar settings, but when they interact as equals. For youth, this involves forming and maintaining social relations and social scientists, school administrators and the general public are interested in understanding the features that shape friendship formation across race, since research shows repeatedly that substantive social contact reduces prejudice, increases social cohesion and fosters positive social acceptance of difference and diversity.

As a theoretical support for integrated education, contact theory (Allport, 1954) is often referred to. Pettigrew's and Tropp's Tropp and Pettigrew (2005) meta-analytic review of intergroup contact theory on a sample from 515 studies proved that intergroup contact typically reduces prejudices among racially different groups. It was also shown that contact under Allport's optimal contact conditions results in even greater reduction in prejudice. Following these considerations, advocates of integrated education usually argue that contact between minority and majority students should lead to the formation and development of social relations beyond their own racial groups. Moreover, it is argued, that such inter-racial relationships, along with the emergence of positive attitudes towards other racial groups may decrease prejudice in itself and may increase the society's social cohesion (Pettigrew and Tropp, 2008; Tropp and Pettigrew, 2005).

Patrons also argue that peer acceptance gives students a sense of participation in school, belonging to a community and access to certain social resources (Lubbers, 2003). By providing companionship and setting behavioural examples, they can increase each other's motivation and school success (Wigfield et al., 1998) as well as lower the probability of dropping out (Hymel et al., 1996). For this reason, relationships among racially different classmates are thought to be especially important.

Moreover, contact theory suggests that due to the more direct contact opportunities, familiarity and friendliness should increase among racially dissimilar students in heterogeneous classes. Therefore, one could presume that similarity in race is a less important selection criteria in such situations, than in case of homogeneous class settings (Lubbers, 2003). Based on this theory, there are some criteria necessary for the positive effects of direct contacts: status equality between groups, cooperative interdependence, and explicit support for mixing from authorities in the setting (Moody, 2001). These findings suggest that putting students with different social background in the same classroom (integrated classroom setting) is not

integration yet, and without extra educational effort will not benefit students. According to Hungary the same results were found and confirmed by (Kezdi and Suranyi, 2008).

Nevertheless, later research shows that even without these conditions, there is a weak positive effect of intergroup contact on intergroup attitudes (Pettigrew et al., 2007). At the same time, extended contact hypothesis (Wright et al., 1997) focuses on relationships instead of only direct contact and suggests that even one friend from the other group improves strongly the attitudes towards the members of that group (Pettigrew and Tropp, 2008; Stark, 2011; Swart et al., 2010; Turner et al., 2007).

Despite all the possible benefits of intergroup contacts, the development of such interracial connection is not obvious at all. Based on social identity theory (Tajfel and Turner, 1979), in racially heterogeneous classes we should see similar students to be befriended each other more often than it would be expected based on the racial proportions only. The effect of homophily also suggests that people tend to choose friends similar to them along several dimensions such as age, gender, socio-economic status, or race (Hallinan and Teixeira, 1987; Kandel, 1978; McPherson et al., 2001; Moody, 2001; Tuma and Hallinan, 1979).

Moody (2001) also proposed some other explanations for friendship segregation in integrated school classes. One of them is the racial composition of the class itself. Based on Moody's results, friendship segregation is the highest in a community when heterogeneity is moderately high, which technically means that there are two, more or less similar sized racial groups in the class. A probable explanation for this phenomenon is that in such a situation, minorities can somehow threaten the dominant position of the majorities in the community. Moody (2001) also highlighted the importance of certain macro-level organisational factors. The principles and methods based on which class-decoupling and extracurricular activities are planned and carried out may both maintain segregation or increase opportunities for cross-race contacts by inducing relational integration in an otherwise segregated class setting.

Shrum and his co-authors (Shrum et al., 1988) argued that studies using socio-metric measures often confuse two theoretically distinct phenomena: segregation and preference, and hence draw imprecise conclusions about changes in racial homophily. To put it simple they argue that segregation is a measure of between-group interaction in a population, while preference is a measure of within-group choice. In their article, segregation refers to the extent to which intergroup relations are absent (Blau and Schwartz, 1984). It is a symmetric concept, implying that the minority group is segregated from the majority group to exactly the same degree that the majority group is segregated from the minority group. Nevertheless, they claim that preference does not need to be symmetric. It is the degree to which actors are oriented toward

members of their own group, based on the perception of intergroup ties from the perspective of specific groups. They suggest that groups in the same population can have distinct levels of same-group reference, particularly when key status variables are differentially evaluated by the wider culture (Ridgeway and Berger, 1986). It may also makes the situation even more difficult that members of the majority group often have negative stereotypes and negative attitudes towards certain minority groups (and obviously, it can also be true reversely).

1.3 The importance of negative ties

Peer selection is essential as it relates to relational integration in racially heterogeneous class settings which is a valuable educational outcome in itself. By the same token, we suggest that when it comes to peer selection, not only intragroup positive connections and the lack of intergroup positive connections matter, but also, and more importantly the presence of negative intergroup connections.

Friendship and homophily among schoolmates has received large attention in the past decades as an important aspect of the structure of peer relations (Eder, 1985; Eder and Hallinan, 1978; Hallinan and Smith, 1985; Kandel, 1978). Though it is indeed a very important research goal to examine circumstance under which positive relationships may form between members of different racial groups, one should not forget that relationships may have more levels than simply being existent or not. Ties between two individuals may also be negative, and the difference between a non-existent positive and an existent negative tie is very important and yet rarely analysed in connection with race (Stark, 2011). Negative relations, though being relatively rare compared to positive ones, have huge effect on attitudes and on performances in the group (Labianca et al., 1998; Labianca and Brass, 2006). Manifest forms of negative ties, like relational aggression, are often the basis of conflict between subgroups (Labianca et al., 1998).

Although empirical evidence for heterophobia, the rejection of dissimilar others (Flache and Mäs, 2008), is not as strong as evidence for homophily (Csaba and Pal, 2010; Flache and Mäs, 2008), the importance of negative interpersonal relations among adolescents seems to be crucial. According to Blau (1977), students tend to dislike their peers from different social backgrounds, and as we know social background is often related to race. Other researchers showed as well that children and adolescents are liable to exclude those of dissimilar in racial background, gender and age (Hartup, 1993). Moreover recent research on adolescents' negative relations show that high school students dislike their class mates who they look down on.

Furthermore, in situations when students do not look up to the ones who they recognise as being cherished by peers, status related inconsistency in perception may arise and leads to negative relations (Pal et al., 2015).

Even though the best case scenario would be to have positive relationships between students from different racial backgrounds, theoretical and empirical evidence suggests that this is not always the case. In this study, we claim that even if students in a racially heterogeneous class setting have less friends from the other racial group(s) than from his/her own, this situation still can be more advantageous than the one in which racially different students do not even meet each other, so they do not have friends from the other group at all. Empirical evidence on contact theory suggests that direct contact opportunity itself helps reducing prejudice about other racial groups. However, this argument seems true only if heterogeneous class settings do not result in the disproportionate emergence of interracial negative ties. Therefore, it is essential to examine the quantity and structure of interracial negative relationships.

1.4 Race, ethnicity and identity

In this Thesis we focus on the interplay between social ties, and racial or ethnic identity. Although, strictly speaking, our outcome variables concern interpersonal relations, we treat group memberships important for social identity formation unfixed whenever our data allows us to do so. Generally speaking, social identity processes operate between and within dimensions of certain attributes that are salient and relevant in the given social context to be the bases of social comparisons (Tajfel and Turner, 1979). Although both race and ethnicity are found to have such influential effect on preferences as well as perception (McPherson et al., 2001), and are often treated similarly in identity studies, more traditional studies made clear distinction between research on ethnicity and ethnopolitics, race and racial politics, and nationhood and nationalism (Brubaker, 2009).

Traditional distinctions between race and ethnicity, however, were found to be false or ambiguous to the least, and they are irrelevant in achieving the cognitive goals of this Thesis (see Brubaker, 2009; Saperstein and Penner, 2012). As Weber (1968) pointed out we can not treat race, ethnicity, and nationhood as well-defined analytical concepts:

> "rather than seek to demarcate precisely their respective spheres, it may be more productive to focus on identifying and explaining patterns of variation on these and

> other dimensions, without worrying too much about where exactly race stops and ethnicity begins" (Brubaker, 2009, pp. 27-28).

As far as the research questions of this Thesis go, race and ethnicity are analysed in relation with minority and majority status of individuals and groups, as well as ingroup and outgroup perceptions. We simply argue that what is important for our study is whether the level of prejudice in the given context, and the extent of perceived differences between the majority and the minority group is based on race and ethnicity. It is beside the point whether these differences are based on race or on ethnicity.

Hence, similarly to other studies (see Saperstein and Penner, 2012) , we will use the term *race* in a broader sense, including ethnicity as well, when talking about general processes. We choose to use race instead of ethnicity in order to remind the reader (and ourselves) that the theoretical basis of this thesis originates from general sociological and social psychological theories, and are supported by empirical studies both focusing on race and ethnicity. Nonetheless, our empirical analysis is based on two datasets, one including racial and ethnic groups: White, Black and Hispanic groups in the US, while the other includes two ethnic groups: the Roma group and the non-Roma group in Hungary. Therefore, in specific cases, such as interpreting particular results or describing a certain minority group, not only race but also the term ethnicity will be used.

1.5 The outline of the Thesis

In the following empirical chapters, we distinguish between racial self-identification and racial perception, while emphasising the importance of interracial friendships as well as negative ties. While these chapters examine the interplay of adolescents racial identity and inter-personal relations, they use more and more advanced statistical models to answer the soon to be presented research questions. Consequently, relational approach will be gradually developed in the Thesis, in order to analyse the different segments of relational integration.

For this reason, in Chapter 2 we develop an overarching analytical framework for a "relational approach" and describe its theoretical and methodological consequences. We define the main concepts of this Thesis within the framework and describe how to analyse relational integration with suitable statistical models. Finally, in Chapter 3 we describe the research design behind this study and the data that was primarily used during this project.

In Chapter 4 and 5, we study different aspects of relational integration in formally integrated school environments, and in Chapter 6 we draw a more complex picture. This is because the concept of relational integration itself can be understood in two major ways: the prevalence of different same-race and cross-race friendships and negative ties in the group, and the dynamic processes affecting tie changes (and maintenance) between students.

Chapter 4 explores *whether the racial composition of the friendship dyad influences its stability over time.* The findings of our hierarchical logistic regression models demonstrate that friendship in adolescence is likely to dissolve over time, whilst the effect of racial difference on friendship retention is accounted for when the model includes controls for socio-economic status. These results suggest that analysis of friendship networks and self-identification is not necessarily a sufficient approach to understand relational integration.

Consequently, in Chapter 5 not only friendships but also negative ties are modelled using Exponential Random Graph models. Furthermore, this Chapter introduces two different aspects of ethnicity: self-declared ethnicity, and ethnicity based on peer perception. Even though it takes a cross-sectional approach, it takes race as a situation-dependent social construction. Here, we account for social identity without focusing on groups that are conceptually fixed, and we study how *positive as well as negative interpersonal relations are influenced by the different aspects of race, and the discrepancy between them.* Moreover, we develop our theoretical framework by following social identity approach in order to explain transactional processes between the individual and the group level of the analysis.

In Chapter 6 we take a more complex stochastic actor-oriented approach by *modelling jointly the development and maintenance of friendship and negative ties as a result of self-identification and categorisation processes.* These models take into account that not only ethnicity affects social relationships, but friendships and negative ties can also influence how students categorise each other. We find that negative ties describe interracial segregation better than friendships: majority students tend to dislike their minority peers, but no such tendencies were found for friendships. Moreover, our results show that different aspects of race influence friendships and negative ties differently, and inconsistencies in someone's racial categorisation play a crucial role in social rejection. Our findings contribute to the understanding of fluid and socially constructed nature of racial identity as they emphasise the duality of racial identification and categorisation.

1.6 Relevance of the research

Minority groups are often deprived from practically available resources necessary to tackle every-day challenges originating from social, and economical *inequalities* in their host societies. More often than not they are found to have relatively low social, and economical status; their members are regularly and repeatedly excluded from the mainstream society in numerous ways. Racial fractions often form the basis of such exclusion that coincides with the evolution of negative relations and prejudice, which can give rise to, and be reinforced by, various forms of interracial conflicts. The promise of *integrated education* is the reduction of racial inequalities through the development of the social, and human capital. In the core of this promise there is an assumption that positive *interracial relations* might develop among members of majority and minority groups.

We make a contribution to this line of research by arguing that relational integration should be defined not only by the development of positive intergroup ties but also by the stability of these ties (see Chapter 4). Furthermore, we extend the definition of relational integration by accounting not only for the prevalence of positive intergroup relations but also for negative ones (see Chapter 5 and 6).

It follows that there are positive and negative interpersonal relations in the focus of our work. These relations are developed and maintained in face-to-face encounters, hence they are constantly altered by *transactional processes* that render the continuous *formation of self* and *identity* inevitable. Whilst a wide range of theories have widely recognised and emphasised the socially constructed nature of race, empirical studies still tend to treat these concepts as fixed characteristics of the individual.

By using a relational approach, however, in this Thesis we describe identities not only as characteristics of individual consciousness, but we further argue, by accepting the idea that identities are shaped by social relations, that every individual may have as many identities as they have relations. Likewise, it can be inferred that race is a situation-dependent *social construction* with multiple theoretically and empirically distinct aspects, such as *self-identification* and *perception* (Saperstein and Penner, 2012).

In Chapter 5 and 6 we contribute to the empirical research on social identity formation by taking both aspects of race into account. We argue that the *perception of race is a purely relational aspect of racial identity* and its analysis can help us understand how social, and economical resources from the outside society can be reached in closely embedded interpersonal situations.

Chapter 2

Analytical framework

Social relations are often times crucial elements of a large variety of social phenomena that social scientists study. Yet, the formalisation of relational approach in sociology is relatively scattered. Hence, in this chapter we draw up an analytical framework in which aims of empirical research can be formulated and analysed. Our main point of departure is the notion of *dependence* that comes by the evolution of relations among individuals, connect them on the meso level of the inquiry, and result in outcomes on the group level. We show that social mechanisms that are responsible for the evolution of these interpersonal relations can be empirically operationalised within the right methodological framework. Then, in the next chapter, we introduce a longitudinal project and describe a unique data set that is suited to examine a wide range of social phenomena in educational setting. We do so with clarifying key theoretical and methodological concepts in the hope that more empirical research and data collection will be carried out in a relational framework in which individuals and their interpersonal relations are similarly important.

2.1 Introduction

When it comes to theoretical thinking, and especially to empirical research, the prevailing trend in sociology involves preoccupation with the idea that it is individuals that come first, and the relations among them only afterwards. Lately, however, scholars have been looking for feasible analytical approaches to reverse this assumption of a rather atomised social reality, and to focus more attention to relations that connect individuals (Brandes et al., 2013). Even though several classical figures in sociology have, to some extent, established the theoretical basis for a *relational sociology*, that scholars have started developing a relational sociological *theory* in a more or less systematic way only throughout the last few decades.

The first attempts were made by Donati (1983), and shortly after that other publications emerged, as for example those of Bajoit (1992), White (1995) , Laflamme (1995), Emirbayer (1997), Tilly (1999), Crossley (2010) and Archer (2012). Dépelteau and Powell (2013), however, suggest that these formulations substantially differ from each other, and that the term relational sociology is used with a wide range of meanings.

Fuhse and Mützel (2011) give a thorough overview of the development of the relational approach in sociology. They show that the elements of this approach were present already in the work of *German formal sociology* (Simmel, 1992; Weber, 2002)[1908,1922], Elias's *figurational sociology* (Elias, 1978), in the *British social anthropology*, and in Mead's *symbolic interaction* (Mead, 1967). Later on, based on William Lloyd Warner's *community studies* (Warner and Lunt, 1941) large scale empirical investigations were developed by scholars such as Lazarsfeld et al. (1968) or Laumann (1973) to study the features of inter-personal or ego-centric networks and their relationship with attributes of individuals.

Moreover, the relational approach has its roots in the *social capital* literature, starting from Granovetter's "strength of weak ties" (Granovetter, 1973) and developing in the work of Lin (2002), Portes (1998), Burt (1992) and Coleman (1988). Here, it is supposed that individuals' embeddedness in more dense networks with more homogenous connections enable individual action, whereas embeddedness in a less dense network with less homogenous ties hinders individual action (Lin, 2002; Portes, 1998). Finally, another approach that developed from anthropological science and technology studies is actor-network-theory (ANT) represented, among others, by Latour's work (Latour, 2007).

From here on we are going to focus our attention on social network analysis (SNA). SNA constitutes both numerous formal procedures for the analysis of observable relations between at least two actors as well as theoretical considerations on these relations. Here the units of the analysis are not the statistical correlates of individual attributes, instead they are the relations that connect individuals. Hence, this approach fundamentally differs from "variable centred sociology" as it assumes interdependence among the units of its analysis (Abbott, 1988). This approach is *structural* in the sense that the interdependent structure of interpersonal relations enable and hider individual action.

Within SNA, Burt (1992) distinguishes between two analytical strategies network analysts tend to follow to explain the effects of networks on social action. One is the *positional approach* that deals with certain patterns of relations individuals may form based on structural equivalence (Lorrain and White, 1971). The main focus of this approach is on the structure of the complete social network and equivalence in individuals' structural positions.

The other strategy is that of the *relational approach* which is in the core of this Thesis. The distinguishing assumption of this approach is that relations are assumed to have an impact on individuals as they transfer certain resources (e.g. information, help, money, trust and so on) among the individuals. This impact then, can be quantified by calculating different measures to describe the position of a focal actor *Ego* or her *Alters*, the features of subgroups within the network or the entire system. This strategy is represented by a relatively unified theoretical formulations of a group of sociologists (H. White, C. Tilly and M. Emirbayer among others) who were coined by Scott and Carrington (2011) as the "New York School of Relational Sociology".

Even though the *relational approach* consists of relatively unified theoretical considerations in the work of these scholars, Fuhse and Mützel (2011) argued that in the past twenty years a more complex theory of social networks has emerged which combines the traditional structural approach while putting emphasise to the importance of culture and meaning in networks, including the work of White (2008), as well as Pachucki and Breiger (2010).

Moreover, according to Donati (2015), Emirbayer and other prominent figures of the "New York School" prefer a "flat ontology" that deals exclusively with dyadic relations, neglecting the importance of context and individuals, while putting too much emphasis on relations.

In their description of pros and cons of social network research, Emirbayer and Goodwin (1994) provide a critique of structuralist social network analysis. They acknowledge that both the "relational approach" and the "positional approach" are structurally deterministic as they objectify social relations and leave little room for cultural content.

Similarly to Emirbayer's acknowledged critique, Harrison White shifts the interpretation of networks from non-cultural objects towards dynamic, sociocultural constructions. In Identity and Control White (2008) describes a sociological theory that operates with more dynamic and contextual concepts by considering how meaning comes by in a relational setting, and similarly, how relations create meaning.

In this Chapter, we cannot reflect on every critique against the "relational approach", neither on the way it has been altered as a consequences of these critiques. Instead, we simply argue, and will demonstrate later on, that this approach has several merits, especially compared to variable centred traditional approaches.

Empirical research that has employed a relational framework, has an even shorter history than theory-focused scientific projects. From an empirical viewpoint, however, network science in general, including social network analysis, is somewhat more unified through a common form of conceptualisation that assumes the existence of complex relational structures among

individuals and locates them at the centre of analysis (Robins, 2015). This approach to complexity among entities is in striking contrast to other social science research that assumes the independence of observations. Social network analysis instead, rests on the claim that individual outcomes are influenced by the structure of relations among individuals. Consequently, relations are affected by individual attributes, and the evolution of relations is a consequence of other relations in the given social context. Therefore, the units of the analysis are not independent of one an other, which results in crucial methodological consequences.

In this Chapter, we emphasise that the ontology of relational sociology should include *both* social relationships and social actors with their attributes (Robins, 2015; Simmel, 1950). We need to observe both in a much more detailed way to better understand the interdependent social mechanisms that operate in social groups. For this reason, our relational perspective needs to be accompanied by explicit theoretical explanations about *relations* and *dependence*, as well as methodological decision-making that makes modelling complex social mechanisms possible (Brandes et al., 2013). In doing so, we can still rely on regularly used theories about individuals and social groups, the majority of methodological considerations still apply, and most measurements and observation techniques are still relevant. However, each of these three components of sociological research require some revision and will be reviewed later on.

In practice, network research should be conducted when the theoretical understanding of the research question suggests that social processes or social structures may be crucial explanatory elements. Robins (2015) argues that "you do network research because you *must* and because you *will*", suggesting that the researcher should either eliminate networks as a possible explanation, or produce evidence of their significance. He also provides general examples of social science research aims that involve studying networks (Robins, 2015):

- One can study, for example, whether the social environment affects individual outcomes. It can be argued that social partners might affect individuals through contagion or influence; perhaps some properties (attitudes, information) can spread across the network from one individual to the other.

- It is also possible to study whether individuals in certain social positions have different individual outcomes. Popularity or isolation in a certain social setting may result in different outcomes, or brokers might form bridges between distinct groups and reap the benefits of their roles.

- Another relevant research aim is investigating how individuals affect social structure. There may be individual factors that make individuals more likely to choose certain social partners or occupy certain positions in the social structure.

- Furthermore, one might study the social processes that underpin and sustain the social structure, or examine how individual outcomes and social structure are entwined. In this case, the researcher seeks to understand what casual processes may be present: do individual factors, social factors, or both provide the best explanation of the phenomenon?

- Finally, on the group level, one could study the global outcomes of the studied social structure in order to understand, for example, whether it is possible to intervene to improve either individual or global outcomes.

Our main argument in this chapter is simply that a relational approach in sociology, despite its currently incomplete formalisation, can be especially fruitful in the investigation of a variety of social phenomena. Consequently, our main task is specifying the most important parts of the relational analytical framework that are required for our empirical research purposes. The *theoretical part* of the framework will be developed based on the relatively unified theoretical formulations of the "New York School of Relational Sociology". Here, we will describe how does a relational framework effect the main concept of the research and can bridge the levels of inquiry.

In the *methodological part* we further develop the notion of *dependence* and explain how this comes about in a relational framework, how it relates to social mechanisms, and how to analyse it with statistical tools (SAOMs and ERGMs) that have been developed to model multiple complex dependencies within social networks.

Finally, the observational part of the analytical framework will be contextualised and illustrated by describing the first phase of data collection of the MTA TK "Lendület" Research Centre for Educational and Networks Studies (RECENS), as well as the database that will be made publicly available on the website of the research group. Since the main goal of this project was to describe ethnic segregation in Hungarian high schools, the majority of the theoretical explanations and empirical examples will be related, but not limited, to this topic.

2.2 Theoretical considerations

In order to avoid misunderstanding, we would like to make it clear that we do not intend to develop the ontology of relational sociology in this paper. Instead, we would simply like to

draw up a broad analytical framework for relational sociology to illustrate its advantages in empirical research. Hereby, we predominantly follow Emirbayer's call for a new relational social science (Emirbayer, 1997), even though there are other theoretical formulations and critiques of his views do exist.

In his manifesto, Emirbayer (1997) characterises the relational approach by comparing it to the offshoots of the *substantialist tradition*. The point of departure of the substantialist perspective is the notion that the basic elements of the investigation are entities. These entities are assumed to operate through "self-action", independently of one an other. He argues that even when actors interact with each other, their individual characteristics remain unaltered (Emirbayer, 1997). From this perspective, the entities in question do not "act". Instead, it is their their varying attributes that provide the incentive for a supposed action, which results in somewhat artificial conclusions such as: a"disadvantaged position leads to increased competitiveness" without the actor itself engaging in any particular competitive behaviour (Emirbayer, 1997, p.286).

Emirbayer (1997) fundamentally differentiates the varieties of substantialist perspective from the approach of *trans-action* which is the key concept of the relational view. As he explains, the units involved in the transactions (which, in his terminology, refers to the relationship among the units) gain their meaning from the changing attributes, behaviour or the roles they play within that transaction. In this view, it is the dynamic process of transaction that defines the units of the analysis and not the compositional elements themselves (Emirbayer, 1997). This mean that here, the units "are not assumed as independent existences present anterior to any relations, but ... gain their whole being ... first in and with the relations which are predicated of them" (Cassirer et al., 1953, p. 36; in Emirbayer, 1997). The distinctive feature of the transactional approach is that it assumes interpersonal relations to be dynamic, ongoing processes, affecting and affected by individual processes (Emirbayer, 1997).

2.2.1 Main concepts of the Thesis

In the previous chapter we explained that integrated education has an important role in fighting social and economic inequality by increasing the human and economical capital of minority groups. Then we further argued that integrated educational setting can only be successful if positive interpersonal relations cross racial boundaries while cross-race negative relations are not unproportionally prevalent. In order to be able to empirically examine this premise, we have to describe and interlink our main concepts within a relational framework that was introduced

by Emirbayer (1997) as the transactional approach. The following concepts that we are going to describe here may account for general attention in various fields of sociological research, but they are particularity important when it comes to the investigation of relational segregation processes in school classes.

The idea of *inequality* (or equality) is generally defined as a matter of individual variations in the possession of human or economic capital (Emirbayer, 1997). For example, "Encountering racial differences in job assignments, researchers ask whether across categories individuals distribute differently with respect to residential location. Uncovering evidence of sharp ethnic differences in industrial concentration, analysis only begin to speak of discrimination when they have factored out individual differences in education, work experience, or productivity" (Tilly, 1999, p. 9). From a transactional point of view, inequality comes from the everyday practices of certain actors as they face challenges around practicing control over positional, symbolic, or emotional resources (Emirbayer, 1997). By exercising some control they may gain advantages that they can preserve by sharing the resources within the ingroup, and frequently reinforcing the boundaries of the ingroup and the outgroup (Tilly, 1999).

Although the notion of *freedom* is not necessarily in the centre of interest when it comes to segregation, it is important for us as it creates the linkage between context and agency that we must understand in order to explain the evolution of interpersonal relations. In a substantialist fashion, freedom is often defined as a possession, a legal status represented in laws. The relational view, however, regards freedom not as a fixed, given attribute, but rather as the potential for action under given circumstances, in a given context (Emirbayer, 1997).

Agency is understood by the substantialist approach as an individual or group property that can be activated and deactivated by will. The transactional approach, nonetheless, emphasises the context dependent nature of agency. It argues that agency is a goal oriented motive, and in this process actors necessarily engage in relationships with surrounding people, places, meanings, and events that create the context of the agency (Emirbayer, 1997).

Finally, we shall talk about *identity* as a key concept of this Thesis. According to Tilly (2005), individuals form identities by answering the questions,"Who am I?","Who are you?", "Who are we?" or "Who are they?". Identities as such indicate boundaries that separate "us" from "them". On both sides of the boundaries, people maintain certain relations with each other and carry on relations across the boundaries. They also create social norms to describe and prescribe relations within and between boundaries. These boundaries, along with relations and social norms, make up the collective identities (Tilly, 2005).

By following a relational approach, we can, like the majority of previous research has done,

treat identities as characteristics of individual consciousness, or "how you think of yourself". However, we can do more. If we accept the core idea that identities are shaped by social relations, it can be argued that every individual or social group has as many identities as it has relations with other individuals and social groups. Consequently, the identity of these individuals and social groups may alter as their relations change. Hence, instead of focusing on self-declared ethnicity only, and treating it as a fixed individual attribute, researchers should define ethnic identity in terms of beliefs, perceptions, and understandings (Brubaker, 2004). Related to this, it is important to distinguish between ethnic *self-identification*, that is, the self-reported ethnicity, and *ethnic classification*, that is, ethnicity perceived by others (Saperstein and Penner, 2012).

2.2.2 Levels of inquiry

In his manifesto, Emirbayer (1997) also describes the different levels of sociological inquiry from a relational point of view that can help us understand the ways which this framework can bridge the different levels of inquiry, and the methodological consequences this implies. First of all, the notion of *individual* can be reconsidered on the *micro-level*. Emirbayer (1997) argues that individual identities and their interests are not pre-constituted, hence individuals do not engage in relations with their already fixed attributes, instead, they are actors lacking in stable, durable identities (Pizzorno, 1991). He suggests that the formation of identity and agency requires some relation with others, as "The individual human agent is constituted as such, when he is recognised and named by other human agents" (Pizzorno, 1991, p. 218; in Emirbayer, 1997).

On the *meso-level*, the analytical framework of research is highly influenced by Robert K. Merton's well-known notion of middle-range theory (Merton, 1968). On this level, scientific inquiry aims to describe clear mechanisms through which actions and transactions on the individual level lead to macro-level facts such as inequality or segregation. Emirbayer (1997) argues that social mechanisms that link the micro and meso-level can be revealed by focusing on face-to-face encounters in which individuals engage in different relations with each other.

Whereas these encounters were most typically seen in self-actional or inter-actional terms as a result of the mutual interplay among pre-constituted actors (Emirbayer, 1997), Goffman argues that it "is not the individual and his psychology, but rather the syntactical relations among the act of different persons mutually present to one another" (Goffman, 1967, p. 2; in Emirbayer, 1997). Goffman's *sociology of occasions* takes dynamic processes as its unit of

analysis and he describes these occasions as shifting entities "created by arrivals and killed by departures" (Goffman, 1967, p. 2; in Emirbayer, 1997), which emphasises, again, the importance of social context, suggesting that the same individuals might act differently inside certain temporal and spatial boundaries than outside of those (see also Stinchcombe, 1991; White, 1973).

On the *macro-level*, *society* is often interpreted as an independent, inherently organised, self-sustaining system, and scholars who view society through a macroscopic lens, tend to begin their inquiry by examining sovereign entities such as national states or countries (Emirbayer, 1997). Here, we would like to simply argue that the analysis of such entities might be possible within the relational approach, although from a practical viewpoint it is more fruitful to define the macro-level of inquiry as an emergent property of individual and meso-level transactions; that is, the overall network structure of the observed *social group*.

At the same time, it is important to note that the macro structure generates constraints on face-to-face encounters, as well as individual processes. However, within a relational approach, accounting for these macro-level processes and constraints in the traditional sense is a more difficult venture. Instead, in order to be able to fully investigate this interplay of individual attributes, interpersonal-relations and the overall network structure of the social group, we have to understand how processes of network structure capture and induce relevant social processes on the group and individual level. For this reason, in the next section we give some examples of relational mechanisms on the meso-level that can create, using the right methodological framework, linkages between the micro- and the macro-level.

2.3 Methodological consequences of the relational approach

It is the interdependence of interpersonal relations and individual actors that makes the individualisation of social structure problematic (Emirbayer, 1997). Since we are actors embedded in social relations (Abbott, 1988), we cannot merely focus our attention on the analysis of the individual – which is the prevailing methodological trend according to the variable-oriented substantialist approach. Instead, to understand social mechanisms, we need a relational methodology, not a methodology that assumes that every individual is independent (Robins, 2015).

If our research aim concerns a social phenomenon that possibly involves the investigation of interpersonal connections, and we cannot theoretically exclude their interpretation as part of

our sociological explanation, then we need statistical tools that allow us to test our hypothesis and answer our research questions according to statistical inference, while accounting for the properties of social networks. The methodological tools presented here are recognised, theory driven statistical approaches to analyse social networks.

2.3.1 Social mechanisms: the source of dependence

Conventional statistical methods, such as regression analysis, work under the assumption that the units of observation, either individuals or the social ties among them, are independent of one another. Within a relational approach, such a lack of dependence is an unreasonable assumption for several reasons, and can be handled in two major ways. Within a traditional analytical framework, one can (only) *control* for the lack of independence, or within a relational methodological framework one can*model* it, and then capitalise on it.

First of all, the lack of independence at the individual level arises from the nature of social network studies; that is, the *units of observation are clustered* within groups. This is incorporated in the very well-known research designs of traditional educational research, and several multilevel (hierarchical) regression techniques have been developed to tackle the statistical challenges that arise due to this sampling (Snijders and Bosker, 2011).

Moreover, there are two additional sources of dependence. One is related to the interplay of individual attributes and network ties, whereas the other is due to endogenous network formation processes. Hence, it is both a theoretical and empirical challenge to define the different aspects of dependence that are exhibited in actual social structures. Of course, there are many network theories that can explain tie formation; here we summarise the most prominent ones. These are simple examples of how theoretically driven meso-level social mechanisms can be operationalised in a way so as to create linkages between the individual and group level.

When it comes to *individual attributes*, the role of *homophily* is probably the most well-documented mechanism (McPherson et al., 2001). This phenomenon describes how certain characteristics of actors influence (on the micro-level) tie formation (on the meso-level). Steglich and his co-authors give a good description of the implied methodological challenges that arise due to the mutual dependence between group members' individual traits, and the structure of interpersonal relationships (Steglich et al., 2010).

As Steglich et al. (2010) points it out, the study of this interdependence has a long tradition in theoretical and empirical social sciences. Prominent sociologists discovered a long time ago that structural cohesion among group members is essential for group members to comply

with group norms (Durkheim, 1893; Homans, 1974). *Social identity theory*, for example, claims that the extent to which individuals in distinct groups differ from each other and individuals within the same group are similar to each other explains group formation processes (Abrams and Hogg, 1990). Furthermore, detailed network studies (Padgett and Ansell, 1993) and essays (Emirbayer and Goodwin, 1994; Stokman and Doreian, 1997) have made it clear that in order to understand social action and social structure in greater details, it is necessary to jointly study the dynamics of individual outcomes, network structure and the way these mutually depend on each other. From a methodological point of view, this means that the complete network structure as well as important characteristics of individuals (one may think here of indicators of performance, attitudes or behavioural tendencies) must be both studied longitudinally as two dependent variables in the same model that allow for the co-evolution of network structure and individual attributes.

Finally, the third main source of dependence is caused by *endogenous tie formation processes*. From a theoretical viewpoint, these serve as linkages between individual and group-level outcomes as they are defined as relations among two or more individuals, and can describe the formation of the network structure within the social group. In a traditional analytical framework we would assume that tie-formation happens randomly among actors; that is, there is no interdependence whatsoever among social ties. However, it has been argued that the observation of a tie is not independent of the observation of other ties in the network. This means that social mechanisms on the meso-level are created partly as a result of endogenous processes.

Reciprocity or exchange, for example, is seen as a basic and universal human activity (Blau, 1964). According to social exchange theory (Emerson, 1976; Rusbult and Buunk, 1993), reciprocity is seen not only as a by-product of other processes behind friendship formation, but it is also a result of individuals actively looking for reciprocated friendships instead of non-reciprocated ones. According to this theory, friendship is interpreted as investment: people seek rewards for the time, energy or sometimes even material goods they invest in a relationship.

Beyond dyads, the importance of *triadic relations* was proposed by Simmel (1950). His work was followed by Heider (1958) and Cartwright and Harary (1956) who introduced *structural balance theory*, describing a triangulation process among social ties, also known as path closure or network closure (Robins, 2015). Tendency for transitive closure on the individual level may lead to clustering on the group level, and cyclic closure will result in generalised exchange. A few decades later Granovetter (1973) contrasted the closure of strong ties to the non-closure of weak ties. Burt (1992) studied network brokerage and structural holes, arguing that taking position in the centre of a non closed structure is advantageous. Other theories suggest that

socially well-connected individuals may occupy prominent position in the network. For example preferential attachment describes how network popularity may induce further popularity (Barabasi and Albert, 1999; Merton, 1968).

These theoretical concepts of social mechanisms provide explanations as to how ties might be associated with individual attributes, why ties might be present in the network, and how ties might come to form particular local patterns, so called "network configurations", or "micro structures" (Lusher et al., 2012; Snijders et al., 2010). Although these configurations embody some ideas about how networks may show local patterns, it is an empirical question whether a particular configuration is present in a given network or not.

2.3.2 Operationalising social mechanisms

The *empirical analysis* of these network configurations is a risky venture. Although there are techniques to control for the lack of independence by running *robustness checks* (see Chapter 4), conventional regression methods are unable to investigate these endogenous network structures due to statistical inference. However, other methodological tools that were developed for examining social networks make the assumption that there is interdependence among network ties. These methods model dependence, instead of trying to control for a lack of independence.

When modelling empirically observed networks, the analyst is generally confronted with a choice between two candidate models that are common in the literature: the Exponential Random Graph Models (ERGM) (Lusher et al., 2012) (for more details see Chapter 5) and Stochastic Actor-oriented Models (SAOM) Snijders (2001); Snijders et al. (2010); Steglich et al. (2010) (for more details see Chapter 7). Even though the two models are designed to execute the same inferential procedure in a relatively similar way, the difference in the underlying theoretical assumptions alone is often not strong enough to help the analyst to make a clear decision between them (Leifeld and Cranmer, 2015), and the empirical performance of the two techniques rarely compared directly (Desmarais and Cranmer, 2012; Leifeld and Cranmer, 2015).

Because an introduction to these statistical tools would exceed the limits of our work, here we only point out the similarity of the two methods; that is, an SAOM can be interpreted as a special case of an ERGM which is estimated via a somewhat different process, given that the SAOM has an ERGM as its limiting distribution (Snijders, 2001). Hence, these models both permit inferences to be made about whether, in a network of interest, there are significantly more (or less) network configurations (e.g. reciprocated ties, or triangles) than we would

expect to occur by chance (Desmarais and Cranmer, 2012; Lusher et al., 2012; Snijders et al., 2010). In addition to this function, these models allow for individual and dyadic attributes and group-level variables to be included in the model, hence providing an opportunity for the researcher to examine more substantive research questions, while controlling for endogenous network processes and analysing them simultaneously.

FIGURE 2.1: Reciprocity

By including such endogenous network configurations together in the relevant statistical model, one can test their effects against each other, and by doing so infer to the social processes that have built the network (Lusher et al., 2012). Nonetheless, it is also important to understand that these models always include effects that are not only statistically correlated (like in most regression models), but which are also *embedded in each other* (Boda, 2016). This is because the micro-structures included in the model are of different levels of complexity, and the more complex structures always contain less complex structures. These configurations or structures can be considered to arise from local social processes, whereby actors in the network form connections in response to other ties in the network (Lusher et al., 2012).

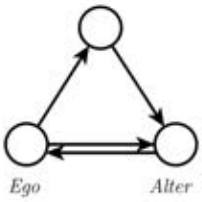


FIGURE 2.2: Transitive reciprocated triplet

For example, with regard to *reciprocity*, which is one of the most basic endogenous tie formation processes, the presence of a friendship tie between *Ego* and *Alter* is dependent on the presence of the friendship tie between *Alter* and *Ego* (see Figure 2.1) (Fuhse and Mützel, 2011). In an actor oriented framework (like SOMAs) the same dependence occurs, because *Ego* consideration of *Alter* as friend is dependent on whether *Alter* treats *Ego* the same way or not. If we go one step further, the presence of the reciprocated friendship tie between *Ego* and *Alter* is dependent on weather they have friends in common, that is, they are embedded in *transitive reciprocated triplets* (see Figure 2.2).

However, if we inspect the transitive reciprocated triplet (see Figure 2.2) carefully, we realise that within this configuration three additional sub-configurations can be recognised (see

Figure 2.4), and these sub-configurations refer to the *degree effects* in the model (see Figure 2.3), for example as it was described earlier by *preferential attachment*.

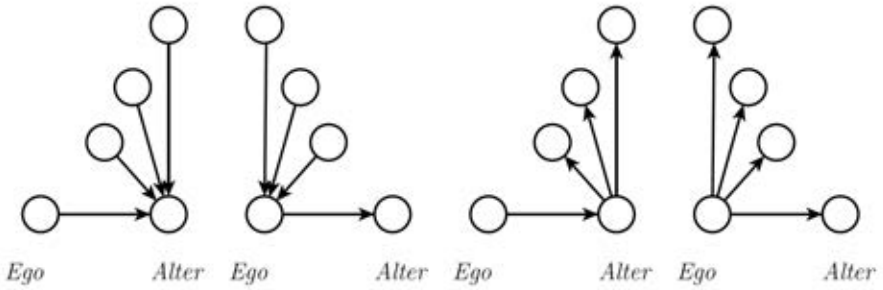


FIGURE 2.3: Degree effects: Popularity of Alter, Popularity of Ago, Activity of Alter, Activity of Ego

One could think about modelling more complex network structures similarly to modelling interaction effect. Just as you would incorporate the two main effects when modelling an interaction in a regression framework, you have to include reciprocity and degree effects in the analysis when modelling transitive triplets. Otherwise it is not possible to distinguish between the two more embedded structural processes and the actually modelled transitivity. Furthermore, it is also possible that one of the substructures (reciprocity or degree effects) is overrepresented in the data, and therefore the analysis results in more triangles than would be expected by chance. Since the underlying sub-process (reciprocation or assortativity) is not controlled for, the transitive triplets effects "disguise" their effect, leading to the over-estimation of transitive closure processes.

When considering individual attributes, similar considerations apply. For example, personal characteristics that are likely to increase the probability of a friendship connection between two people, such as similarity along certain dimensions (homophily), apply to dyads instead of just one individual. As mentioned earlier, the characteristics of the individual gain meaning only through reference to interpersonal relations. Hence, it is likely that both actors are affected by the same exogenous matching characteristics, which may result in the same network formation process as endogenous reciprocation (see Figure 2.1). Therefore, *disentangling these two mechanisms* is essential in understanding social network formation processes (Steglich et al., 2010).

All of these considerations require meticulous and precise model-building efforts involving an iterative process in which theory and empirical experience must be jointly developed. This is because the network configurations under analysis serve at least two purposes. First, they have to provide convincing theoretical arguments about how the given network structure may have

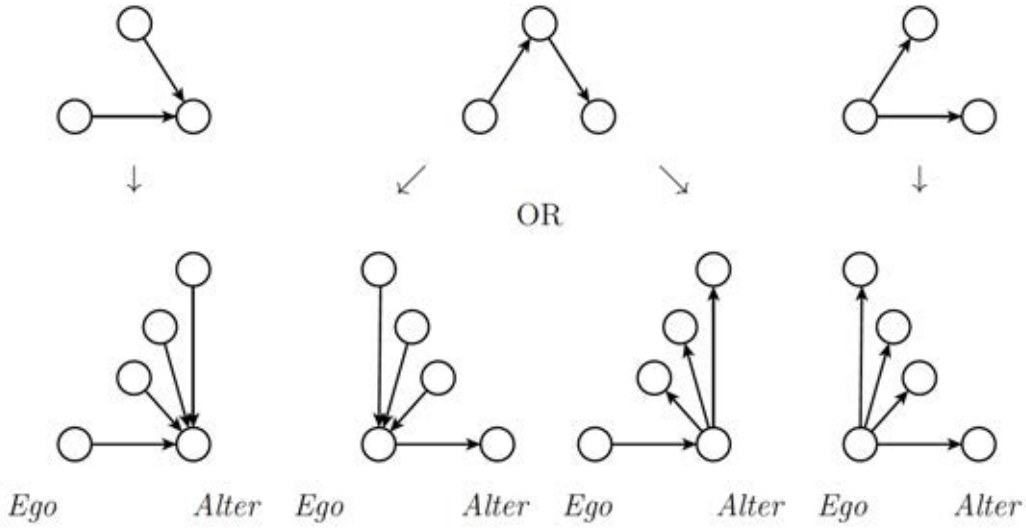


FIGURE 2.4: Effects Embedded in the Transitive Triplets effect

evolved; and secondly, they have to be suitable for modelling the empirical network structure. However, it is also important to note that the research aim (just as in case of other empirical studies) might shift the primary focus of attention from network configurations to individual attributes. If the substantial interest of the investigation concerns individual traits, attributes or behaviour, then, from an interpretative point of view, the micro structures serve as "control variables" in the model.

Chapter 3

Research design

3.1 Design of the research project

To answer our research questions related to integrated education (in Chapter 5 and 6), we analysed two waves of a four-wave social network database of Hungarian secondary school students. This data has several unique features and provides the researcher with an abundance of opportunities to study different social phenomena in relational framework. Because these opportunities have not been fully exploited and because a research design in SNA framework might not be self-evident, herby we invite the reader to learn about the unique features of this data and to think about its further exploitation.

The data were collected by the MTA TK "Lendület" Research Centre for Educational and Networks Studies (Budapest, Hungary) within the frame of the project: "Wired into Each Other: Network Dynamics of Adolescents in the Light of Status Competition, School Performance, Exclusion and Integration". The author of this Thesis also participated in the research design of the project as well the data collection and data management. The leader of the research group and the research project is Dr. Károly Takács.

The main research aim of the project has been to observe the evolution of students' networks over time, starting from their very first, initial relationships with each other. Since in Hungary secondary school usually starts in 9^{th} grade, we started the data collection with ninth-graders. The first wave of data was collected shortly after the students started school together, where most of them met for the first time. Afterwards, we regularly repeated the measurement to capture changes in social ties as well as individual attributes and attitudes. Because changes in interpersonal relationships are usually much more frequent in the first couple of months after the first relationships are formed and before students know each other well, it is advantageous

to have more frequent observations at the beginning than later. Therefore, the second wave of data was collected when the first academic year was still in progress; after that, there was one more data collection in second academic year, and one during the third one. The questionnaires mostly contained the same questions across data waves, though with some variation: there were some questions that were not asked every time.

In Hungary, students in the same cohort are sorted into distinct school classes of 30 students (though sometimes more or less), with whom they attend most of their classes. Hence, the group boundaries, that is the units of data collection, are relatively well-defined and stable. This is important, as we are interested in social processes both on the individual and group level, and because of the well-defined nature of the group boundary we can more realistically assume that we observe the majority of the relevant processes.

Before the data collection, an information sheet and a consent form were sent to the parents in cooperation with the schools. In this information sheet parents were informed about the the research group (RECENS) that collected the data, the aim of the data collection and research, and how data would be treated. Parents' passive consent for their children's participation was requested, and only children with valid consent were provided with the opportunity to fill out our questionnaire (see Appendix A.12).

Students were asked to fill in a paper questionnaire under the supervision of at least one trained research assistant. Students were also informed at the beginning of the questionnaire about the organisation that collected the data, the aim of the data collection and research, and how data would be used. The participants were informed that their responses would be kept confidential, would not be exposed to third parties and would be used for research purposes only. They took part in the research on a voluntary basis. They were allowed to refuse to participate in the study or to refuse to answer some of the questions. In order to provide anonymity, each student was given a unique code of four digits. The questionnaires did not contain any other information through which students could be identified. In order to get additional information on students and classes, questionnaires with form-masters were also filled in by a trained interviewer.

3.2 The RECENS data

Our research design in this project is based on the assumption that ethnic integration, the integration of Roma in Hungary in particular, can be best understood by investigating the positive as well as negative relations students form with each other over time. The formation

and dynamics of social networks in in school settings, however, are strongly interrelated with other aspects of school life such as academic achievement and status competition (Moody, 2001). Hence, data on academic performance, motivations, aspirations, socio-economic status, and ethnicity combined with self-reported social network data was collected.

The research design after years of data collection and data management resulted in a unique dataset that allows us the study research questions related to the association between individual characteristics and declared or perceived interpersonal relations. The main goal of the project was to analyse racial segregation within school classes from a relational point of view. For this reason particularly detailed data was collected to describe relations among students as well as different components of ethnic identity. First, self-declared ethnic identification of the students were measured by asking students to classify themselves as "Hungarian", "Roma", "both Hungarian and Roma", or "other ethnicity". Roma students were also asked to indicate which Roma subgroup they belonged ("Lovari", "Boyash", "Romungro" or "other"). Second, we measured the ethnic classification of peers, hat is, we measured perceived ethnicity with a network roaster. Students were provided a list of all classmates and they should nominate whom they considered Roma. Third, teachers were also asked to classify every student in the class as Roma or non-Roma. These data allow us to compare the different kinds of measurements of ethnicity and their effect on ethnic integration.

This data is unique furthermore, because not only ethnicity, but also positive and negative relations were measured in different ways. Friendship and negative relations were measured with one scale; each student was asked to judge all of their classmates along a five-point scale: "-2" for "I hate him/her, he/she is my enemy"; "-1" for "I do not like him/her"; "0" for "He/she is neutral for me"; "+1" for "I like him/her", and "+2" for "He/she is my friend". As everyone judged everyone else in the community along this scale instead of making lists of their best friends, we also know whom the students respect and disdain. Students we asked to answer the following questions: "Who do you look up to?", "Who do you look down on?" and whom students think their classmates respect or disdain: "Who do your classmates look up to?", "Who do your classmates look down on?"

Besides questions related to our main research goal in this Thesis, we also measured students' perceptions of several characteristics of their peers. For instance, we asked whom they considered clever, pretty/handsome, gossipy, charitable, funny, quarrelsome, pointdexter, reserved, and so on. We also measured shared activities by asking with whom students usually go home together, have private classes or do sports together, spend their spare time together, and study together. We asked who they trust, on whom they could count if they needed help,

who they bully or by whom they are being bullied. With regard to questions about students' social networks and opinion about the characteristics of their classmates, pupils were allowed to nominate as many classmates as they wanted in an alphabetic roster. On average 44 different social networks collected per wave (for more details Appendix A.12).

Name of school	Grammar-school class	Technical-school class	Vocational-school class	Sum
Capital (1)	4	0	0	4
Capital (2)	0	4	3	7
Big town (1)	5	0	0	5
Big town (2)	0	5	5	10
Small town (1)	3	1	0	4
Small town (2)	0	3	3	6
Small town (3)	3	1	3	7
Sum	15	14	14	43

TABLE 3.1: Distribution of the schools and school classes

The collected sample contains school classes from three different training programmes of secondary education available in Hungary (table 3.1). These programmes have distinct academic criteria and outputs, and have different prestige in society. One school is not necessarily limited to only one programme, some of them (including a few in our sample) offer classes of different training types. Secondary grammar programmes are the most academically oriented and mainly prepare students for tertiary education. Secondary technical programmes provide students with vocational training, but also allow them to later participate in tertiary education. Vocational programmes, even though they offer some academic subjects, mostly focus on vocational training, and does not prepare students for exams at the end of the secondary studies that are necessary to enter higher education in Hungary.

The four-wave survey started in November 2010 and ended in April 2013. In the beginning, the overall 1425 students were distributed among 7 secondary schools and 44 school classes in the sample; in total, approximately 1750 students participated in at least one wave of the data collection. They were attending the 9th grade during the first data collection period which means that they were freshly brought together and barely knew each other at that time. Hence, starting the analyses with the first wave makes it possible to examine the development of interethnic attitudes and interpersonal relations from a "neutral" situation. The original sample is representative for settlement size and type as well as institution type

Table 3.2: Descriptives of the RECENS sample

	wave 1	wave 2	wave 3	wave 4
N of groups	44	44	41	38
N of students	1425	1378	1154	980
N in different training types				
grammar school	487	483	469	449
technical school	390	374	316	409
vocational school	548	521	369	122
man (%)	38.9	40.0	38.8	40.3
N in self-declared ethnic groups				
Hungarian	800	816	808	689
Roma	172	131	80	40
Roma and Hugarian	136	131	102	62
other	15	22	12	9
mother's highest education (%)				
less than 8 years	3.2	3.1	2.1	1.1
primary school	18.1	18.9	16.8	14.9
vocational school	19.9	20.3	21.3	20.1
technical school	8.8	8.5	13.6	12.3
grammar school	8.6	10.5	10.9	13.5
BA / BSc	12.8	12.6	13.4	13.5
MA / MSc	4.5	4.8	6.5	7.1
father's highest education (%)				
less than 8 years	2.3	1.7	1.0	0.8
primary school	14.0	14.5	13.0	9.6
vocational school	30.0	32.4	34.5	34.5
technical school	10.9	11.0	13.7	16.8
grammar school	4.0	4.6	5.3	4.7
BA / BSc	6.9	6.2	7.5	6.9
MA / MSc	5.1	4.9	6.3	6.9
Network satistics for 20 classes with more than 10% of non-Hungarians				
Density (%)				
friendship network	16.2	13.6	12.2	12.1
negative networks	8.0	10.2	10.3	10.9
roma perception network	12.8	17.3	16.8	16.3
Av. N of mutual nominations				
friendship network	71.3	59.5	43.2	41
negative networks	40.6	41.3	39.8	41.3
roma perception network	46.3	49.3	47.8	49.1
Av. N of triads				
friendship network	188.8	88.85	82.9	79.3
combined negative networks	39.4	39.75	40.5	38.6
roma perception network	250.5	311.6	323.6	317.8

within Hungary, but it does not hold for the analysed samples in Chapter 4 and 5. This is because Roma students typically live in smaller settlements and they are basically absent from grammar schools, proportionally present in vocational secondary schools and overrepresented in vocational training schools.

During the 3 waves, the a relatively big number of students dropped out of the sample. While there were 1425 students in the sample at wave 1, this number was only 980 at wave 4 (see table 3.2). Because the drop out rate was largest in the vocational training schools with high number of Roma students, the ethnic heterogeneity of the sample substantially decreased from wave 1 to wave 4. Since we are interested in interracial relations within school classes, this composition change makes the third and especially the forth wave of the data less useful for our research. Consequently, in the next chapter we have to rely on an other data base in order to investigate the stability of interracial friendship relations.

Chapter 4

Inter-racial friendship stability: the bases of relational integration

4.1 Introduction

The primary motivation of scientific research friendship formation of adolescents is often related to the efforts to lessen racial segregation and prejudice by providing students with integrated educational environment. As a theoretical support for integrated education, contact theory (Allport, 1954) is often cited, because friendship is expected to embody the equal-status intergroup contact as it can be individualised, collaborative and trusting (Allport, 1954; Pettigrew, 1998). Pettigrew's and Tropp's meta-analytic review of intergroup contact theory demonstrated that intergroup contact typically reduces prejudices among racially different groups (Pettigrew and Tropp, 2008). This research also confirmed that contacts under Allport's optimal conditions results in even greater reduction in prejudice. Based on these conclusions, advocates of integrated education usually argue that contact between minority and majority students can lead to the formation and development of social relations beyond their own racial groups. It is often implied that such inter-ethnic relationships, along with the emergence of positive attitudes towards other ethnic groups may decrease prejudice in general and increase social cohesion (Pettigrew and Tropp, 2008; Tropp and Pettigrew, 2005). Patrons also argue that peer acceptance gives students a sense of participation in school, belonging to a community and access to certain social resources (Lubbers, 2003). By providing companionship and setting behavioural examples, they can increase each other's motivation and school success (Wigfield et al., 1998) as well as lower the probability of dropping out (Hymel et al., 1996)

Nonetheless, the possible beneficial impact that cross-race friendships could provide to

individuals and to the society may be hindered if these relationships fail to develop or persist over time. Indeed, evidence of previous research undoubtedly indicates that adolescents' interracial friendship formation is a rare phenomenon. Even though Allport's (Allport, 1954) contact theory requires intergroup contact to be sustained in order to effectively reduce prejudice, there are surprisingly few studies that analysed the stability of these relationships over time. Moreover, these studies had controversial results that provoke further investigation.

Hence, in this study we follow the existing body of literature on adolescents' interracial friendship stability (Aboud et al., 2003; Hallinan and Williams, 1987; Rude and Herda, 2010) in that we control for potential mediators of interracial friendship stability such as influential factors of homophily and of friendship quality, as well as contextual effects. Our longitudinal approach however, differs from earlier attempts in that we also control for time-related aspects of friendship. As a consequence, this study adds to the state of existing knowledge by demonstrating that friendship in adolescence is a fragile relationship that is likely to dissolve as time goes on. The longer the friendship exists, however, the less likely it is to dissolve later on. Moreover, our results indicate that cross-race friendships are more likely to discontinue, however, the effect of racial difference on friendship retention is completely accounted for when controls for socio-economic status and racial heterogeneity are included in the model.

4.2 Empirical and theoretical background

4.2.1 Previous work on race and friendship

It has been long known that people tend to choose friends similar to them along several dimensions such as age, gender, socio-economic status, or race and ethnicity (Hallinan and Tuma, 1978; Kandel, 1978; McPherson et al., 2001; Tuma and Hallinan, 1979). Accordingly, previous research on friendship evolution has found that the formation of interracial friendship is relatively unlikely even in desegregated school contexts (DuBois and Hirsch, 1990; Hallinan and Tuma, 1978; Quillian and Campbell, 2003). Based on Moody's (Moody, 2001) results, school kids' odds of forming a homophilous friendship tie are 1.8 times higher than those of forming a cross-race friendship, however, contextual and organisational factors may alter this relationship. Moreover, principles and methods based on which class-decoupling and extracurricular activities are planned and carried out may both maintain segregation or increase opportunities for cross-race contacts by inducing relational integration in an otherwise segregated class setting (Moody, 2001). Nevertheless, it seems to be a general fact that cross-race friendships are

unlikely even when measurements for cross-race contact opportunity are accounted for (Joyner and Kao, 2005).

Despite of the robust results on interracial friendship formation, there has been much less attention payed to the stability of these friendships over time. It would be misleading to compare the results of previous attempts because of their rather different samples size, number of observations, composition and methodological approach. Nonetheless, we give a brief overview of the already existing body of work in order to illustrate the ambiguity of the findings.

Hallinan and Tuma (1978) studied 455 students from 10 school communities in norther Carolina. The adolescents were observed six times during one school year at approximately six-week intervals. The researchers focused on the stability of best friend choices, and they found that students' different-race friendships are similarly stable to their same-race friendships. While the stability of interracial and same-race friendships is influenced by classroom characteristics, it is more strongly influenced by ascribed and achieved characteristics of students.

Aboud et al. (2003) analysed 240 elementary school students' mutual friendships in Montreal, each of whom was individually interviewed twice within a six-month time-period. As the result of their four-way analyses of covariance, these scholars find that the likelihood for of friendship retention for different- and same-race ties are significantly differ from each other.

Rude and Herda (2010) used the first two waves of the Add Health data, a nationally representative sample of U.S. high schools. Their sample contained 5494 students with only one nomination per Ego in order to maintain the assumption that the observations are independent of on another, and only same sex best friendships were considered. The authors found that cross-race friendship ties are less durable than same-race ones, even when the models are controlled for different contextual and dyadic characteristics. Their results show that friendship stability is not determined by dyadic features besides the racial composition of the friendship dyad. Furthermore, relational characteristics such as closeness or reciprocity not only increase friendship stability, but mitigate the effect of race as well.

Although, these studies differ from each other in several aspects, they have some important common features. They all take an approach from the research on friendship formation in which the selection of friends is explained by dyadic similarity, Consequently, friendship retention is assumed to be influenced by homogeneity bias, or in statistical terms network autocorrelation (Doreian, 1989).

The origin of *network autocorrelation* is not self-evident and multiple explanatory theories

exist. Steglich and his co-authors give a well-summarised description of the main explanations (Steglich et al., 2010) . Since Lazarsfeld and Merton (1954) first depicted the role of *homophily* in friendship formation, many scholars have proved that similarity between individuals promotes continuous attraction and interaction (McPherson et al., 2001). However, different network formation processes may operate similarly to homophily, but for different reasons; hence, it is important to distinguish among them (Feld, 1981; Feld and Elmore, 1982; Steglich et al., 2010).

First, as Steglich et al. (2010) points it out, friendship formation in different *social contexts* is influenced by the particular meeting *opportunity*, and consequently it prevents us form inferring a causal role of the dyadic similarity in tie formation. For this reason, while homophily is assumed to have a casual effect on friendship formation, context is assumed to be correlated with it. Nonetheless, previous attempts on friendship stability take similarity on several individual dimensions into account while controlling for the social context. Second, it was shown that *endogenous network formation processes* of friendship dynamics (e.g. triadic closure or balance) can also result in greater dyadic similarity (Berndt and Keefe, 1995; Feld and Elmore, 1982; Van De Bunt et al., 1999).

Even though previous studies on friendship stability acknowledge the importance of endogenous network dynamics, they conceptualise them as more of a measure of friendship quality rather then controls for (homophilous) selection. We would like to argue that while both aspects are substantively important, the latter one has extra methodological consequences. In order to evaluate endogenous network mechanisms according to statistical inference one needs to use special methodological tools designed for this purpose. Previous research on friendship stability did take advantage of such a statistical tool suggested for instance by Steglich and his co-authors (Steglich et al., 2010). Hereby, albeit we do not follow these suggestions in order to have a more solid bases on which we can compare our result to those of previous attempts, but at the same time we would like to stress that exploiting the suggested statistical tool shall be the next step of this research agenda.

4.2.2 Individual attributes

First and foremost we would like to know whether friends from different *racial background* are less likely to retain their relationship compared to those from similar social background. Because racial difference is likely to be correlated with other individual attributes, we have to take these into account in order to answer our main question. Without forming specific

hypotheses, we predict that same-race friendships are more likely to be retained over time, but we expect individual attributes to alter or mitigate this effect to some extent.

Previous research on same- and cross-*gender* friendships led to diverse results. It is clear that same-gender friendships are much more prevalent than cross-gender friendships (Epstein, 2011), however adolescents start developing friendships with others of the opposite gender (Connolly et al., 2000; Feiring, 1999; Pellegrini, 1994; Poulin and Pedersen, 2007; Tuma and Hallinan, 1979). Some scholars would argue that differentiating between cross-gender friendships and cross-gender romantic relations at this age is problematic, and consequently they only consider same-gender friendships in their analysis (Rude and Herda, 2010). Even though we could not find strong theoretical arguments or consistent empirical findings that explain gender differences in cross-race friendships, we controlled for the gender-composition of the friendship dyad in our preliminary models.

Even though earlier research on adolescents mixed-*age* friendships is very limited, we know that the opportunity to make friends with peers from different age groups increases during high school (Rubin et al., 2008). One could argue that this kind of friendship might be beneficial for the younger children which can make the relationship likely to develop, but since the satisfaction of the partners might be unequal, this relationship is also likely to be unreciprocated and less stable over time. Again, we do not have specific arguments that could explain age differences in cross-race friendships, but we took the possibility of homophily on age into account in our preliminary models.

Differences in students' *achievement* level on the other hand might effect the stability of cross-race friendships. It can be argued that friendship with successful students is more desirable as it can serve as a signal of status or a source of motivation, so differences in academic performance may positively affect the stability of students with lower performance level. Furthermore, it is known that Hispanic and Black students' achievement level is usually lower then that of White's, consequently, one could argue that interracial friendship choices of minority students may be more stable than those of majority students.

Similarly to school achievement, one can also think about possible correlation between the discrepancy in *socio-economic status* and the stability of a cross-race friendship dyad. Because friendships with students from better socio-economic background are assumed to be more desirable and majority students are more likely to come from those families, the difference in status might influence cross-race friendship stability over time.

4.2.3 Contextual factors

Furthermore, previous studies on interracial friendship stability take into account the effect of the social context that determine same-race and cross-race contact opportunities. The main argument behind this consideration comes from (Blau, 1977), who explained that even for mathematical reasons, intergroup contact should be bigger for groups with less members.This is because as the size of one's own group increases, the opportunity for making intergroup connections decreases.

Moreover, as McFarland et al. (2014) points it out, whilst the group-formation might happen on the bases of externally determined individual characteristics, their salience and their distribution in the network are related to each other in a way that generally well-spread characteristics are less likely to be the basis of sorting (Frank et al., 2008).

Moreover, psychological theories also suggest that relations become more unstable as attractive alternatives become more easily available (Levinger, 1976). Moody's research indicates that the increase in racial heterogeneity result in lower preference for cross-race friends. He found that friendship segregation is the highest in a community when heterogeneity is moderately high, which technically means that there are two, more or less similar sized ethnic groups in the school. However, above a certain level of heterogeneity interracial friendships become more popular (Moody, 2001). Based on these theoretical and empirical findings on friendship formation, we expected racial heterogeneity to be influential on cross-race friendship stability and introduced it to our models.

4.2.4 Relational characteristics

Past research on friendship stability accounts for the relational characteristics of the friendship dyad in order to control for the quality of the friendship. Most of the measures of friendship quality are captured by endogenous network mechanisms that could be responsible for the evolution of the network. One exception is the "best-friend" nomination which is either the dependent variable of the analysis or a control variable for the quality of the relationship. Furthermore, following social exchange theory (Emerson, 1976; Rusbult and Buunk, 1993), the effect of reciprocity is often accounted for in the models. As the theory argues, people invest into their relationships and aim to get some reward for their time and effort. Consequently, they actively look for reciprocated friendships instead of non-reciprocated ones. Furthermore,

On top of these measures, we also accounted for the number of shared friends Ego and Alter has in common, assuming that the higher number of shared friends makes the relationship more stable over time.

4.2.5 Cost of maintenance

Finally, contrary to previous studies we examine the effect of variables that capture the longitudinal nature of the data. Following the arguments of social exchange theory (Emerson, 1976; Rusbult and Buunk, 1993) we expect friendship relations to be costly to maintain, and if the cost of the investment results in no return, that is the friendship tie is not reciprocated, it is likely to be dissolve over time. We also expect friendship dyads to become less stable when friends change social context together (they move to a different school environment) which makes possibly attractive alternatives readily available and homophilous selection easier. However, we assume that time spent together is also a factor that, in itself, increases the likelihood of friendship stability (Block et al., 2015; Homans, 2013).

4.3 Data

In order to find out whether the racial composition of the friendship dyad influences its stability over time we used the data of American school children from the PROSPER project. PROSPER is an evaluation program to study the substance use interventions among adolescents. Even though there was no special focus on race in this project the research design guaranteed some heterogeneity on race in the sample. In order to make sure there are students at significant risk of substance use, the sample targeted school districts in which at least 15% of families are enitled for free or reduced cost school lunch.

In this project there were two grade cohorts followed starting from the beginning of the 2002-2003 and 2003-2004 school year for the two cohorts. The assessments took place in the school first in the fall of the 6th grade, then once again in the spring of the same year, and then on one more time every following year for 4 years. This 5-wave panel data was collected from 28 rural school districts in Iowa and Pennsylvania where more than 16 000 students filled out at least one school questionnaire and about 12.000 students responded each wave. The average participation rate of students was 87% but the over-time rate of participation naturally lowered. Among the 12.245 first wave respondents, 90% completed 3 waves, 85% completed 4

and 71% completed all 5 waves. On average, in the 5-wave sample 50% of the students was female, 35% of them was entitled for free lunch and 80% of them was White.

The relatively big size of the sample compensates for the moderate racial heterogeneity and the real advantage of the data is that the observation was repeated 5 times. This is important, because the duration a friendship choice is usually unknown for choices that were already in existence before the data collection and / or were still in existence at the end of the observation period. Even though this data cannot help the fact that some of the dyads are left-censored (and probably also right-censored), it allows us to control for the time period the friendship was already in existence within the observation window.

For the analysis we restricted the original PROSPER sample to those with valid data on race and we focused only on students who declared themselves to be either White, Hispanic or Black. The proportion of students who identified differently was so small (6.4%) that these students were removed from the sub-sample. Moreover, we selected only schools where the proportion of the non-White population was at least 15% in each and every wave and the proportion of missing data on Race was less than 20%. We decided to further restrict our sample for observations with valid data on being entitled for free lunch in school, because it serves as the key control variable of the analysis. This procedure resulted in a sub-sample of 2190 students in 10 school communities. Among them, 48% was female, 37% was entitled for free lunch in school and regarding race, 72% of them was White, 19% was Black and 9% Hispanic (Moody et al., 2011).

This final sub-sample of the PROSPER data is relatively similar to the RECENS data (see table 3.2) and due to its long-term longitudinal nature we are able to examine the stability of cross-race friendships in detail, while controlling for potential mediators of interracial friendship stability such as socio-economic status, local-friendship embeddedness and school context effects as well as dynamic features related to duration, development and changes in school contexts.

The in-grade friendship networks of these students were measured over the 5 waves and 2 cohorts by using open name generator technique. Students were asked to name friends by answering the question "Who are your best and closest friends in your grade?", where two names were allowed for best friends and five names for "other close friends". Finally, we decided to further restrict the subsample by excluding those friendship nominations from the analysis where Ego, Alter or both had missing data on Race. Because this restriction concerned only the 6.6% of the observations, no imputation techniques were used.

4.4 Measurements

The dependent variable of the analysis is the retention of the friendship dyad between two consecutive waves. In order to create dyadic-level data records were created for all possible dyadic combinations of students within each schools and each waves. Then, measurement of friendship retention was created in the form of a binary variable that takes the value 1 if the friendship dyad existing in a particular time of observation already existed in the previous time of observation. The students in the sub-sample had 2.99 friendship nominations on average adding up to 18.868 nominations which is the total number of observation in the analysed sample.

Our research interest primarily concerns the racial composition of the friendship dyad what is the main explanatory variable of the analysis. Even though the questionnaire allowed for multiple identification, we do not have information this because the race variable in the PROSPER data was constructed along mutually exclusive categories: White, Hispanic, Black, Native American, Asian and other. Students belonging to the latter three categories were removed from the final sub-sample due to their relatively small number. The racial composition of the dyad was determined in two ways. Firstly, we classified same race friendship dyads as a binary variable that takes the value 1 when both Ego and Alter are of same race (White-White being the reference category) and controlled for Ego's race (again, leaving White as reference point). Secondly, we decomposed the same race and different race friendship dyads taking all 9 possible combinations into account. We included 8 binary variables into the models, leaving out White-White friendship nominations.

In order to account for the longitudinal nature of the data we introduced time dummies into the models that control for the time period in which the friendship retention was measured, relatively to the period between wave 1 and 2 which is the reference category. Moreover, we also controlled for the number of time periods the friendship dyad was retained before the observation. The variable 'duration' ranges from 0 to 3 and has mean of 0.27. Finally, we also controlled for the event when the social context and pool of available friends for Ego and Alter changed, because their school merged together with an other school in the sample. The 'merge' variable has the value 1 when the friendship dyad at time n belonged to different school than at time *n-1*.

Furthermore, we introduced three variables to the model accounting for the quality of the friendship. The variable 'best friend' has the value 1 if Ego nominated Alter as her or his best friend. The 'mutual friend' variable takes the value 1 when Ego's friendship nomination

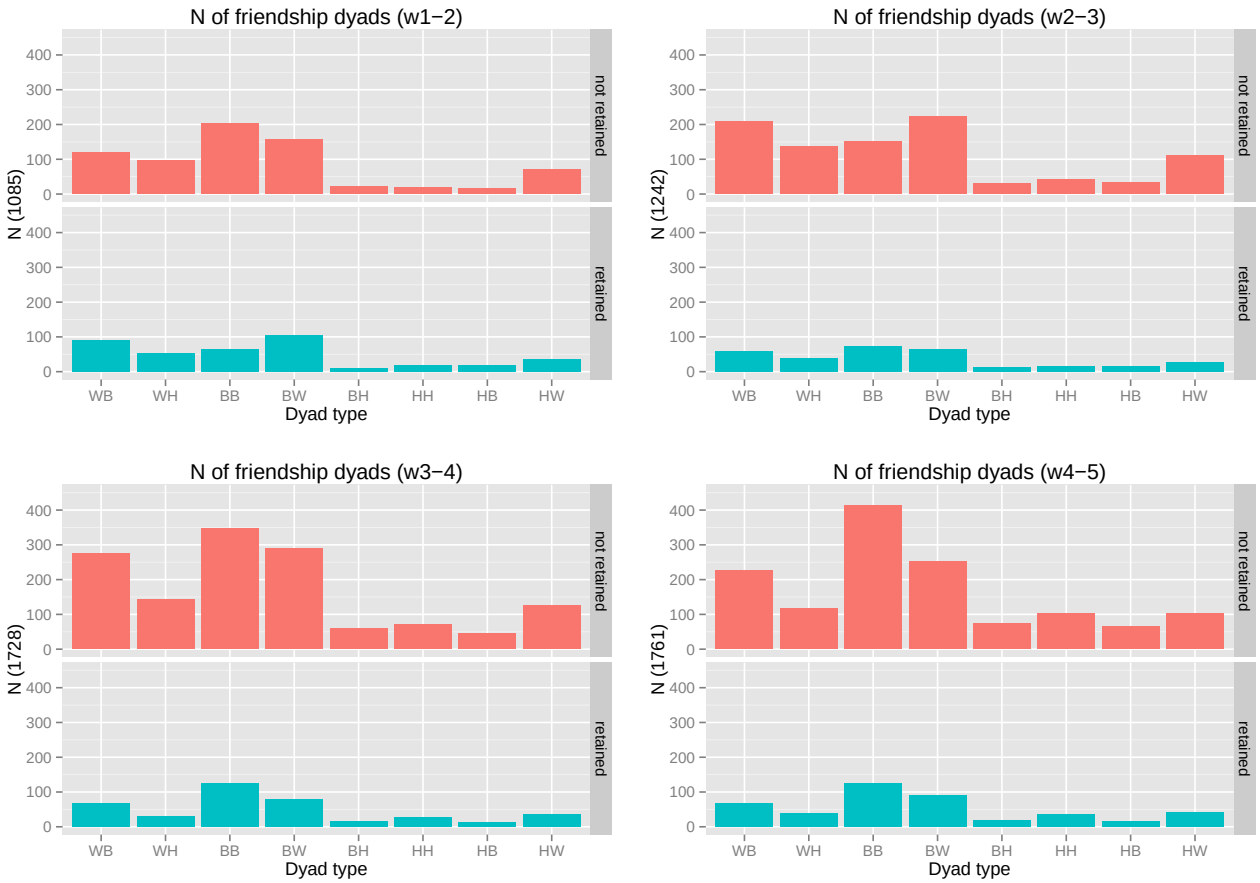


FIGURE 4.1: Friendship retention by racial composition of the dyad for every period 1-4

was reciprocated by Alter. There is 1.09 best friend nomination per student on average in the sub-sample and 43% of the nominations was reciprocated. Finally, we accounted for the number of shared friends Ego and Alter have in common. This variable has the range of 0-17 and the mean of 2.67.

The effect of the racial composition of the dyad was controlled for several other characteristics of Ego and Alter. However, similarity on gender, two-parents family background, performance and age all remained insignificant next to the substantial effect of social status measured by entitlement for free lunch. The variable 'same free lunch' has the value one when both Ego and Alter are entitled for free lunch, and it is controlled for Ego's social status in the models which is also 1 when Ego is entitled for free lunch.

Last but not least we calculated the Blau's Index for each school in every wave in order to control for the racial heterogeneity of the group. The index is 0 in case of perfect homogeneity of the majority group, 0.5 if there is perfect heterogeneity within the group and 1 in case of perfect homogeneity of the minority group. In the analysed sub-sample the Blau's Index ranges from 0.21 to 0.5 with a mean of 0.37. It is important to note that the effect of racial heterogeneity on friendship retention is not linear. Following Moody's work (Moody, 2001), we

Table 4.1: Distribution of friendship dyads (%)

	Friendship: not retained	Friendship: retained	Race: same	Race: different
Race: different	22.68	18.66		
Ego's Race: White	77.12	80.75	87.63	43.75
Ego's Race: Black	16.78	13.88	10.13	37.06
Ego's Race: Hispanic	6.10	5.37	2.23	19.20
Period 1-2	14.97	26.53	18.13	19.52
Period 2-3	23.66	19.57	22.06	23.81
Period 3-4	30.54	26.23	29.28	29.14
Period 4-5	30.83	27.68	30.53	27.54
Duration: 0 period	95.40	50.29	81.08	84.90
Duration: 1 period	3.63	29.64	11.86	9.80
Duration: 2 periods	0.97	11.85	4.47	3.33
Duration: 3 periods	0	8.22	2.59	1.97
Merge	62.47	62.09	65.35	51.42
Best friends	34.34	70.90	46.41	41.15
Mutual friends	38.67	71.47	50.08	42.68
Av. N of shared friends	2.28	3.49	2.76	2.20
Same SES (free lunch)	68.65	75.01	74.78	55.12
Ego's SES (free lunch)	31.19	23.23	26.37	37.75
Av. racial heterogeneity	36.63	37.52	36.57	38.09

The table shows the proportion of not retained and retained friendship dyads as well as same-race and difernet-race friendship dyads by explanatory variables of the "Basic" regression models. 100% can be calculated by adding up the categories of the explanatory variables; in case of binary variables, the reference category is missing.

tried to dichotomise the variable so it could capture the low, the middle and the high level of heterogeneity. However, because of the relatively low variance of race this variable would have been strongly collinear with Ego's race, hence we we used Blau's index in its continuous form.

4.5 Methods and models

The subject of the research is the retention of a friendship dyad between two consecutive waves. In order to generate dyad-level data for the analysis, units of observation for all friendship nominations of the students within each of the 10 schools communities and 5 waves were created. Our analytic strategy treats each dyad in each discrete observation period as a separate unit of the analysis. Records of friendship nominations were created in each wave and if the friendship nomination was present in the next wave then the dependent variable 'friendship retention' was

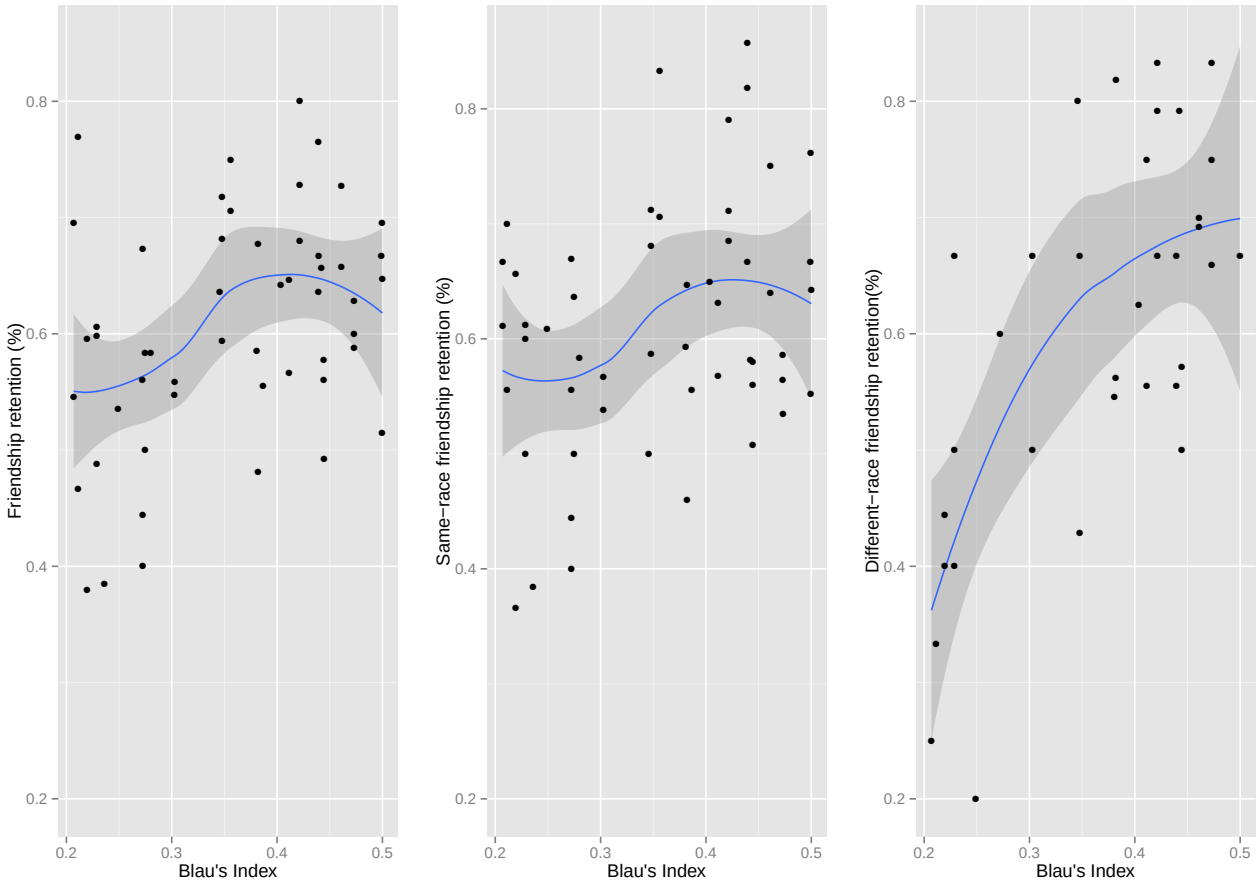


FIGURE 4.2: Racial composition and friendship retention

coded 1 and 0 otherwise. In cases when measurement of friendship retention was impossible because at least one member of the friendship dyad left the sample at time *n*, the dyad was removed from the analysis at time *n-1* in order to avoid the underestimation of friendship stability. Then observations were pooled with the exception of friendship dyads that were only present in the 5th wave. Consequently, a friendship dyad is included in the analysis once if it was not retained between two consecutive waves, twice if it was retained between two consecutive waves and maximum four times if it was retained between wave 1-2, 2-3, 3-4 and 4-5 as well. Instances where the friendship dyad was observed in a certain time period, then it was observed only at least two periods afterwards (n=2097) did not qualify as stable friendship dyads. We assigned explanatory variables to the dyad based on the attributes Ego and Alter had at the particular time of observation.

Since the dependent variable of the analysis has two possible outcomes (friendship retention or dissolution) and the observations are clustered within schools, we estimated a set of hierarchical logistic regression models in order to predict friendship stability.

Snijders and Bosker (2011) describe multilevel analysis as a stream that has two offshoots. One of them is *contextual analysis* that was developed in the social sciences in order to examine

the effect of social context on individual outcomes. The other one are *mixed-effects models*, statistical tools in the analysis of variance and in regression analysis where it is assumed that some of the coefficients are fixed and others are random. Multilevel analysis as we now know it was formed by these two stream coming together, when it was realised that the individuals and the context are different sources of variability and both should be modelled as random influences (Snijders and Bosker, 2011).

In educational studies the collected data is usually of multilevel nature. This is because such studies require a multistage sampling design where the procedure is carried out selecting gradually smaller sampling units to the sample. For example the selection of schools or school classes is followed by the selection of individuals belonging to a certain classroom. The use of this sampling design is rather obvious when someone is interested in macro-micro relations, and somewhat less obvious, but often necessary if micro-level propositions are our primary concern (Snijders and Bosker, 2011). Here we control for the longitudinal structure of the data by including time dummies in the model, refer to primary unites (schools or school classes) as *macro-level* units that provides the social context, and the secondary unit (individuals) as *micro-level* unit that we are primarily interested in.

Hierarchical regression model are often used to address the multilevel nature of the data at hand. It differs from the usual multiple regression model in that the equation defining the hierarchical linear model incorporates more than one error term: at least one for each level in order to capture the unexplained variance both on the micro-level and the macro-level. Since our data base is clustered on the school level and we examine whether the racial composition of the friendship dyad influences its stability, we use hierarchical logistic regression models to determine the survival of the *friendship dyad*.

Even though this method provides a solution for the above mentioned problem arising from the nested nature of the data, it cannot solve the problem originating from the presence of relational variables in the model. Since our outcome measure is dyadic (the existence of a friendship tie between Ego and Alter), it is influenced by endogenous relational processes in the network. Even though our models might capture some of these processes, they are surely inefficient to appropriately account for longitudinal network evolution (see the subsection Methodological consequences of the relational approach). For situation like this – when the assumption of independence has failed – heteroscedasticity-consistent standard errors or Huber–White standard errors can be computed in order to test the deviation from the original restrictions of nested regression models (Huber, 1967; White, 1980). In practice, one can compute the so called "robust" standard errors in the R language environment, proposed by

Zeileis (2006). We used the *robust* package in *R* for this purpose, and the results tables A.5 and A.6 in the Appendix clearly show that the standard errors of regular GLM estimates and the heteroskedasticity-consistent "robust" standard errors are basically identical.

We created two sets of models that differ from each other in their base-line (model 1). In case of the first sets of "Basic models" the same-race friendship choice is included in the analysis as a base-line against which we interpret the stability of cross-race friendship choice while controlling for Ego's race. The second set consists of "Desegregated models" that account for every possible dyadic combination of cross-race. White-White nomination is included as a base-line against which we can interpret the rest of the 6 possible cross-race-dyads. The common feature of the two base-line models is that they both involve binary controls for the time period when the friendship retention was measured.

From this point, the set-up of the "Basic" and "Desegregated models" follows the same logic as they introduce identical variables in the same order. The only difference between the two models is caused merely by interactions between variables included in the base-line part and variables included later in the models. Models 2 and 3 account for the longitudinal nature of the data as they introduce additional variables that capture time-varying effects on friendship retention. Model 4 includes variables that measure the quality of the friendship dyad. Model 5-7 account for the social status composition of the dyad by controlling for "Same free lunch", "Ego's free lunch" and its interactions with race. Finally, Model 8 and 9 capture the heterogeneity on race in the given school as it introduces Blau's Index and its interactions with race to the model.

4.6 Results

4.6.1 Descriptive analysis

Figure 4.1 illustrates the number of retained and not retained friendship dyads between each consecutive wave broken down by the racial composition of each dyad type. The complete figure with the White-White dyads is only presented in the Appendix A.1 and it is revealing from two perspectives. First, it describes the distribution of dyads among racial categories making it obvious that the vast majority of the observations consist of White-White dyads. Second, and more importantly, it suggests that the number of friendship nominations increased over time. While between wave 1 and 2 3466 friendship nominations were either retained or not retained, this number was 4228 for the second period, 5496 for the third and 5690 for the fourth. On

Figure 4.1 by taking out the White-White nominations we can more easily compare the size of the bars in the retained and not retained categories. This comparison clearly tells us that despite of the increase in the total number of friendship nominations, friendship retention is unlikely both for same-race and cross-race dyads.

Table 4.1 presents the distribution of the independent variables within the two categories of the dependent variable and within the two categories of the main explanatory variable. Even though only two dimensional relations are presented here, the table sheds light on the differences in the distribution of each independent variable between not-retained and retained friendship and same- and cross-race friendships. The independent variables are listed in a way as they appear in the "Basic models" and in case of binary variables the reference category is left out for the sake of simplicity.

The left hand side of the table suggests that even though different-race friendship dyads are somewhat more frequent within not retained friendship nominations than within retained ones, the distribution of retained friendship nominations do not substantially differ from not retained nominations regarding Ego's race or the observed time period. The "Duration" variable on the other hand suggests that the pre-history of the friendship dyad might have a strong effect on friendship retention. While the 95.4% of the not retained friendship dyads did not survive more than one period (two consecutive waves), 50.29% of the retained friendship dyads terminated immediately after the observation, 29.64% has already been in existence for one period (two consecutive waves), 11.85% for two periods and 8.22% for 3 periods. Moreover, whereas the 70.9% of the retained friendship nominations is 'Best friend' nomination and 71.47% of them is also mutual nomination, these proportions are 34.34% and 38.67% within the not retained friendship category. The quality of retained and not retained friendships is furthermore different in that while Ego and Alter of the former friendship dyad have 3.49 shared friends on average, this number is only 2.28 for the latter dyad. It can be also said that social background seems to have a moderate effect on friendship retention as friendship dyads where both Ego and Alter is entitled for free lunch are more likely to be retained. In addition, students from lower social background are more likely to terminate friendships than students with higher social status.

The right hand side of the table describes the difference between same-race and different-race friendship dyads along the categories of other independent variables. When it comes to Ego's race it is clear that the majority of same-race friendship consist of White-White nominations (87.63%) whereas the different-race friendship nominations are more equally distributed along racial categories, suggesting tendency for homophily among White students and more open friendship choices among Black and Hispanic students. In general, it can also be said

that the quality of the friendship is somewhat lower for different-race friendship dyads than for same-race dyads as the former ones are less likely to be best friendships, less likely to be reciprocated, furthermore Ego and Alter of these dyads have less friends in common. Regarding social background, it can be stated that it is much more likely for same-race dyads (74.78%) than for different-race ones (55.12%) that both Ego and Alter is entitled for free lunch. Moreover students from lower social background tends to engage in different-race friendships (37.75%) more often than in same-race friendships (26.37%), suggesting that social background might have some impact on friendship choices.

Even though the average level of racial heterogeneity within the schools does not seem to be in a strong relation with either friendship retention or the racial composition of the dyad, Figure 4.2 tells a different story. Albeit the average level of racial heterogeneity within a school is very similar for same-race and different-race friendship dyads as well as for retained and not retained friendships, the distribution of racial heterogeneity seems to have a different effect on same-race than on different race friendship retention. Whereas the probability of same-race friendship peaks when the heterogeneity is around 42% then it declines, the probability of cross-race friendship retention seems to be increasing as racial heterogeneity grows.

4.6.2 Regression analysis

The dependent variable of the regression analysis is Ego's friendship choice of Alter, and the independent variables are supposed to have an effect on the survival of this friendship dyad. We excluded earlier those controls of individual similarity from the final models that did not have a significant effect on friendship retention in order to minimise the number of missing observations.

Table 4.2 presents odds ratios and significance levels of the "Basic models". According to the base-line, different-race friendship nominations are 0.78 times less likely to be retained between two consecutive waves than same-race ones. Black students are also less likely to retain their friendship nominations (Odds Ratio (OR)=0.87), but Hispanic students do not differ significantly from Whites in this regard. More importantly, model 1 also indicates that friendships are indeed costly, hence they are likely to dissolve between two consecutive waves. This is because the binary control variables for time are all below zero (OR=0.45, 0.48, 0.5) and they remain significant in every following model, demonstrating the robustness of this finding.

However, the "Duration" of the friendship also has a strong and positive effect on friendship retention (OR=10.68), indicating that the longer the friendship exists, the more stable it

becomes. With the introduction of this variable in model 2 the variable "Ego's race: Black" looses its significance, suggesting that Black-ego friendship nominations are just as likely to be retained as White-ego nominations if the dyads were observed the same number of times previously. The parameter of the "Merge" variable is below zero and similarly robust (OR=0.71), which tells us that the school shift has a negative effect on friendship stability.

Model 3 presents the parameter estimates of the variables that supposed to capture the quality of the friendship. The variables "Best friend", "Mutual friend" as well as "N of shared friends" all have a positive and significant effect on friendship retention (OR=2.23, 1.75, 1.12) and contrary to the previous variables, they do a relatively good job mitigating the effect of "Different race". Whereas in model 2 the value of this parameter is 0.82 and significant on every conventional level, in model 3 this number is 0.90 and barely significant.

In model 4, we originally introduced a list of control variables of individual similarity, none of which had a significant effect on friendship retention with the exception of socio-economic status, measured by entitlement for free lunch. It turns out that the variable "Same SES" has a positive and significant effect on friendship stability (OR=1.13) and it seems to mitigate the remaining effect of "Different race". This suggests, firstly and not surprisingly that race and socio-economic status are correlated, and secondly that dyadic similarity on SES has a more influential effect on friendship retention than difference on race.

However, when "Ego's SES" gets introduced in model 5, the "Different race" variable becomes slightly significant again, while "Same SES" looses its significance. This is because low socio-economical status has a negative effect on friendship retention (OR=0.84) and it also intensifies the effect of "Different race" when Ego comes from low socio-economic background whereas Alter does not.

Model 6 explains the effect of SES on friendship retention more clearly. The interaction term "Ego's SES*Same SES" is below 1 and significant (OR=0.83), while the main effect of "Ego's SES" is not significant anymore and the main effect of "Same SES" becomes significant again (OR=1.15). This suggests that the likelihood of friendship retention of a low-SES – high-SES dyad is not significantly different that of a high-SES – low-SES friendship dyad. Moreover, low socio-economic position of both Ego and Alter makes the friendship more likely to discontinue, whereas shared high status position creates stability. Finally, the fact that the parameter of "Different race" is unaltered in this model (OR=0.91) reinforces the result of model 5, that is, difference in Ego's and Alter's race has a negative impact on friendship retention when Ego is in low status position whereas Alter has high status.

However, as the interaction term "Same SES*Different Race" in model 7 demonstrates,

when both Ego and Alter are from the same (low) socio-economical background, the likelihood of friendship retention is significantly larger (OR=1.19) despite of the racial difference. In the meantime, the previous interaction term of "Ego's SES*Same SES" as well as the main effect of "Same SES" remains unaltered, while the main effect of "Different Race" becomes more significant.

Last but not least, it turns out from model 8 that the increment in racial heterogeneity in the school community increases the likelihood of friendship stability, in the meantime it leaves the previous conclusions unaltered.

TABLE 4.2: Basic models: odds ratios from logistic regression estimates of friendship retention

	Dependent variable:							
	Friendship retention							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Different race	0.78***	0.82***	0.90*	0.92	0.91*	0.91*	0.94**	0.94**
Ego's race: Black	0.87***	0.94	0.92	0.92	1.00	1.02	1.02	1.01
Ego's race: Hispanic	0.97	1.01	1.01	1.01	1.05	1.06	1.06	1.06
Wave2-3	0.45***	0.33***	0.31***	0.31***	0.31***	0.31***	0.31***	0.31***
Wave3-4	0.48***	0.33***	0.31***	0.31***	0.31***	0.31***	0.31***	0.30***
Wave4-5	0.50***	0.40***	0.37***	0.37***	0.37***	0.37***	0.37***	0.35***
Duration		10.83***	6.55***	6.53***	6.52***	6.51***	6.51***	6.44***
Merge		0.71***	0.62***	0.62***	0.62***	0.63***	0.63***	0.62***
Best friend			2.23***	2.23***	2.25***	2.25***	2.25***	2.24***
Mutual friend			1.75***	1.74***	1.73***	1.74***	1.73***	1.72***
N of shared friends			1.12***	1.12***	1.12***	1.11***	1.11***	1.11***
Same SES				1.13***	1.07	1.15**	1.15**	1.16**
Ego's SES					0.84***	0.93	0.96	0.96
Ego's SES*Same SES						0.83*	0.83*	0.82**
Same SES*Different race							1.19*	1.19*
Racial-heterogeneity								11.85***
Constant	0.79***	0.66***	0.30***	0.27***	0.30***	0.28***	0.29***	0.12***
Observations	18,868	18,868	18,868	18,868	18,868	18,868	18,868	18,868
Log Likelihood	-11,293.38	-8,713.38	-8,225.99	-8,222.02	-8,216.70	-8,215.07	-8,213.59	-8,203.42
Akaike Inf. Crit.	22,602.76	17,446.76	16,477.98	16,472.04	16,463.40	16,462.13	16,461.19	16,442.84
Bayesian Inf. Crit.	22,665.52	17,525.21	16,579.97	16,581.88	16,581.08	16,587.65	16,594.56	16,584.05
Note:								*p<0.1; **p<0.05; ***p<0.01

Table 4.3 presents the results of the desegregated models. Here, the reference category is the "White-White" friendship nomination, and the main independent variable "'Different Race" is replaced by the 6 possible combinations of different race nominations. As a result, this table provides us with more detailed picture of cross-race friendship stability. According to model 1, with the exception of "Hispanic-Black" nomination, the retention of every other cross-race friendship dyad is less likely than that of a "White-White" dyad. However, after controlling for the duration of the friendship and the event of merge in model 2, only 3 parameters remain significant: "White-Black" (OR=0.81), "White-Hispanic" (OR=0.75) and "Black-White" (OR=0.80) friendships are more unstable than "White-White" nominations. Moreover, in model 3, the measurements of friendship quality seem to mitigate the significant

effect of "White-Hispanic" and "White-Black" variables, leaving "Black-White" nominations (OR=0.87) significantly different from "White-White" nominations.

However, when we control for the SES of the cross-race dyads in model 7, the main effects of "White-Black" and "Black-White" nominations become significant again (OR=0.73, 0.80), while the interaction effect of "Same SES*White-Black" is positive and significant (OR=1.47). This suggests that the previously observed negative effect of cross-race friendship (in Table 4.2) is mainly driven by the significant effect of unstable "White-Black" nominations and the moderately significant effect of unstable "Black-White" nominations. Nonetheless, while similarity on low social status makes the "White-Black" friendship nominations more likely to be retained, it does not influence "Black-White" friendship retention. Moreover, similarity on high socio-economic status does not increase the likelihood of friendship retention anymore, since the main effect of "Same SES" is not significant, but similarity on low SES does still significantly lower the likelihood of friendship retention (OR=0.84).

TABLE 4.3: Desegregated models: odds ratios from logistic regression estimates of friendship retention

	Dependent variable:							
	Friendship retention							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
White-Black	0.74***	0.81**	0.87	0.90	0.89	0.91	0.73**	0.73**
White-Hispanic	0.69***	0.75***	0.87	0.88	0.87	0.88	0.86	0.87
Black-White	0.78***	0.80***	0.87*	0.90	0.92	0.91	0.80*	0.80*
Black-Hispanic	0.68**	0.90	1.02	1.06	1.10	1.12	1.26	1.25
Hispanic-White	0.74***	0.83	0.90	0.91	0.93	0.92	0.81	0.82
Hispanic-Black	0.90	0.84	0.87	0.90	0.92	0.94	0.99	0.99
Wave2-3	0.46***	0.33***	0.31***	0.31***	0.31***	0.31***	0.31***	0.31***
Wave3-4	0.48***	0.33***	0.31***	0.31***	0.31***	0.31***	0.31***	0.30***
Wave4-5	0.50***	0.40***	0.37***	0.37***	0.37***	0.37***	0.37***	0.35***
Duration		10.84***	6.56***	6.54***	6.52***	6.51***	6.51***	6.44***
Merge		0.71***	0.62***	0.62***	0.62***	0.63***	0.63***	0.62***
Best friend			2.22***	2.23***	2.25***	2.25***	2.26***	2.25***
Mutual friend			1.75***	1.74***	1.73***	1.73***	1.74***	1.73***
N of shared friends			1.12***	1.12***	1.12***	1.11***	1.11***	1.11***
Same SES				1.13***	1.07	1.15**	1.09	1.10
Ego's SES					0.84***	0.93	0.92	0.92
Ego's SES*Same SES						0.84*	0.84*	0.83*
Same SES*White-Black							1.47**	1.45**
Same SES*White-Hispanic							1.04	1.03
Same SES*Black-White							1.26	1.26
Same SES*Black-Hispanic							0.78	0.78
Same SES*Hispanic-White							1.20	1.22
Same SES*Hispanic-Black							0.89	0.88
Racial-heterogeneity								11.70***
Constant	0.78***	0.66***	0.30***	0.27***	0.30***	0.28***	0.29***	0.12***
Observations	18,868	18,868	18,868	18,868	18,868	18,868	18,868	18,868
Log Likelihood	-11,295.52	-8,713.52	-8,226.53	-8,222.57	-8,216.09	-8,214.56	-8,210.94	-8,200.85
Akaike Inf. Crit.	22,613.04	17,453.03	16,485.07	16,479.13	16,468.18	16,467.12	16,471.89	16,453.69
Bayesian Inf. Crit.	22,699.34	17,555.02	16,610.59	16,612.50	16,609.39	16,616.18	16,668.02	16,657.67

Note: *p<0.1; **p<0.05; ***p<0.01

So far we emphasised the effect of socio-economic status on friendship retention and concluded that what might seem to be a racial difference for the first sight, is in fact caused by the discrepancy in socio-economical background. The difference in socio-economic background enhances the effect of different race on friendship retention especially among Black and White adolescents. However, we should not forget that the evolution as well as the stability of social relations are also influenced by endogenous network processes. Unfortunately, the methodological tool we chose does not allow us to examine the effect of endogenous network processes according to statistical inference. Nevertheless, we ran our models without the variables capturing the quality of the friendship in order to check the validity of this assumption and the robustness of our results.

Table A.3 and Table A.4 in the Appendix represent the "Basic models" and the "Desegregated models" without the variables "Best friend", "Mutual friend" and "N of shared friends". The main conclusion of these tables is that without variables that capture friendship quality as well as endogenous network processes to a very limited extent (by the variables "Mutual friend" and "N of shared friends"), controls for SES do not mitigate the negative and strongly significant effect of cross-race friendship nominations. More precisely, the likelihood of friendship retention in case of cross-race nominations that involve either Hispanic Ego or Alter, is statistically similar to the stability of "White-White" nominations, but the relative instability of "White-Black" and "Black-White" dyads remain unaltered – and not even similarity on SES can make it more stable.

4.7 Conclusion

The main motivation of our work comes from the promises of integrated education. There is a growing consensus that true racial integration requires more than merely putting people of different categories into proximity (Moody, 2001; Pettigrew and Tropp, 2008; Stark, 2011; Swart et al., 2010; Turner et al., 2007): true integration occurs not just when people are in similar settings, but when they interact as equals. For adolescents, this involves forming and maintaining social relations and social scientists, school administrators and the general public are interested in understanding the features that shape friendship formation across race, since research shows repeatedly that substantive social contact reduces prejudice, increases social cohesion and fosters positive social acceptance of difference and diversity (Allport, 1954; Pettigrew and Tropp, 2008; Tropp and Pettigrew, 2005). In turn, scholars argue that peer acceptance gives students a sense of participation in school, community membership and access to greater social resources

(Lubbers, 2003). By providing companionship and setting behavioural examples, peers increase the motivation and school success of one an other (Wigfield et al., 1998), furthermore it lowers the likelihood of dropping out (Hymel et al., 1996).

To reap the positive benefits of social integration, however, students need to develop meaningful and stable friendships. While prior work has demonstrated the factors that shape cross-race friendship prevalence in the cross-section, with the exception of either short-duration studies based on Add Health (Rude and Herda, 2010) or small local samples (Aboud et al., 2003; Hallinan and Williams, 1987) data constraints have made it difficult to assess relational stability over time. The benefits accruing to integration are less likely to be effective if cross-race relations are particularly unstable. It is possible, in fact, that high levels of churn specific to cross-race relations will induce a sense of distance to those in other races that would reinforce negative perceptions.

Using unique long-term longitudinal network data, we are able to examine the stability of cross-race friendships in detail, while controlling for potential mediators of interracial friendship stability such as socio-economic status, local-friendship embeddedness and school context effects as well as dynamic features related to duration, development and changes in school contexts. For the analysis we used a five-wave sub-sample of the PROSPER project containing 2,190 students from 10 school communities with 18,868 nominations in total.

Our study adds to the state of existing knowledge by emphasising that friendship in adolescence is a fragile relationship that is likely to dissolve as time goes on. Our results indicate that friendships at this age are costly and unlikely to be maintained, however the length of the time period spent in a friendship makes the relationship more likely to survive. These two robust findings together suggest that adolescents are constantly looking for possible friends, among which only a few become stable, actual ones.

Contrary to previous research on this topic we furthermore found that what at first glance appears to be the effect of race is rather the consequence of socio-economic status. The effect of racial difference on friendship retention is completely accounted for when controls for socio-economic status are included in the model and other individual attributes do not alter this effect. More precisely, our results show that the effect of race operates through differences in socio-economic position in a way that the latter intensifies the effect of race when Ego has low SES whereas Alter has not. One could argue that this is because students from poor family background live unsettled lives that creates uncertainty and makes the maintenance of relations more costly. Despite of this instability created by social status, we also found that similarity on SES foster stability even when Ego and Alter are of different race.

Moreover, we decomposed the friendship dyad based on its racial composition in order to describe the previous mechanisms more clearly. Our results indicate that the negative effect of different race is driven by the fickle nature of White-Black and Black-White friendships. One important distinction can be made between these two friendship nominations, however. While White-Black friendships proved to be more unstable than Black-White nominations, similarity on low socio-economic position makes the previous ones more likely to be retained, but it does not effect the latter ones. This is probably because the actor who makes the decision (Ego) in a Black-White dyad is likely to be already in low status position, whereas Alter in a Black-White dyad is more likely to have high status.

Last but not least, our findings also indicate that what seems to be the result of homophily on race and socio-economic background, might be partly caused by endogenous network formation processes. The variables that supposed to capture the quality of the friendship ("Best friend") and account for endogenous network processes ("Mutual friend", "N of shared friends") had a significant mitigating effect on the variable "Different-race". Even though we did not test these effects separately, we can infer that once cross-race best friendships are formed, once they became mutual and the actors have some friends in common, they are almost as likely to be retained as same-race friendships. Nonetheless, without these variables the relative instability of White-Black and Black-White dyads remain significant regardless of the socio-economic background of the students.

Even though the analytic framework and methodology we chose allowed us to extend our knowledge on this field, these choices also limited our possibilities to analyse network data according to statistical inference. Our model choice was inappropriate to deal with the fact that our observations are not independent, and could not take the effect of endogenous network processes correctly into account. By using specific statistical methods however, these processes can be captured by individual, dyadic and higher order network effects that are dependent on each other (Steglich et al., 2010). Our model nevertheless, could not account for all the important network effects, neither of their inter-dependence, hence the effect of the "Mutual friend" and "N of shared friends" parameters are likely to be over-estimated in our model. By using stochastic actor oriented models (Steglich et al., 2010) for analysing the stability of cross-race friendships one could examine the probability of terminating an existing tie while distinguishing between different network autocorrelation effects. We strongly believe that application of such models should serve as a next logical step of this research agenda.

Chapter 5

Relational integration in cross-section[1]

5.1 Introduction

5.1.1 Integration and segregation

In our ethnically diverse world interethnic tension is a serious social issue. Minority groups are often in disadvantaged positions in their host societies which exacerbates this problem (Dustmann and Frattini, 2011; Quillian, 2012). The formation of interracial and interethnic social ties might attenuate this tension as they serve as mediators of knowledge and information transfer. Hence, they potentially play a significant role in decreasing prejudice, and increasing the social and human capital of minorities (Coleman, 1988; Stark, 2011). Therefore, it is essential to find effective ways for creating positive, and eliminating negative social ties between members of different ethnic groups. It is often argued that the role of education is crucial in this regard, as it creates a formal opportunity for mixing students from different ethnic backgrounds, and these contact opportunities may lead to the emergence of interethnic positive relations (Allport, 1954; Wright et al., 1997).

However, as Moody (2001) pointed out, formally integrated school classes can remain essentially segregated, if ethnically different students tend not to become friends with each other. Once contact opportunities are given, the magnitude of relational integration can be described by the likelihood of positive interethnic relations. In the last decades, empirical studies have been conducted to explore the formation of students' interethnic friendship networks and the importance of ethnic mixing (Moody, 2001; Stark, 2011). In these studies, it was found that the

[1] the main content of this Chapter was published in *Social Networks* with Zsofia Boda (Boda and Neray, 2015)

formation of interethnic friendship ties tend to be relatively unlikely, and relational integration is not necessarily achieved by the opportunity of ethnic mixing only.

Our work extends existing research in at least two major ways. First, we emphasise that relational integration should be described not only by the prevalence of positive, but also by the absence of negative interethnic relations. The lack of positive relations does not equal to the existence of negative ones, but interpersonal relations in ethnically fragmented social contexts are often hostile. As positive and negative relationships generally give rise to different structures, one of our main aims is to explore whether they are influenced differently by ethnicity. So far, only a relatively small number of studies have investigated networks of interethnic negative ties (Stark and Flache, 2012), therefore the majority of the previous research in this field has missed an opportunity to capture some important aspects of the relational integration phenomenon. By analysing negative ties separately from positive relations, this paper contributes to our understanding of the nature of negative interpersonal relations in ethnically heterogeneous social contexts.

Second, we introduce two different aspects of ethnicity and apply them simultaneously. The first is self-declared ethnicity, which refers to one's own ethnic identification and is very commonly used in network studies (Munniksma et al., 2013; Stark et al., 2013; Tolsma et al., 2013). The second is peers' perceptions of each others' ethnicity, which captures the way someone is identified by others, which, by our knowledge, has not yet been used in social network models. The idea originates from the phenomenon that ethnicity is a situation-dependent social construction, rather than an objectively defined (and definable) attribute. This constructivist approach is not new. Brubaker (2009) gives a detailed theoretical review, starting with Weber's Economy and Society (Weber, 1968), and examining several clusters of works that have contributed to developing ways of studying ethnicity without focusing on groups that are conceptually fixed. This allows us to empirically tackle the identification problem, that is, the issue that perceptions about someone's ethnicity may vary (Brubaker, 2004; Hogg and Terry, 2000; Jenkins, 1994), leading to potential inconsistencies between self-declared and perceived ethnicity (Marques et al., 1988; Ogbu, 2008; Saperstein, 2012). Besides demonstrating the different effects of these aspects of ethnicity, our research provides strong evidence that discrepancy between someone's self-declared and perceived ethnicity has a crucial influence on how much that person is liked or disliked by others.

Our theoretical framework is based on the social identity approach (Tajfel, 1974; Turner, 1975). A main idea of this approach is that individuals strive to maintain positive social identity in order to increase or maintain the level of their self-esteem. Social identity is based

on comparisons between the ingroup, that is, one's own social group, and the outgroup. Tajfel and Turner (1979) proposed a number of strategies for dealing with a situation when individuals perceive their ingroup's social identity as negative compared to that of a relevant outgroup's. In this paper, we focus on three of these: (1) engagement in social competition with the higher status group; (2) individual mobility, that is, dissociation from the original group and attempting to join a higher status one; (3) internalisation of the inferior social status and attempting to achieve positive self-esteem without positive social identity. Since these strategies influence the emergence of friendships and negative social ties within and between social groups, examining the likelihood of these relation-ships also gives us indications about which strategies were chosen by the students in a given community.

Our goal is to investigate interethnic segregation in secondary school by analysing relationships between majority and minority students; specifically between non-Roma and Roma students in Hungary. As we are interested in how positive and negative relations are associated with self-declared and perceived ethnicity, we choose a rather descriptive analytic approach to focus on the relative prevalence of intraethnic and interethnic social ties in a community. That is, we examine the likelihood of different positive and negative intraethnic and interethnic relationships using cross-sectional network models.

To foreshadow our methodological framework, we estimate exponential random graph models (Lusher et al., 2012) on the sample of 16 Hungarian secondary school classes (average age = 15.9, N = 420). After building individual models for each school class, we meta-analyse the results to discover general tendencies. Our results demonstrate that accounting for both positive and negative nominations and capturing the nominators' perceptions provide us with a new perspective about ethnic segregation.

5.2 Empirical and theoretical background

5.2.1 Integration and segregation

Those who promote integrated education usually argue that contact between minority and majority students should lead to the formation and development of social relations beyond their own ethnic groups, and this, along with the emergence of positive attitudes towards minority ethnic groups, should directly decrease prejudice and increase social cohesion at the societal level (Allport, 1954; Munniksma et al., 2013; Pettigrew and Tropp, 2008; Tropp and Pettigrew, 2005). Proponents also emphasise that peer acceptance gives students a sense of participation

in school, and of belonging to a community (Lubbers, 2003). By providing companionship and setting behavioural examples, students can increase each other's motivation and school success as well as lower the probability of dropping out (Hymel et al., 1996; Wigfield et al., 1998). For these reasons, relationships among ethnically different classmates are especially important.

However, it is not yet fully understood how interethnic friendship ties are formed. Based on social identity theory (Tajfel, 1974; Turner, 1975), people have a fundamental need to categorise themselves and others into groups. Social identity is part of the self-concept, and rests on social comparisons between the perceived ingroup and perceived outgroup. These comparisons are motivated by an underlying need for positive self-esteem, therefore their role is to establish and confirm ingroup-favouring evaluative distinctiveness between the ingroup and the outgroup (Tajfel and Turner, 1979; Turner, 1975). Hence, ingroup-favouritism (Turner and Reynolds, 2001) predicts that people tend to prefer others whom they perceive to belong to the same group as themselves along salient social categories. Following this, in ethnically heterogeneous classes we should see ethnically similar students giving preferential treatment to each other and befriending each other more often than would be expected only based on the proportions in the group as a whole. These predictions are also supported by the strong and general empirical regularity of homophily, suggesting that people indeed tend to choose friends similar to themselves along various dimensions, including race and ethnicity (McPherson et al., 2001; Moody, 2001). In connection with these theoretical considerations and empirical results, we hypothesise that

> H1. interethnic positive nominations are less likely than positive nominations within the same ethnic group.

5.2.2 Positive and negative relationships

So far, previous research has demonstrated that friendships between students from different ethnic backgrounds tend to be relatively unlikely. However, one should not forget that ties between two individuals may also be negative, and the difference between the absence of a positive tie and the presence of a negative tie is very important, yet rarely analysed in connection with race or ethnicity. From the perspective of ethnic integration, examining negative ties is essential, because an ethnically heterogeneous class setting, providing contact opportunities, can still be more advantageous than one in which ethnically different students do not even meet each other's long as it does not result in the disproportionate emergence and strengthening of negative relationships.

Tajfel and Turner (1979) provide a comprehensive explanation of intergroup conflict derived from the social identity approach. They claim that through social categorisation, social groups provide their members with group identification in the given social context, and the perception of an ingroup and an outgroup. The fundamental need for evaluative comparisons between the ingroup and the outgroup creates social identity, and defines the individual as better or worse than members of the other group. When individuals perceive the ingroup's social identity as negative compared to that of the outgroup's, they will normally strive to achieve more positive social identity, in order to enhance their self-esteem. Tajfel and Turner (1979) proposed a number of strategies to deal with a situation when the social identity of the own group is perceived as negative. As a first strategy, group members can seek positive distinctiveness by trying to reverse the relative positions of the ingroup and the outgroup, which is an essentially competitive process (Strategy 1). Tajfel and Turner (1979) hypothesised that engaging in social competition will generate conflict and antagonism between the groups to the degree that it challenges the group's position in the established social hierarchy (Tajfel and Turner, 1979) .

Even though there are much fewer empirical results about interethnic negative ties than about positive ones, there is support that in certain cases negative relationships evolve under heterogeneous class settings. More specifically, in case of earlier established negative relationships, heterogeneous class settings may cause more negative inter-group attitudes, whereas in case of positive relationships the result may be the emergence of more positive attitudes towards the other ethnic group (Stark and Flache, 2012). Moreover, according to Blau (1977), students often tend to dislike their peers from different social backgrounds, which is often related to ethnicity. Other researchers also showed that children and adolescents tend to exclude those of dissimilar ethnic background, gender, and age (Hartup, 1993). Ethnic and cultural differences may increase the prevalence of bullying among students, where not only minority, but also majority students can be the victims of bullying (Tolsma et al., 2013; Vervoort et al., 2010). Finally, Farris's research provided evidence that aggression and negative relations can be used by adolescents to achieve or maintain the status of their ingroup (Faris, 2012; Faris and Ennett, 2012).

Evidence for heterophobia is less strong than evidence for homophily (Csaba and Pal, 2010; Flache and Mäs, 2008), but based on Tajfel's and Turner's theory and the results on negative tie formation between individuals from different ethnic backgrounds we hypothesise that

H2. interethnic negative nominations are more likely than negative nominations within the same ethnic group.

Finding evidence for this hypothesis would imply that indeed, the pursuit of social competition is a valid strategy chosen by at least some individuals in our sample.

5.2.3 The consequences of the "inconsistent" ethnic categorisation

Turner and his colleagues extend social identity theory by developing self-categorisation theory (Turner, 1985; Turner et al., 1987). According to this, social categorisation of self and others into an ingroup and an outgroup accentuates the perceived similarity of the target person to the relevant ingroup or outgroup prototype. If, however, the relevant comparison outgroup saliently changes over time, modifications in prototypes and hence the self-concept can occur (Fiske and Taylor, 2013). This makes social identity and categorisation highly context-dependent and dynamic (Hogg and Terry, 2000).

If categorisation is not based on stable, "objectively existing" categories, ethnic group boundaries should also be treated as context-based, fluid, and subjective for each individual. This aligns with the argument of Brubaker (2004), who pointed out that the concept of ethnic identity is too ambiguous, therefore ethnicity should be defined in terms of participants' beliefs, perceptions and understandings. Empirical results also suggest that ethnicity is a situation-dependent social construction rather than a salient, stable personal or group attribute. Shifts in ethnic identification can be observed, and it can be altered by the surrounding social environment (Harris and Sim, 2002; Hitlin et al., 2006; Ladanyi and Szelenyi, 2006). Hence, in different social contexts different aspects of identity may be emphasised or concealed (Harris and Sim, 2002; Herman and Herman, 2004). Whether as a consequence of prejudice or an assimilation process, Roma people in Hungary may suppress their ethnic identity in certain social situations (Ladanyi and Szelenyi, 2006). Related to its socially constructed nature, ethnicity can also be understood as a social phenomenon with more than one aspect. Saperstein (2012) proposed a distinction between identification (self-declared ethnicity), and classification (ethnicity judged by others), and – analysing them separately – provided evidence that both are fluid overtime.

Examining the two different ethnicity aspects together is advantageous as it makes them and their social implications comparable. Moreover, this way we can analyse situations when individuals are perceived differently from their ethnic self-declarations; these discrepancies, according to the social identity approach, can have serious social consequences. Tajfel and Turner (1979) proposed another strategy to deal with a situation when the ingroup's social

identity is perceived as too negative. This is dissociation from the original ingroup; that is, individuals try to leave their group and join a more positively perceived one (Strategy 2). When ethnicity is a relevant aspect of social categorisation in the community, choosing a certain ethnic group for self-identification can be understood as a sign about the social status the individual seeks to achieve, and about the strategy for achieving those goals. When individuals who are perceived as members of the lower-status ethnic group identify themselves as members of the higher-status group, this may be seen as choosing Strategy 2 for improving their self-esteem, that is, leaving the original ethnic group and trying to join the higher-status one. Especially when other members of the group try to engage with social competition (Strategy 1), these people can seem to be "traitors" of their original ethnic groups, who, in addition, jeopardise the distinctiveness, prototypical clarity, and integrity of the ingroup, hence introducing the threat of uncertainty (Hogg and Terry, 2000).

Marques and his colleagues introduced the black sheep hypothesis in accordance with the social identity theory as a "sophisticated" form of ingroup-favouritism (Marques et al., 1988). Because individuals seek positive social identities, and therefore try to preserve the overall positivity of their ingroups, their judgements about ingroup members, whether positive or negative, will be more extreme than those about similarly likeable outgroup members (Marques et al., 1988). We already argued that perceived ingroup members, who identify themselves as outgroup members are deviant, and therefore, dislikeable. Therefore, based on the black sheep hypothesis, they are expected to be rejected even more than outgroup members.

Our next two hypotheses are related to this argument, and are as follows. In cases when the social status of the minority group is lower, such as that of the Roma people in the Hungarian society

> H3. self-declared minority students are unlikely to name those peers as friends whom they perceive as minorities but who identify with the majority group; and
>
> H4. self-declared minority students tend to dislike these peers.Finding evidence for these hypotheses would also imply that both mentioned strategies are followed by at least some of the group members.

5.2.4 Asymmetric inter-group relations

In the previous sections, following Tajfel's and Turner's reasoning we argued that social competition and leaving the social group are two valid strategies for individuals to achieve more

positive social identity. However, joining another group is not always perceived as an available option. Social competition requires positive group self-esteem from the subordinate group, and the ability and willingness for questioning or denying its presumed characteristics associated with its low status (Tajfel and Turner, 1979). When social structural differences in the distribution of resources have been institutionalised, legitimised, and justified through a consensually accepted status system, the subordinate group's self-esteem might be not positive enough even to compete with the majority, therefore it is less likely to engage in social competition; instead, it internalises the wider social evaluation of itself as inferior (Strategy3) (Gregor and McPherson, 1966; Milner, 1983; Morland, 1969). Tajfel and Turner (1979) argued that in this case ethnocentrism among stratified groups is a "one-way street", as minority group members frequently tend to derogate their own ingroup and display positive attitudes towards the dominant group. Although this strategy can undermine the group's positive social identity, it can enhance positive self-esteem, which is the basic underlying psychological need at the individual level (Tajfel and Turner, 1979).

As the social status of the Roma group in Hungary is much lower than the status of the majority group, Strategy 3 might be a valid choice for some of the Roma students. This might influence both positive and negative relations among Roma and non-Roma students. Consequently, in contexts when the minority group has a much lower social status, such as the Roma minority in the Hungarian context, we expect that

> H5. minority students are more likely to send positive nominations to their majority peers than the other; and
>
> H6. minority students are less likely to send negative nominations to their majority peers than the other way around.

Providing evidence for these hypotheses would suggest that in our case, at least some minorities choose the third strategy of accepting their inferiority.

5.3 Data

Our current analysis relies on the second data-wave of the RECENS data, which was collected in the second half of the fist academic year of secondary school (in 2011), therefore students already had time to get to know each other by then. We restrict our sample to classes with appropriate levels of ethnic heterogeneity. We use a subsample (N = 420) which includes 16

classes with at least 10% of Roma students based on their ethnic self-assessments, and with less than 20% of missing data in the relevant network questions (based on the example of (Huisman, 2009)). As a consequence, our subsample contains mostly vocational and secondary technical school classes, with only one grammar school class included.

5.4 Measurements

5.4.1 Positive and negative ties

In the dataset, friendship and negative relations are measured with one scale; each student was asked to judge all of their classmates along a five-point scale: "-2" for "I hate him/her, he/she is my enemy"; "-1" for "I do not like him/her"; "0" for "He/she is neutral for me"; "+1" for "I like him/her", and "+2" for "He/she is my friend". For our analysis, we chose friendship networks ("+2") as a measurement for positive nominations as we believe that this network contains the most important and most influential positive nominations. As everyone judged everyone else in the community along this scale instead of making lists of their best friends, the density of "aggregated positive nominations" – friendship and liking nominations together – is comparatively high (0.52), which con-firms that the network constructed based on positive nominations cannot be reflective of very close relationships. For negative nominations, however, we have decided to include both weak ("-1") and strong ("-2") negative ties, as these networks were not dense (0.12 together).

For handling missing values in the network data, we imputed the value of ties using the first and the third waves of data collection as follows. We used the original 5-point scale to impute the strength of missing ties: (1) if data were available only for the first or the third wave, we directly used the value available; (2) if data were available for both the first and the third waves, we calculated the mean of the two rounding it to the number closer to 0 (e.g. 1.5 $\rightarrow$ 1, 0.5 $\rightarrow$ 0, -0.5 $\rightarrow$ 0, -1.5 $\rightarrow$ -1). After the imputation, we inferred friendship and negative ties as described above.

5.4.2 Roma ethnicity

In the questionnaire, both aspects of ethnicity were measured. First, self-declared ethnicity had four different values: "Hungarian","Roma", "Hungarian and Roma", and "Other". For the analysis, we created two groups: "Roma" (from "Roma" and "Roma and Hungarian"), and "non-Roma" (from "Hungarian" and "Other"). Missing cases were imputed in two steps.

In the first step, we considered Roma those students who did not answer the question about ethnicity but gave a valid answer to the question "If you consider yourself a Roma, which Roma subgroup do you belong to?", or considered themselves Roma in the first or third data wave, but never considered themselves non-Roma. As a next step, we imputed the remaining missing values (8.1%) using a multiple logistic regression imputation method suggested by (van Buuren, 2011), based on the teachers' judgement whether the student is Roma or not, on the economic status of the students and the education level of the students' fathers (Nagelkerke R2= 0.7; predictive power: 90.4%). As a result, our restricted subsample consists of 270 non-Roma (64%) and 150 Roma students (36%).

Perceived ethnicity was measured by network rosters, meaning that all students had to nominate classmates whom they considered Roma based on the complete list of their classmates.This resulted in a network of Roma nominations, with an average density of 0.21. For imputing missing values, we used Roma nominations from the first and the third waves, as we did with the friendships and negative ties. In total, 13% of the ties was imputed this way.

5.4.3 Socio-economic status and gender

When analysing interethnic relationships, it is important to control for certain characteristics which are considered to be important for tie formation and/or related to ethnicity. Since Roma ethnicity in Hungary is strongly related to socio-economic status (SES) (Kertesi and Kezdi, 2011b), a principal component was created for measuring it, using the variables of the father's education level and cultural assets that are in the students' personal use at home: desk, a place where they can study without being disturbed, a computer that they can use for school work, internet access, a self-owned calculator, classical literature books, and books to help them prepare for school. The variable for the father's level of education is a part of the students' socio-economic status index and also serves as a predicting variable in the regression model that we use for imputing Roma ethnicity. However, we imputed ethnicity only in 8.1% of the cases, which did not artificially strengthen the relationship between the two variables (correlation coefficients before and after the imputation are -0.40 and -0.42, respectively).

Gender was also used as a control variable, as it is found to be the most important source for homophily among children and adolescents (McPherson et al., 2001). In the analysed sample 46% of the students are male and 54% of them are female, although there are two classes without female students.

5.5 Methods and models

5.5.1 Methods

For the analysis, exponential random graph models were estimated. These models, also known as p* models, were introduced by Frank and Strauss (1986) developed by Frank (1991) and Wasserman and Pattison (1996) in order to analyse complete networks. The reader is referred to Snijders et al. (2006), Robins et al. (2007) and Lusher et al. (2012) for more recent developments. In ERGMs, the unit of analysis is a binary tie variable that can be denoted by *Yij*. A tie from actor i to actor j can be donated by $i \rightarrow j$, it can be present or absent and can take value 1 and 0 respectively. The network is constituted by the tie variables, represented by an $n * n$, adjacency matrix, where n stands for the total number of actors and self-nominations are excluded.

This statistical approach estimates the probability that a tie exists and a probability is a function of structural network parameters (e.g.: reciprocity) and actor or dyadic attributes (e.g.: race and similarity on race). The model estimation is based on simulation. During the simulation process the model generates thousands of networks that were randomly permutated from the original, empirically observed adjacency matrix. It aims to reproduce the empirical network by adjusting structural network parameters to the simulated networks. The simulation stops after the model has converged, meaning that the simulated network significantly fits the empirical one.

For the estimation, we used the software MPNet (Wang et al., 2013) with the single-level (or one-mode network) option. In the first step of analysis, separate ERGMs were estimated for each school class in the sample. For each class, we fit models with the dependent variable of friendship, and models with the dependent variable of negative ties. In the next step, class based results were analysed together to study the general tendencies for the two model types.

For the meta-analysis, estimated parameters and standard errors of the separate models per class were used. The underlying assumption of these meta-analyses is that individual networks area sample from a common population. Using the method proposed by Snijders and Baerveldt (Snijders and Baerveldt, 2003), it was estimated whether the values for a given parameter, averaged over the population differed significantly from 0, that is, whether the results indicated some general tendency or not. Parameters were estimated jointly for each classroom, and the meta-analysis was conducted for each parameter separately. The mean as well as the variance of the parameters in the population were estimated and tested.

5.5.2 Model

5.5.2.1 Roma ethnicity effects

We designed different models using the different ethnicity aspects: only self-declared ethnicity (Model A), only perceived ethnicity (Model B), and both (Model C) for the nominee's ethnic self-identitification, for both positive (+) and negative (-) networks. Consequently, we have six models in total: Model A+, B+ and C+, and Model A-, B- and C-, where different letters refer to the different compositions of ethnicity effects applied, and + or - signs stand for the type the dependent network.

In the first two models (A and B), we tested the same hypotheses (H1-H4) using different measurements for ethnicity concepts (self-declared or perceived). Model C uses these different ethnicity measurements simultaneously, which allows us to examine the results of the discrepancies between self-declaration and sender-perception of ethnicity, in order to test our remaining hypotheses (H5 and H6). For this, in each model we used the sender's self-declared ethnicity. In Model A, we also included the receiver's self-declared ethnicity and the interaction between the sender's and the receiver's self-declared ethnicity. Model B differs from Model A in the sense that here we used another measurement for the receiver's ethnicity: the sender's perception about the receiver. In this model we also included the interaction between the sender's self-declared ethnicity and the sender's perception about the receiver's ethnicity. In model C, both measurements of the receiver's ethnicity mentioned above were included, together with the two interaction effects. Self-declared ethnicity was included as a nodal covariate, and perceived ethnicity as a dyadic covariate, therefore the perceived ethnicity of a given receiver does not have only one value but can be different in different dyads. Note that the variables are not centred, therefore in every model the value 0 refers to non-Roma, and 1 to Roma students; in case of interactions, the value is 1 if both the sender and the receiver are (self-declared or perceived) Roma.

Figure 5.1 and Figure 5.2 both illustrate the logic of our models, representing the negative and the perceived ethnicity networks in one class from our sample. On both figures, black arrows mean Roma nominations and the grey ones stand for the negative relations. Self-declared Roma students are represented with squares and non-Roma students with circles. The colours of the nodes depend on the number of the incoming perceived ethnic nominations: the higher the indegree of the node, the darker it is. Finally, whereas on Figure 5.1 the larger the node, the more incoming negative nominations the student has, on Figure 5.2 the node size depends on

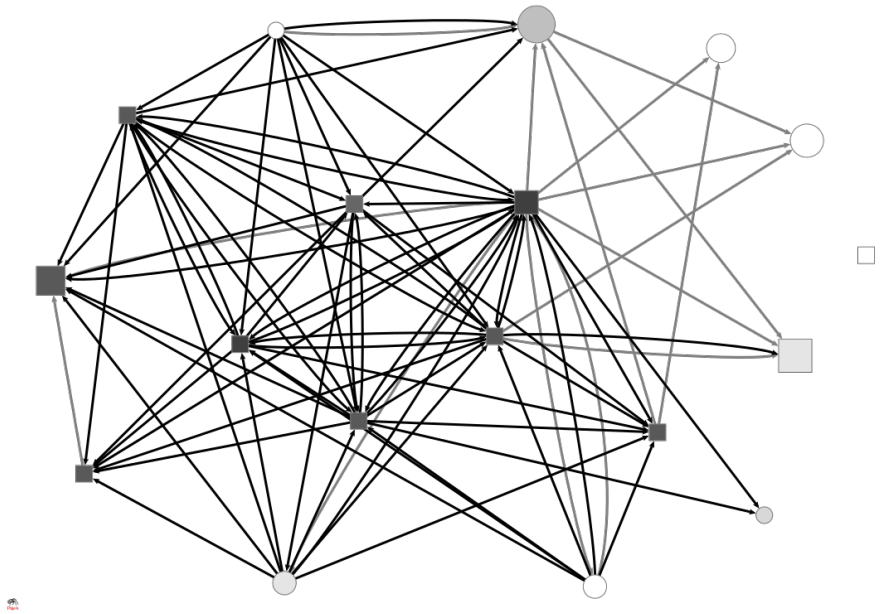


FIGURE 5.1: Friendship and Roma perception ties (node size based on out-degrees in negative networks).

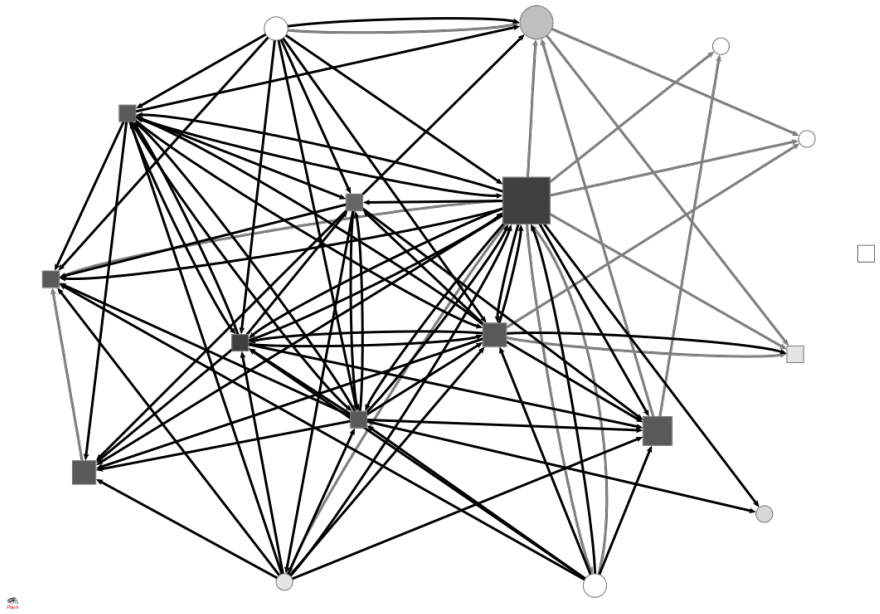


FIGURE 5.2: Negative and Roma perception ties (node size based on out-degrees in negative networks).

the outgoing negative nominations (the position of the nodes in the figures is fixed to ease comparison).

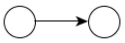
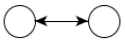
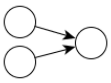
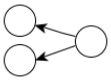
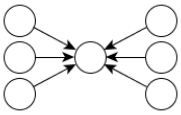
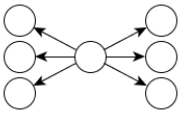
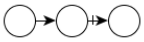
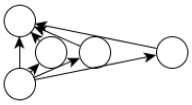
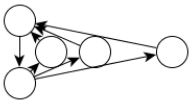
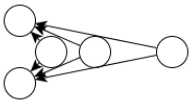
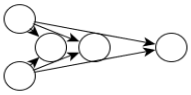
5.5.2.2 Gender and socio-economic status effects

For gender and socio-economic status (SES), effects based on self-declared attributes were used: (1) gender of the sender, (2) gender of the receiver, (3) interaction, (4) SES of the sender, (5) SES of the receiver, and (6) absolute difference in SES. SES and gender effects were included

as non-centred node covariate effects in the models, therefore higher values on the SES variable are associated with higher socio-economic status; and 1 refers to boys 0 to girls.

5.5.2.3 Structural effects

In the models, we also included structural effects to represent the network structure. The applied structural effects were somewhat different for friendship and for negative models. While reciprocity and star-effects seem essential both for friendship and negative ties, in negative networks, triad-based effects are less important than in friendship networks (Robins and Lusher, 2012). For the model specifications, especially for the rarely analysed negative networks, examples of Robins and Lusher (2012) and Huitsing et al. (2012) guided our selection. We started with an initial set of effects corresponding to the theoretical ideas explained above, and the examples in these papers. This initial specification was modified if the model did not converge for all school classes. Variables seeming to cause divergence in some cases were excluded, and new structural effects were included which had seemed to be represented poorly before, based on the goodness of fit statistics. We continued with this process to refine the models until we reached a final model specification for both friendship networks and for negative networks that converged for every school class – these are the ones we subsequently present in this paper. Table 5.1 summarises which structural effects were used in the friendship and in the negative models.

Name		Description	Illustration	Included in models	
				Friendship	Negative
Arc	*arc*	Occurrence of nominations		×	×
Reciprocity	*reciprocity*	Occurrence of mutual ties		×	×
Two-in-star	*in-2-star*	Occurrence of shared nominations received		×	
Two-out-star	*out-2-star*	Occurrence of shared nominations sent		×	
Simple connectivity	*2-path*	Occurrence of paths connecting three actors		×	×
Popularity spread	*A-in-S*	Dispersion of in-ties distribution		×	×
Activity spread	*A-out-S*	Dispersion of out-ties distribution		×	×
One-sided isolates (non-receivers)	*Sink*	Occurrence of actors with zero in-degree			×
One-sided isolates (non-senders)	*Source*	Occurrence of actors with zero out-degree			×
Path closure	*AT-T*	Closure of two-paths		×	
Cyclic closure	*AT-C*	Cyclic closure of two-paths		×	
Shared in-ties	*A2P-D*	In-ties-based structural equivalence (being nominated by the same actors)			×
Shared out-ties	*A2P-U*	Out-ties-based structural equivalence (nominating the same actors)			×

Unfortunately, difficulties with software implementation made it impossible to use the third A2P-effect, the multiple two-path (A2P-T). Each time it was included, our models diverged

TABLE 5.1: Structural network parameters included in friendship and negative models

The model applied to all school classes confirm the structure presented in Table 5.1, with two exceptions: (1) gender variables were not included in the models of the two all-female classes as there was no variance in gender, and (2) effects of isolation (non-senders and non-receivers) were not included in the case of one class as everybody was part of the negative network in this classroom.

5.6 Results

5.6.1 Descriptive results

Before presenting the results of the exponential random graph models, it is important to take a closer look at some descriptive characteristics of our sample. Table 5.2 shows that 38% of the students were self-declared Roma, with a big variation across classrooms. The average is quite high compared to the proportion of Roma minority in Hungary, but it is the result of our sample selection criteria. It illustrates the highly disadvantaged position of the Roma group in the Hungarian society that classes containing enough Roma students for our analysis (10% or more) showed very disadvantaged social background in general. The fathers' average level of education is low, only half of the fathers graduated from secondary school, and just 7% participated in tertiary education.

Individual attributes					
Ethnicity (self-declared)					
Roma (*N*)	Roma (%)	SD of classroom averages (%)	Min (%)	Max (%)	Missing
150	38%	19.11%	12%	78%	0
Father's education level					
Primary (*N*)	Secondary (*N*)	Tertiary (*N*)	Sum valid (*N*)	Missing (N)	
132 (33%)	229 (53%)	31 (7%)	392 (93%)	28 (7%)	
Gender					
Boy (*N*)	Girl (*N*)				
189 (46%)	231 (54%)				
Network descriptives					
Density					
	Friendship	Negative relations	Roma		
Mean	0.19	0.12	0.21		
SD	0.05	0.05	0.18		
Number of mutual ties per classroom					
	Friendship	Negative relations	Roma		
Mean	32.9	12.6	20.1		
SD	11.7	10.3	26.1		
Number of triangles per classroom					
	Friendship	Negative relations	Roma		
Mean	117.7	52.0	326.4		
SD	65.2	57.0	377.9		

TABLE 5.2: Descriptive statistics of the sample

In our analysis, we examined whether ethnically different students would be more or less likely to make friends with one another, or dislike one another, than students from the same ethnic background – holding all else equal as described above. For that, it is important to take a look at our networks themselves first. Based on the network descriptive statistics presented, friendship

networks were more dense on average than negative networks (19% and 12%, respectively). The density of Roma nomination networks is 21%. This is lower than the proportion of self-declared Roma students in the sample. While the standard deviation of the densities of the friendship and negative networks along classrooms is quite small, suggesting that classrooms tend to be similar to this respect, the densities of Roma perceptions show large between-classroom differences. This is not surprising, since self-declared Roma proportion also varies along classrooms.

		Average Roma nominations received (%)
Self-declared ethnicity	Roma	1.97
	Non-Roma	49.21
		$R^2 = 0.647$

TABLE 5.3: Relationship between Roma measurements from the results of linear regression models

As we argued earlier that self-declared ethnicity can differ from how someone is perceived by others, and these differences can have social consequences, we checked the relationship between our two ethnicity measurements (see Table 5.3). This was done by a linear regression model with clustered standard errors, which takes into account that the sample is composed by different subgroups. In the model, the dependent variable was the proportion of classmates who nominated the student as Roma, explained by the student's self declared ethnicity. On average, self-declared non-Roma students were nominated as Roma by 2% of their classmates, while this was 49% for those who declared themselves Roma. Our results show that the relationship is significant ($p < 0.001$).

This suggests that students were nominated as Roma by their classmates much more often when their self-perception was Roma, than when it was non-Roma. Figure 5.3 demonstrates the proportion of classmates nominated students as Roma if they declared themselves as non-Roma (first box), or Roma (second box). This gives us some indications that there might be "ambiguous" cases as well, and judgements about others' ethnicity are not necessarily in con-sensus (see Figure 5.3).

Table 5.4 provides us with descriptive statistics about friendships and negative ties, separately for (self-declared) Roma and non-Roma students. In the friendship networks there was little difference between the average incoming nominations of Roma and non-Roma students, although non-Roma students received slightly more ties; however, Roma students nominated more. In negative networks, Roma students both sent and received somewhat more nominations

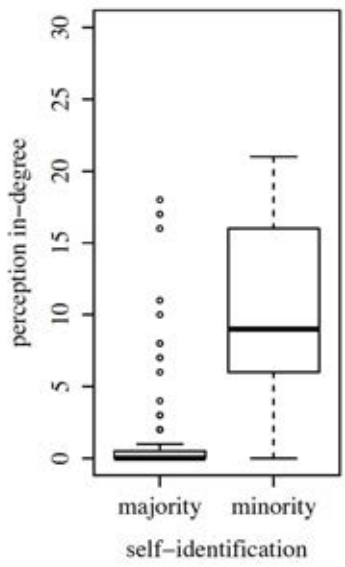


FIGURE 5.3: The Relationship Between Ethnic Self-Declaration and Perceptions

than their non-Roma peers. This suggests that Roma students are more active (nominating more in both networks) but less popular (receiving less friendship, and more negative ties); however, these are really small differences.

Table 5.4 also presents the shares of different interethnic and intraethnic nominations of all ties. First, we calculated what pro-portion of the friendship ties were sent and received by Roma and non-Roma students, and we defined ethnicity based on self-declarations. We found that 60% of the ties were within the intraethnicnic group, and 40% of them were interethnic. Obviously, these values are highly dependent on the class compositions, therefore they cannot indicate homophily and heterophobia themselves. However, it is interesting that Roma students nominated their non-Roma peers more often than the other way around (25% and 15%of the total nominations, respectively). The same descriptives for the negative ties show that the same class compositions resulted in more cross-ethnic mutual ties in negative networks than in positive ones: 46% of all nominations were interethnic, 54% were within the same ethnic group. Here, we did not find a large difference between the Roma-non – Roma and the non-Roma-Roma nominations (22% and 24%, respectively). When instead of self-declarations, we define both the sender‘s and the receiver‘s ethnicity from the sender‘s perspective, the difference seems even stronger: negative networks show a larger proportion of interethnic nominations (40%) than positive networks (27%). This suggests that ethnicity can indeed have an important effect on tie formation in these communities.

Average degrees

Friendship				Negative			
In-degree		Out-degree		In-degree		Out-degree	
Roma	Non-Roma	Roma	Non-Roma	Roma	Non-Roma	Roma	Non-Roma
4.73	4.87	5.21	4.69	3.10	3.24	3.06	3.21

Share of all ties, receiver's ethnicity based on self-declaration (Roma proportion based on self-declaration: 38%)

Friendship

	Receiver	
Sender	Non-Roma	Roma
Non-Roma	53%	15%
Roma	25%	7%

Negative

	Receiver	
Sender	Non-Roma	Roma
Non-Roma	44%	24%
Roma	22%	10%

Share of all ties, receiver's ethnicity based on sender's perception (Roma proportion based on self-declaration: 38%; Roma nomination density: 21%)

Friendship

	Receiver	
Sender	Non-Roma	Roma
Non-Roma	59%	6%
Roma	21%	14%

Negative

	Receiver	
Sender	Non-Roma	Roma
Non-Roma	53%	15%
Roma	25%	7%

TABLE 5.4: Descriptive statistics of the sample

5.6.2 ERGM results

After these descriptive statistics, here we present the results of our exponential random graph models, which also take network dependencies and node-level characteristics into account. At the end of the estimation process, all of our models converged for every parameter based on the t-statistics for convergence ($t < 0.01$). Our models also met the requirements for goodness of fit and sample autocorrelation factors suggested by (Koskinen and Snijders, 2012) and (Robins and Lusher, 2012). GoF captures whether the observed graph is far from the one that we would predict under the fitted model, by calculating a standardised difference with mean = 0, and SD = 1 (Koskinen and Snijders, 2012). Its value is ideally below 0.1 for variables included in the models and below 2 for non-included variables; however, occasional higher values are tolerable (Robins and Lusher, 2012). In our case, this value was lower than 0.1 for almost all included variables and lower than 0.15 for all of them; and it was below 2 for almost all non-included variables and below 2.2 for all of them. Also, for every model, each value for the sample autocorrelation factor was less than 0.4. With values higher than 0.4, the basic premise of converged estimates would likely be violated (Robins and Lusher, 2012).

In Table 5.5 and in Table 5.6 results for the friendship and negative models are presented (see Table 5.1 for the interpretation of the structural effects). In these tables, only the parameter estimates and the standard errors for the cross-classroom means are included; homogeneity tests on the meta-analysis (estimated between-classroom standard deviations, and test-statistics

whether there is a difference between parameters among schools) can be found in the Appendices (see Table A.7 and Table A.8) for friendship ties and negative ties, respectively.

	Model A+		Model B+		Model C+		N of groups
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	
Structural							
Arc	−1.727	(0.330)*	−1.934	(0.329)*	−1.891	(0.326)*	16
Reciprocity	1.854	(0.161)*	1.983	(0.186)*	1.959	(0.181)*	16
Two-in-star	0.092	(0.017)*	0.092	(0.018)*	0.094	(0.017)*	16
Two-out-star	0.116	(0.019)*	0.121	(0.018)*	0.122	(0.018)*	16
Simple connect.	−0.192	(0.035)*	−0.192	(0.037)*	−0.192	(0.038)*	16
Popularity spread	−0.675	(0.200)*	−0.595	(0.194)*	−0.624	(0.193)*	16
Activity spread	−0.229	(0.119)	−0.317	(0.155)*	−0.281	(0.157)	16
Path closure	0.987	(0.111)*	1.004	(0.115)*	0.986	(0.117)*	16
Cyclic closure	−0.080	(0.066)	−0.055	(0.063)	−0.053	(0.063)	16
Roma ethnicity							
Roma Sender	−0.141	(0.109)	−0.056	(0.121)	−0.163	(0.114)	16
Roma Receiver self-declared	−0.143	(0.079)			−0.179	(0.089)*	16
Sender*Receiver	0.643	(0.162)*			0.518	(0.171)*	16
Roma Receiver sender-perceived			0.012	(0.138)	0.093	(0.115)	16
Sender*Receiver			0.808	(0.139)*	0.450	(0.188)*	16
Gender							
Boy Sender	−0.365	(0.066)*	−0.388	(0.066)*	−0.400	(0.069)*	14
Boy Receiver	−0.256	(0.077)*	−0.263	(0.077)*	−0.284	(0.079)*	14
Sender*Receiver	0.770	(0.087)*	0.808	(0.085)*	0.832	(0.088)*	14
Socio-economic status							
SES of Sender	0.035	(0.045)	0.057	(0.042)	0.056	(0.042)	16
SES of Rec.	0.117	(0.051)*	0.131	(0.064)*	0.123	(0.069)	16
Abs. difference	−0.032	(0.038)	−0.007	(0.042)	−0.005	(0.041)	16

$*p < 0.05$

TABLE 5.5: ERGMs of the friendship networks

From these results we can conclude that Roma ethnicity played an important role in relationship formation, even after controlling for gender and socio-economic status, and structural factors. Both in the friendship and the negative models, there are several significant ethnicity variables, including main sender and receiver/perception effects, and interactions as well. For a more detailed interpretation, we calculated the conditional odds ratio for each kind of nomination, compared to non-Roma – non-Roma nominations as a reference category. For that, we used the Roma sender effects (when the sender was self-declared Roma), the Roma receiver effects (when the receiver was self-declared Roma), the Roma perception effect (when the sender perceived the receiver as Roma), and the two interactions (when both the sender and the receiver declared themselves as Roma; and when the self-declared Roma sender perceived the receiver as Roma). For each cell, differences from the reference cell were calculated using a Wald-test. Table 5.7 and Table 5.8 show the conditional odds ratios, together with significance levels, for all kinds of same- and interethnic nominations included in each model, and for the interaction effects the joint significance levels are presented as well. This approach allows us to compare and contrast the real effect sizes of the different kinds of ethnicity measures on tie formation. In case of Model A and Model B, only the non-Roma and the Roma categories were used, which refer to self-declared Roma and perceived Roma ethnicity, respectively. In case of Model C, the category "Consistent" Roma means that someone was both self-declared and perceived

Roma, and there are two more categories added for those who were only self-declared (but not perceived by the sender), or only sender-perceived (but not self-declared) Roma.

	Model A–		Model B–		Model C–		*N* of groups
	Estimate	(SE)	Estimate	(SE)	Estimate	(SE)	
Structural							
Arc	−4.942	(0.169)*	−4.964	(0.161)*	−4.967	(0.179)*	16
Reciprocity	1.303	(0.119)*	1.341	(0.122)*	1.276	(0.138)*	16
Simple connect.	−0.033	(0.013)*	−0.021	(0.010)*	−0.019	(0.010)	16
Non-receivers	0.101	(0.387)	−0.263	(0.406)	0.151	(0.054)*	16
Non-senders	−0.066	(0.436)	0.262	(0.457)	−0.244	(0.063)*	16
Popularity spread	0.389	(0.174)*	0.228	(0.190)	0.450	(0.263)	16
Activity spread	1.222	(0.198)*	1.454	(0.186)*	0.770	(0.257)*	16
Shared in-ties	0.049	(0.070)	0.040	(0.067)	0.193	(0.127)	15
Shared out-ties	0.057	(0.077)	0.133	(0.038)*	0.065	(0.052)	15
Roma ethnicity							
Roma Sender	0.352	(0.195)	0.189	(0.183)	0.365	(0.213)	16
Roma Receiver self-declared			0.333	(0.188)	0.065	(0.109)	16
Sender*Receiver			−1.023	(0.279)*	−0.420	(0.190)*	16
Roma Receiver sender-perceived			0.593	(0.129)*	0.505	(0.124)*	16
Sender*Receiver			−0.572	(0.203)*	−0.194	(0.223)	16
Gender							
Boy Sender	−0.213	(0.087)*	−0.236	(0.160)*	−0.212	(0.089)*	14
Boy Receiver	0.129	(0.084)	0.120	(0.079)	0.059	(0.085)	14
Sender*Receiver	0.211	(0.194)	0.207	(0.193)	0.473	(0.164)	14
Socio-economic status							
SES of Sender	0.007	(0.030)	0.021	(0.036)	0.022	(0.032)	16
SES of Rec.	−0.105	(0.036)*	−0.093	(0.048)	−0.100	(0.038)*	16
Abs. difference	−0.042	(0.042)	−0.026	(0.056)	−0.006	(0.038)	16

$*p < 0.05$

TABLE 5.6: ERGMs of the negative networks

First, Hypothesis 1 posited that interethnic positive nominations are less likely than positive nominations within the same ethnic group. These differences are modelled by the Roma Sender, the Roma Receiver and/or Roma perception effects (Roma Receiver in Model A, Roma perception in Model B, and both in Model C), and the related Interaction effects. Table 5.7, Model C+ shows that Roma-Roma nominations are more likely than the reference category, that is, non-Roma – non-Roma nominations (OR = 1.66, $p < 0.01$). However, cross-ethnic nominations are not significantly less likely than the reference category (OR = 0.85, for Roma – non-Roma, OR = 0.92, for non-Roma - "consistent" Roma nominations, $p > 0.1$ in both cases). Therefore, Hypothesis 1 is partly confirmed: positive nominations are more likely within the Roma ethnic group, but not significantly more likely within the non-Roma ethnic group than nominations between groups. Moreover, Model C+ shows that the combination of self-declared and perceived ethnicity also matters: Roma students preferred other Roma students only when they had a "consistent Roma identification", that is, they were perceived as Roma by themselves as well as by the sender. Only self-declared, or only sender perceived Roma peers were not more likely to get friendship nominations from other Roma students than the reference category (OR = 1.19, and OR 1.19, respectively, $p > 0.1$ in both cases). This tendency remains hidden when only focusing on the models using only one type of Roma ethnicity (Models A and B).

		Receiver's ethnicity	
	Sender's ethnicity (self-declared)	Non-Roma	Roma
Model A+	Non-Roma	1.000	0.866^{+}
	Roma	0.869	1.589**
Model B+	Non-Roma	1.000	1.012
	Roma	0.946	0.641

		Non-Roma	"Consistent" Roma (in both ways)	Self-declared Roma but sender-perceived non-Roma	Sender-perceived Roma but self-declared non-Roma
Model C+	Non-Roma	1.000	0.922	0.836^{+}	1.098
	Roma	0.850	1.656**	1.187	1.191

Odds ratios are presented; non-Roma → non-Roma nominations are the reference category
$+p < 0.1 * p < 0.05 * *p < 0.01 * * * p < 0.001$

TABLE 5.7: Effect of ethnicity on friendship ties (from Model A+, Model B+, Model C+)

Second, Hypothesis 2 suggested that interethnic negative nominations are more likely than negative nominations within the same ethnic group. Table 5.8, Model C- demonstrates that perceived ethnicity has a more important role in this than self-declared ethnicity: non-Roma students tend to dislike those whom they perceive as Roma, regardless of these students' self-identifications (OR = 1.75, $p < 0.01$ for Receivers with "consistent" Roma identification, OR = 1.66, $p < 0.001$ for perceived, but not self-declared Roma Receivers). Nominations sent by non-Roma students towards those whom they perceived as non-Roma did not significantly differ based on the receiver's self-declaration (OR = 1.07, $p > 0.1$). Besides, Roma students tended to send more negative nominations to non-Roma students than the reference category, even though this difference is not significant based on the 0.05 significance level (OR = 1.44, $p < 0.1$). At the same time, nominations from Roma senders to those with consistent Roma ethnicity did not differ significantly from non-Roma-non-Roma nominations (OR = 1.20, p > 0.1). Therefore, this is evidence for our second hypothesis that interethnic negative nominations are more likely than negative nominations within the same group.

Our Hypotheses 3 and 4, related to the black sheep phenomenon, predicted that Roma students will be less likely to nominate as friends those whom they perceive as Roma, but who, at the same time, declare themselves non-Roma. In the negative networks, we expected a larger likelihood for a tie in these cases. Both of these effects are presented in the friendship and negative tables, by the Roma sender and sender-perceived Roma (but self-declared non-Roma) receiver cells (OR = 1.19, $p > 0.1$; OR = 1.99, $p < 0.01$, respectively). This does not confirm H3, as there is no significant effect in the positive networks. However, it confirms H4, because the conditional odds-ratio for negative ties is significant, which is strong evidence for the black sheep phenomenon. To add more detail to the picture, we could also see that not only Roma, but also non-Roma students were very likely to dislike those whom they perceived as Roma, but who nevertheless did not declare themselves Roma. The combination of these two results

suggests that the discrepancy between the declared and the perceived ethnicity plays a crucial role in negative tie formation. This kind of discrepancy had less impact on positive relations; however, we found a similar phenomenon for friendship ties as well. The emergence of positive relations was less likely only in dyads in which the sender declared him/herself as non-Roma and perceived the receiver as non-Roma as well, while the receiver declared him/herself as Roma. This "reversed black sheep effect" also suggests that discrepancies between peer-perception and self-identification may have serious negative effects on social ties in general, not just in case of the lower-status group.

			Receiver's ethnicity	
		Sender's ethnicity (self-declared)	Non-Roma	Roma
Model A–		Non-Roma	1.000	1.395^{+}
		Roma	1.421^{+}	0.811
Model B–		Non-Roma	1.000	1.809***
		Roma	0.946	0.779
		Non-Roma	"Consistent" Roma (in both ways)	Self-declared Roma but sender-perceived non-Roma	Sender-perceived Roma but self-declared non-Roma
Model C–	Non-Roma	1.000	1.754**	1.067	1.656***
	Roma	1.440*	1.197	0.836	1.987**

Odds ratios are presented; non-Roma → non-Roma nominations are the reference category
$+p < 0.1 * p < 0.05 * *p < 0.01 * * * p < 0.001$

TABLE 5.8: Effect of ethnicity on negative ties (from Model A-, Model B-, Model C-)

According to Hypothesis 5, Roma students are more likely to send positive nominations to non-Roma students than the other way around. For this, we have to compare the likelihood of a nomination from a Roma sender to a non-Roma receiver, and a nomination from a non-Roma sender to a Roma receiver. This difference is not directly modelled in our analysis, and not included in Tables 7 and 8, either, as in those the reference category is a non-Roma – non-Roma nomination. However, it can be calculated as a comparison of the Roma sender and the Roma receiver / Roma perception effects. Therefore, we ran additional Wald-tests to see if the effects of these variables differ significantly. Our results showed that in the positive models, there were no significant differences between the Roma sender and Roma receiver/perception effects in any of the models, therefore we could not confirm the fifth hypothesis. Hypothesis 6 formulated similar predictions for the negative networks, that is, Roma students are less likely to send negative nominations towards non-Roma students than the other way around. Wald-test results on Model A- showed that when only taking self-declared ethnicity into account, non-Roma – Roma nominations were not significantly more likely that Roma – non-Roma nominations (OR = 1.02, $p > 0.1$). However, in Model B- the difference was large and significant: non-Roma students seem to be more likely to send negative ties towards those whom they perceive as Roma than vice versa (OR = 1.50, $p < 0.01$). When taking both measurements into account

(Model C-), the results suggest than non-Roma students nominate self-declared Roma students less, but perceived Roma students more than the other way around (OR = 1.35, $p < 0.01$; and OR = 0.87, $p < 0.001$, respectively). Therefore, those who declared themselves as Roma but are not perceived as Roma by the non-Roma sender will be more likely to send negative ties towards these non-Roma students; those who are perceived as Roma but declared themselves as non-Roma will be less likely to nominate them in the negative networks. We also compared whether students who have consistent Roma ethnicity will be more or less likely to send negative ties towards their non-Roma peers; the results of the Wald-test show that these Roma students tend to dislike their non-Roma peers less than the other way around (OR = 0.82, $p < 0.05$). This supports Hypothesis 6, and it also highlights the importance of perceived ethnicity, since these asymmetric relationships did not have any indications in the models only using self-declared ethnicity.

Together with the meta-analysis, measures for between-classroom differences were also calculated, and are presented in the Appendices. These tables show that when including all the ethnicity effects, parameters for the Roma variables did not differ significantly among classes, except for the sender effect for friendship networks (Appendix A, model C+: $p < 0.05$). Here, our results suggest that although the average sender effect is negative, in a minority of the classrooms it is positive (estimate: -0.16, $\sigma = 0.36$). When using only one measurement type for the receiver's ethnicity, significant differences between classrooms occurred more often.

Finally, every friendship model suggests significant gender homophily, but we did not find evidence for gender heterophobia. This means that even though gender and ethnicity are both important factors of friendship formation, they influence negative ties differently. In addition to this, students from better social backgrounds were more likely to receive friendship nominations and less likely to get negative nominations regardless of the nominator's own social background. This also suggests that statistical relationships between social ties and ethnicity cannot be explained by differences in socio-economic status.

5.7 Conclusion

The goal of this study was to explore important characteristics of interethnic friendships and negative relationships in order to see which aspects of relational integration appear in these networks. Furthermore, we focused on two different aspects of ethnicity, that is, self-declaration

and peer-perception, for investigating more deeply the different dimensions of ethnic integration, and also for analysing the effect of the possible discrepancies between someone's self-identified and perceived ethnicity. We provided a comprehensive theoretical background to situate the study utilising the social identity approach. By operationalising several important social psychological mechanisms based on the original theory and its offshoots we constructed an analytical framework to examine interethnic relationships from a network approach. Our work is an important contribution to social identity theory and social psychology, since both these fields make strong assumptions about social ties and derive substantively important implications of these assumptions for social networks, implying that social network analysis should be a natural tool for them, yet they are rarely interpreted in a social network framework.

Following social identity theory (Tajfel, 1974; Turner, 1975) and ingroup-favouritism (Turner and Reynolds, 2001), we expected that even in heterogeneous classes, the chance of interethnic friendship ties would still be relatively low compared to that of intraethnic friendship ties. Moreover, Tajfel and Turner (1979) argued that there are multiple sufficient strategies to develop positive social identity and increase or maintain positive self-esteem. The first one is social competition, which must involve conflict between the groups, hence inducing negative intergroup relations. Therefore, we hypothesised that interethnic friendship nominations will be less likely, and negative ties will be more likely that those within ethnic groups. In our analysis, we found evidence for both processes, which is consistent with the theory that students choose this strategy to achieve or maintain positive social identity.

Tajfel and Turner (1979) also suggested that for those in the lower-status social group, a second strategy can be leaving their original ethnic group, in order to try to join to another group with a more positive social identity. As we conceptualised ethnicity as not fixed but fluid and context-dependent, Roma students who are not satisfied with the position of their group but do not want conflict with the majority can choose this strategy, and try to identify themselves as non-Roma. If other students, however, decide to compete with the majority group, these students, if still perceived as Roma by their peers, can seem as "traitors" of their "original" ethnic group. Based on this and the black sheep hypothesis, we expected that Roma students to reject those whom they perceived as Roma, but who, at the same time, perceived themselves as non-Roma. Indeed, while we found our Roma participants to have a higher tendency for homophily, their friendship nominations were more likely to be sent only towards those whom they perceived as Roma and who perceived themselves as Roma as well. Towards those whom they perceived as Roma but who perceived themselves as non-Roma, Roma students had a high chance to send negative nominations instead. This can imply that

leaving the low-status group to join another in a better position is also a strategy chosen by certain students in classrooms in secondary schools. Our results also show that the social exclusion of these students was exacerbated by being rejected by those non-Roma classmates who also perceived them as Roma. It is important to note, however, that the perception of ethnicity does not necessarily follow the same pattern among Roma and non-Roma students.

Finally, Tajfel and Turner (1979) argued that there is a third strategy for members of the lower-status group, which enhances positive self-esteem without improving social identity. In these cases, the lack of positive group self-esteem and/or internalised inferior position in the status system can bring subordinate group members to display positive attitudes towards the dominant group. Even though this strategy might go against the group's positive social identity, at the same time it can satisfy the need for positive self-esteem on the individual level. Consequently, we argued that members of the lower status group would be more likely to be rejected by their non-Roma peers than vice versa, and Roma students might even have a preference for non-Roma peers in certain situations. We found that indeed, non-Roma students tended to exclude those who they perceived as Roma by sending negative nominations towards them – regardless of their ethnic self-declaration. This rejection, however, was less reciprocated by Roma students. The fact that Roma students showed a more positive behaviour towards non-Roma students than the other way around shows that the third strategy can also be observed in the school context.

In our study, we focused on three major strategies for members of the lower status group to follow in order to achieve more positive self-esteem. This is because these strategies seem to be directly related to within-group and inter-group relationships we focused on. It is worth noting, though, that besides these, other options also exist. Most importantly, individuals can follow the strategy of social creativity, in which case positive distinctiveness is achieved by redefining or altering the elements of the comparison: changing its dimension, modifying the values assigned to certain attributes, or finding another relevant outgroup for the comparison (Tajfel and Turner, 1979). Because the influence of these strategies on relationship structure is not obvious, they are not examined in our analysis, but might still be chosen by students in our sample.

Although in this paper we followed the social identity approach, our results are also in accordance with other important social-psychological and sociological theories. Ethnic competition theory (Coenders et al., 2004; Olzak, 1992) predicts that perceived competition induces conflicts between ethnic groups, and based on Moody's argument (Moody, 2001) , in ethnically heterogeneous classes, the majority might feel their dominant position threatened, suggesting

that in heterogeneous school classes, the number of interethnic friendships is relatively low. Indeed, in our (ethnically heterogeneous) classes, we found that interethnic friendships were less frequent than intraethnic friendships, though unfortunately our sample size does not allow us to compare these classes to each other based on their level of ethnic heterogeneity. Moreover, our findings about the asymmetric intergroup relations are in line with social dominance theory (Sidanius and Pratto, 1999) and system justification theory (Jost and Banaji, 1994), which both predict that in certain situations, the lower-status social group is willing to accept their positions in the status hierarchy, and sometimes even develop outgroup preference. Finally, our results for the black sheep hypotheses (Marques et al., 1988) can also be understood as evidence for an "acting white" phenomenon (Ogbu, 2008). Based on this approach, perceived Roma, but self-declared non-Roma students may seem to other Roma students to somehow disown their "real" ethnic identity, choosing behaviours and attitudes associated with those of the majority group, thereby becoming "traitors" of their own ethnic group.

We argued earlier that even if students have only a relatively small number of friends from the other ethnic group, ethnic mixing may still be advantageous if it does not result in the disproportionate emergence of interethnic negative ties. Even though we found evidence for the higher probability of interethnic than that of intraethnic negative relationships, one should not draw a conclusion against integrated education for a number of reasons. Some of these reasons refer to certain limitations of our study, while some others are based on earlier studies proposing effective policy solutions to enhance integration, which were not used in our examined schools.

First, our results cannot be generalised to other minorities than the Roma, and even the generalisation for the situation of Roma people in Hungary has its limits due to the non-representative nature of our sample. Second, this analysis was cross-sectional, only capturing a snapshot of these communities. As discussed earlier, this cross-sectional step is very important, because it shows the likelihood of the presence of different kinds of interethnic and intraethnic relationships. However, this also means that while demonstrating the existence of negative relationships, we do not know yet whether the situation improved or deteriorated over time, which would be necessary for deciding about the effectiveness of ethnic mixing on integration. Therefore, in our next chapter we intend to investigate the factors of relationship changes between ethnically different students for a more detailed picture.

Third, we argued that both ethnic perception and ethnic self-identification depend on the social environment and interpersonal relations. Consequently, not only does ethnicity affect social ties, but also the other way around. Therefore, in a longitudinal analysis we should

not only model relationship formation based on ethnicity, but also the evaluation of perceived ethnicity and ethnic self-categorisation based on other variables including relationships.

Finally, there was no additional effort (such as extracurricular activities, proportional tracking, specific pedagogical programmes) made in these schools to strengthen the effects of formal integration. This is important since principles and methods based on which class-decoupling and extracurricular activities are planned and carried out may both maintain segregation or, instead, induce integration by increasing or decreasing opportunities for beneficial cross-race contacts (Moody, 2001; Stark and Flache, 2012). In this sense, results demonstrating the existence of interethnic negative ties call for special interventions supporting integrated education rather than condemning its effectiveness.

Our analysis suggests that examining positive and negative relationships together with different concepts of ethnicity add more detail to the picture of intraethnic and interethnic relationships. Besides, we provided evidence that positive and negative outgroup attitudes were not directly related, as they were found to appear in different inter-group relationship types. Based on the results, it seems that ethnic segregation in these schools is somehow maintained by both Roma and non-Roma students, even if they contribute to the situation in different ways. Non-Roma students do so by excluding those from different ethnic background, while Roma students by excluding those who they think are willing to "hide" or disown their Roma ethnicity.

The discrepancy observed between someone's self-declared and perceived ethnicity might also be understood and interpreted as a sign for an assimilation effort: students may be reluctant to represent their Roma identity if they would like to be assimilated to the non-Roma students. This behaviour seems to have a price, as Roma classmates tended to punish these students by social rejection. In addition to this, their non-Roma self-declaration was not enough for being accepted by the non-Roma, either: they were also rejected by those non-Roma classmates who still perceived them as Roma. The combination of these two results suggests that students with this kind of ambiguous ethnicity might be in a very difficult situation that may hinder seriously the process of assimilation. One should not forget that actual interethnic relationships are also strongly related to general interethnic attitudes as well (Stark, 2011; Wright et al., 1997), implying that these social ties might have an even broader impact on integration at the societal level.

These very important results would have remained hidden without the observation of negative networks and the application of the concept of perceived ethnicity. Hence, future scientific

research in this field should focus more on negative networks, as well as on the discrepancy between ethnic self-identification and perceived ethnicity, in order to design and establish special interventions and pedagogical programmes.

Chapter 6

Relational integration as a process

6.1 Introduction

The effectiveness of racial and ethnic integration is one of the most crucial research topics in multi-ethnic societies. Previous findings show that positive relationships with majority peers are very beneficial for minority members, since these ties strongly improve their social and cultural capital (Coleman, 1988; Stark, 2011). Moreover, interethnic relationships are useful for the society as a whole, since they decrease prejudice between groups (Pettigrew et al., 2007; Turner et al., 2007).

In an "ideal" interethnic situation, positive social ties are commonly present between ethnically different individuals. We call this as *relational integration*. To achieve this, the first step is to create a formal environment for individuals of different backgrounds to meet, which we call *formal integration*. Social policies play a crucial role to reach this first stage. These often target the education system where the proportionate mixing of racially different students can be achieved, providing direct contact opportunities. Another advantage is that in school, both the mixing procedure and later group processes can be monitored and controlled by authorities. Thus, this chapter focuses on interethnic relationships in formally integrated school communities and investigates the extent this contributes to the development of relational integration.

We also emphasise that analysis of ethnic integration should focus on negative ties as well as friendships, since these are two crucial and partly independent aspects of the process (Brewer, 1999). Integration implies not only the development of friendships between different students, but also the absence (or disappearance) of negative relationships. However, so far only relatively few studies have investigated networks of interethnic negative ties (Boda and

Neray, 2015; Stark and Flache, 2012). By analysing them separately from friendships, this chapter contributes to our understanding of the nature of negative interpersonal relations in ethnically heterogeneous social contexts.

Similarly to Chapter 5, presenting a cross-sectional analysis of inter-ethnic friendships and negative ties (Boda and Neray, 2015), we again rely on the social identity approach, concentrating on intergroup social comparison processes and their effects on social relationships. However, our hypotheses in this chapter focus on the *process-related* aspects of integration rather than integration as a state, therefore, we conduct a dynamic analysis. Our earlier Chapter also provided evidence that ethnic self-identification is not necessarily the same as someone's ethnicity is perceived by others, and both if these aspects are important for social relationships. Therefore, some hypotheses in this chapter will differentiate between self-identified and perceived ethnicity as well. Moreover, by also dynamically modelling ethnic perceptions about each other instead of only using them as an exogenous independent variable explaining relationships, we can take into account related and simultaneous other processes, such as the fact that not only ethnicity affects social ties, but social ties affect ethnic perceptions as well. For this, we treat ethnic perceptions as a network, that is, a tie between two individuals shows how one person categorises the other person's ethnicity. Consequently, our work extends existing research in another major way by accounting for the fluid nature of ethnicity.

In order to be able to test our longitudinal hypotheses, we estimate a stochastic actor-oriented model (SAOM) on the sample of 12 Hungarian school classes (N=357). For this, we utilise the new random coefficient multilevel version of SAOMs (Koskinen and Snijders, 2015) which makes it possible to estimate one joint model for the twelve groups. This method is analogous to standard random coefficient hierarchical regression techniques. In our analysis, we jointly model changes (and maintenance) in friendships, negative ties, and ethnic perceptions between students, using a separate set of independent variables for each network. Our results on the friendship networks do not show significant tendencies towards relational integration or segregation. However, we see strong tendencies towards segregation in the *negative* networks: majority students tend to reject their minority peers. Surprisingly, we also find evidence that minority students tend to form and maintain negative ties towards each other, which might be a sign of a growing level of enmity within the minority group. This highlights the importance of modelling negative ties as well as friendships, and examining the effect of the different aspects of ethnicity. Without these, our most important findings on relational segregation would have stayed hidden.

6.2 Empirical and theoretical background

In empirical sociological research, racial and ethnic memberships are often treated as given and identifiable individual attributes which lead to differences in economic, social, or political resources and rewards. Even though there is a consensus among sociologists that not only ethnicity but even race is socially constructed (American Sociological Association, 2003), the fact that individuals' race or ethnicity can change within their lifetime falls outside of the scope of most empirical studies (Saperstein and Penner, 2012). In sociological theory, however, this approach already has a long tradition. Brubaker (2009) provides a theoretical review, starting with the Economy and Society (Weber, 1968), focusing on several clusters of works that have contributed to developing ways of studying race and ethnicity without focusing on groups that are conceptually fixed (Saperstein and Penner, 2012). By ignoring the fact that race and ethnicity are situation-dependent and fluid social constructs rather than objectively defined (and definable) individual characteristics, most of the past empirical research in this field has missed an opportunity to capture some essential aspects of racial and ethnic differences.

Saperstein and Penner (2012) also suggest that race and ethnicity are multidimensional: it is crucial to distinguish between self-identifications, that is, the way someone identifies him or herself, and perceptions, that is, how this person is classified by others. This distinction refers to the complex nature and implications of race: even though we can argue that someone's racial membership should be defined by the individual him- or herself, most of the resources and rewards from the outside society depend on how someone is perceived by others. This is especially true for resources and rewards that are closely embedded in interpersonal situations and social interactions. Obviously, self-identifications and perceptions are related, and in many cases, they coincide. However, cases when they are actually different have very important social consequences (Boda and Neray, 2015). Therefore, focusing on self-identifications and perceptions jointly can provide us with a more detailed picture about race and ethnicity. Moreover, we also highlight that even others' perceptions about the same person are not necessarily in line with each other. Therefore, in this chapter we treat ethnic perception as a dyadic concept, thus, the analysis takes everyone's perception about everyone else into account.

6.2.1 The Effect of Direct and Indirect Contact

Contact theory (Allport, 1954) is probably the most important theoretical basis for integrated education. It proposes that racially mixed environments should stimulate the development

of positive social ties between individuals from different racial backgrounds, and decrease intergroup prejudice. Providing direct contact opportunities, familiarity and friendliness should increase among racially dissimilar students, at least in case of status equality between groups, cooperative interdependence, and explicit support for mixing from authorities (Allport, 1954; Brown and Hewstone, 2005; Moody, 2001). However, while efforts can be – and often are – taken by school managements to meet the second and the third criteria, the first one is usually particularly difficult to achieve, since it depends on status differences in the broader society as well. This is important because theoretically, Allport (1954) suggests that contact can even have negative consequences in situations not fulfilling these requirements.

Empirical studies about the effect of direct contact are numerous, and findings are mixed: a meta-analysis including over 500 empirical studies shows that there is an average positive effect of direct contact opportunities on intergroup attitudes (Pettigrew et al., 2007). This means that the effect of formal integration itself seems to be generally rather positive; even though the effect is much weaker when Allport's conditions are *not* met. Other results, focusing on social ties, suggest that providing direct contact opportunities is not necessarily sufficient without other policies and practices (mostly related to Allport's criteria) applied (Moody, 2001). Moreover, a study finds that in case of earlier established negative relationships, contact can indeed even make negative stereotypes stronger (Stark et al., 2013).

While contact theory emphasises the positive effect of direct contact, the extended contact hypothesis (Wright et al., 1997) focuses on the role of already formed social ties in shaping intergroup attitudes. In accordance with the extended contact hypothesis, even having a friend maintaining inter-group relationships improves someone's attitudes towards that given group (Brown and Hewstone, 2005; Pettigrew et al., 2007; Stark, 2011; Swart et al., 2010; Turner et al., 2007). In this case, friends serve as positive exemplars of their groups, which helps the inclusion of their group memberships in the own psychological self (Wright et al., 1997).

To summarise this, while it seems certain that cross-race friendships *could* have crucial positive roles in different social outcomes, it is not certain that such ties *actually* form as a result of formal integration of students. This is true especially when the formation of such ties is not explicitly stimulated by the surrounding system. In this study, we investigate interracial relationships in a context that can be described as only providing formal integration, since no additional efforts – based on Allport's criteria, or on other principles – were made to reach the goal of relational integration.

6.2.2 The Social Identity Approach

The central idea of the social identity approach (Tajfel, 1974; Turner, 1975) is that the psychological self consists of two different aspects: personal identity, and social identity. The latter is the collective aspect of the psychological self, which expresses that "at certain times the self is defined and experienced as identical, equivalent, or similar to a social class of people in contrast to some other class" (Turner et al., 1994, p. 454). Development and evolution of these identity types are based on individuals' fundamental need for social comparisons. Personal identity rests on evaluative comparisons between the given individual and others, while social identity rests on those between the perceived ingroup and perceived outgroup. The motivation for both processes is the underlying need for a positive self-esteem. Consequently, the goal of intergroup comparisons is to create and confirm ingroup-favouring evaluative distinctiveness between the ingroup and the outgroup, and thus, to increase the individual's self-esteem (Tajfel and Turner, 1979; Turner, 1975).

Following these mechanisms, social identity theory gives an explanation why individuals prefer others whom they perceive to belong to the same ingroup along certain dimensions which are relevant enough to serve as bases of categorisation. It is crucial to highlight, however, that categorisation is a dynamic and context-dependent process based on the cognitive grouping of environmental stimuli, which therefore works based on individuals' perceptions about their peers. Consequently, they will prefer others whom they *perceive* as similar to themselves more than based on their similarity in self-identifications.

The dimensions relevant enough to serve as bases of intergroup comparisons vary and depend on the context. Although minimal group experiments show that even ad hoc group memberships without real content can lead to giving preferential treatments to those signalled as "ingroup members", some distinctions are more meaningful and have more serious consequences than others (see Tajfel and Turner, 1979). Research on homophily in the field of social network analysis implies that race and ethnicity are amongst the most important dimensions of ingroup and outgroup perceptions (see McPherson et al., 2001).

Through categorisation processes, social groups provide their members with an ingroup identification, and the perception of a relevant outgroup. As a result of these comparisons, social identity is created, and the ingroup is evaluated as better or worse than the outgroup, also defining oneself as better or worse than members of the outgroup. In situations when the ingroup's social identity is perceived as more negative than that of the outgroup's, the individual

will normally strive to increase his or her social identity, in order to achieve a satisfactory self-esteem. Tajfel and Turner (1979) proposed a number of strategies to deal with these situations. The final purpose of all of them is to improve individual self-esteem, which can be achieved together with the given ingroup, or individually. Therefore these strategies strongly influence cross-race and same-race social ties as well.

6.2.2.1 Direct Competition

A possible strategy to achieve positive distinctiveness is trying to reverse the relative positions of the ingroup and the outgroup, which is an essentially competitive process. The more it is related to redefining the distribution of scarce resources the more likely that competition will be accompanied by antagonism or conflict between the groups, since it challenges the position of the groups in the established social hierarchy (Tajfel and Turner, 1979). This is also in accordance with the ethnic competition theory (Olzak, 1992), suggesting that social identity processes intensify in case of real or perceived intergroup competition, which induces perceived threat, and therefore causes negative inter-group attitudes (Bobo, 1983; Coenders et al., 2004; Savelkoul et al., 2011; Scheepers et al., 2002). As a qualitative example for this, a Black owner of a major business in Miami describes the competition between Cubans and Blacks in the following way:

> "There is also a growing number of Cuban-owned businesses in Black neighborhoods but they don't hire Blacks. For example, I was in a drugstore a couple of weeks ago and there was a Cuban lady at one of the cash registers. I went to her and she didn't even want to talk to me. I thought to myself, 'Talk to me, if I'm going to leave my money here, you ought to learn how to speak English.' They come in our areas, they take our jobs, they take our dollars, and don't even have the decency to learn the language!" (Portes and Stepick, 1993, p. 12)

Violent conflicts between racial groups even emerge during adolescence, as a Puerto Rican drug dealer in New York describes his early teenage years:

> "I was chillin' out most of the time in junior high. But they had like a wild war out there - black against Puerto Ricans - and the Puerto Rican kids used to get beat up real crazy." (Bourgois, 2003, p. 174)

In educational context, evidence supports that adolescents use aggression to achieve or maintain the status of their ingroup (Faris, 2012; Faris and Ennett, 2012). Research often, but not always,

finds evidence for cross-race dislike relationships and negative interracial attitudes in school classes (Hartup, 1993; Stark and Flache, 2012). As a behavioural outcome, the prevalence of bullying might also be higher among racially different students, with both minority and majority students serving as bullies and victims as well (Tolsma et al., 2013; Vervoort et al., 2010). This also demonstrates that interracial conflict arises in some, but not in all, formally mixed communities.

6.2.2.2 Outgroup Preference

Even though there are strategies for members of the lower-status group to improve their social identities with their own group, these are not always perceived as "real", available options. In cases when social structural differences determine the distribution of resources and the system have been institutionalised, legitimised, and justified through a generally accepted status system, or through a status system that has no cognitive alternatives for the participants, the result might be the lower-status group internalising the wider social evaluation of itself as inferior (Gregor and McPherson, 1966; Milner, 1983; Tajfel and Turner, 1979). Although this strategy does not change the group's negative social identity, it can enhance the individual's self-esteem, which is the underlying psychological need. In this case, members of the lower-status group tend to show positive attitudes towards the outgroup and, at the same time, to derogate their ingroup. The following quote demonstrates attitudes of those showing outgroup preference towards their ingroup members.

> "If anything when you look at me you know I'm Hispanic. When I jog down the neighborhood, people get scared. It's not a problem for me because I have self-confidence. Every once in a while I used to get a crank call in the house, saying 'Hey, spic,' you know 'spic' and other stuff, but I don't worry about that. In a sense, I've learned to be in their shoes. You see what I mean. Because I've seen what minorities as a group can do to a neighborhood. So I step into theirs shoes and I understand, I sympathize with them. Cause I've seen great neighborhoods go down." (Portes and Sensenbrenner, 1993, p. 1943)

We can see that this strategy also affects intergroup relations. In this case, attitudes, affections and relationships between the social groups might become (and stay) asymmetric: the higher status group shows ingroup favouritism, while lower-status group develops outgroup preference.

6.2.2.3 Individual Mobility

Yet another strategy for dealing with negative social identity is dissociation from the original ingroup: that is, individuals might try to leave their group and join a more positively perceived one which is called individual mobility by Tajfel and Turner (1979). Generally speaking, the more the idea of individual mobility is represented in a person's system of beliefs the more likely it is that this person will try to dissociate from the group in order to join another one.

When the basis of the social identity processes is race, individual mobility indicates a change in someone's racial identifications. We described existing evidence earlier that racial group memberships can change over time. In several cases, these changes are consequences of direct assimilation efforts (Portes and Sensenbrenner, 1993; Saperstein and Penner, 2012; Tajfel and Turner, 1979). Moreover, we defined race as a multidimensional concept: individuals are not necessarily perceived in the same way they self-identify (Saperstein and Penner, 2012). Since the social identity approach proposes that categorisation is based more on perceptions than (externally given) attributes of others, the crucial part is someone's race categorised by others. Therefore, for individual mobility the key seems to be whether others, especially from the target ingroup, will accept the new self-identification of those choosing this strategy. At the same time, in communities where race is a relevant dimension of categorisation and group perceptions, choosing a certain racial identification also has a signalling function about the social status the individual aims to achieve.

Consequently, the importance and meaning of each identifying characteristics always depends on the context and the relative status each group has, together with the opportunities they can provide for their members. Portes and Sensenbrenner (1993) describe this in the following way:

> "In this regard, the use of Spanish in Miami and in the Bronx is instructive. In the Bronx, shifting to English and anglicizing one's name is a sign that the individual aspires to move up by leaving behind his or her ethnic community. In Miami, the same behavior would bring exclusion from the business networks of the enclave and the unique mobility opportunities that they make available. In both instances, public use of Spanish signals membership in the ethnic community, but the socioeconomic consequences are very different." (Portes and Sensenbrenner, 1993, p. 1343)

The strategy of individual mobility is, therefore, an individualist approach: the position of the person who leaves the group might change, but this will not improve the low status of

the original group (Tajfel and Turner, 1979). Moreover, on the longer term it probably even further decreases it, especially if individual mobility is not easy and requires good skills and abilities. In this case, those who can "make it" outside of the group leave the rest in an even worse position than before (Portes and Sensenbrenner, 1993). Consequently, this strategy is destructive for group solidarity in the subordinate group (Tajfel and Turner, 1979). As a result, it can be expected that members of this group will consider those as "traitors" whom they perceive to belong to their ingroup but who, at the same time, identify with the higher-status outgroup. The following quote from a Puerto Rican man illustrates this phenomenon for the above described Bronx-context:

> "When you see someone go downtown and get a good job, if they be Puerto Rican, you see them fix up their hair and put some contact lens in their eyes. Then they fit in. And they do it! I have seen it! Look at all the people in that building, they all turn-overs. They people who want to be white. Man, if you call them in Spanish it wind up a problem. I mean like take the name Pedro - I'm just telling you this as an example - Pedro be saying (imitating a whitened accent) 'My name is Peter.' Where do you get Peter from Pedro?" (Bourgois, 2003, p. 170)

Due to seeking positive self-esteem, individuals generally try to preserve the overall positivity of their ingroups. As the Black sheep hypothesis (Marques et al., 1988) - a modifying element of ingroup favouritism - suggests, the judgements about ingroup members are more extreme than those about outgroup members, whether positive or negative. Hence, those choosing the individual mobility strategy can be rejected by their former ingroup members even more than outgroup members are. This process can, therefore, also serve as a basis of certain types of negative relationships and conflict in communities.

6.2.2.4 Social Creativity

Finally, the last strategy to achieve positive distinctiveness is to redefine or change the elements of the comparative situation. This is a group strategy rather than an individual one, and it does not affect the actual allocation of objective resources, only the subjective interpretation of the social situation (Tajfel and Turner, 1979).

Social creativity includes multiple distinct options to enhance social identity. First, it is possible to change the relevant outgroup for comparisons. This can play an important role in interracial situations where multiple racial groups are present; in our study, this option is not available for the minority group, since there are only two groups in our sample. Another

option is to change the values assigned to each group, that is, the characteristics that have been evaluated as negative for the ingroup will count as positive values. Finally, group members can find new dimensions for comparisons, which they perceive as more advantageous for their own group (Tajfel and Turner, 1979). Empirical results show that this last scenario has a crucial importance in educational settings in general: students whose ingroup is (self-)evaluated as worse based on "traditional" dimensions often deal with their lower status this way.

As an example, a study on university students finds Manchester students to evaluate Oxford students as superior to them on academic dimensions such as "hard-working", "self-assured", "articulate" and "intellectually minded", but at the same time, to rate their ingroups more positively in non-academic dimensions, such as "practically minded", and especially in social dimensions like "easygoing", and "aware of trends in music and fashion" (Spears and Manstead, 1989). In an interracial context, the "acting White" phenomenon can be understood as an example for this: because it is traditionally not acknowledged that Black Americans are capable of intellectual achievement, Black students begin to doubt and hide their own intellectual ability during their socialisation process, and define academic success as White people's privilege (Fordham and Ogbu, 1986).

Instead of encouraging academic efforts, Black peer communities often emphasise and reward other dimensions they perceive themselves to be better at: sports, (certain types of) music. Research on Black former collegiate athletes suggests that parents also tend to encourage sports as an opportunity for success as opposed to other ways (Beamon, 2009). The following quote from one of the ex-athletes, now a police officer, provides some qualitative insight into this socialisation process.

> "Even on my job now where I have kids that are bad or whatever and I try to talk to 'em I ask them what are you gone be, its either I'ma play football or basketball or either I'ma be a rapper and so when you try to point out to 'em its okay to get an education and be smart. I don't think that in the Black community now, I don't think that it's really emphasised on education. It's just more glorified from what we see most Black young people being and that's a rapper or that's a sports entertainer of some fashion. Education is not really ya know just not the goal and the focus." (Beamon, 2009, p. 14)

If members of the lower-status racial group choose social creativity to improve their social identities, there might be no conflict between the racial groups and interracial negative ties do not necessarily form. However, if this means that minority students do not consider dimensions

traditionally important for later success as something they can be good at and they should concentrate on, it can still contribute to the reproduction of social inequalities.

6.2.3 Hypotheses

This chapter focuses on how ethnic self-identifications and perceptions influence friendships and negative ties. When we analysed ethnic integration cross-sectionally in Chapter 5, We found that majority students reject those they perceived as minorities, while minority students are more likely to be friends with those they perceive as minorities if they also identify so. However, it was also shown that minority students are likely to exclude those whom they perceive as minorities, but who, at the same time, identify with the majority group. This is true after controlling for endogenous network factors. Therefore, these results provide evidence that ethnicity indeed plays an important role in the formation of friendships and negative ties. Moreover, as we expected, we found several significant structural variables in the model, highlighting the importance of endogenous network processes in the formation of interethnic social ties.

In this chapter, we rely on the four strategies introduced by (Tajfel and Turner, 1979), from which members of lower-status social groups can choose in a comparative intergroup situation in order to enhance their self-esteem. To test which strategies are followed by students in the sample, we form dynamic hypotheses and estimate longitudinal models.

6.2.4 Direct Competition

By engaging in competition, members of lower-position groups aim to reverse the relative positions of the ingroup and the outgroup. Therefore, this is potentially related to intergroup conflicts and negative intergroup relationships.

In our cross-sectional analysis, we did not find clear evidence that the minority group would compete against the majority group; even though minority students seemed to send more negative ties towards majorities, this parameter was only marginally significant. However, it does not mean that the dynamic processes cannot lead towards this direction; especially since majority students, at the same time, seem to exclude their minority classmates. Over time, we expect that this strategy would induce a growing level of enmity between racially different students, therefore, the network would get more segregated over time (less positive ties, more negative ties). Since in this case new relationships are formed and old ones are maintained based

on both ingroup preference and outgroup rejection, we hypothesise that in case of students following the strategy of direct competition,

> H1: Students *do* create and maintain interracial friendships less than same-race friendships; and they *do* create and maintain interracial negative ties more than same-race negative ties.

6.2.5 Outgroup Preference

Outgroup preference is a strategy for improving individual self-esteem without achieving positive social identity during the process. This is because students choosing this strategy tend to derogate their own racial group and to show positive attitudes towards the majority group. In our cross-sectional study, we already showed some signs that members of the lower-status group might develop outgroup preference, since in general, minority students seemed to be much more open towards majorities than vice versa. If individuals in our sample also choose and maintain this strategy over time for dealing with their negative self-esteem, we expect to see both majority and minority students to develop an increasing preference for majority students over time. Therefore, if this strategy is followed in our sample, we hypothesise that

> H2: both majority and minority students form and maintain friendships more, and negatively ties less, towards majority than minority peers.

6.2.6 Individual Mobility

Individual mobility between groups is an individualistic strategy and means that a person leaves his or her original, lower-status group behind and tries to join a more positively perceived one instead. This is likely to induce conflict between this given person and other members of the original group, since it worsens the social position and chances of the group as a whole. In the previous chapter, we found strong evidence for this strategy and for its negative interpersonal consequences: minorities seemed to strongly reject those whom they perceive to belong to the minority group like themselves, but who, at the same time, self-identify with the majority group. In this chapter, we expect to see similar dynamic tendencies. Therefore, if students in our sample choose the strategy of individual mobility, we predict that

> H3: self-identified minority students form and maintain friendships less, and negative ties more, with those whom they perceive as minorities but who, at the same time, identify with the majority group than with others.

6.2.7 Social Creativity: the "reference category"

Social creativity is the strategy that enhances individuals' self-esteem by modifying elements of the comparative situation; among these, the most relevant for our study is finding new, more advantageous dimensions for comparison. According to Tajfel and Turner (1979), social creativity is one of the efficient strategies to avoid intergroup conflict between groups, since it is related to the (conscious or unconscious) avoidance of direct competition between groups.

In Boda and Neray (2015), we did not find strong evidence that minority students have hostile feelings about the majority group; however, they seem to be rejected by their majority peers at the same time. This does not give us a definite answer whether social creativity is followed as a strategy in our classrooms; just focusing on cross-sectional results only gives us a snapshot and might not reveal overall tendencies in the classrooms. In this case, we could expect that even if students have more intragroup than intergroup friends cross-sectionally, this ratio does not further increase over time. Similarly, we would not expect a growing number of negative ties, either. Even though we cannot find direct evidence for this social creativity, since this strategy assumes the *lack* of dynamic ethnicity effects on friendships and negative ties, if we do not find support for the rest of the hypotheses, this can be understood as a potential indicator that the strategy of social creativity might be followed in our sample. In other words, this means that if minority students follow the strategy of social creativity, the given community should not get more segregated over time even if the initial level of segregation would not disappear.

6.3 Data

To test our hypotheses we analysed two waves of a four-wave social network database of the RECENS data. The examined subsample was chosen based on appropriate levels of ethnic heterogeneity within school classes, appropriate density and turnover between waves. In each classes there are at least 10% of Roma students based on their ethnic self-assessments, and there is less than 25% of missing cases in the social network data. The density of the negative networks were above 0.1 and the Jaccard index was at least 0.2 for every network. The resulted subsample (N = 357) includes 12 classes.

6.4 Measurements

6.4.0.1 Friendships and negative ties

The main interpersonal relations were measured with a five-point scale in a full network roaster. Every student was asked to evaluate their relations with all of their classmates one by one on this scale. The relation could be "-2" for "I hate him/her, he/she is my enemy"; "-1" for "I do not like him/her"; "0" for "He/she is neutral for me"; "+1" for "I like him/her", and "+2" for "He/she is my friend". In this study, the friendship network ("+2") is the measurement for positive relations as we believe that this network can express strong influence among individuals that we are interested in. Furthermore, the combined positive nominations - that is friendship and liking nominations together - were too dense (mean density: 0.49) to be used as an indicator of influential relationships. As for negative nominations, however, we have decided to combine dislike ("-1") and hate ("-2") relations, because these networks were not dense enough for the analyses (0.09 for weak negative ties and 0.05 for strong negative ties).

6.4.0.2 Roma ethnicity

The dataset provides us with information about both aspects of ethnicity. The original measurement for self-declared ethnicity had four categories: "Hungarian", "Roma", "Hungarian and Roma", and "Other". However, in our analysis we simplified this variable in the following way. We merged "Roma" with "Roma and Hungarian" and called this ethnic group "Roma"; furthermore we also combined "Hungarian" with "Other" and labelled this ethnic group as "non-Roma".

Perceived ethnicity was measured by a full network roster. Every student got a full list of their classmates and was asked to nominate those whom they considered to be Roma.

6.5 Method and models

6.5.1 Stochastic Actor-Oriented Models

The fundamental assumption underlying social network analysis concerns the dependency between network ties, that is, the presence of some ties influences the presence of others (Snijders et al., 2010; Steglich et al., 2010). Stochastic actor-oriented models (SAOMs), however allow analysing longitudinal network change while accounting for selection processes based on relevant actors? attributes (Snijders, 2001, 2005; Snijders et al., 2010; Steglich et al., 2010).

Network evolution modelled with stochastic actor-oriented models can be interpreted as the result of individual actors' "choices" about their ties towards other actors in the network: they can *form* new ties, and *maintain* or *terminate* existing ones. SAOMs allow measuring whether these choices are made based on endogenous, explanatory variables related to network tie dependencies, on the individual characteristics of the receiver of the tie, called *Ego (i)*, or on the individual characteristics of the actor, called *Alter (j)*, who considers forming, maintaining, or terminating a tie with *Ego*.

Like every statistical model, SAOMs are restricted by *basic assumptions*. It is assumed that there is information on a binary directed network tie *Yij* and a discrete individual variable *Xi*, observed for the same n individuals for at least two discrete points in time. The important feature of this approach is that the overall tie changes between two consecutive discrete observation moments is assumed to be the result of the total process of dynamic interplay between network ties and attributes. This dynamic process happens in continuous time (provided by simulation processes), during which several tie changes happen one after the other; and observed changes between the empirically observed networks at time 1 and time 2 are accounted for by accumulating the results of individual decisions over time. Individual decisions happen in micro steps: in each step, a randomly selected actor has the opportunity to make a decision about its own outgoing ties (to terminate or maintain an existing tie, or to form a new one) (Snijders et al., 2010).

Practically, probabilities related to tie change are modelled using theoretically assumed effects weighted by the parameters that can be estimated in a way to obtain a good fit with the observed network (Ripley et al., 2016). The interpretation of obtained parameters is similar to that of logistic regression models, and parameter values refer to the conditional probabilities of a tie to exist (being formed or maintained) as a function of the explanatory variables. At the end of the simulation process, parameters are estimated based on comparing the characteristics of the observed networks to the simulated networks.

In SAOMs, effects have a similar role as explanatory variables in a logistic regression as they specify the ways in which network configurations or attributes affect tie evolution (Ripley et al., 2016). Beyond attribute-based effects (so called covariates), SAOM models always include structural effects referring to different relevant network configurations in order to take network dependencies into account. In a SAOM framework, the main challenge of the model building process is to convert theory-based predictions into structural and attribute-based effects. Then, these effects can be tested on the dependent variable that provides us with the probability of *Ego* maintaining or developing a tie in the network with *Alter*. The probability of tie creation

or maintenance in the network is dependent both on individual attributes and structural effects that are responsible for endogenous network processes. The majority of these endogenous processes, such as the tendency for reciprocation or triangulation, are rather well documented in human social systems (see Chapter 2), others are responsible to capture empirically observed endogenous tendencies in the network formation.

In our case, such a simple SOAM would account for the effect of ethnicity on friendship choices as well as on negative ties while controlling for other important tendencies. Moreover, it is also possible to model ethnic perceptions over time together with friendships and negative ties instead of only using them as a dependent variable. This way, we can take into account other related and simultaneous other processes, such as the fact that not only does ethnicity affects social ties, but social ties affect ethnic perceptions as well.

Our analysis defines ethnic perceptions on the dyadic level, that is, whether *Ego* classifies *Alter* as a minority person. This way, each dyadic perception can be treated as a tie from *Ego* to *Alter*, and these ties form a social network of ethnic perceptions. This network can be used in an analysis explaining friendships or negative ties; for example, it can be estimated whether *Ego* will be more or less likely to name *Alter* as a friend if *Ego* also perceives *Alter* as a minority peer. This way, we can analyse the relationship between ethnic perceptions and social ties on the micro level, avoiding unnecessary aggregation of data.

In our co-evolution models, we have three different dependent variables: friendships, negative ties, and ethnic perceptions. To estimate these, we have three separate sets of independent variables of which each explains one dependent variable. These sets include effects based on the other dependent variables as well, therefore, processes related to ethnic perceptions can be used to explain friendships, while ethnic perceptions themselves are explained in another part of the same model.

6.5.2 Model Specification

This chapter focuses on friendships, negative ties and ethnic perception among students. For estimating these networks, we design a model specification where negative and friendship networks are estimated in the same model, as two dependent variables. Moreover, perceived ethnicity is also modelled together with the relationships, since this way we can take into consideration changes in the perception networks over time, and the fact that they can be partially caused by relationships themselves. This way, technically ethnic perceptions are also treated as a dependent variable.

In the friendship and negative model parts, we include the same ethnicity-related independent variables. To capture the effect of *Ego*, we model *Ego*'s ethnic self-identification. We also include *Alter*'s self-identification in two different ways: how *Alter* self-identifies, and how each *Ego* perceives *Alter*. This second measurement for *Alter*'s ethnicity is, again, based on a network, which includes everyone's perception about each *Alter* in the community. We also include the interaction between *Ego*'s and *Alter*'s ethnicity, using both *Alter* variables; therefore, we have two interaction effects in both the friendship and the negative parts of the model. In this step, we do not find it important to build models with only self-identifications and only perceptions, since our previous analysis has already revealed the importance of modelling these together. Therefore, we only present results of the full model specification.

We also include several structural effects in our model in order to capture important endogenous network mechanisms. The full model specification can be found in Appendix A.12.

To control for the fact that friendships and negative ties can also affect how someone's ethnicity is perceived, which is one of the major reasons for this co-evolution analysis, we also include structural, friendship and negative tie effects on the evolution of the ethnic perception network. This part of the model is not the main focus of this chapter; these effects are summarised in Appendix A.12. However, as it was described earlier, we now disregard that ethnic self-identifications can also change, and treat them empirically as fixed, which is reasonable since very few changes happen in our dataset between the two observation used.

Our analysis aimed to consider socio-economic status as a crucial control variable which can be the underlying reason behind observed ethnicity related preferences. However, socio-economic variables did not have significant effects in any of the preliminary models, and parameter sizes were really close to 0. This is probably because these classes are very homogeneous in social background: both minority and majority students came from families with relatively low socio-economic status. Therefore, these variables were dropped from the final model in order to reduce the number of variables estimated.

6.6 Results

6.6.1 Descriptive Results

Before estimating SAOMs, it is important to make sure that the analysed networks are dense enough to allow for the existence of theoretically important micro structures. We calculated the average density values that measure the proportion of actual ties and potential ties (if everyone

would nominate everyone else) in the friendship and negative networks. The mean density of the friendship networks was 0.185 in the first wave and slightly decreased for the second wave (0.16), the mean density of negative networks somewhat increased from wave one to wave two (0.131 – 0.158). Similarly to the negative networks the ethnic perception networks became more dense for the second wave (0.139 – 0.187).

It is also vital for the analysis to have sufficient, but not too much, of change in the networks of two successive waves. This can be expressed by the Jaccard index which measures tie stability in networks. It captures what proportion of ties existed at one point of time still exists at the next time of the observation. For our models, the mean Jaccard index of the friendship networks was 0.385, 0.269 of the negative ones and 0.435 of the ethnic perception networks, which is good for a SAOM analysis.

6.6.2 SAOM results

First we present the full set of results, including the evolution of friendships, negative ties, and ethnic perceptions. Table 6.1 provides a more detailed description of the results, with estimates, standard errors, and between-classroom differences. The first part of the table contains results for friendship dynamics, the second part for the dynamics of negative networks, and the third part represents results for the classification of minority students. For each part, the parameter estimates of structural effect are presented first, they are followed by covariate effects, and mixed-network effects that connect the ethnic perception network with the friendship- and the negative network.

	Estimate	(S.D.)	Posterior prob.	Credible interval from	to	Varying
Friendships						
Same-network structural						
Outdegree	-1.307	0.433	0.004	-2.174	-0.47	+
Reciprocity	1.925	0.268	0.000	1.382	2.461	+
Transitive triplets	0.426	0.093	0.000	0.245	0.608	+
Trans. reciprocated triplets	-0.249	0.045	0.000	-0.336	-0.148	⊘
Alter's popularity	0.005	0.012	0.352	-0.017	0.027	⊘
Alter's friendship activity	-0.155	0.013	0.000	-0.179	-0.129	⊘
Ego's friendship activity	-0.011	0.041	0.382	-0.097	0.073	+
Covariate						
Alter's self-identification	-0.014	0.107	0.458	-0.225	0.188	⊘
Ego's self-identification	0.044	0.081	0.304	-0.114	0.201	⊘
Ego × *Alter* 's self-identification	0.17	0.127	0.088	-0.067	0.415	⊘
Alter's gender	-0.038	0.085	0.334	-0.195	0.126	⊘-
Ego's gender	-0.065	0.083	0.23	-0.225	0.089	⊘
Ego × *Alter* gender	0.053	0.089	0.285	-0.117	0.214	⊘
Mixed-network						
Minority tie × *Ego*'s self-identification	-0.268	0.222	0.108	-0.705	0.146	⊘
Negative tie	-2.08	0.557	0.000	-3.373	-1.207	+
Reciprocity with a neg. tie	-0.542	0.26	0.010	-1.085	-0.073	⊘
Level of dislike towards *Alter*	-0.023	0.013	0.026	-0.048	0	⊘
Ego's dislike activity	-0.008	0.010	0.223	-0.029	0.011	⊘
Minority tie	0.014	0.192	0.465	-0.395	0.376	⊘

	Estimate	(S.D.)	Posterior prob.	Credible interval from	Credible interval to	Varying
Negative ties						
Same-network structural						
Out-degree	-2.445	0.452	0.000	-3.331	-1.524	+
Reciprocity	0.519	0.361	0.071	-0.202	1.208	+
Transitive triplets	-0.169	0.101	0.042	-0.374	0.025	+
Level of dislike towards *Alter*	0.147	0.047	0.005	0.054	0.241	+
Alter's dislike activity	0.009	0.015	0.305	-0.019	0.034	⊘
Ego's dislike activity	0.11	0.045	0.010	0.021	0.197	+
Covariate						
Alter's self-identification	-0.32	0.109	0.001	-0.526	-0.115	⊘
Ego's self-identification	-0.106	0.09	0.106	-0.285	0.055	⊘
Ego × *Alter* self-identification	0.175	0.125	0.081	-0.062	0.412	⊘
Mixed-network						
Minority tie × *Ego*'s self-identification	-0.514	0.197	0.003	-0.921	-0.135	⊘
Friendship	-1.701	0.372	0.000	-2.426	-0.993	+
Reciprocity with a friendship	-0.708	0.244	0.000	-1.224	-0.267	⊘
Alter's popularity	-0.03	0.014	0.014	-0.057	-0.004	⊘
Ego's friendship activity	-0.009	0.012	0.213	-0.033	0.013	⊘
Minority tie	0.876	0.174	0.000	0.524	1.223	⊘

	Estimate	(S.D.)	Posterior prob.	Credible interval from	to	Varying
Minority classification						
Same-network structural						
Out-degree	-4.229	0.497	0.000	-5.211	-3.239	+
Reciprocity	-0.146	0.127	0.128	-0.388	0.1	⊘
Alter's level of being classified as a minority	0.159	0.045	0.003	0.065	0.244	+
Ego's minority classification activity	0.127	0.048	0.007	0.029	0.221	+
Covariate						
Alter's self-identification	0.909	0.077	0.000	0.767	1.064	⊘
Ego's self-identification	0.151	0.119	0.104	-0.071	0.384	⊘
Mixed-network						
Negative tie × *Ego*'s self-identification	-0.167	0.286	0.268	-0.702	0.412	⊘
Friendship × *Ego*'s self-identification	0.665	0.252	0.003	0.186	1.162	⊘
Friendship	0.017	0.22	0.465	-0.418	0.43	⊘
Negative tie	0.301	0.235	0.102	-0.172	0.737	⊘

Note: Estimated parameters; estimated standard errors; posterior probabilities; credible interval for the estimated parameters; parameters randomly varying (+) or fixed (-) in the model. We present the posterior probabilities of values less than 0 for positive estimates, and the posterior probabilities of values larger than 0 for negative estimates.

Since this is an overwhelming amount of data, in this section we primarily focus on results directly relevant to our hypotheses. Table 6.2 demonstrates these results for the friendship networks and table 6.3 for the negative networks. For both tables, the rows represent *ego's* self-declared ethnicity which can be either majority (non-Roma) or minority (Roma). *Alter's* ethnicity can be found in the columns, and it can be (self-declared) majority, "consistent"

minority: that is self-declared minority by Alter and perceived minority by Ego. Furthermore, it can be ambiguous in two ways: Alter may self-identify as minority while being perceived by Ego as majority; or the other way around. Similarly to our cross-sectional results, we calculate conditional odds ratios for each of the nomination types based on self-identified and perceived ethnicity. The reference point is the maintenance or creation of a majority-majority friendship tie in table 6.2, and that of a negative tie in table 6.3.

		Alter's ethnicity			
		Majority	"Consistent" minority (in both ways)	Self-identified minority but perceived majority	Perceived minority but self-identified majority
Ego's ethnicity (self-identified)	Majority	1	0.956	0.971	0.984
	Minority	1.028	0.935	1.219 *	0.789

$+p < 0.1 * p < 0.05 * *p < 0.01 * * * p < 0.001$
Reference category: majority - majority nomination

TABLE 6.2: SAOM results: Ethnicity on Friendship Ties Selection Table

For the interpretation of results, we now go back to our hypotheses. First, we concentrate on the first and second hypotheses, since these have predictions about interracial friendships and negative ties in general; afterwards, we focus on the third hypothesis which also refers to the effect of discrepancies between self-identified and perceive race. The first hypothesis predicts students to form and maintain interracial friendships less and negative ties more than same-race ones. The second hypothesis expects that both majority and minority students form and maintain friendships more, and negative ties less, towards majority than minority peers.

When focusing on friendship ties, neither the predictions of H1 nor H2 seem to be confirmed: we cannot find significant differences between the majority-majority nominations and other tie types. In fact, in the friendship models no nominations are significantly different from the reference category based on the conventional, 0.05 significance level. There is one parameter that is marginally significant ($p < 0.1$), expressing that minority students tend to nominate those more whom they perceive as majorities, but who, at the same time, identify with the minority group (OR = 1.22, $p < 0.1$). This finding, however, does not reflect directly either H1 or H2. Therefore, based on friendship ties only, it seems that neither the strategy of direct competition nor that of outgroup preference are supported. This seems to suggest that students might turn to social creativity to enhance their self-esteem.

For negative ties, however, results paint a completely different picture. Here we see (similarly to our cross-sectional results) that majority students tend to exclude those whom

		Alter's ethnicity			
		Majority	"Consistent" minority (in both ways)	Self-identified minority but perceived majority	Perceived minority but self-identified majority
Ego's ethnicity (self-identified)	Majority	1	1.669 ***	0.725 ***	2.300 ***
	Minority	0.899	4.504 ***	0.824 $^{+}$	1.176

$+p < 0.1 * p < 0.05 * *p < 0.01 * * * p < 0.001$
Reference category: majority - majority nomination

TABLE 6.3: SAOM results: Ethnicity on Negative Ties Selection Table

they perceive as minority peers, regardless whether these consider themselves as minorities or not (OR = 1.74, $p < 0.001$, and OR = 2.40, $p < 0.001$, respectively). This can be partial support for either H1 or H2 which both predict intragroup preference for majority students. Therefore, to decide which one is the underlying mechanism for tie formation and maintenance, we need to focus on the relationship choices of minorities as well. There, it seems that minority students tend to strongly dislike other "consistent" minorities compared to the reference category (OR = 4.726, $p < 0.001$); moreover, this parameter is much higher than any other odds ratios in the table. This suggests that H2 is supported, since it predicted outgroup preference amongst minority students, and our results indeed show very strong outgroup preference (and, even more ingroup rejection).

Finally, the third hypothesis predicts that self-identified minority students form and maintain less friendships, and more negative ties, towards those whom they perceive as minorities but who, at the same time, identify with the majority group than towards others. We cannot find support for this hypothesis: even though the parameter sizes and directions are in line with our expectations, neither of them is significant (OR = 0.811 in the friendship networks and OR = 1.293 in the negative networks, in both cases $p > 0.1$). However, we find another interesting phenomena: both minority and majority students tend to dislike those peers less whom they perceive as majorities, but who, at the same time, self-identify as minorities. This is an interesting finding which is not related to any of our hypotheses; however, it matches the other unexpected piece of result in the positive networks, that is, minority students liked those more whom they perceived as majorities, but who identified with the minority group. Therefore, some other mechanisms should operate behind this result which are not captured by the social processes the theoretical sections of this thesis have focused on.

6.7 Discussion

6.7.1 Interpreting the results of the chapter

In this chapter, we formed theoretically based hypotheses about the dynamics of interethnic relationships, and tested our predictions using a Hungarian dataset on Roma and non-Roma Hungarian students. We applied a social network approach and focused not only on friendships but also negative ties, including self-identified and perceived ethnicity in the models at the same time. We also considered, and controlled for, the role of the network structure when modelling and understanding segregation; therefore, our model captured endogenous network processes that have an important effect on relationship formation.

Following social identity theory (Tajfel, 1974; Turner, 1975) and previous results (Boda and Neray, 2015) on this topic, we formed different, mostly competing hypotheses about interracial friendship and negative ties based on the various possible strategies members of a lower-status group can follow in order to improve their self-esteem. We expected that the strategy of social creativity would not induce further interethnic segregation in the group, since it does not affect the objective positions of the two groups. However, social competition should lead to, and confirm, ethnic segregation. At the same time, in consequence of individual mobility processes minority students were expected to exclude those whom they perceive as minorities, but who, at the same time, identify with the majority group. This is because these peers can seem to them to be traitors of their "original" ethnic group. Finally, minority groups can develop outgroup preference as well, in which case we predicted them to tend to prefer their majority instead of their minority peers.

Our results showed that indeed, friendship ties do not become significantly more (or less) ethnically segregated over time, controlling for structural mechanisms. This seems to imply that our groups do not follow a path of segregation over time, that is, the case of social creativity is the most important strategy in these communities. However, when we take a look at our results on the negative ties as well, this interpretation seems to be false. Even though we did not find ingroup preference in the classrooms, we did find evidence for outgroup rejection from the side of majority students. Moreover, minority students also tend to dislike other minority members, showing significant ingroup rejection. This suggests that instead of integration, our groups follow a path towards a state where majority students exclude minority students, who, at the same time, also develop a rejection towards their own group. This implies strong hierarchical differences between the two groups.

6.7.2 Broader discussion and complementary analyses

If we compare the longitudinal results of Chapter 6 to the cross-sectional results of Chapter 5, we can reveal two unexpected findings. Firstly, while the fact that majority students reject their minority classmates is not surprising – it fits some of our hypotheses as well as our earlier, cross-sectional results – minority students' rejection towards their minority peers is something we have not expected. Cross-sectionally, we found that minority students are likely to be friends with their "consistent" minority peers (see Chapter 4); these longitudinal results, on the other hand, show a strong tendency for negative ties.

A second unexpected set of results suggests that both minority and majority students tend to dislike those *less* whom they perceive as majority classmates, but who, at the same time, identify with the minority group. The acceptance of these peers is somewhat supported in the friendship networks (in case of minority *Ego*s) as well. At first sight, this finding is somewhat similar to the case of individual mobility, when people identify as the majority but are still perceived as minorities by (at least some) others. However, the tendencies here are exactly the opposite.

While the fact that majority students reject their minority classmates is not surprising – it fits some of our hypotheses as well as our earlier, cross-sectional results –, minority students' rejection towards their minority peers is something we have not expected. Cross-sectionally, we found that minority students are likely to be friends with their "consistent" minority peers (see Chapter 5); these longitudinal results, on the other hand, show a strong tendency for dislikes. Here, it is important to keep in mind that the cross-sectional results were based on the second wave of the longitudinal sample, that is, they capture the state of integration at the end point of the dynamic processes modelled.

Whilst the cross-sectional results describe the inter-ethnic relations in terms of a collection of likelihoods at a certain point of time, the longitudinal model reveals tendencies between an earlier observation and that point of time. Therefore, based on the longitudinal results, there is a tendency for minority students to form and maintain negative ties towards those peers whom they perceive as minorities, and who also self-identify that way. However, based on the cross-sectional results, we also see that at the end of the observation period there are not significantly more negative ties between these students than between others. An explanation for this difference could be that in the beginning, minority students were really unlikely to dislike each other compared to everyone else, but these negative ties have started to develop later. This way, the very strong dynamic tendency would still result in just a "normal" level of

dislike by the end of the observed period.

A second unexpected set of results suggests that both minority and majority students tend to dislike those *less* whom they perceive as majority classmates, but who, at the same time, identify with the minority group. The acceptance of these peers is somewhat supported in the friendship networks (in case of minority *Ego*s) as well. At first sight, this finding is somewhat similar to the case of individual mobility, when people identify as majorities but are still perceived as minorities by (at least some) others. However, the tendencies here are exactly the opposite.

In order to better understand this finding, we should examine how prevalent this inconsistent categorisation is in our sample, and whether this is concentrated in only few of the individual classrooms. For this, we present a histogram demonstrating how frequently self-identified minority students are perceived as majority members by their classmates. We present the figure for the whole sample (see Figure 6.1); the class-level histograms can be found in the Appendix A.10 for classrooms separately.

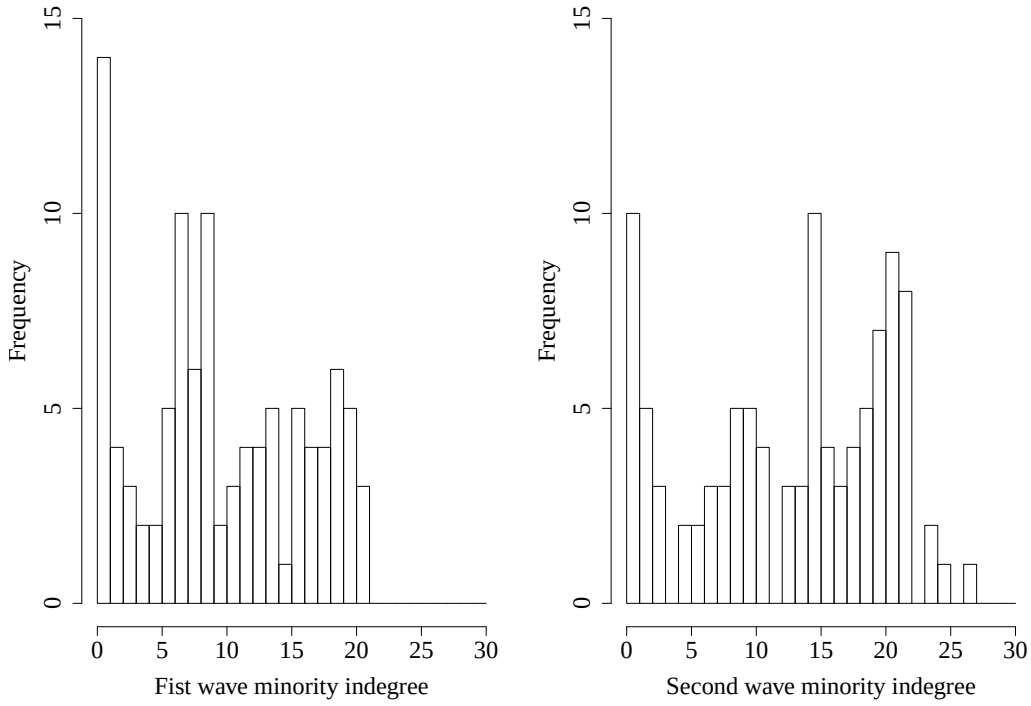


FIGURE 6.1: Minority In-Degrees of Self-Identified Minority Students at Wave 1 and 2

Figure 6.1 shows that the case of being nominated as a majority student while self-identifying as a minority member is not as unlikely as we might think. In the first wave, there is, on average, one self-identified minority student in every class who is not perceived as a minority member by anyone - this is a slightly lower number in the second wave. We already saw in the

descriptive statistics that in the second wave, there are more minority classification ties in the community. Figure 6.1 also demonstrates that this will make the classifications more "precise", that is, more likely to match self-identifications. Still, nominations about self-identify minority students substantially vary in both waves. The individual level models show that this is not the result of one or two classrooms, though communities also show quite some variation on this.

We also need to understand why these students seem to be attractive to their peers. We argue that even though this type of an in categorisation is the opposite of what we expected for minority students' individual mobility, it might still be (partly) driven by ethnic assimilation attempts. This is because assimilation is not always the consequence of direct efforts; instead, sometimes perceptions about a person change, which is often, but not always followed by a change in self-identification. Therefore, these students might be accepted members of the community as majority peers regardless of the fact that they (still) self-identify as minorities. Saperstein and Penner (2012) suggest that an increase in someone's socio-economic status comes with a higher likelihood that this person will be later perceived as White, based on stereotypes about socio-economic status. Given that based on our results, being a majority member comes with a much higher social acceptance than being a minority member, those who have good social positions in the community might be assumed to belong to the majority group, since minorities are, in general, disliked. However, this is just a possibility that we do not elaborate in the article, since this effect is not modelled in the minority perception part in the co-evolution model.

Even though comparing parameter sizes of this chapter to that of the previous one is rather problematic, when we study these results together, we have to keep in mind that our longitudinal model does not distinguish between forming new ties and maintaining existing ones. If either happens relatively often, this can result in a strong parameter for the given variable. Therefore, it is also an option that the large parameter is due to the stability of these negative ties instead of a tendency for them to form. This would mean that negative ties between minority students are relatively stable, while other negative ties dissolve more easily. Similarly, it could also mean that negative ties towards those who are perceived as majorities but self-identify as minorities seem to be less stable relative to other negative ties. To be able to judge the relative importance of these processes, we should either design a SAOM that distinguishes between creation and maintenance of ties, or build an additional ERGM for the first point of time of the observed period. Although the first solution seems quite problematic due to power issues, the second one could be a feasible idea for further analysis of the topic.

In Chapter 4 we combined our group-specific results with meta-analysis and in Chapter 5 we analysed separate groups jointly in order to discover general tendencies in our sample. However, the only indisputable tendency we found is that students seem to follow different strategies in the positive and negative networks. Beyond this, after such a long discussion of the results we still cannot decisively link our empirical results to our theoretical arguments and hypotheses. Besides the above mentioned reasons, this could be due to the fact that the joint analysis of sovereign classes might resulted in a mash-up of different group-specific tendencies.

Hence, in order to describe group-level tendencies we went back a few steps and descriptively recreated the result tables (table 6.2 and table 6.3) focusing on the possible strategies of self-declared Roma students. We created three tables. Strategies followed by self-declared Roma students in wave 1 and wave 2 are in Appendix A.9 and A.10. The change in the strategies between wave 1 and 2 is presented here in table 6.4. The different school classes (class 1 through class 12) are underneath each other in the table, hence the main table basically consists of 12 class-level sub-tables. The structure of each sub-table is the same. In the rows, there are the distribution of friendship (+) and negative (-) nominations of self-declared Roma students according to the categorisation of Alter, which is represented in the first four column of the main table. Similarly, to the earlier representation of the results, Alter can be categorised by Ego in four different ways: it can be (self-declared) majority, "consistent" minority: that is self-declared minority by Alter and perceived minority by Ego. Furthermore, it can be ambiguous in two ways: Alter may self-identify as minority while being perceived by Ego as majority; or the other way around. In the last column the identified strategies followed by self-declared Roma students in the positive and negative networks is presented.

Firstly, we identified class-level strategies in wave 1 and wave 2 (see Appendix A.9 and A.10) simply comparing the proportion of ties among cells within one sub-table. Then, we calculated the change in the distribution of certain ties between wave 1 and 2 and evaluated its magnitude. If this change was insignificant, that is, the group followed the same strategy with the same "intensity" in wave 1 and 2, then we characterised the strategy as *stable*, for example "Stable Outgroup preference". If, however, there was a significant change in the strategy, we characterised it as *increasing*, for instance "Increasing Competition". Hence, the strategies identified in wave 1 and wave 2 might differ from each other to some extent, and the strategies identified in table 6.4 express somewhat more general, dynamic tendencies.

The main conclusions of this very basic, descriptive attempt to better understand our results are the following. Because there are only 3 classes in total in wave 1, wave 2 and dynamically as well (class 1, 5 and 3 in table 6.4) that follow the same strategies in the friendship

and negative networks, we can reconfirm our previous statement: there are typically different strategies followed in the positive and in the negative networks. If we take a look at table 6.4 we can tell that in class 1 and 5 self-declared minority students follow the path of increasing competition in both networks, and class 3 shows tendency for increasing outgroup preference. In the rest of the classes there is tendency for outgroup preference in the friendship network and for competition in the negative network. The only exception is class 2, where it is the other way around.

Furthermore, it is also clear that the classes essentially differ from each other with regards to the strategy they follow in the two networks. The tendencies for different strategies are marked by different colours on the grey-scale. The darker the colour, the more likely the class is to follow strategy that leads to segregation (direct competition), and the lighter colours refer to tendency towards possible integration (outgroup preference). By studying the dynamic tendencies in table 6.4, we can see that in four classes (class 3, 10, 12 and 2) student had increased tendency for outgroup preference, whereas the tendency for direct competition increased only in two classes (class 1 and 5). In the remaining 6 classes students did not change the intensity of their strategies, that is, they kept following outgroup preference in the friendship networks and direct competition in the negative networks.

If we connect these findings to those of the SOAM in Chapter 5, we can argue that the different strategies followed by different classes could have resulted in weaker model estimates earlier, that made social creativity the most likely strategy. Here, on the other hand, we can see that the vast majority of the classes follow the strategy of outgroup preference. When interpreting the negative networks, our descriptive results reinforce our previous analytic results: Roma students have a tendency to follow outgroup rejection in the negative networks, and there is no sign of ingroup rejection (besides class 2).

With this in mind, we can more confidently say that despite our previous expectations, our results are not in line with the notion of "acting White", which rests on the assumption that people interacting with others from a different ethnic group are sometimes perceived to be traitors of their original identity by the members of their own ethnic group. Even though Black students usually form ties with White students because they share their aspirations and skills and not because they would prefer the White in general, they are usually perceived and accused of acting White by their Black peers as they reject attitudes and cultural norms that are more frequent among Black students (Ogbu, 2008). We, however, did not see minority students have negative feelings towards those whom they consider to belong to their own ethnic group, and who – at the same time – are reluctant to represent this perceived ethnicity.

	Majority	"Consistent" minority	Self-identified minority but perceived majority	Self-identified majority but perceived minority	Minorities' Strategy
			class 1		
+	0.00	0.24	*-0.20*	-0.04	Increasing Competition (+/-)
-	0.17	-0.17	0.00	0.00	
			class 5		
+	-0.27	0.31	0.00	-0.03	Increasing and Stable Competition (+/-)
-	0.02	-0.03	0.00	0.02	
			class 3		
+	0.21	0.08	*-0.29*	0.00	Increasing Outgroup pref. (+/-)
-	-0.17	0.26	-0.08	-0.02	
			class 10		
+	0.19	-0.13	0.00	-0.06	Increasing Outgroup pref. (+),
-	0.00	0.00	0.00	0.00	Stable Competition (-)
			class 12		
+	0.07	-0.16	0.08	0.00	Increasing Outgroup pref. (+),
-	-0.02	0.00	0.02	0.00	Stable Competition (-)
			class 2		
+	-0.02	0.23	*-0.20*	-0.01	Increasing Outgroup pref. *(-)*,
-	0.06	0.25	*-0.31*	0.01	Stable Competition. *(+)*
			class 4		
+	-0.04	0.06	0.00	-0.02	Stable Outgroup pref. (+)
-	0.00	0.00	0.00	0.00	Stable Competition (-)
			class 6		
+	-0.11	-0.05	*0.16*	0.00	Stable Outgroup pref. (+)
-	0.00	0.00	0.00	0.00	Stable Competition (-)
			class 7		
+	-0.02	0.00	0.00	0.02	Stable Outgroup pref. (+)
-	0.00	0.00	0.00	0.00	Stable Competition (-)
			class 8		
+	-0.01	-0.05	0.07	-0.01	Stable Outgroup pref. (+)
-	-0.03	0.09	-0.04	-0.01	Stable Competition (-)
			class 9		
+	0.02	-0.04	0.05	-0.03	Stable Outgroup pref. (+)
-	0.00	0.00	0.00	0.00	Stable Competition (-)
			class 11		
+	0.03	-0.03	-0.01	0.00	Stable Outgroup pref. (+)
-	0.00	0.00	0.00	0.00	Stable Competition (-)

TABLE 6.4: Self-declared Roma students' strategies between wave 1 and 2

Actually, what we found is somewhat the opposite, both in the SOAMs and in the descriptive statistics presented here. If we take a look at the fourth column of table 6.4, we can see that there is no explicit tendency for rejecting or accepting self-identified majority but perceived minority students. Even though we did not emphasised it here, this lack of change is due to a stable "neutral" relationship with these students in 10 classes, and stable acceptance of these students in 2 classes. According to table A.9 and A.10 both in wave 1 and 2 self-declared Roma student had a significant amount of friendship nominations towards self-identified majority but perceived minority students (in class 4 and 5).

In summary of this descriptive analysis we may conclude that the strategy of outgroup preference is somewhat more prevalent than the strategy of direct competition in the individual school classes. Furthermore, in two school classes students who chose to follow individual mobility (self-identified majority but perceived minority students) were positively treated by their self-identified minority peers. Even though, this descriptive approach can never produce statistically and analytically convincing outcomes, the combination of these two descriptive results may suggest that the overall dynamics of inter-ethnic relations in our sample points towards relational integration rather than segregation.

6.7.3 General concluding words

Although our empirical results provoke further analysis in order to better understand the examined phenomena, the current study reinforces the main general conclusions of the previous one. These results, again, highlight the role of negative ties in school communities, and the importance of examining them when analysing relational integration. Without modelling negative ties, tendencies of segregation could have stayed hidden, since they did not have signs in the friendship networks. Moreover, it was demonstrated again that potential inconsistencies between self-declared and perceived ethnicity play a crucial role in the development of inter-ethnic relations. Hence, these findings contribute to the understanding of social identity as they emphasise the duality of racial identification and categorisation.

Chapter 7

Conclusion

7.1 Research questions

Our departure in the beginning of this Thesis was the disadvantaged position of minority groups, who are often deprived from practically available *liberties* necessary to tackle every-day challenges originating from social, and economical *inequalities* in their host societies. More often than not they are found to have relatively low social, and economical status; their members are regularly and repeatedly excluded from the mainstream society in numerous ways (Alon and Haberfeld, 2007; Black et al., 2006; Cohen, 1999; Dustmann and Frattini, 2011; Neal and Johnson, 1995; Trejo, 1997).

Racial fractions often form the basis of such exclusion that coincides with the evolution of negative relations and prejudice, which can give rise to, and be reinforced by, various forms of interracial conflicts (Black et al., 2006; Espinosa and Massey, 1997; Greenman, 2011; Neal and Johnson, 1995; Trejo, 1997). The promise of *integrated education* is the reduction of racial inequalities through the development of the social, and human capital. In the core of this promise there is an assumption that positive *interracial relations* might develop among members of majority and minority groups that have the potential to foster integration (Moody, 2001; Pettigrew and Tropp, 2008; Stark, 2011; Swart et al., 2010; Turner et al., 2007).

Nonetheless, it is difficult to talk about potential benefits of different-race friendship, if it fails to develop and persist over time. Indeed, evidence of previous research undoubtedly indicates that adolescents' interracial friendship formation is a rare phenomenon. Even though Allport's contact theory requires intergroup contact to be sustained in order to effectively reduce prejudice (Allport, 1954), there are surprisingly few studies that analysed the stability of these relationships over time. Moreover, these studies had controversial results that provoke

further investigation (Hallinan and Tuma, 1978; Kandel, 1978; McPherson et al., 2001; Tuma and Hallinan, 1979). Hence, we argued that relational integration should be defined not only by the development of positive intergroup ties but also by the stability of these ties. In Chapter 4 we explored *whether the racial composition of the friendship dyad influences its stability over time.*

Furthermore, we extend the definition of relational integration by accounting not only for the prevalence of positive intergroup relations but also for negative ones (see Chapter 5 and 6). Consequently, in Chapter 5 we introduced two different aspects of ethnicity: self-declared ethnicity, and ethnicity based on peer perception. Here, we studied social identity without focusing on groups that are conceptually fixed (Brubaker, 2009; Emirbayer, 1997; Saperstein and Penner, 2012; Tilly, 2005), and we analysed how *positive as well as negative interpersonal relations are influenced by the different aspects of race, and the discrepancy between them.*

In Chapter 6 we applied a more complex approach in order to *model together the development and maintenance of friendship and negative ties as a result of self-identification and categorisation processes.* Here we took into account that not only ethnicity affects social relationships, but friendships and negative ties can also influence how students categorise each other. In this relational approach, we, like the majority of previous research, treated identities as characteristics of individual consciousness. However, we did more. By accepting and capitalising on the idea that identities are shaped by social relations, we argued that every individuals has as many identities as it has relations with other individuals within the social group (Tajfel and Turner, 1979; Tilly, 2005).

7.2 Results and contributions of the research

7.2.1 Theoretical contributions

In Chapter 2, our effort focused on the description of a relational analytical framework that is suitable to the theoretical understanding and empirical analysis of our research topic. In this chapter we argued that the empirical investigation of social relations is often a necessary and fruitful element of the research on a large variety of social phenomena. Even though relational approach has been present in theoretical thinking for a long time, its more precise formalisation as well as empirical application is relatively recent and scattered. Hence, we decided to draw up an analytical framework in which aims of empirical research can be articulated and analysed.

In this framework, as a first theoretical contribution of this work, we introduced the notion of *dependence* that *connects the different levels of social scientific inquiry*. Theoretically speaking, the dependence comes by the evolution of relations among individuals. They depend upon each other as their attributes get influenced by their relations, relations are selected as a result of the difference (or similarity) of their attributes, and finally, relations evolve as a consequence of other relations within a given context or social group. Once we accept these arguments we can further reason that interpersonal relations evolve and operate on the meso level of the scientific inquiry, connecting individual attributes or outcomes (e.g. ethnic identification) on the micro level to outcomes on the group or macro level (e.g. ethnic segregation).

Further, we argued that the social mechanisms responsible for the *evolution of these interpersonal relations* had been long described theoretically and can be *empirically operationalised* within the right methodological framework. We referred to ERGMs and SAOMs as theory driven methodological tools that allow the researcher to acknowledge the lack of independence of the observations. As an other contribution of this Thesis, we showed that considering dependence among the different levels of scientific inquiry is not only fruitful from a theoretical point of view, but necessary empirically as well. For future reference we illustrated that the *interpretation of the network evolution processes* requires some caution due their endogenous and embedded nature. As a result of our efforts in Chapter 2, *we presented an analytic framework* that is well suited to answer substantive research questions concerning social relations, and analyse them according to statistical inference.

As a third theoretical contribution of this Thesis, *we introduced social identity theory*, an already existing theoretical approach, *within the relational framework*. Related to our empirical agenda, in Chapter 5 and 6 we illustrated that (racial) *identity formation* can be more precisely described within this framework. In a relational approach, identity can be understood as a fluid attribute constantly shaped by within, and between group relations that are regulated through context specific social norms (Tilly, 2005). Consequently, *identities can be interpreted as characteristics of individual consciousness*: how you think of yourself, *and also by social context and social relations*: individuals might have as many identities as they have relations with other individuals and social groups (Tilly, 2005).

Following SIT we can argue that this is because the categorisation of someone as a member of the ingroup or the outgroup depends on perceived differences between individuals in the situation along important dimensions, and the perception of ingroups and outgroups is based on the cognitive grouping of environmental stimuli (Tajfel and Turner, 1979). Therefore, the identity formation process consists of two main parts: the perception of individual attributes,

and their relevance in the given social situation. Consequently we were able to *explain the social construction of racial identity through transactional processes between the individual level and contextual level.*

We further argued theoretically that *the construction of racial identity is context-dependent.* To be more precise, the categorisation process, that is part of the perceived identity construction, is context dependent, and so are the *dimensions* of the the categorisation process. As Brown and Hewstone (2005) point it out, when it comes to perceiving unknown individuals, some dimensions have a higher chance to get "activated" as the main source of categorisation, if the other individual is perceived as a typical member of the given category, or when the particular dimension is accentuated in the given context. Similarly, if someone is not perceived as a typical member of her group, nor is her category membership emphasised, she will be less likely to be categorised based on the particular dimension. This leads to an other, more indirect contribution of our work, related to the potential *discrepancies between globally and locally salient dimensions.*

In cases when someone is not perceived to match a particular salient dimension and hence, is not categorised according to the dimension, the potential positive or negative experience about the individual will not get generalised for the whole group (Brown and Hewstone, 2005). This is important as it *explains how transactional processes result in group level outcomes.*

In our case, this situation is captured in Chapter 5 and 6 when self-declared majority students are perceived as minority by majority students. In this situation a minority person is not categorised based on her self-declared race in the given school context; hence, the perceiver's racial stereotypes remain untouched. In a situation like this, even if there was positive relationship between the majority student and the student with the inconsistent identity (which is not the case according to our results), the potential positive relation could not affect the group level salience of the given dimension. Instead, in our studied context, category memberships are likely to be emphasised and reinforced, which enhances the global salience of the given dimension as a main source of differences between individuals. Similarly, in situations when self-declared minority students are perceived as majority by other majority students, positive relationship (or the lack of negative relations as in Chapter 6) between the majority student and the student with the inconsistent identity could potentially result in the reduction of the perceiver's racial stereotypes.

Consequently, whilst our empirical outcomes related to these theoretical considerations are somewhat unclear, our work supports earlier theoretical arguments claiming that there is no objective truth about someone's race. Therefore, it is suggested that researchers should define

race in terms of beliefs, perceptions, and understandings (Brubaker, 2004). Most importantly, someone's racial self-identification is not necessarily the same as how it is categorised by others in different social interactions and relations (Saperstein and Penner, 2012). We can call this the discrepancy between racial identification (self-perception) and racial classification (perception by others).

This argument may have crucial *consequences in the relational integration process.* If individuals achieving higher social status lose their racial memberships at the same time, they can hardly serve as positive examples for others in their original racial groups or for the outside society. This is similar to a phenomenon mentioned earlier, that is, positive experience about a cross-race person does not affect racial stereotypes when the individual is not categorised based on his or her race by others.

Furthermore, we argued that besides the external categorisation of others, there is evidence that *individuals' racial membership is not fixed, but instead, it can be different across social contexts and change over time* (Harris and Sim, 2002; Hitlin et al., 2006; Saperstein and Penner, 2012). Therefore, racial identity is socially constructed not only in the sense that its definition and categories change in the macro structure over time, but it is also conceptually fluid on the individual level. We refer to this as the *micro level aspect of racial fluidity.* Even though this theoretical contribution is not new, it is important nonetheless as the fluid aspect of racial identity is hugely neglected in empirical sociological research.

7.2.2 Empirical contributions

In Chapter 4 we took a longitudinal approach examining the stability of interracial friendships, whereas in Chapter 5 we analysed the prevalence of interracial friendships as well as negative ties from a cross-sectional point of view. By doing so, we emphasised that relational integration should be described not only by the prevalence of positive, but also by the absence of negative interracial relations. We also introduced two different aspects of race: race based on self-perception, and race based on peer-perception. Finally, in Chapter 6 we combined the two approaches, and we modelled together the development and maintenance of friendship as well as negative ties as a result of self-identification and categorisation processes. The results of these efforts extend previous research in several major ways.

In Chapter 4 we argued that friendship is expected to embody the equal-status intergroup contact as it can be individualised, collaborative and trusting. Being such a relationship, it is expected to reduce prejudices among racially different groups (Allport, 1954; Pettigrew, 1998),

especially if proves to be stable in time. In this chapter we used a special data base from the PROSPER project that was appropriate to test our hypotheses. As opposed to earlier studies on this topic, we took advantage of the large sample size and longitudinal nature of the data in order to better capture the main components of friendship retention. The findings of our hierarchical logistic regression models demonstrate that adolescents are constantly looking for possible friends, among which only a few become stable ones. We found evidence that friendship in adolescence is a fragile relationship that is costly to maintain, and consequently likely to dissolve as time goes on. Even though these findings are not new, they provide us with an important contribution to the following parts of this Thesis. They suggests that *analysis of friendship networks is not necessarily a sufficient approach* to understand relational integration; hence, it provokes further research on other inter-personal relations, such as negative ties.

Furthermore, we contributed to the already existing literature by demonstrating how *social status can mitigate the effect of race on friendship retention.* It turns out in Chapter 4 that the stability of the friendship relations might, at first glance, seem to be effected by race, but in reality, it is mainly the consequence of socio-economic status. The effect of racial difference on friendship retention is completely accounted for when controls for socio-economic status are included in the model. *The effect of race operates through differences in socio-economic position in a way that individuals with low SES are more likely to terminate friendship relations.* This might be because students from poor family background live unsettled lives that creates uncertainty and makes the maintenance of relations more costly. Last but not least, our findings also indicate that what seems to be the result of homophily on race and socio-economic background, might be partly caused by endogenous network formation processes.

The evidence, supporting the importance of these endogenous network formation processes is not surprising and was already emphasised in the theoretical section of the Thesis. In order to account for these, in Chapter 5 and 6 we capitalised on more advanced models designed to analyse social networks; and we tested our hypotheses on the RECENS data. Even though in Chapter 5 we took a cross-sectional approach, we *modelled not only friendships but also negative ties* using Exponential Random Graph models.

In Chapter 6 we used stochastic actor-oriented models and, and similarly to Chapter 5 we found that *negative ties describe interracial segregation better than friendships*: majority students tend to dislike their minority peers, but no such tendencies were found for friendships.

These results extend existing empirical research on interracial integration in a major way. We argued that the state of relational integration should be described not only by the prevalence of positive, but also by the absence of negative (dislike, hate) interracial social ties;

therefore, we focused on both friendships and negative ties in our analysis. Since so far only a few studies took negative ties into account when analysing integration, this is also an important contribution to current research on the topic. Indeed, in Chapter 5 and 6 we found that by analysing negative ties together with friendships, we can capture more aspects of relational integration or segregation. Furthermore, *our most important results are related to negative networks and not to friendships, suggesting that negative ties have a major role in segregation.* This remains hidden in most sociological analysis.

Moreover, we made an other important contribution in Chapter 5 and 6 as we *conceptualised race as a situation-dependent social construction*, according to our theoretical framework. Our results show that *different aspects of race influence friendships and negative ties differently*, and *inconsistencies in someone's racial categorisation play a crucial role in social rejection.*

In summary, the contribution of our work in both chapters regards the *extension of previous research with the analysis of negative ties and perceived racial identity.* We defined racial perceptions on the micro-level, as we measured how each individual perceives each of his or her peers in the classroom. The collection of individual perceptions was then treated and analysed as a network, allowing us to focus on perceptions on the dyadic level (every Ego's perception about every Alter's ethnic identity in the group). This way, *our study investigates the relational structure of racial perceptions* in the group, and thanks to our methodological tools we could also avoid unnecessary aggregation of data which could have lead to ecological fallacy. This is an important contribution of this thesis, since to our knowledge, *this conceptualisation and measurement of race have not been used in similar studies before.*

Our empirical analysis on interracial integration has an other important contribution. We found that *in inter-racial relationship formation, perceptions have even more important role than self-identifications*; for instance, social exclusion of others seems to operate based on perceptions. Moreover, by including the two aspects of race in our models together we gained more detailed insights into the important negative effect of discrepancies between self-identifications and perceptions on someone's relationships.

One of the main joint conclusions of Chapter 5 and 6 reinforces the main message of Chapter 4. We found proof that *friendships do not become significantly more racially segregated over time.* Based on this, one could imply that our groups do not follow a path of segregation over time. However, when we take a look at our results on the negative ties as well, this interpretation seems to be false, as we found strong evidence for outgroup rejection from the side of majority and minority students. Moreover, minority students also tend to dislike other minority members, showing significant ingroup rejection. This suggests that *instead of integration, our*

groups follow a path towards a state where majority students exclude minority students, who, at the same time, also develop a rejection towards their own group. However, as we discussed in the end of Chapter 6, some of these tendencies might be present cross-sectionally but they do not operate dynamically.

7.2.3 Potential policy implications

We started off this Thesis by describing the disadvantaged position of immigrants and racial minorities in their host society from a human and a social capital perspective (Coleman, 1988; Stark, 2011). We argued that minorities' low level of education in association with insufficient knowledge of the majority's culture prevent them from securing a stable labour market position. Moreover, we claimed that minorities are in disadvantaged positions as they rarely have any relationships with majorities, consequently they have less opportunity to receive information on the norms of the main society as well as about the labour market (De Vroome and Van Tubergen, 2010; Kanas and Van Tubergen, 2009).

In order to ameliorate the social and the human capital of minority groups, policy makers urge integration as a resort. For this reason, it is often recommended that integration should already take place during early childhood and adolescence, as experiences from these periods have been found to influence both aspects of school success (Ellison and Powers, 1994; Patchen, 1982). Accordingly, it has become a desirable goal to have desegregated schools that mirror the racial composition of the neighbourhood they serve (Karsten et al., 2003; Moody, 2001). In addition, we further argued that true racial integration requires more than merely putting people of different categories into proximity; true integration occurs not just when people are in similar settings, but when they interact as equals.

Eventually, this line of research should ideally result in policy implications; the implementation of our results in practice, however, is a challenge due to the *complex*, multi-level nature of the educational context. First, the matching of students and the quality level of education is mediated by the *school choice process*. If the school choice is free, and if enough people believe that low academic performance of a school or a school class is related to the high proportion of minority students, then parents having high bargaining power will flee with their kids from these schools.

Second, in order to stop this natural phenomenon, schools tend to induce *institutional processes* as tracking based on students' certain characteristics (such as performance, social

background or ethnic characteristic). Both mechanism results in ethnic segregation either within the classroom or through separate classes and schools.

Third, the matching of students is related to the quality level of education which highly influenced by the *quality of teachers*. Teachers' tasks become increasingly difficult as the proportion of disadvantaged / minority students increases in the class. At the same time education of elementary and high school teachers is often times contra-selected and in some countries, such as Hungary, the incentives of the education system are explicitly unable to compensate for the extra effort (Varga, 2007).

As we pointed out earlier, these macro-level phenomena can lead to a self-fulfilling prophecy: the higher proportion of disadvantaged and /or Roma students in the class can spuriously cause low academic achievement for every student in the class which can serve as an argument supporting segregation in the educational system.

In addition to these constrains, there was no additional effort made in the analysed schools to strengthen the effects of formal integration. This is important since principles and methods based on which class-decoupling and extracurricular activities are planned and carried out may both maintain segregation or, instead, induce integration by increasing or decreasing opportunities for beneficial cross-race contacts. In this sense, our results demonstrating the existence of inter-ethnic negative ties and lack of positive ties call for special interventions supporting integrated education rather than condemning its effectiveness.

Based on contact theory we can argue that school organisational features affect students' relational preferences. When students of different races have the opportunity to work together for collective ends in settings of relative equality, substantive integration results.

Moody (2001) provided evidence that the strongest effect of school organisation on racial friendship is through *extracurricular mixing*. Schools that succeed in mixing students by race in extracurricular activities have lower levels of racial friendship segregation. Furthermore, his research proved that the *proportionate mixing* of majority and minority students is also a crucial factor of the process. On the one hand, this is because majority members may start to see minorities as a potential status threat once their numbers increase significantly. On the other hand, increasing numbers allow minorities to identify same-race friends that match on other attributes, leading to an increase in same-race friendship choice within the minority group.

There is scientific evidence that interventions aiming to create a common ingroup can fail if students' opinions and interests correlate with ethnicity (Stark, 2011). Successful interventions, such as the anti-bullying programs of the Olweus Program and KiVa project, thus require a

thorough investigation of students' interests and attitudes.

7.3 Discussion

In this Thesis we found that race and social ties are linked together in numerous ways, confirming that there are strong interrelations between them. Friendships and especially negative ties are strongly influenced by race. Our results also suggest that racial boundaries are not explicit in these communities, and judgement about others is very much embedded in social networks.

In Chapter 4 we used hierarchical logistic regression models to analyse the stability of interracial friendship relations. We chose this methodological approach in order to be able to better reflect on the results of the rather limited number of earlier studies. However, as we discussed before (see the methodological part of the Chapter 2), there are more appropriate statistical tools to carry out such an analysis. SAOMs have the possibility to dynamically model the maintenance of a tie while taking endogenous network processes into account. Hence, in a forthcoming study we will carry out this research in a stochastic actor-oriented methodological framework in order to avoid the discussed conceptual and statistical issues.

Our results for the hierarchical positions of the majority and the minority group are very strong. When focusing on both racial perceptions and on social ties it turns out that minority students are in a rough social situation: their group has a lower-status than the majority group. Therefore, according to the social identity approach they should react to this situation in order to improve their self-esteem. We mentioned four possible strategies they can potentially follow: social creativity, direct competition, individual mobility, and outgroup preference. However, in Chapter 5 we did not find a conclusive evidence about which strategies are followed in our communities and which ones are not. Examining the relationship choices of minority students together with the effects of being perceived as a minority can potentially help us in finding an answer to this question.

We did not have the chance to take into account that not only perceptions but also self-identifications might change over time. This was mostly because our dataset does not span a period long enough to document a "sufficient amount of change" in self-identification too. However, racial shifts have been found surprisingly often in other studies, and they are related to changes in social background: whitening is associated with increasing, and darkening with decreasing social status. For example, people losing their jobs are more likely to self-identify and be classified as Black, and people getting married as White, regardless of their previous self-identification and classification (Saperstein, 2012). Since race is considered one of the most

important sources of inequalities in many Western societies, ignoring the fact that race not only race affects social position but also the other way around causes bias in traditional sociological analyses: the effect of race on social status will be overestimated (Saperstein, 2012). Therefore, future research should focus on social effects on racial self-identifications as well. Revealing changes in someone's self-identification and how this person is perceived by others could be a strong sign for the assimilation of this person.

The dimensions that are relevant for relational choices are not fixed and universal, but are changeable and context-dependent. This can be called the *varying salience of dimensions*, and it refers to the social meaning of certain differences between individuals. These explications can be linked to more general scientific concepts beyond the scope of this research. As we discussed in Chapter 2, sociological theory should treat processes related to different *categories* of entities and relations. In our context, entities include ethnic and racial groups of individuals, and relations include interpersonal positive and negative ties. Hannan (2010) differentiates between *folk categories* and *analytic categories*. The first one comes about the every day practices of people who often times rely on "categories with vague boundaries" because some entities or relations fit only *partially* into some category or might belong to more than one category. These categories lack the "crisp boundaries" that is traditionally required from scientific analysis. Even though scientific research prefers clear category membership that results in *analytic categories*, social scientists often rely on *folk categories* in order to better understand and describe the "everyday reality" of their subjects.

In Chapter 5 and 6 we, indeed, capitalised on folk categories by analysing perception networks, and we argued that they alter properties of certain relationships, inter-group and intra-group nominations based on self-declared identity. We argued earlier that social scientists should study social phenomena in transaction, with categories that emerge, transform, and disappear. The boundaries of such categories are very far from well-defined, hence, future research has to focus on finding a better balance between the analysis of ambiguous and crisp categories.

Again, in Chapter 5 and 6 we made an attempt to define identities without insisting on crisp categories. Instead, we argued that when it comes to interpersonal-relations Ego's self-identification, its perception of Alter's identity and Alter's identity matter jointly. However, this approach resulted in mixed categories, there is more to be done. Since we have data on mixed self-identification, future analysis has to take this information into account when analysing identity-formation.

In Chapter 2 we talked about the importance of parallel processes on the different level of

the analysis. Micro level salience as well as meso level relational processes are highly influenced by the wider environment. In certain societies, language might be a crucial source of perceived differences, while in other environments individuals rather differentiate between people based on their skin colour (Tajfel and Turner, 1979). These factors have their own historical origins and their political, economical and sociological reasons. However, not only the relevant dimensions vary along societies and change over time, but also the constituting categories of these dimensions and their definitions. Even though race is generally found to be an important factor of differentiations (McPherson et al., 2001), social categories of race vary by country and have changed throughout history (Davis, 2001; Saperstein and Penner, 2012). An example for such macro level changes is the whitening process of Eastern- and Southern-European immigrants in the U.S. during the early 20th century (Saperstein, 2012). Consequently, individual racial memberships are influenced by macro level changes, which are usually based on important political and sociological changes in the given society. This is the first, macro level of the socially constructed nature of race that we, unfortunately, had to take as given.

In order to answer our empirical questions we relied on two data bases. However, the analyses of these data overlap only in one aspect, that is, they focus on the interplay of friendship networks and racial self-identification. The majority of our empirical work is limited, however, to a rather specific macro context: the situation of the Roma ethnic minority group in Hungary. This is a good example for testing the general processes we proposed, because the Roma minority group has a low social status in the Hungarian society, yet, Roma people are not as different in their observable physical characteristics from majority individuals that judgements about their categorisations would be unambiguous. However, our context limits the conclusions for our analysis. Our most important results cannot be generalised to other minorities than the Roma; and even the generalisation for Roma people in Hungary is limited, because the sample is not representative in this respect. To be able to draw reliable conclusions about social effects on racial perceptions, similar analyses should be conducted on larger, representative samples from various social contexts.

Even though the PROSPER data cannot make such a detailed analysis possible, we would probably find much fewer changes per observation, for instance, examining Black and White students in the United States. However, in theory, our processes, even if to a smaller extent, should also work on intergroup situations where individuals are more different from each other than they are in our current sample. Moreover, this approach would be excellent to analyse the situation of ethnic migrant groups in various social contexts, especially when hundreds of thousands migrants have reached Europe and another 3 million are waiting in Turkey. One of

the most crucial and exciting research topics is whether minority students need to leave their original ethnic group memberships behind in order to integrate in the school class, and if so, what will help them to be perceived as majority members. For this, we need new, large datasets measuring students' racial perceptions about each other together with friendships and negative ties. The extension of the current thesis could this way greatly contribute to our knowledge on racial integration and the nature of race itself. Hopefully, our study is an important first step towards a new perspective of examining interracial integration and understanding racial identity.

Appendix A

A.1 Full dyad plot

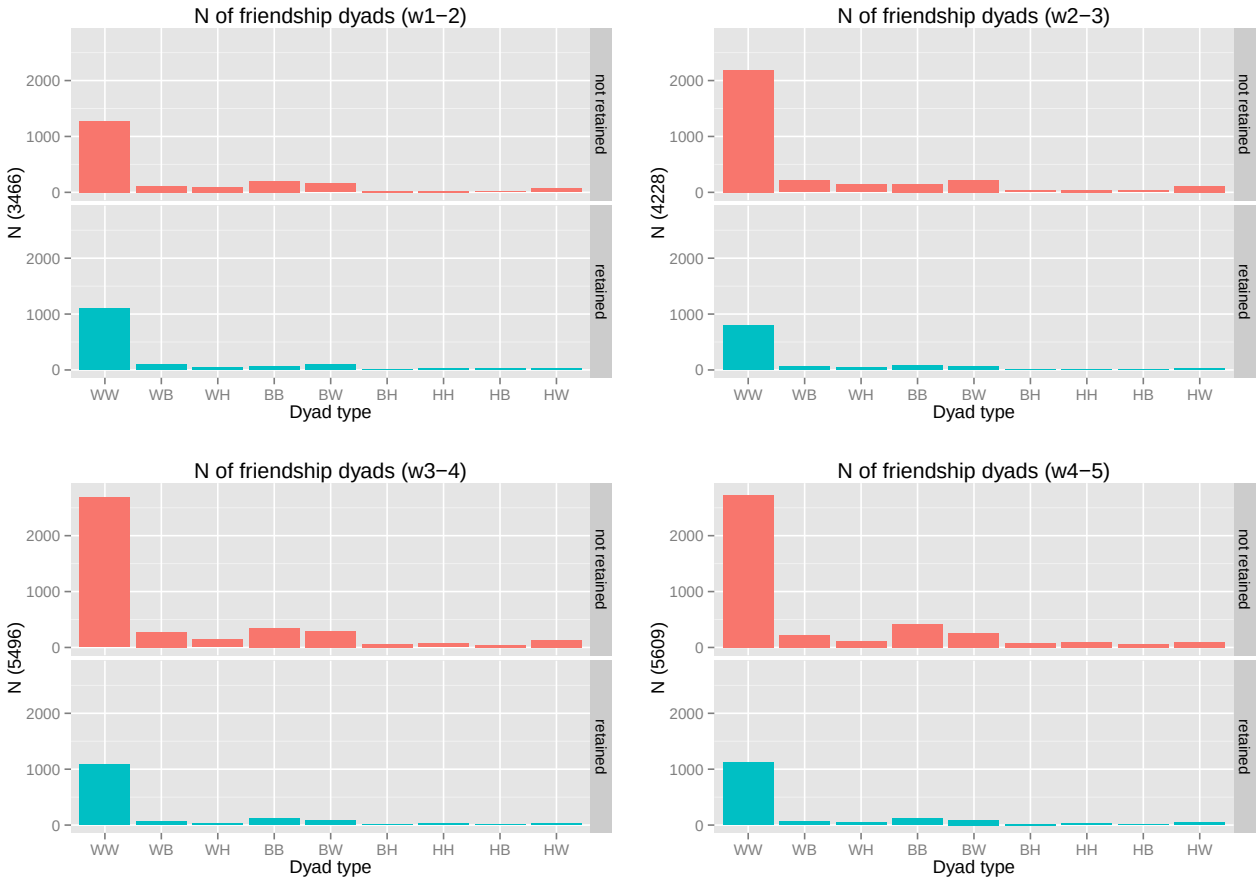


FIGURE A.1: Friendship retention by racial composition of the dyad for every period 1-4

A.2 Basic models in details

TABLE A.1: Basic models in detailes: log odds from logistic regression estimates of friendship retention (log odds, SE and significance levels)

	Dependent variable:							
	Friendship retention							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Different race	−0.25***	−0.20***	−0.10*	−0.08	−0.10*	−0.10*	−0.21**	−0.20**
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.09)	(0.09)
Ego's race: Black	−0.14***	−0.06	−0.08	−0.08	−0.0004	0.02	0.03	0.02
	(0.05)	(0.06)	(0.06)	(0.06)	(0.07)	(0.07)	(0.07)	(0.07)
Ego's race: Hispanic	−0.03	0.01	0.01	0.01	0.05	0.06	0.05	0.05
	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Wave2-3	−0.79***	−1.10***	−1.18***	−1.18***	−1.18***	−1.18***	−1.18***	−1.18***
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Wave3-4	−0.74***	−1.12***	−1.18***	−1.18***	−1.18***	−1.18***	−1.18***	−1.21***
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Wave4-5	−0.69***	−0.92***	−1.00***	−1.00***	−1.00***	−1.00***	−1.00***	−1.05***
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Duration		2.38***	1.88***	1.88***	1.88***	1.87***	1.87***	1.86***
		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Merge		−0.34***	−0.48***	−0.48***	−0.47***	−0.47***	−0.47***	−0.49***
		(0.11)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Best friend			0.80***	0.80***	0.81***	0.81***	0.81***	0.81***
			(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Mutual friend			0.56***	0.55***	0.55***	0.55***	0.55***	0.55***
			(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
N of shared friends			0.11***	0.11***	0.11***	0.11***	0.11***	0.11***
			(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Same SES				0.13***	0.07	0.14**	0.09	0.10
				(0.04)	(0.05)	(0.06)	(0.07)	(0.07)
Ego's SES					−0.17***	−0.08	−0.08	−0.08
					(0.05)	(0.08)	(0.08)	(0.08)
Ego's SES*Same SES						−0.18*	−0.19*	−0.20**
						(0.10)	(0.10)	(0.10)
Same SES*Different race							0.18*	0.17*
							(0.10)	(0.10)
Racial-heterogeneity								2.47***
								(0.57)
Constant	−0.23***	−0.42***	−1.21***	−1.30***	−1.21***	−1.27***	−1.24***	−2.10***
	(0.06)	(0.10)	(0.13)	(0.13)	(0.14)	(0.14)	(0.14)	(0.26)
Observations	18,868	18,868	18,868	18,868	18,868	18,868	18,868	18,868
Log Likelihood	-11,293.38	-8,713.38	-8,225.99	-8,222.02	-8,216.70	-8,215.07	-8,213.59	-8,203.42
Akaike Inf. Crit.	22,602.76	17,446.76	16,477.98	16,472.04	16,463.40	16,462.13	16,461.19	16,442.84
Bayesian Inf. Crit.	22,665.52	17,525.21	16,579.97	16,581.88	16,581.08	16,587.65	16,594.56	16,584.05

Note: *p<0.1; **p<0.05; ***p<0.01

A.3 Desegregated models in detailes

TABLE A.2: Desegregated models: log odds from logistic regression estimates of friendship retention (log odds, SE and significance levels)

	Dependent variable:							
	Friendship retention							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
White-Black	−0.30***	−0.21**	−0.14	−0.11	−0.12	−0.10	−0.32**	−0.31**
	(0.07)	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)	(0.14)	(0.14)
White-Hispanic	−0.37***	−0.29***	−0.14	−0.13	−0.13	−0.12	−0.15	−0.14
	(0.09)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.19)	(0.19)
Black-White	−0.25***	−0.22***	−0.14*	−0.11	−0.08	−0.09	−0.23*	−0.22*
	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)	(0.13)	(0.13)
Black-Hispanic	−0.38**	−0.11	0.02	0.06	0.10	0.11	0.23	0.22
	(0.15)	(0.17)	(0.17)	(0.17)	(0.17)	(0.17)	(0.24)	(0.24)
Hispanic-White	−0.30***	−0.18	−0.11	−0.09	−0.08	−0.08	−0.21	−0.20
	(0.10)	(0.11)	(0.12)	(0.12)	(0.12)	(0.12)	(0.21)	(0.21)
Hispanic-Black	−0.11	−0.17	−0.14	−0.11	−0.08	−0.06	−0.01	−0.01
	(0.15)	(0.18)	(0.19)	(0.19)	(0.19)	(0.19)	(0.26)	(0.27)
Wave2-3	−0.79***	−1.10***	−1.18***	−1.18***	−1.18***	−1.18***	−1.18***	−1.18***
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Wave3-4	−0.74***	−1.12***	−1.18***	−1.18***	−1.18***	−1.18***	−1.18***	−1.21***
	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Wave4-5	−0.70***	−0.92***	−1.00***	−1.01***	−1.01***	−1.00***	−1.00***	−1.05***
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Duration		2.38***	1.88***	1.88***	1.88***	1.87***	1.87***	1.86***
		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Merge		−0.34***	−0.48***	−0.48***	−0.47***	−0.46***	−0.46***	−0.48***
		(0.11)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)	(0.12)
Best friend			0.80***	0.80***	0.81***	0.81***	0.81***	0.81***
			(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Mutual friend			0.56***	0.55***	0.55***	0.55***	0.55***	0.55***
			(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
N of shared friends			0.11***	0.11***	0.11***	0.11***	0.11***	0.11***
			(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Same SES				0.13***	0.07	0.14**	0.09	0.10
				(0.05)	(0.05)	(0.06)	(0.07)	(0.07)
Ego's SES					−0.18***	−0.08	−0.08	−0.08
					(0.05)	(0.08)	(0.08)	(0.08)
Ego's SES*Same SES						−0.18*	−0.17*	−0.19*
						(0.10)	(0.10)	(0.10)
Same SES*White-Black							0.38**	0.37**
							(0.18)	(0.18)
Same SES*White-Hispanic							0.04	0.03
							(0.23)	(0.23)
Same SES*Black-White							0.23	0.23
							(0.17)	(0.17)
Same SES*Black-Hispanic							−0.25	−0.24
							(0.35)	(0.35)
Same SES*Hispanic-White							0.19	0.20
							(0.26)	(0.26)
Same SES*Hispanic-Black							−0.12	−0.13
							(0.37)	(0.37)
Racial-heterogeneity								2.46***
								(0.57)
Constant	−0.25***	−0.42***	−1.22***	−1.31***	−1.21***	−1.27***	−1.23***	−2.09***
	(0.06)	(0.10)	(0.13)	(0.13)	(0.14)	(0.14)	(0.14)	(0.26)
Observations	18,868	18,868	18,868	18,868	18,868	18,868	18,868	18,868
Log Likelihood	-11,295.52	-8,713.52	-8,226.53	-8,222.57	-8,216.09	-8,214.56	-8,210.94	-8,200.85
Akaike Inf. Crit.	22,613.04	17,453.03	16,485.07	16,479.13	16,468.18	16,467.12	16,471.89	16,453.69
Bayesian Inf. Crit.	22,699.34	17,555.02	16,610.59	16,612.50	16,609.39	16,616.18	16,668.02	16,657.67

Note: *p<0.1; **p<0.05; ***p<0.01

A.4 Basic models without network effects

TABLE A.3: Basic models: log odds from logistic regression estimates of friendship retention (log odds, SE and significance levels)

	Dependent variable:						
	Friendship retention						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Different race	−0.25***	−0.20***	−0.16***	−0.18***	−0.18***	−0.24***	−0.23***
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.08)	(0.08)
Ego's race: Black	−0.14***	−0.06	−0.06	0.03	0.06	0.06	0.05
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Ego's race: Hispanic	−0.03	0.01	0.01	0.06	0.07	0.07	0.07
	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)	(0.09)
Wave2-3	−0.79***	−1.10***	−1.10***	−1.10***	−1.10***	−1.10***	−1.11***
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Wave3-4	−0.74***	−1.12***	−1.12***	−1.12***	−1.12***	−1.12***	−1.17***
	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)
Wave4-5	−0.69***	−0.92***	−0.92***	−0.92***	−0.92***	−0.92***	−0.99***
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Duration		2.38***	2.38***	2.37***	2.37***	2.37***	2.36***
		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Merge		−0.34***	−0.33***	−0.32***	−0.30***	−0.30***	−0.39***
		(0.11)	(0.11)	(0.11)	(0.12)	(0.12)	(0.11)
Same SES			0.18***	0.12**	0.20***	0.18***	0.19***
			(0.04)	(0.05)	(0.06)	(0.06)	(0.06)
Ego's SES				−0.20***	−0.08	−0.08	−0.08
				(0.05)	(0.07)	(0.07)	(0.07)
Ego's SES*Same SES					−0.23**	−0.23**	−0.25**
					(0.10)	(0.10)	(0.10)
Same SES*Different race						0.09	0.08
						(0.10)	(0.10)
Racial-heterogeneity							3.30***
							(0.58)
Constant	−0.23***	−0.42***	−0.55***	−0.47***	−0.54***	−0.53***	−1.64***
	(0.06)	(0.10)	(0.11)	(0.11)	(0.12)	(0.12)	(0.26)
Observations	18,868	18,868	18,868	18,868	18,868	18,868	18,868
Log Likelihood	-11,293.38	-8,713.38	-8,704.53	-8,696.71	-8,693.90	-8,693.53	-8,676.41
Akaike Inf. Crit.	22,602.76	17,446.76	17,431.07	17,417.41	17,413.81	17,415.07	17,382.82
Bayesian Inf. Crit.	22,665.52	17,525.21	17,517.36	17,511.56	17,515.80	17,524.90	17,500.50

Note: *p<0.1; **p<0.05; ***p<0.01

A.5 Desegregated models without network effects

TABLE A.4: Desegregated models without network effects: log odds from logistic regression estimates of friendship retention (log odds, SE and significance levels)

	Dependent variable:						
	Friendship retention						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
White-Black	−0.30***	−0.21**	−0.17*	−0.18**	−0.15*	−0.31**	−0.30**
	(0.07)	(0.08)	(0.09)	(0.09)	(0.09)	(0.13)	(0.13)
White-Hispanic	−0.37***	−0.29***	−0.27**	−0.28**	−0.26**	−0.19	−0.17
	(0.09)	(0.11)	(0.11)	(0.11)	(0.11)	(0.18)	(0.18)
Black-White	−0.25***	−0.22***	−0.18**	−0.14*	−0.16*	−0.25**	−0.25*
	(0.07)	(0.08)	(0.08)	(0.08)	(0.08)	(0.13)	(0.13)
Black-Hispanic	−0.38**	−0.11	−0.06	−0.02	0.001	0.08	0.07
	(0.15)	(0.17)	(0.17)	(0.17)	(0.17)	(0.24)	(0.24)
Hispanic-White	−0.30***	−0.18	−0.16	−0.14	−0.15	−0.16	−0.15
	(0.10)	(0.11)	(0.11)	(0.11)	(0.11)	(0.20)	(0.20)
Hispanic-Black	−0.11	−0.17	−0.12	−0.09	−0.06	−0.01	0.001
	(0.15)	(0.18)	(0.18)	(0.18)	(0.18)	(0.26)	(0.26)
Wave2-3	−0.79***	−1.10***	−1.10***	−1.10***	−1.10***	−1.10***	−1.11***
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Wave3-4	−0.74***	−1.12***	−1.12***	−1.12***	−1.12***	−1.12***	−1.17***
	(0.05)	(0.05)	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)
Wave4-5	−0.70***	−0.92***	−0.93***	−0.92***	−0.92***	−0.92***	−0.99***
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Duration		2.38***	2.38***	2.37***	2.37***	2.37***	2.36***
		(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Merge		−0.34***	−0.34***	−0.31***	−0.30***	−0.30**	−0.39***
		(0.11)	(0.11)	(0.11)	(0.12)	(0.12)	(0.11)
Same SES			0.18***	0.12***	0.20***	0.18***	0.18***
			(0.04)	(0.05)	(0.06)	(0.07)	(0.07)
Ego's SES				−0.20***	−0.07	−0.08	−0.08
				(0.05)	(0.07)	(0.08)	(0.08)
Ego's SES*Same SES					−0.21**	−0.21**	−0.23**
					(0.10)	(0.10)	(0.10)
Same SES*White-Black						0.28	0.27
						(0.17)	(0.18)
Same SES*White-Hispanic						−0.10	−0.12
						(0.23)	(0.23)
Same SES*Black-White						0.15	0.15
						(0.16)	(0.16)
Same SES*Black-Hispanic						−0.16	−0.16
						(0.34)	(0.34)
Same SES*Hispanic-White						0.02	0.03
						(0.24)	(0.24)
Same SES*Hispanic-Black						−0.12	−0.14
						(0.36)	(0.36)
Racial-heterogeneity							3.29***
							(0.58)
Constant	−0.25***	−0.42***	−0.56***	−0.47***	−0.54***	−0.52***	−1.63***
	(0.06)	(0.10)	(0.11)	(0.11)	(0.12)	(0.12)	(0.26)
Observations	18,868	18,868	18,868	18,868	18,868	18,868	18,868
Log Likelihood	-11,295.52	-8,713.52	-8,704.53	-8,695.91	-8,693.49	-8,691.39	-8,674.27
Akaike Inf. Crit.	22,613.04	17,453.03	17,437.06	17,421.81	17,418.97	17,426.77	17,394.55
Bayesian Inf. Crit.	22,699.34	17,555.02	17,546.90	17,539.49	17,544.49	17,599.37	17,574.99

Note: *p<0.1; **p<0.05; ***p<0.01

A.6 Final basic robust model

TABLE A.5: Final basic model: GLM estimates with standard errors; and Robust GLM estimates with standard errors

	Dependent variable:			
	Friendship retention			
	Coeff	SE	R.Coeff	R.SE
Different race	−0.2	0.09	−0.2	0.09
Ego's race: Black	−0.02	0.07	−0.02	0.07
Ego's race: Hispanic	0.07	0.09	0.07	0.09
Wave2-3	−1.15	0.06	−1.15	0.06
Wave3-4	−1.12	0.06	−1.13	0.06
Wave4-5	−0.9	0.05	−0.9	0.05
Duration	1.85	0.05	1.91	0.05
Merge	−0.05	0.04	−0.05	0.04
Best friend	0.81	0.04	0.8	0.04
Mutual friend	0.56	0.04	0.55	0.04
N of shared friends	0.09	0.01	0.09	0.01
Same SES	0.12	0.07	0.13	0.07
Ego's SES	−0.07	0.08	−0.07	0.08
Ego's SES*Same SES	−0.28	0.1	−0.28	0.1
Same SES*Different race	0.21	0.1	0.2	0.1
Racial-heterogeneity	0.52	0.24	0.49	0.24
Constant	−1.66	0.12	−1.66	0.12

A.7 Final desegregated robust model

TABLE A.6: Final desegregated model: GLM estimates with standard errors; and Robust GLM estimates with standard errors

	Dependent variable:			
	Friendship retention			
	Coeff	SE	R.Coeff	R.SE
White-Black	−0.33	0.14	−0.33	0.14
White-Hispanic	−0.15	0.18	−0.13	0.18
Black-White	−0.26	0.13	−0.26	0.13
Black-Hispanic	0.27	0.24	0.26	0.24
Hispanic-White	−0.18	0.21	−0.18	0.21
Hispanic-Black	0.02	0.27	0.02	0.27
Wave2-3	−1.16	0.06	−1.16	0.06
Wave3-4	−1.12	0.06	−1.13	0.06
Wave4-5	−0.9	0.05	−0.9	0.05
Duration	1.9	0.05	1.9	0.05
Merge	−0.05	0.04	−0.04	0.04
Best friend	0.8	0.04	0.8	0.04
Mutual friend	0.56	0.04	0.56	0.04
N of shared friends	0.09	0.01	0.09	0.01
Same SES	0.12	0.07	0.12	0.07
Ego's SES	−0.08	0.08	−0.08	0.08
Ego's SES*Same SES	−0.23	0.11	−0.23	0.11
Same SES*White-Black	0.41	0.18	0.41	0.18
Same SES*White-Hispanic	0.03	0.23	0.01	0.23
Same SES*Black-White	0.27	0.17	0.27	0.17
Same SES*Black-Hispanic	−0.24	0.34	−0.22	0.34
Same SES*Hispanic-White	0.16	0.26	0.15	0.26
Same SES*Hispanic-Black	−0.08	0.37	−0.08	0.37
Racial-heterogeneity	0.56	0.24	0.53	0.24
Constant	−1.69	0.12	−1.68	0.12

A.8 ERGM Meta-results

	Model A+					Model B+					Model C+					*N* of groups
	Global		Between-group			Global		Between-group			Global		Between-group			
	Estimate	(SE)	$\hat{\sigma}$	Q	*p*	Estimate	(SE)	$\hat{\sigma}$	Q	*p*	Estimate	(SE)	$\hat{\sigma}$	Q	*p*	
Structural effects																
Arc	−1.727	(0.330)	0.00	33.4	0.004	−1.934	(0.329)	0.00	29.4	0.014	−1.891	(0.326)	0.00	32.0	0.007	16
Reciprocity	1.854	(0.161)	0.40	22.6	0.093	1.983	(0.186)	0.54	27.4	0.026	1.959	(0.181)	0.51	27.1	0.028	16
Two-in-star	0.092	(0.017)	0.00	9.5	0.851	0.092	(0.018)	0.00	10.4	0.796	0.094	(0.017)	0.00	10.3	0.799	16
Two-out-star	0.116	(0.019)	0.06	15.7	0.403	0.121	(0.018)	0.05	16.2	0.370	0.122	(0.018)	0.05	15.8	0.393	16
Simple connect.	−0.192	(0.035)	0.12	62.7	0.000	−0.192	(0.037)	0.13	68.7	0.000	−0.192	(0.038)	0.14	72.0	0.000	16
Popul. Spread	−0.675	(0.200)	0.00	15.7	0.401	−0.595	(0.194)	0.00	15.4	0.425	−0.624	(0.193)	0.00	16.9	0.327	16
Activity spread	−0.229	(0.119)	0.18	15.7	0.400	−0.317	(0.155)	0.41	19.5	0.191	−0.281	(0.157)	0.42	20.7	0.148	16
Path closure	0.987	(0.111)	0.38	67.1	0.000	1.004	(0.115)	0.40	69.8	0.000	0.986	(0.117)	0.41	72.4	0.000	16
Cyclic closure	−0.080	(0.066)	0.20	36.9	0.001	−0.055	(0.063)	0.18	35.9	0.002	−0.053	(0.063)	0.18	37.1	0.001	16
Roma ethnicity																
Roma Sender	−0.141	(0.109)	0.32	36.5	0.002	−0.056	(0.121)	0.41	41.9	0.000	−0.163	(0.114)	0.36	34.6	0.003	16
Roma Receiver self-declared	−0.143	(0.079)	0.00	16.6	0.344						−0.179	(0.089)	0.00	8.0	0.920	16
Sender*Receiver	0.643	(0.162)	0.48	29.3	0.015						0.518	(0.171)	0.45	21.7	0.115	16
Roma Receiver sender-perceived						0.012	(0.138)	0.35	26.4	0.034	0.093	(0.115)	0.00	15.7	0.402	16
Sender*Receiver						0.808	(0.139)	0.08	26.0	0.038	0.450	(0.188)	0.22	18.1	0.255	16
Gender																
Boy Sender	−0.365	(0.066)	0.00	11.3	0.585	−0.388	(0.066)	0.00	11.6	0.558	−0.400	(0.069)	0.00	12.1	0.423	14
Boy Receiver	−0.256	(0.077)	0.00	16.7	0.212	−0.263	(0.077)	0.00	10.3	0.668	−0.284	(0.079)	0.00	11.9	0.539	14
Sender*Receiver	0.770	(0.087)	0.00	19.2	0.116	0.808	(0.085)	0.00	15.3	0.292	0.832	(0.088)	0.00	18.0	0.157	14
Socio-economic status																
SES of Sender	0.035	(0.045)	0.13	18.9	0.127	0.057	(0.042)	0.10	20.3	0.160	0.056	(0.042)	0.10	19.6	0.191	16
SES of Rec.	0.117	(0.051)	0.12	18.8	0.225	0.131	(0.064)	0.19	25.2	0.048	0.123	(0.069)	0.20	24.6	0.056	16
Abs. difference	−0.032	(0.038)	0.06	20.6	0.220	−0.007	(0.042)	0.09	24.7	0.054	−0.005	(0.041)	0.08	24.5	0.057	16

Estimated parameters; estimated standard errors; estimated between-classroom standard deviations; test-statistics and *p*-values testing whether there is a difference between parameters among classrooms.

TABLE A.7: Meta-results for friendship ties with within-group statistics.

	Model A-					Model B-					Model C-					*N* of groups
	Global		Between-group			Global		Between-group			Global		Between-group			
	Estimate	(SE)	$\hat{\sigma}$	Q	*p*	Estimate	(SE)	$\hat{\sigma}$	Q	*p*	Estimate	(SE)	$\hat{\sigma}$	Q	*p*	
Structural effects																
Arc	−4.942	(0.169)	0.00	11.0	0.808	−4.964	(0.161)	0.00	8.6	0.929	−4.967	(0.179)	0.00	23.7	0.096	16
Reciprocity	1.303	(0.119)	0.00	18.0	0.327	1.341	(0.122)	0.00	15.9	0.464	1.276	(0.138)	0.22	22.0	0.142	16
Simple connect.	−0.033	(0.013)	0.03	27.2	0.040	−0.021	(0.010)	0.00	21.6	0.156	−0.019	(0.010)	0.00	23.6	0.098	16
Non-receivers	0.101						(0.406)	0.00	14.7	0.545	0.151	(0.054)	0.00	20.1	0.215	16
Non-senders	−0.066						(0.457)	0.00	13.9	0.605	−0.244	(0.063)	0.00	14.0	0.596	16
Popul. spread	0.389	(0.174)	0.00	17.9	0.332	0.228	(0.190)	0.00	15.0	0.525	0.450	(0.263)	0.56	17.1	0.380	16
Activity spread	1.222	(0.198)	0.30	23.3	0.106	1.454	(0.186)	0.00	20.9	0.183	0.770	(0.257)	0.65	42.9	0.000	16
Shared in-ties	0.049	(0.070)	0.25	69.1	0.000	0.040	(0.067)	0.23	64.7	0.000	0.193	(0.127)	0.49	101.0	0.000	15
Shared out-ties	0.057	(0.077)	0.24	39.6	0.001	0.133	(0.038)	0.08	28.0	0.032	0.065	(0.052)	0.13	23.7	0.096	15
Roma ethnicity																
Roma Sender	0.352	(0.195)	0.65	26.0	0.055	0.189	(0.183)	0.60	31.1	0.013	0.365	(0.213)	0.72	25.1	0.068	16
Roma Receiver self-declared	0.333	(0.188)	0.58	24.4	0.081						0.065	(0.109)	0.00	17.8	0.335	16
Sender*Receiver	−1.023	(0.279)	0.78	27.8	0.034						−0.420	(0.190)	0.00	12.9	0.681	16
Roma Receiver sender-perceived						0.593	(0.129)	0.21	15.7	0.477	0.505	(0.124)	0.00	5.8	0.990	16
Sender*Receiver						−0.572	(0.203)	0.00	35.9	0.003	−0.194	(0.223)	0.00	17.2	0.376	16
Gender																
Boy Sender	−0.213	(0.087)	0.00	24.0	0.091	−0.236	(0.160)	0.46	25.2	0.066	−0.212	(0.089)	0.00	23.7	0.070	14
Boy Receiver	0.129	(0.084)	0.00	16.4	0.426	0.120	(0.079)	0.00	14.8	0.540	0.059	(0.085)	0.00	19.4	0.198	14
Sender*Receiver	0.211	(0.194)	0.00	12.2	0.730	0.207	(0.193)	0.00	13.2	0.658	0.473	(0.164)	0.00	20.2	0.164	14
Socio-economic status																
SES of Sender	0.007	(0.030)	0.00	18.3	0.309	0.021	(0.036)	0.00	14.2	0.585	0.022	(0.032)	0.00	19.6	0.239	16
SES of Rec.	−0.105	(0.036)	0.00	14.7	0.544	−0.093	(0.048)	0.10	19.0	0.269	−0.100	(0.038)	0.00	13.5	0.639	16
Abs. difference	−0.042	(0.042)	0.07	15.3	0.501	−0.026	(0.056)	0.13	15.1	0.516	−0.006	(0.038)	0.00	13.3	0.649	16

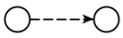
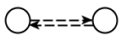
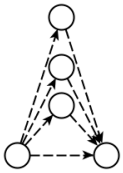
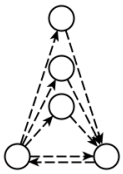
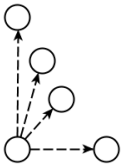
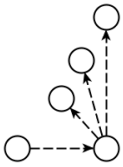
Estimated parameters; estimated standard errors; estimated between-classroom standard deviations; test-statistics and *p*-values testing whether there is a difference between parameters among classrooms.

TABLE A.8: Meta-results for negative ties with within-group statistics.

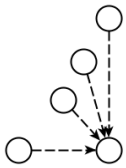
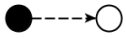
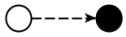
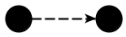
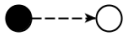
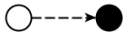
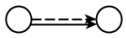
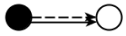
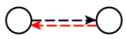
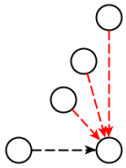
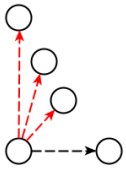
A.9 Full Model Specification

Dependent variable: friendship

Ego nominates Alter as a friend, creating or maintaining the described substructure

	Name	Formula	Description	Illustration
	Same-network structural			
1	Outdegree	F_{ij}	"intercept" – nomination when every parameter is 0 (1=tie, 0=no-tie)	
2	Reciprocity	$F_{ij}F_{ji}$	*Ego*'s tendency to reciprocate friendship nominations	
3	Transitive triplets	$\sum_h F_{ij}F_{ih}F_{hj}$	tendency for clustering	
4	Transitive reciprocated triples	$\sum_h F_{ij}F_{ji}F_{ih}F_{hj}$	interaction between reciprocity and clustering	
5	*Ego*'s friendship activity	$F_{ij}\sum_h F_{ih}$	tendency of *Ego*s nominating many as friends to nominate *Alter* as well *(control for "activeness" of Ego)*	
6	*Alter*'s friendship activity	$F_{ij}\sum_h F_{jh}$	tendency to nominate those as friends who nominate many	

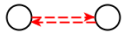
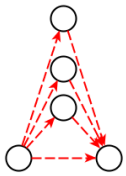
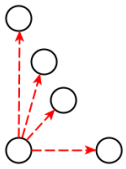
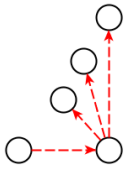
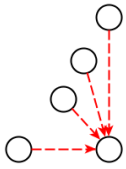
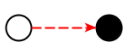
F/black dashed arrow: friendship; N/red dashed arrow: negative tie; M/blank arrow: minority classification; m, g/black node: self-id. minority or female actor; white node: any actor; i:*Ego*; j:*Alter*; h: other actor (e.g. ij: tie from*Ego* to*Alter*; jh: tie from*Alter* to a third person)

7	*Alter*'s popularity	$F_{ij}\sum_h F_{hj}$	tendency to nominate those as friends who are nominated by many *(capturing the "Matthiew effect", that is, popularity inducing more popularity)*	
	Covariate effects			
8	*Ego*'s self-identification	$m_i F_{ij}$	tendency of self-identified minorities to send more friendship nominations	
9	*Alter*'s self-identification	$m_j F_{ij}$	tendency to nominate more self-identified minorities as friends	
10	*Ego* × *Alter* self- identification	$m_i m_j F_{ij}$	tendency of self-identified minorities to nominate more self-identified minorities *(with Effects 8-9, it captures racial homophily in friendships)*	
11	*Ego*'s gender	$g_i F_{ij}$	tendency of females to send more friendship nominations	
12	*Alter*'s gender	$g_j F_{ij}$	tendency to nominate more females as friends	
13	*Ego* × *Alter* gender	$g_i g_j F_{ij}$	tendency of females to nominate each other more	
	Mixed-network effects			
14	Roma tie	$F_{ij} M_{ij}$	*Egos'* tendency to send friendship nominations towards those whom they perceive as minorities	
15	Roma tie × *Ego*'s self-identification	$m_i F_{ij} M_{ij}$	self-identified minority *Egos'* tendency to send friendship nominations towards those whom they perceive as minorities	
16	Negative tie	$F_{ij} N_{ij}$	*Egos'* tendency to send friendship nominations towards those whom they nominate as a disliked person	
17	Reciprocity with a negative tie	$F_{ij} N_{ji}$	*Egos'* tendency to send friendship nominations towards those who nominate them as a disliked person	
18	Level of dislike towards *Alter*	$F_{ij}\sum_h M_{hj}$	tendency to nominate those as friends who get negative ties from many	
19	*Ego*'s dislike activity	$m_i F_{ij}\sum_h M_{hj}$	tendency of *Egos* to send a friendship nomination they nominate many in the negative network	

F/black dashed arrow: friendship; N/red dashed arrow: negative tie; M/blank arrow: minority classification; m, g/black node: self-id. minority or female actor; white node: any actor; i:*Ego*; j:*Alter*; h: other actor (e.g. ij: tie from*Ego* to*Alter*; jh: tie from*Alter* to a third person)

Dependent variable: negative tie

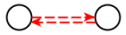
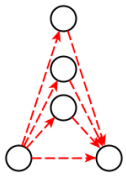
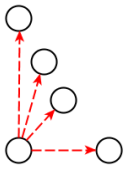
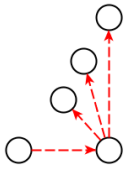
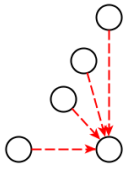
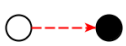
***Ego* dislikes *Alter*, creating or maintaining the described substructure**

	Name	Formula	Description	Illustration
	Same-network structural			
20	Out-degree	N_{ij}	"intercept" – nomination when every parameter is 0 (1=tie, 0=no-tie)	
21	Reciprocity	$N_{ij}N_{ji}$	*Ego*'s tendency to reciprocate negative ties	
22	Transitive triplets	$\sum_h N_{ij}N_{ih}N_{hj}$	tendency for closed negative triads (according to balance theory, these should not exist)	
23	*Ego*'s dislike activity	$N_{ij}\sum_h N_{ih}$	tendency of *Ego*s disliking many to dislike *Alter* as well *(control for "activeness" of Ego)*	
24	*Alter*'s dislike activity	$N_{ij}\sum_h N_{jh}$	tendency to dislike those who dislike many	
25	Level of dislike towards *Alter*	$N_{ij}\sum_h N_{hj}$	tendency to dislike those who are disliked by many *(capturing the negative "Matthiew effect", that is, unpopularity inducing more unpopularity)*	
	Covariate effects			
26	*Ego*'s self-identification	$m_i N_{ij}$	tendency of self-identified minorities to dislike more	
27	*Alter*'s self-identification	$m_j N_{ij}$	tendency to dislike self-identified minorities	
28	*Ego* × *Alter* self-identification	$m_i m_j N_{ij}$	tendency of self-identified minorities to dislike self-identified minorities	

F/black dashed arrow: friendship; N/red dashed arrow: negative tie; M/blank arrow: minority classification; m, g/black node: self-id. minority or female actor; white node: any actor; i:*Ego*; j:*Alter*; h: other actor (e.g. ij: tie from*Ego* to*Alter*; jh: tie from*Alter* to a third person)

Dependent variable: negative tie

***Ego* dislikes *Alter*, creating or maintaining the described substructure**

	Name	Formula	Description	Illustration
	Same-network structural			
20	Out-degree	N_{ij}	"intercept" – nomination when every parameter is 0 (1=tie, 0=no-tie)	
21	Reciprocity	$N_{ij}N_{ji}$	*Ego*'s tendency to reciprocate negative ties	
22	Transitive triplets	$\sum_h N_{ij}N_{ih}N_{hj}$	tendency for closed negative triads (according to balance theory, these should not exist)	
23	*Ego*'s dislike activity	$N_{ij}\sum_h N_{ih}$	tendency of *Ego*s disliking many to dislike *Alter* as well *(control for "activeness" of Ego)*	
24	*Alter*'s dislike activity	$N_{ij}\sum_h N_{jh}$	tendency to dislike those who dislike many	
25	Level of dislike towards *Alter*	$N_{ij}\sum_h N_{hj}$	tendency to dislike those who are disliked by many *(capturing the negative "Matthiew effect", that is, unpopularity inducing more unpopularity)*	
	Covariate effects			
26	*Ego*'s self-identification	$m_i N_{ij}$	tendency of self-identified minorities to dislike more	
27	*Alter*'s self-identification	$m_j N_{ij}$	tendency to dislike self-identified minorities	
28	*Ego* × *Alter* self-identification	$m_i m_j N_{ij}$	tendency of self-identified minorities to dislike self-identified minorities	

F/black dashed arrow: friendship; N/red dashed arrow: negative tie; M/blank arrow: minority classification; m, g/black node: self-id. minority or female actor; white node: any actor; i:*Ego*; j:*Alter*; h: other actor (e.g. ij: tie from*Ego* to*Alter*; jh: tie from*Alter* to a third person)

A.10 Histograms by Groups

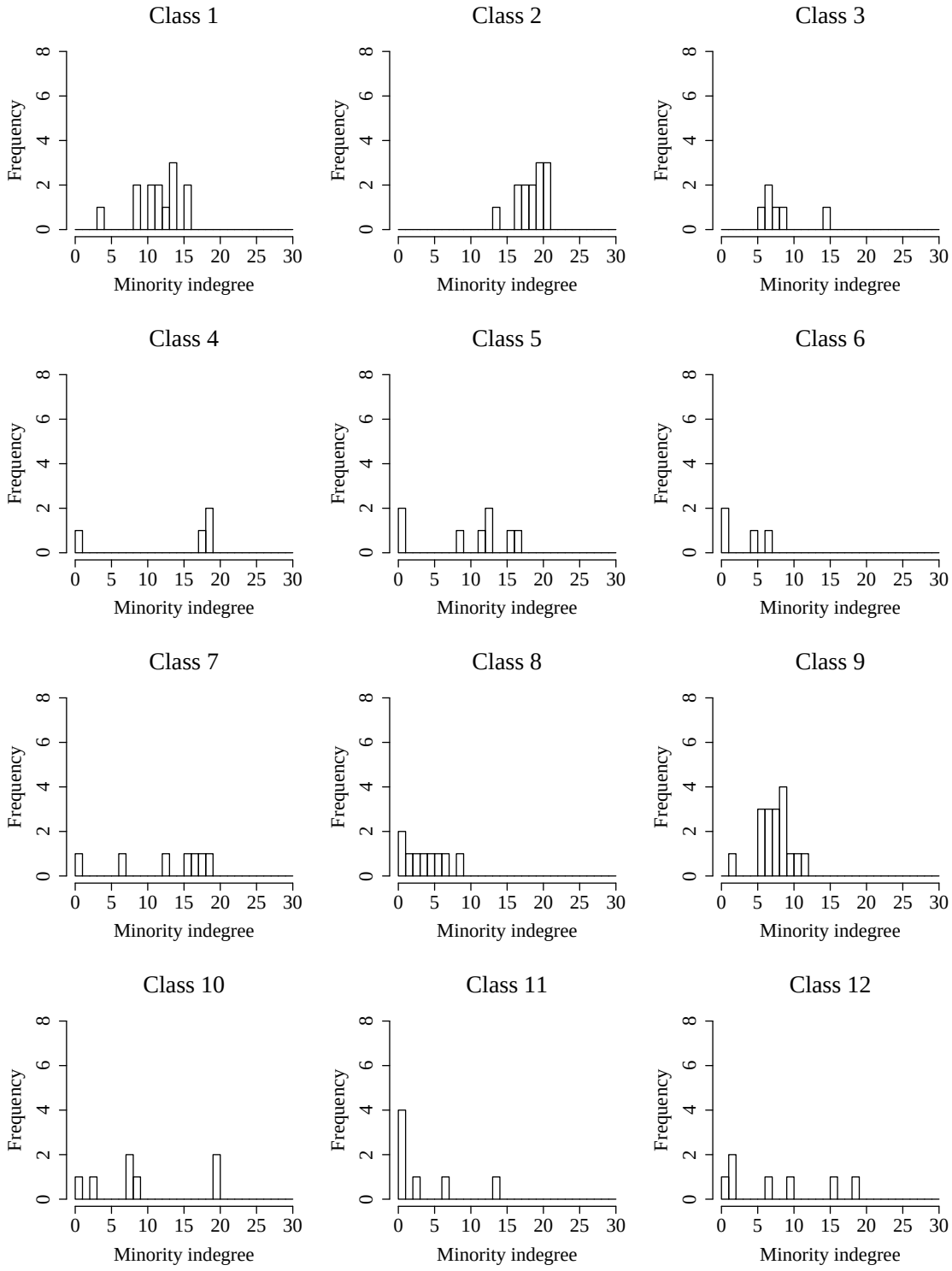


FIGURE A.2: Incoming Minority Nominations of Self-Identified Minority Students per Class, Wawe 1

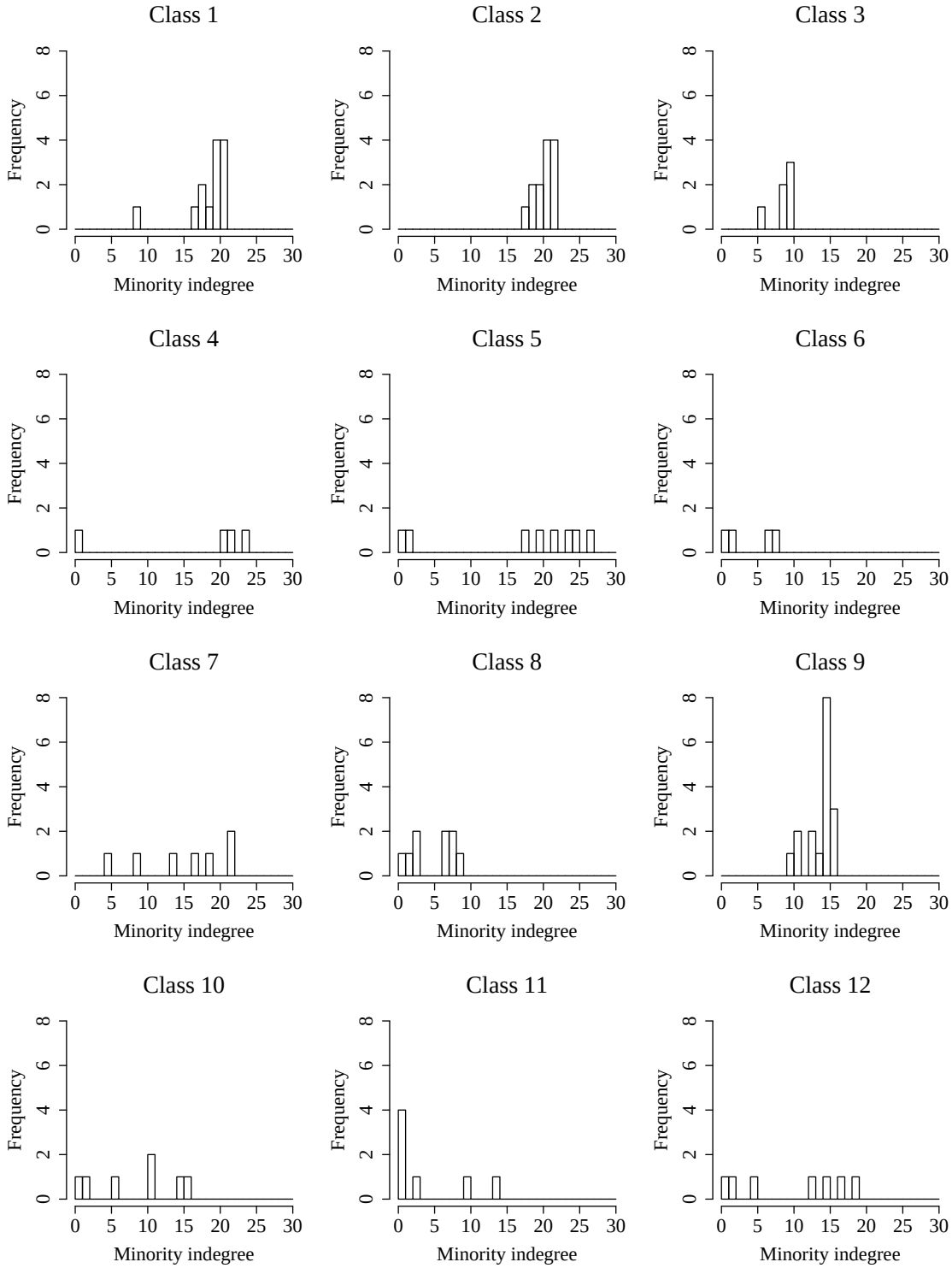


FIGURE A.3: Incoming Minority Nominations of Self-Identified Minority Students per Class, Wawe 2

A.11 Class-level strategies in wave 1 and 2

	Majority	"Consistent" minority	Self-identified minority but perceived majority	Self-identified majority but perceived minority	Minorities' Strategy
				class 1	
+	0.32	0.42	*0.21*	0.05	Competition (+/-)
-	0.67	0.33	0.00	0.00	
				class 2	
+	0.16	0.39	*0.39*	0.06	Competition (+/-)
-	0.31	0.17	*0.50*	0.02	
				class 3	
+	0.14	0.55	*0.31*	0.00	Outgroup pref. (+/-)
-	0.75	0.11	0.11	0.03	
				class 4	
+	0.77	0.05	0.00	0.18	Outgroup pref. (+), Competition (-),
-	1.00	0.00	0.00	0.00	Rev. Ind. Mob. (+)
				class 5	
+	0.62	0.22	0.00	0.16	Outgroup pref. (+), Competition (-),
-	0.84	0.11	0.00	0.05	Rev. Ind. Mob. (+)
				class 6	
+	0.81	0.15	0.04	0.00	Outgroup pref. (+)
-	1.00	0.00	0.00	0.00	Competition (-)
				class 7	
+	0.96	0.00	0.00	0.04	Outgroup pref. (+)
-	1.00	0.00	0.00	0.00	Competition (-)
				class 8	
+	0.74	0.16	0.08	0.03	Outgroup pref. (+)
-	0.72	0.11	0.11	0.06	Competition (-)
				class 9	
+	0.70	0.12	0.11	0.07	Outgroup pref. (+)
-	0.91	0.00	0.09	0.00	Competition (-)
				class 10	
+	0.53	0.35	0.00	0.12	Outgroup pref. (+)
-	1.00	0.00	0.00	0.00	Competition (-)
				class 11	
+	0.69	0.25	0.06	0.00	Outgroup pref. (+)
-	1.00	0.00	0.00	0.00	Competition (-)
				class 12	
+	0.54	0.19	*0.27*	0.00	Outgroup pref. (+)
-	0.97	0.00	0.03	0.00	Competition (-)

TABLE A.9: Self-declared Roma students' strategies in wave 1

	Majority	"Consistent" minority	Self-identified minority but perceived majority	Self-identified majority but perceived minority	Minorities' Strategy
			class 1		
+	0.32	0.66	0.01	0.01	Competition (+/-)
-	0.83	0.17	0.00	0.00	
			class 5		
+	0.35	0.52	0.00	0.13	Competition (+/-), Rev. Ind. Mob.
-	0.86	0.07	0.00	0.07	(+)
			class 3		
+	0.35	0.63	0.02	0.00	Outgroup pref. (+/-)
-	0.58	0.37	0.03	0.02	
			class 2		
+	0.14	0.62	*0.18*	0.06	Outgroup pref. *(-)*, Competition *(+)*
-	0.37	0.41	*0.19*	0.03	
			class 4		
+	0.74	0.11	0.00	0.16	Outgroup pref. (+), Competition (-),
-	1.00	0.00	0.00	0.00	Rev. Ind. Mob. (+)
			class 6		
+	0.70	0.10	*0.20*	0.00	Outgroup pref. (+)
-	1.00	0.00	0.00	0.00	Competition (-)
			class 7		
+	0.94	0.00	0.00	0.06	Outgroup pref. (+)
-	1.00	0.00	0.00	0.00	Competition (-)
			class 8		
+	0.72	0.11	*0.15*	0.02	Outgroup pref. (+)
-	0.69	0.20	0.07	0.04	Competition (-)
			class 9		
+	0.73	0.08	*0.16*	0.04	Outgroup pref. (+)
-	0.91	0.00	0.09	0.00	Competition (-)
			class 10		
+	0.72	0.22	0.00	0.06	Outgroup pref. (+)
-	1.00	0.00	0.00	0.00	Competition (-)
			class 11		
+	0.72	0.22	0.06	0.00	Outgroup pref. (+)
-	1.00	0.00	0.00	0.00	Competition (-)
			class 12		
+	0.61	0.03	*0.35*	0.00	Outgroup pref. (+)
-	0.95	0.00	0.05	0.00	Competition (-)

TABLE A.10: Self-declared Roma students' strategies in wave 2

The different school classes (class 1 - class 12) are underneath each other in the tables, hence the whole table basically consists of 12 class-level tables. The structure of each sub-table is the same. In the rows, there are the distribution of friendship (+) and negative (-) nominations of self-declared Roma students, according to the categorisation of Alter which is represented in the first four columns. In the last column the identified strategies followed by elf-declared Roma students in the positive and negative networks is presented.

A.12 RECENS Questionnaire

Research OTKA T/81336

QUESTIONNAIRE
April 2011.

Corvinus University of Budapest
Department of Sociology and Social Policy
Research Center for Educational and Network Studies

Before you start, please read it!

By filling out this questionnaire you provide help in a research project carried out by the Research Center for Educational and Network Studies affiliated with the Corvinus University of Budapest. The research is funded by the Hungarian Scientific Research Fund. You can read more here: http://www.recensproject.hu/eng/

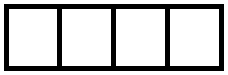
The questionnaire is anonym – it does not contain your name or any information with which you could be identified. All results would be presented in a way that no students, no classes and no schools may be identified.

Your cooperation is your free will – if you wish not to answer any of the questions please, leave it blank!
The questionnaire is not a test – there are no good or bad answers. If you do not find any provided answers a perfect fit, please try to find the best compromise you can.

Sometimes we ask you answer with your own words, we sign this with: "✍". Other times we ask you to circle the best answer, which we sign with: "O". In order to this research be successful, please answer honestly and judiciously, and please fill the questions in the order they appear. Do not forget that we treat your answers confidentially!

We wish you enjoy the questionnaire! Should you have any problem, please turn to the administrator in the room!
We are grateful for your help!

1. ✍ Please, give your personal code.



2. ✍ Date of birth: Year: 19…… Month (e.g. if you were born in May, write 05) ✍ :……

3. O Sex?

   1. Male.
   2. Female.

4. ✍ Where (in which settlement) do you live?

   ✍ ……

The following questions will concern your family. If you were not brought up mostly by your ... parents, but by foster parents or anyone else, your answers should refer to them. In case you have a father and a foster father as well, think of the one who was more involved in your upbringing.

5. O What is your (foster) father's highest level of education?

   1. less than 8 grade
   2. 8 grade (elementary school)
   3. vocational school
   4. grammar school (with school leaving exam)
   5. technical school (with school leaving exam)
   6. college (BA)
   7. university (MA or higher)
   8. I don't know.
   9. I don't have a father or stepfather. (I can't tell, or he's not alive.)

6. O What is you (foster) mother's highest level of education?

   1. less than 8 grade
   2. 8 grade (elementary school)
   3. vocational school
   4. grammar school (with school leaving exam)
   5. technical school (with school leaving exam)
   6. college (BA)
   7. university (MA or higher)
   8. I don't know.
   9. I don't have a mother or stepmother. (I don't know or she's not alive.)

XXXX

7. ✍ How many of the following things does your family posses in your home?

1.	Colour television:	✍ ….. *pc*
2.	Washing machine:	✍ …..*pc*
3.	Sailing or motor yachts:	✍ ….. *pc*
4.	Computer:	✍ ….. *pc*
5.	Plasma tv:	✍ ….. *pc*
6.	Jacuzzi or sauna:	✍ ….. *pc*
7.	Dishwasher:	✍ ….. *pc*
8.	Self-owned car :	✍ ….. *pc*
9.	Mobile phone:	✍ ….. *pc*

8. O . Please mark those objects which are in <u>your personal</u> use. Multiple answers possible.

1. Desk.
2. Self-owned room.
3. A place where you can study without being disturbed.
4. A computer that you can use for school assignments.
5. Computer programmes used for educational purposes (Excel, Word).
6. Internet access.
7. Self-owned calculator.
8. Classic literature books.
9. Books to help you prepare for the school.

9. O How many books do you have at home? *On a one meter long bookshelf about 30 books can be stored. Please do not count newspapers and magazines!*

1. 0 – 10 books.
2. 11 – 25 books.
3. 26 – 100 books.
4. 101 – 200 books.
5. 201 – 500 books
6. More than 500 books.

In the following question we would like to learn a few things about your classmates.. XXXX

10. ✍ In the first coulmn you can read statements, the remaining column headers contain the name of your classmates. Please, put an "x" in cells whose content you feel right. E.g. if the second contains the name of a classmate with whom you go home together, put an "x" in the fourth row, second column.

I usually sit next to him/her during class.																							
We usually go home together.																							
We have private classes or do sports together.																							
We spend our sparetime together .																							
We study together.																							
I'm dating him/her.																							
I dated him/her.																							

XXXX

11. ○ Please let us know, how much you like or dislike your classmates. “-2” stands for strong dislike or hate, “-1” for dislike, “0” for neutrality, “1” for like and “2” for close friendship. Please mark one number in every line!

	-2: hate	-1: dislike	0: neutral	1: like	2: good friend
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2
	-2	-1	0	1	2

The following questions are related to your studying habits and the expectations concerning your studies. XXXX

12. O To some pupils, studying is important, whereas to others it is not. Which one of the statements concerning studying befits you the most?

1. I'm only satisfied with myself when I get good marks.
2. I'm troubled when I get good marks.
3. My marks do not have an influence at all on my being satisfied with myself.

13. O In every class, „good pupils" and „bad pupils" are accepted differently. Which one of the statements befits your class the most?

1. One gets accepted if they get good marks.
2. One gets accepted if they don't get too good marks.
3. No one is interested in what mark the other one gets.

14. O Do you sometimes...

1. help someone do their homework?	1. regularly	2. it's happened before	3. no, never
2. copy someone else's homework?	1. regularly	2. it's happened before	3. no, never
3. let your homework be copied	1. regularly	2. it's happened before	3. no, never
4. tell the teacher on someone who has cheated (during tests, repetitions)?	1. regularly	2. it's happened before	3. no, never
5. talk back to the teacher?	1. regularly	2. it's happened before	3. no, never
6. cheat during tests?	1. regularly	2. it's happened before	3. no, never
7. prompt during repetitions?	1. regularly	2. it's happened before	3. no, never

15. ✍ How much do you study for a bigger test in the following subjects? Please answer in hours.

1. Mathematics: ✍…….. hours
2. Literature: ✍…….. hours
3. Grammar: ✍…….. hours
4. History: ✍…….. hours
5. Foreign Language: ✍…….. hours

16. ✍What marks would satisfy you in school record?

1. Mathematics ✍……..
2. Literature. ✍……..
3. Grammar. ✍……..
4. History. ✍……..
5. Foreign Language. ✍……..

17. O Are your parent satisfied with your grades?

1. Yes.
2. No.
3. Partially.
4. I don't know.

XXXX

18. O Please mark the option which you think befits you the most. If attending school wasn't mandatory, and if it was all up to me,

    1. I would stay at school until high-school graduation / an additional certificate in some vocation.
    2. I would leave shool before high-school graduation / an additional certificate in some vocation.
    3. I don't know how I would decide.

19. O Do you often play truant from school?

    1. No, never.
    2. It has happened before, but only once or twice.
    3. Yes, a lot.

20. O Please rate your relationships with your teachers on a scale ranging from 1 to 5. Mark in the first column how much you like your teacher and mark in the second how much you think he/she likes you. If a teacher teaches more subjects of the following, rate him/her the same way! (The scale works like normal school marks: 1: I can't stand him/her,.. 5: we're on very good terms.

	How much do you like your teacher?					How much does he/she like you?				
Mathematics	1	2	3	4	5	1	2	3	4	5
Literature	1	2	3	4	5	1	2	3	4	5
Grammar	1	2	3	4	5	1	2	3	4	5
History	1	2	3	4	5	1	2	3	4	5
Foreign Language I.	1	2	3	4	5	1	2	3	4	5
Foreign Language II.	1	2	3	4	5	1	2	3	4	5
Classmaster	1	2	3	4	5	1	2	3	4	5
Major	1	2	3	4	5	1	2	3	4	5

21. ✍ In the first column, you will find statements, the remaining column headers contain the names of your classmates. Please, put an "x" in the cells whose content you feel right. For example, if the name standing in the first column marks a classmate of yours whom you think funny, then mark the first line with an „x". You can mark yourself as well.

Funny, has a good sense of humor.																							
Quarrelsome, he/she is into fights.																							
Pointdexter.																							
Gossipy.																							
Charitable.																							
Clever, smart.																							
Stuck-up.																							
Smug.																							
Reserved.																							
Roma/Gipsy.																							

XXXX

22. ✍ In the first column, you will find statements, the remaining column headers contain the names of your classmates. Please, put an "x" in the cells whose content you feel right. For example, if the name standing in the first column marks a classmate of yours who you're looking up to, then mark the first line with an „x". You can mark yourself as well.

I'm looking up to him.																							
I disdain him/her.																							
She is a pretty girl/He is a handsome boy.																							
I would like to go out with him/her.																							
He/she dares to confront the headmaster.																							
He/she has money.																							
He/she tells what to do after classes.																							
He/she protects the weak.																							
If I had a secret, I would tell it him/her.																							
In a debate, he/she would do justice.																							
He/she could organize the school trip very well.																							
If I needed help, I could count on him/her.																							

XXXX

23. ✍ Az első oszlopban állításokat olvashatsz, a többi oszlop fejléce az osztálytársaid neveit tartalmazza. Kérünk, tegyél x-et azokba a cellákba, amelyek tartalmát igaznak érzed. Például, ha az első oszlopban lévő név olyan osztálytársadat jelöli, to whom many are looking up to from the class, akkor jelöld meg x-szel! Magadat is jelölheted.

A lot of people look up to him/her.																							
A lot of people disdain him/her.																							
He/she is disdained by many undeservedly.																							
He/she is held in high esteem undeservedly.																							

24. ✍ Please decide about the following statements how much you think they befit you. Mark 1 if you think it's absolutely right, and 7 if it's absolutely wrong.

1. Drawn to the outside, soulful.	1	2	3	4	5	6	7
2. Criticising, controversial.	1	2	3	4	5	6	7
3. Reliable, organized.	1	2	3	4	5	6	7
4. Impatient, easy to wind up.	1	2	3	4	5	6	7
5. Open to new experiences, open -minded.	1	2	3	4	5	6	7
6. Withdrawn, quiet.	1	2	3	4	5	6	7
7. Tolerant, broad-minded.	1	2	3	4	5	6	7
8. Disorganised, negligent, slothful.	1	2	3	4	5	6	7
9. Calm, balanced.	1	2	3	4	5	6	7
10. Likes accustomed things, is not creative.	1	2	3	4	5	6	7

25. O How mature do you think you are bodywise compared to the other boys/girls? Please answer the question comparing yourself only to the same sex!

The following questions refer to you.

1. I look much younger than the others.
2. I look somewhat younger the others.
3. I look the same as the others.
4. I look somewhat older than the others.
5. I look much younger than the others.

26. O Please mark the statement that befits you! You can mark multiple answers.

1. I go to concerts, discotheques at least once a week.
2. I do sports at least once a week.
3. I go to a pub at least once a week.
4. I'm there at almost every party.

27. O What kind of activities do you have apart from your lessons?

1. Training.
2. Private classes
3. Music-school.
4. Language school.
5. Divinity.
6. Other: ……..

XXXX

28. O Some students have already tried cigarettes. Do you smoke?

1. No, never.
2. No, but I've already tried it.
3. Yes, but only in company.
4. Yes, regularly.

29. O Some students have already tried alcohol. Do you drink?

1. No, never.
2. No, but I've already tried it.
3. Yes, but only occasionally.
4. Yes, at least once a week.

30. O Some students have already tried some kind of narcotic. Do you take drugs?

1. No, never.
2. No, but I've already tried it.
3. Yes, but only in company.
4. Yes, regularly.

31. O Some people consider themselves Hungarian, others belong to other ethnic groups. What group do you consider yourself to belong to?

1. Hungarian.
2. Roma / Gypsy.
3. Roma /Gypsy and Hungarian as well.
4. Other: ✍ ……

32. ✍ In the first coulmn you can read statements, the remainig column headers contain the name of your classmates. Please, put an “x” in the cells of which the content you feel right.

Who did you beat up?																							
Who did beat up you?																							
Of whom do you say bad things to ‘your friends’?																							
Who says bad things about you?																							
Who do you mock?																							
Who mocks you?																							
Who did you deliberately humiliate?																							
Who humiliated you deliberately?																							

33. ○ Are you dating someone at the moment?
    1. Yes.
    2. No.

34. ✍ How many people have you dated in your life? Please choose from the following options!

    1. I haven't dated anyone yet.
    2. 1 person.
    3. 2 persons.
    4. 3 persons.
    5. 4 persons.
    6. 5 persons.
    7. 6-10 persons.
    8. More than 10 persons.

35. ✍ Have you dated someone from the same grade in your current high-school? Please give his/her name and the class in which he/she studies!

What's his/her name?	Circle the class in which he/she studies!
1.	9a 9b 9c 9d
2.	9a 9b 9c 9d
3.	9a 9b 9c 9d
4.	9a 9b 9c 9d
5.	9a 9b 9c 9d

Thanks for your answers!
If you are curious about the project or the preliminary results, please visit this site: http://recensproject.hu/eng/

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