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The role of peers' perceptions in ethnic self-identification

Zsófia Boda[1],*, and **Bálint Néray[2],**

[1]University of Essex, Department of Sociology and Criminology, Wivenhoe Park, Colchester CO4 3SQ, UK

[2]Northwestern University, McCormick School of Engineering and Applied Science, 2145 Sheridan Rd, Evanston, IL 60208, USA

*Corresponding author. Email: zsofia.boda@essex.ac.uk.

A major source of social inequalities. Its fluid and multidimensional nature is extensively discussed in theoretical and qualitative work but is less often studied quantitatively, partly due to the lack of appropriate data. In this article, we conduct a quantitative analysis on ethnic fluidity and multidimensionality: We empirically demonstrate that one's ethnic self-identification may change if not aligned with relevant others' perceptions. Using longitudinal models on data from 27 freshly formed Hungarian secondary school classes of Roma and non-Roma adolescents (N=784) and a dyadic measure for ethnic perceptions, we disentangle the two-way relationship between ethnic self-identification and ethnic perception of classmates. We find that students perceived as Roma by more classmates are more likely to develop and maintain a Roma self-identification and, independently, less likely to develop and maintain a Hungarian one. Furthermore, a Roma self-identification increases one's likelihood to be perceived as Roma by others, and independently, a Hungarian self-identification decreases it.

Ethnic groups are not self-evident units of social research: Ethnicity is constructed through various boundary-making processes that separate individuals into categories of 'us' and 'them' (Jenkins, 1994; Nagel, 1994; Wimmer, 2009). This defines ethnicity as a fluid, contextual, and multidimensional construct. It is fluid, because the definition of ethnic categories, as well as category-memberships, are ambiguous and may change over time as boundaries are shifted, blurred or crossed in society (Zolberg and Long, 1999; Brubaker, 2004). It is contextual, because individuals may perform different aspects of their ethnic belonging in different social contexts (Ethier and Deaux, 1994; Khanna and Johnson, 2010). Finally, ethnicity is multidimensional, consisting distinct aspects that relate to social inequalities in different ways. Amongst them, most notable are ethnic self-identification and ethnicity as perceived by others (Roth, 2016). Self-identification is based on self-perception; perceived ethnicity is based on perceptions of others.

Dimensions of ethnicity are distinct but interrelated: in particular, ethnic self-identifications are argued to be influenced by external opinions (Nagel, 1994). Despite its importance, the link between self-identification

and perceived ethnicity is relatively understudied (see Saperstein and Penner, 2012 and Csepeli and Simon, 2004, for two exceptions), and the joint development of individuals' ethnic self-identification and their ethnicity as perceived by those in their social environment has never been specifically investigated. To fill this gap, this paper shows how perceptions of important peers may change a person's ethnic identity.

We utilize longitudinal data on Roma and non-Roma adolescents in Hungary ($N_{classrooms}$=32; $N_{students}$=1,033) collected at the start of their secondary studies, and six months later (grade 9, age 15). We model how students change their ethnic self-identification during the first six months of their studies based on how many classmates perceive them belonging to the Roma group, while simultaneously modelling changes in students' ethnic categorizations of each other. Examining adolescent communities is highly advantageous for our purpose, as this is an important age for ethnic identity development (Phinney, 1993; Hitlin et al., 2006). Moreover, entering a new school gives students an opportunity to renegotiate ethnic identities in a new environment (Ethier and Deaux 1994). The empirical example of Roma minorities in Hungary provides

an interesting context to test our general hypotheses. While Roma ethnicity is salient in Hungary, it is also fluid, making it possible for Roma people to pass as non-Roma (Ladányi and Szelényi, 2006; Simonovits and Kézdi, 2014; Kovai, 2017): this relatively high level of uncertainty leaves more room for the influence of others.

For self-identification, three categories are considered: identifying as Roma, Hungarian, or both. This way, we can study the separate but interrelated development of majority-group identity and minority-group identity and can consider both single and dual identity. Perceived ethnicity is inherently dyadic: who perceives whom in what way. Thus, it is conceptualized and modelled on the level of dyads, using data in which students reported which classmates they perceived as Roma. This provides us with a fine-grain measure for perceived ethnicity. By showing a two-way relationship between perceived ethnicity and self-identification, this paper contributes to our understanding of social inequalities, ethnic-identity formation, and provides analytically sound empirical evidence for the development of distinct but potentially overlapping self-identifications in adolescents.

Theory

Ethnic groups have historically been treated as separate and objectively defined entities. However, Weber (1968) already challenged this 'substantialist' or 'groupist' assumption (Brubaker, 2009), described as a Herderian legacy by Wimmer (2009). Since then, multiple clusters of literature contributed to a new line of thinking that rejects the assumption of ethnic groups being pre-existing entities (see Brubaker 2009) as research attention has gradually shifted from the study of ethnic groups to the study of ethnic boundaries (Barth 1969).

Ethnic boundaries define where 'us' ends and 'them' begins in society. Boundaries are not fixed but constantly re-negotiated by social groups and actors (Barth, 1969; Zolberg and Long, 1999), and are not necessarily agreed upon (M. Harris, 1970). The boundary perspective proposes that ethnic identities evolve related to perceived identities of other groups (Barth 1969), drawing attention to processes by which members of ethnic groups define and redefine other groups (Blumer, 1958). A large body of research has been conducted on forming, negotiating and closing ethnic boundaries in a wide variety of contexts (see Lamont and Molnár, 2002; Pachucki et al., 2007).

Ethnic boundaries are shaped around characteristics perceived as relevant in the given context (Wimmer, 2008, 2009). Boundaries take different forms depending on the social environment (Barth 1969). Bauböck

(1994) and Zolberg and Long (1999) propose a distinction between bright and blurred boundaries, expressing the level of ambiguity in ethnic memberships.

Ethnic multidimensionality

Ethnicity is multidimensional (for a full review of dimensions identified, see Roth 2016). A*ncestry* is defined based on the ethnic origin of one's ancestors; its importance varies along contexts (Roth, 2016). *Ethnic self-identification* is one's own understanding of one's ethnic membership. This includes *self-categorization*: the ethnic category/categories one identifies with. This is typically measured by what people select in a questionnaire asking about their race or ethnicity. This answer can depend on where the questionnaire is filled out (e.g. Kramer et al., 2015), demonstrating the contextual nature of ethnic self-categorization. Moreover, it includes ethic *identity*, which expresses more complex psychological patterns about a person's ethnic belonging and is thus not limited to a choice from a set of predetermined options (Roth, 2016). In several countries, such as the United States and Brazil, ethnicity in sociological studies is usually defined based on one's self-identification (e.g. Jenkins, 1994; Moody, 2001; Saperstein, 2012; Roth, 2016). In recent Western European sociological literature– which has a strong focus on the situation of immigrants—typically ancestry is considered: the country of origin of the respondents, their parents and grandparents (e.g. Lubbers et al., 2010; Smith, Maas, and van Tubergen, 2014; Leszczensky and Pink, 2015). Self-identifications are analysed in relation with this as a dependent variable (Barth, 1969; Leszczensky, 2013; Leszczensky et al., 2016), or as a moderator for same-ethnic friendship preference (Leszczensky and Pink, 2019).

Further dimensions include *perceived (or observed) ethnicity*. This may be defined solely based on appearance or also based on interactions (Roth, 2016): these may result in different categorizations (Porter et al., 2016). Perceived ethnicity has often been measured through the categorization of the interviewer (e.g. Csepeli and Simon, 2004; Saperstein and Penner, 2012), or through perceptions of others from one's social environment, such as school peers (e.g. Boda, 2018) and teachers (e.g. Kisfalusi, Janky, and Takács, 2021). Perceived ethnicity varies by characteristics of the observer and the context (Herman, 2010; Boda, 2018, 2019) and has thus been suggested to be defined for dyads (who perceives whom into which ethnic category) rather than individuals (which ethnic category someone is perceived as a member of) (e.g., Boda and Néray, 2015; Boda, 2019, 2021). Finally, *reflected ethnicity* expresses individuals' perceptions about their perceived ethnicity (Roth 2016).

Ethnic dimensions often show important differences when applied to the same individual. Especially differences between self-identified and perceived (or reflected) ethnic memberships have been extensively studied recently (for a summary, see Roth 2016). Such differences can be found, in theory, for members of all ethnic groups (see Vargas and Kingsbury, 2016). The extent of these, however, strongly depends on the group and context. In the U.S., mixed-race individuals and Native Americans (Harris and Sim 2002), as well as people with Hispanic origin (Hitlin, Brown and Elder, 2007; Roth, 2012), are often perceived into categories not matching their self-identifications. In Eastern Europe, the categorization of Roma people is similarly ambiguous (Csepeli and Simon, 2004).

Ethnic changes

That aspects of ethnicity develop together, mutually influencing each other, is highlighted by various theories in sociology and social psychology. Barth (1969) describes ethnicity as a product of labelling processes carried out jointly by oneself and others (highlighting the role of both self-identified and perceived ethnicity), whereas social interactionists focus on intra- and interpersonal mechanisms in the construction of ethnicity.

Based on the concept of the looking-glass self (Cooley, 1902; Mead, 1934; Yeung and Martin, 2003), identity develops through interactions with others. Similarly, Nagel (1994) argues that others' perceptions limit one's options for self-identifications. It is important which 'others' the researcher focuses on, though. While society serves as an important context (Roth, 2018), much of the actual labelling process happens on the level of social interactions and social relationships. In a series of studies, Khanna (Khanna, 2004, 2011) and Khanna and Johnson (2010) show that self-identifications are influenced by one's (perceived) immediate social environment: people tend to conform to the perceived opinions of others around them (their reflected ethnicity).

This shows that all aspects of ethnicity may change. Individual crossing of ethnic boundaries process has been a central problem for sociology and social psychology and has also been called passing (Kennedy, 2004), or individual mobility between social categories (Tajfel and Turner, 1979). From social-interactionist point of view, the concept of stigma is central to these processes (Goffman, 1963). People can cope with stigmatized identities in various ways. One is concealing aspects of the stigma not obviously visible for external perceivers (equivalent of boundary-crossing). Snow and Anderson (1987) describe a similar process as 'identity work' by which individuals create, present, and maintain positive personal identities. This may involve, for example, changing one's personal appearance or association

with other people and groups. Indeed, in order to pass as a member of another (usually, but not always, more advantaged) ethnic group, people have been found to change their behaviour, appearance, accent, or name to adopt those typical for the target ethnic group (Nagel, 1995; Ginsberg, 1996; Bourgois, 2003), or to cut ties with members of their original group (Portes and Sensenbrenner, 1993). Social identity theory also proposes a similar mechanism: when people perceive to be associated with a lower-status group, decreasing their self-esteem, one strategy to solve this is leaving the group and joining another one which they perceive as of higher status (Tajfel and Turner, 1979).

Opportunities for (micro-level) boundary crossing are limited by the (macro-level) blurriness of boundaries and hierarchical differences between the groups (Tajfel and Turner, 1979; Alba, 2005). At the same time, in different contexts, different attributes (e.g. skin colour, language, religion) are salient and serve as bases of ingroup and outgroup perceptions (Tajfel and Turner, 1979; Zoldberg and Long, 1999; Chen et al. 2018). Being more similar to an outgroup along relevant dimensions makes boundary crossing easier, even when boundaries are bright. Individuals from minority-group backgrounds who share salient characteristics with the majority group and accept their norms are sometimes not perceived as minority-group members and become part of 'us' from a majority perspective (Ladányi and Szelényi, 2006; E. Telles and Paschel, 2014).

The Hungarian context

We focus on the Roma minority group in Hungary. The Roma are the only sizable ethnic minority group in Hungary, constituting about 6 per cent of the entire population, and 10-12% of the adolescent population (Kertesi and Kézdi, 2016). Similar to elsewhere in Central-Eastern Europe, where 80% of the Roma live, Roma people in Hungary face deep poverty, low labour market participation and poor access to school, health care, safe housing and other social services (Sobotka and Vermeersch, 2012; Bernát, 2014). They typically live in ethnically mixed neighbourhoods and speak Hungarian as a first language (Kemény and Janky, 2005), though segregated areas where most inhabitants are Roma also exist, and some Roma people also speak Roma languages (Csepeli and Simon, 2004).

After the fall of the communist regime in Hungary, the job market collapsed, resulting in a 23% employment rate among Roma people. Their reintegration still awaits: the Hungarian school system has been failing for decades to close the widening achievement gap between Roma and majority students, which is the primary reason behind their low employment rate (Kertesi and Kézdi, 2011). While most Roma children

finish the 8-year long primary school and advance to secondary school from the 9th grade on, most of them never attain a secondary degree (Hajdu et al. 2019).

Kertesi and Kézdi (2016) report moderate institutional segregation in Hungarian primary schools. However, in secondary education (9th grade on), students are clustered into schools based on their achievement, increasing ethnic segregation. About half of Hungarian adolescents have no Roma classmates (Váradi, 2014). The few studies that examined inter-ethnic relations in mixed school settings have found that Roma-non-Roma friendships are rare while enmity is frequent (Boda and Néray, 2015, Boda, Néray, and Snijders, 2020). Roma students are often bullied by both their Roma and non-Roma peers (Kisfalusi et al., 2020), and inter-ethnic romantic relations hardly develop (Lőrincz, 2016). It has been shown though that Roma students with higher academic achievement have more friends and fewer adversaries than Roma students with lower achievement (Hajdu et al., 2019).

These difficult social and economic conditions create and maintain an environment in which Roma people constantly struggle with and for self-identification as they try to find the balance between representing their ethnic identity and not being judged for it (Koulish, 2005).

Based on the work of Vajda (2000), Csepeli and Simon (2004) show a range of responses to the strong prejudice Roma people face in Hungary, ranging from 'I am not *cigány* [a Hungarian word for Roma/gypsy], because it's a disgrace to be *cigány*'. to 'I'm a *cigány*, my skin is dark, people can tell even from a distance. It bothers me to some extent, but there is nothing I can do about it, so I struggle along as best I can'. to 'I am proud of my origin. I treasure my ancestry, my heritage, and teach my children the *cigány* language'. (Csepeli and Simon, 2004, p. 136)

Roma identity itself is complex: Csepeli and Simon (2004) argues that 'the experience of being Roma is determined by the convergence of factors such as ancestry, mother tongue, neighbourhood, and social bonds' (p. 138). At the same time, on the perceiver's side, 'colour of skin, speech, way of life and family name contributes to the construction of the Roma category' (Csepeli and Simon, 2004, p. 147), with neighbourhood composition (proportion of Roma people) appearing especially important (Csepeli and Simon, 2004). It is argued that Roma ethnicity is fluid and strongly related to social class and socio-economic status in Hungary (Ladányi and Szelényi, 2006; Kovai, 2017). In school, Roma and non-Roma students can be 'misclassified' by others (e.g. Kovai, 2017; Boda, 2018, 2019) and Roma students are sometimes able to 'pass' as non-Roma (Simonovits and Kézdi, 2014).

Hypotheses

As discussed in this article so far, the categorization of Roma people in Hungary is far from unambiguous; in fact, not only perceiver and perceived person, but also two perceivers may disagree on someone's ethnicity (Boda and Néray, 2015). Therefore, instead of determining whether a student is perceived as Roma by others or not, we harness the unique power of observing all perceptions in the classroom to obtain a more fine-grain measure of perceived ethnicity that expresses how strongly and how certainly a student is perceived as Roma by their peers. Looking at the number of peers that perceive someone as Roma can give us a good indication for this."

Based on theoretical considerations and empirical results on the relationship between identity and perceptions described in this article so far, we expect that *those categorized as Roma by more classmates will be more likely to adopt or maintain a Roma identification than those categorized as Roma by fewer classmates (hypothesis 1)*. At the same time, while Roma and Hungarian identities are not mutually exclusive, they may often be conflicting due to differences in established social norms between ethnic groups (Ladányi, and Szelényi 2006; Kovai, 2017). Therefore, we also expect that *those categorized as Roma by more classmates will be less likely to adopt a Hungarian identification than those categorized as Roma by fewer classmates (hypothesis 2)*.

In terms of how self-identifications affect categorizations, we expect that *students will be more likely to categorize classmates who identify with the Roma group as Roma, compared to those not identifying with the Roma group (hypothesis 3)*. Due to potential conflicts between Roma and Hungarian self-identifications, we expect that *students will be less likely to categorize classmates who identify with the Hungarian group as Roma, compared to those not identifying with the Hungarian group (hypothesis 4)*.

Data and methods

Data

This study uses data from the four-wave Hungarian panel study Wired Into Each Other (Vörös et al., 2022). It was collected between 2010-2013 by the Research Center for Educational and Network Studies (RECENS) at Corvinus University of Budapest and the Hungarian Academy of Sciences. Data was collected in seven secondary schools (which in Hungary includes grades 9th to 12th) from four cities and towns. As it is often the case with social network studies, it is not a representative but a targeted sample. However, the schools were selected to provide heterogeneity along important school characteristics in Hungary. First, the schools were selected based on their location and economic

situation (the capital, one large and two smaller towns from one region), the training programmes they offered (the three main training programmes available—vocational, technical, and grammar schools—were included) and their estimated ethnic composition. Schools were approached via telephone. In schools that agreed to take part in the study, all classrooms in their first year of secondary school (9th grade) in 2010/2011 were surveyed four times (i) October-November 2010 (shortly after starting) (ii) April 2011, (iii) April 2012, and (iv) April 2013. Informed consent was acquired from the students and their parents. Researchers and research assistants trained by RECENS were present in all the classrooms at the time of the surveys. Further details on the data collection, the research design, and the questionnaire are available in Vörös et al. (2022), together with the complete dataset through the UK Data Service (see Vörös et al., 2022).

From the original sample, we exclude 8 classes as they have no self-identified Roma students in the first wave and 5 classes because there were no changes in self-identifications in the first period. Our final subsample consists of 27 classes ($N_{students}$ = 784). However, the results are replicated on a larger sample of 32 classes, including the 5 classes originally excluded due to no changes in self-identifications, as well as on a smaller subsample of 12 classes, where we used stronger criteria on missing cases and Roma proportion (missing cases less than 20% along all variables and proportion of self-identified Roma students at least 10% in each classroom).

We use the first two waves of the dataset. The first wave was collected within a month after school started when most of them met for the first time. The second wave was collected six months later: by then, students had spent seven months together, allowing a shift from first impressions to negotiated ethnic self-identifications. Theoretically, we expect changes in ethnicity to mostly happen during this period, at the beginning of the emergence of the community, when students get a fresh start to decide which aspect of their ethnic self-identification to perform. In addition, we also have a practical reason for limiting our analysis to the first two waves. The third and fourth waves of data were collected in the second and third academic year, respectively, by which a significant proportion of students dropped out of the school or their classrooms, prohibiting longitudinal analysis. In the first wave, 14% of students did not fill out the questionnaire due to the lack of parental consent or being absent from school on the day of the survey. In the second wave, this is 21%.

Variables
Ethnic self-identification
Ethnic self-identifications were measured by asking the question 'Which group do you belong to?'. Four answer categories were offered: 'Hungarian', 'Roma', 'Hungarian and Roma at the same time', and 'Other'. For the analysis, we created three groups: *Roma-only, dual,* and *Hungarian-only* ethnic groups. Members of the 'other' category (which only consisted of 6 students in the first wave and 10 students in the second wave) were excluded from the main analyses.

In the first wave, 21%, and in the second wave, 23% of responses were missing (the majority of this is due to students not filling out the questionnaire). Of the valid data, 58% identified as Hungarian-only in the first wave, 62% in the second wave. 24% identified as an exclusively Roma person in the first wave, and 20% in the second wave. In both waves, 18% reported a dual self-identification.

Ethnic categorization
Ethnic classifications were measured for each pair of respondents who studied in the same classroom. Students received a list of their classmates and were asked to put an 'X' next to the names of those they considered Roma. In the first wave, 14% of the responses is missing; this is 21% in the second wave. On average, students nominated 18% of classmates as Roma in the first wave, and 27% in the second wave. We highlight that whereas ethnic self-identifications had three categories (Roma-only, dual, and Hungarian-only), perceptions had only two (Roma, and non-Roma).

In terms of change, 59% of Roma categorizations that existed in the first wave is maintained until the second wave, but only 44% of Roma categorizations that existed in the second wave had already existed in the first wave. The average Jaccard index, that shows the number of categorisations that existed at both times compared to those existing at at least one of the times, is 39%. Ethnic categorizations, therefore, change considerably in the first six months of these communities, especially by the development of more Roma categorizations. Classrooms show a large variation in the extent of this change (minimum Jaccard index: 18%; maximum Jaccard index: 67%, standard deviation: 13%), but this change is not significantly related to the ethnic composition of the classroom (namely, the proportion of Roma-only, dual-identifying, and Hungarian-only students).

Parental education
As a measure of socioeconomic status, we consider the father's highest level of education, which can be related to both self-identified and perceived ethnicity. We create one variable: whether the father completed at most his primary studies, or achieved higher educational qualifications, based on students' reports in the first wave. We do not distinguish between secondary and tertiary education levels, because almost no students

with self-identified Roma background had a father who went to college or university (2 students with dual, 3 with Roma-only identification). We impute missing data using answers to the same question from later waves. After this procedure, 14% of the responses were missing and an additional 8% of students claimed that they did not know what their father's highest level of education was (these cases were recoded as missing as well).

Neighbourhood composition

To account for the fact that Roma people in Hungary sometimes live in somewhat segregated areas and this can influence both their self-identifications and others' perception of their ethnicity, we take neighbourhood composition into account. We have self-reported information about the ethnic composition of the neighbourhood each student lives in from the first wave. There are five categories: a neighbourhood where only non-Roma families, mostly non-Roma families, both Roma and non-Roma families, mostly Roma families, or only Roma families live. We code this variable as a scale from 0 to 4, where 0 stands for a completely non-Roma and 4 for a completely Roma neighbourhood. However, our results are replicated when we include neighbourhood as two dummy variables: mostly/only Roma families, mostly/only non-Roma families (reference category: mixed).

Classroom size

In larger classrooms, a person can be categorized as Roma by more peers. To account for this, we control for classroom size in the model: More specifically, we include the number of students who participated in the questionnaire in the first wave.

Statistical analysis
Ethnic categorizations as a social network

We define and model ethnic categorizations of each classroom as a network, in which a tie from *i* to *j* represents that *i* categorizes *j* as Roma. This is illustrated by Figure 1, showing an example school class from our data set, where node colours show students' ethnic self-identifications and arrow ethnic perceptions of each other. The collection of Roma categorizations within the same community can be treated and analysed as a network.

Illustration of ethnic perceptions and self-identifications using an example school class from our data set. Dark nodes represent students with Roma-only self-identification, light nodes represent students with dual self-identification, and white nodes represent students with Hungarian-only self-identifications. Ties stand for ethnic categorizations: the sender of the tie categorizes the receiver as Roma. The node size

refers to the number of peers perceiving the person as Roma."

The treatment of ethnic categorizations as a social network is well justified. We define ethnic categorization for pairs of individuals, creating a dyadic variable. Researchers usually treat such a dyadic variable as a social network when observations along the variable are not independent of each other, violating basic assumptions of standard statistical methods, such as of linear or logistic regression. This is the case for ethnic categorizations. For instance, those nominated as ethnic minority students by many of their peers tend to attract more minority nominations in the future, independent of their or the nominators' individual characteristics, which can be seen as a form of a Matthew effect (Merton, 1968; Boda, 2018). By treating ethnic perceptions as a network, we can analyse these using specialized tools for social network analysis that can control for similar dependencies. This is important because dependencies may result in similar outcomes as individual variables: for instance, individuals may receive more Roma nominations due to the Matthew effect, or because they self-identify as Roma. Not taking this form of dependencies into account, we could attribute its effect to self-identification and overestimate the effect of self-identifications on the development of categorizations.

Stochastic actor-oriented models

We apply stochastic actor-oriented models (Snijders, 2001, 2017) developed for the analysis of social network panel data, which are often used to model the co-evolution of a social network and individual attributes. The model takes two (or more) subsequent observations of both the network and the attributes. It then simulates a series of unobserved changes that lead to the second observation starting from the first one. This is an actor-oriented process: individuals are assumed to make decisions about their outgoing network ties (that is, whom they nominate) and their individual attributes. The network and the individual attributes are modelled together but are treated as separate dependent variables: change in each of them is explained by its own set of independent variables defined by the researchers. For each independent variable, a parameter is estimated based on its contribution to changes or stability of the given network or attribute.

While SAOMs are most often applied to model social relationships, such as friendships, in this article, we rely on them to model ethnic categorizations as a network. We opt for using SAOMs for three reasons. First, as mentioned earlier, SAOMs allow for the operationalization of ethnic perceptions as a network, enabling us to take dependencies in categorizations into account. Second, with SAOMs it is possible to have multiple dependent
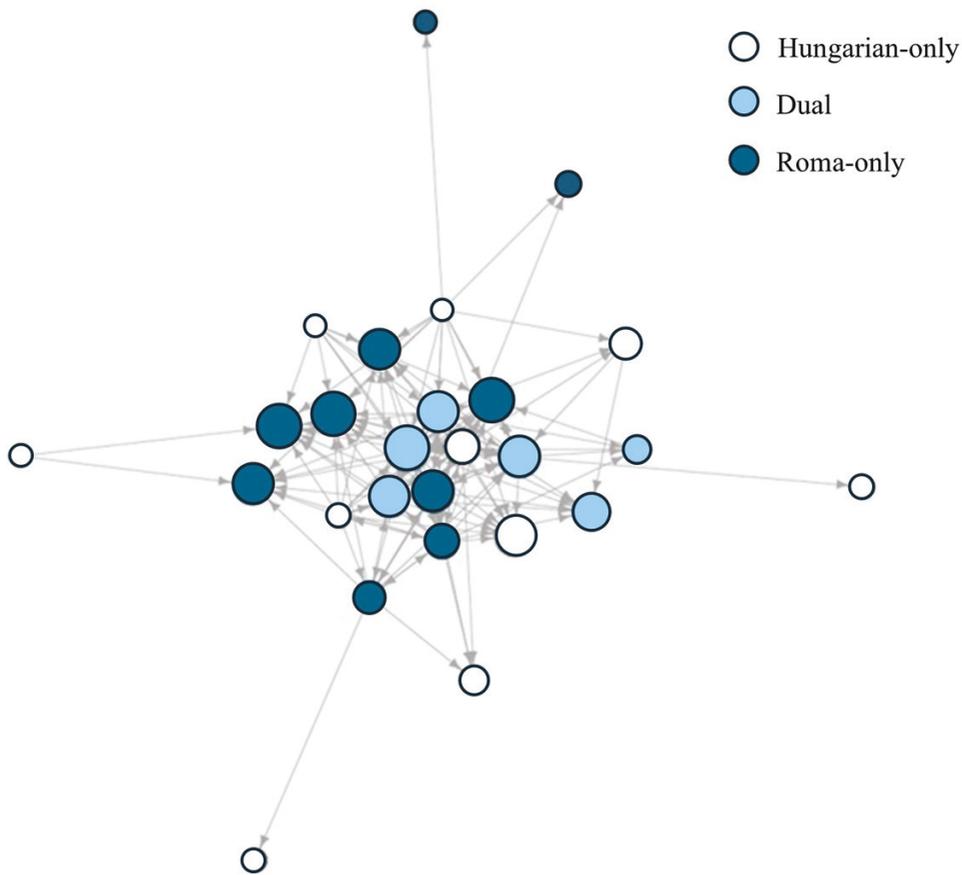
Figure 1 Ethnic perceptions and self-identifications in an example class (from wave 1).

variables at the same time. This way, we can model the joint evolution of ethnic categorizations and self-identifications, analysing their effects on each other. The model assumes continuous time, allowing one change in either perceived or self-identified ethnicity at a time during simulations, always based on the current state of the other ethnicity aspect. This reflects the underlying processes better than, for instance, cross-lagged regression analyses could. Third, SAOMs take an actor-oriented approach. We argue that imagining individuals as actors continuously making judgements about their own and others' ethnic categories while monitoring their social environment is in line with substantive theories on the cognitive processes of (self-)categorizations (Tajfel and Turner, 1979; Turner, 1987).

For the model, we define three dependent variables: (i) Roma categorization as a network, (ii) Roma self-identification as an individual attribute, and (iii) Hungarian self-identification as an individual attribute. The model allows students to identify with both the Roma and the Hungarian group at the same time,

however they must always identify with at least one of these (we set up the model so that it does not allow to choose neither during the simulations) to match the empirical data. By modelling Roma and Hungarian self-identifications separately, we can test how being perceived as Roma influences identification with both the Roma minority group and the Hungarian majority group. For modelling purposes, we assume that individuals cannot change their self-identifications from Roma-only to Hungarian-only (or vice versa) in one step: they must 'go through' a state of dual identification. This does not mean that the model forbids a complete change in identification between the two waves (even though such changes were very rare in the data). We only assume that this unobserved change happens in (at least) two steps, and at some point during the simulations, this person has to have a dual identification. Given that identity formation is a continuous process, this assumption seems realistic.

Changes in categorizations and self-identifications are each modelled based on a set of independent
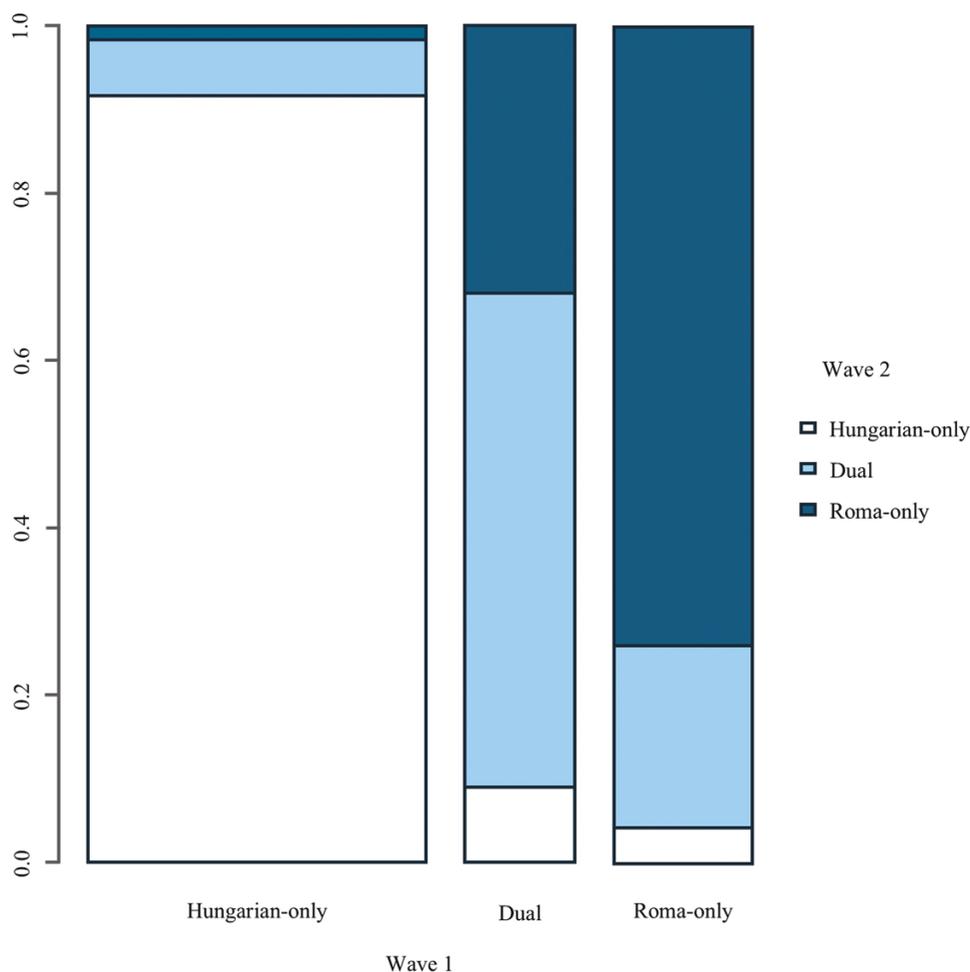
Figure 2 Change and stability in ethnic self-identification.

variables ('effects'). For ethnic categorizations, we include self-identifications (the effect of the categorized person's self-identification), other individual attributes (the effect of the categorized person's neighbourhood composition and father's level of education), and endogenous dependencies between categorizations that capture how existing categorizations in the classroom affect who classifies whom as Roma. For self-identifications, we use effects based on others' categorizations (the number of incoming Roma categorization ties), and individual attributes (e.g. own neighbourhood composition and father's level of education).

For the current article, we utilize the new random coefficient multilevel version of SAOMs (Koskinen and Snijders, 2023; Ripley et al., 2023). Analogous to standard random coefficient hierarchical regression techniques, this Bayesian method has been implemented for the estimation of one model for multiple groups, allowing random differences between the groups along

selected variables. Details of the modelling procedure can be found in Appendix B.

Results

Descriptive results

First, we look at the extent to which change in ethnic self-identification happens in our sample. 81% of the students identify the same way in the first and the second wave; 19% of students experience a change in their self-identifications. To illustrate between which categories these changes happen, Figure 2 shows the relationship between first- and second-wave self-identifications. Namely, it represents students' self-identification at the second wave (shown by the three colours) based on their self-identifications at the first wave (shown by the three bars). The widths of the bars reflect the number of students who belong to the respective category at the first wave. We can see
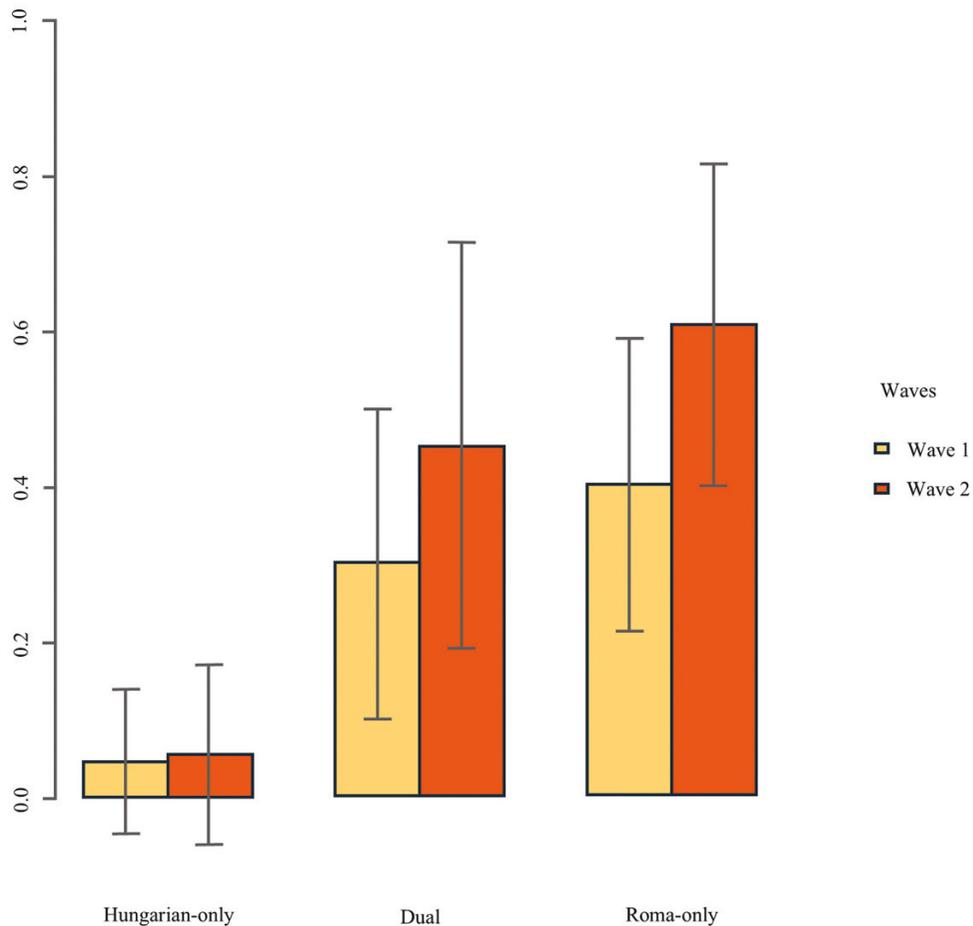
Figure 3 Ethnic categorizations based on self-identifications in both waves.

in the first bar that most self-identifications are stable in all three ethnic groups, but this is especially true among Hungarian-only individuals, 91% of whom identifies as Hungarian only in the second wave as well. When it comes to the change, 7% of Hungarian-only individuals change to dual identification and only a negligible proportion, 2% changes to a Roma-only self-identification. Shown by the third bar, stability of self-identifications is less strong among Roma-only individuals (74%). From here, most of the change happens towards a dual identification (22%), and only 4% switches to a Hungarian-only self-identification. Unsurprisingly, the middle bar shows that individuals with dual identifications experience the most change in their self-identifications (only 59% of them still identify with both ethnic groups at wave 2). They develop Roma-only identifications (that is, lose their Hungarian self-identifications) more often (32%) than developing Hungarian-only identification (that is, losing their Roma self-identification; 9%). This suggests

that dual-ethnicity people are 'closer' in their identities to the Roma than to the Hungarian group.

Proportion of students' identifying as Hungarian-only, dual, or Roma-only at the second wave (shown by the three colours) based on their self-identifications at the first wave (shown by the three bars)."

As a second step, we look at self-identifications in relation to ethnic perceptions. As described before, we conceptualize and operationalize perceived ethnicity on the level of dyad: who perceives whom as a member of which ethnic group (see again Figure 1 for an example). Figure 3 shows self-identifications and the proportion of classmates that perceive the individual as Roma, indicating a clear relationship between these.

Those identifying only as Hungarian were usually perceived as Roma by 4.6% of their classmates (s.d.=9.3%) in the first wave and by 5.5% (s.d.=11.6%) in the second wave. This is 30% (s.d.=20%) and 45%, (s.d.=26%) respectively, for those who identifying with both groups, and 40% (s.d.=19%) and 61%

(s.d.=21%), respectively, for those identifying only with the Roma group. The standard deviation is relatively high in each category, showing the ambiguity of ethnic perceptions, but its relative value (that is, its value compared to the respective mean) decreases by the second wave, which can indicate that students learn about each other's ethnicity (regardless of whether or not the information they learn is in line with each other's self-identification) and they develop more consistent categorizations.

Average proportion of classmates nominating each student as Roma, depending on the students-self-identification (left two bars: Hungarian self-identification only, middle two bars: both Roma and Hungarian self-identification, right two bars: Roma self-identification only) and the wave (light-coloured bars: first-wave self-identifications based on first-wave perceptions, dark-coloured bars: second-wave identifications based on second-wave perceptions). The lines show the standard error that belongs to the given mean."

Finally, we can see a general increase in Roma perceptions (also shown by Figure 3). The increase in average Roma perceptions happened primarily among those who self-identified as Roma only or both Roma and Hungarian (both increasing with about 50%), while the increase was smaller for Hungarian-only students (about 20%).

Results from the model

Figure 4 presents the main results of our SAOM analysis for the evolution of Roma self-identification, Hungarian-self-identification, and Roma perception. (The complete set of results are presented in Appendix A, Table A.1). Parameters in Figure 4 (and Table A.1 can be interpreted as similar to conditional log odds ratios in logistic regression models.

The main results of the stochastic actor-oriented models, with variables expressing our main hypotheses. The dots show parameter values, lines show Bayesian 95% credible intervals (which, as the figure shows, are not necessarily symmetric). Stars stand for statistical significance (***<0.001)."
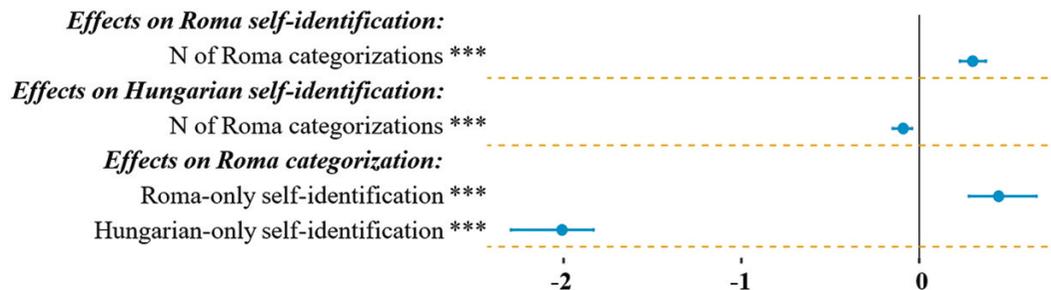
First, Figure 4 shows that individuals are significantly more likely to adopt or maintain (if already adopted) a Roma self-identification if more classmates categorize them as Roma ($\beta=0.301$; $P < 0.001$), providing support for Hypothesis 1. Second, the more classmates perceive someone as Roma, the less likely they are to develop or maintain a Hungarian identity ($\beta=-0.090$; $P < 0.001$). We therefore also find evidence for Hypothesis 2. Finally, compared to a dual identification, individuals are more likely be perceived as Roma by their classmates if they have a Roma-only self-identification ($\beta=0.447$; $P < 0.001$), and are less likely to be perceived as Roma if they have a Hungarian-only self-identification ($\beta=-2.009$; $P < 0.001$). This confirms both the third and the fourth hypotheses.

Additional results from the model (see Table A1 in Appendix A) show that neighbourhood composition also has a significant positive effect on adopting or maintaining a Roma self-identification: those who live in neighbourhoods with more Roma families are more likely to start or keep self-identifying as Roma ($\beta=0.593$; $P < 0.001$). At the same time, both the neighbourhood's ethnic composition ($\beta=-0.401$; $P = 0.046$) and the father's low level of education ($\beta=-1.046$; $P < 0.001$) has a negative effect on developing or maintaining a Hungarian identification: that is, those who live in areas with more non-Roma families and those whose father has higher levels of education are more likely consider themselves Hungarian. Finally, ethnic categorizations show self-reinforcing tendencies: those who are categorized as Roma by many are likely to attract more nominations ($\beta=0.498$; $P < 0.001$). Similarly, those who are not yet named as Roma by any of their classmates are unlikely to receive a nomination ($\beta = -0.925$; $P < 0.001$). These latter processes work in addition to the role of self-identified ethnicity (which is taken into account in the model).

Discussion

Many studies investigate the role of ethnicity in social inequalities, but few take into account that ethnicity

Figure 4 Main results of the stochastic actor-oriented model.

has multiple aspects that each change over time. Even fewer studies focus on these changes themselves. In this article, we focussed on two aspects of ethnicity: self-identification and peer-perceived ethnicity and investigated the two-way relationship between them. We first synthesized theoretical and empirical contributions from several fields, such as sociology, social psychology, and anthropology. We reviewed long-standing theories on the development of ethnic identities in relation to the environment (Cooley, 1902; Mead, 1934; Goffman, 1963; Khanna, 2004) and identified the specific mechanisms, such as boundary crossing (Zolberg and Long, 1999), passing (Kennedy, 2004), or individual mobility (Tajfel and Turner, 1979), proposed in sociological and social psychological literature. Based on these, we hypothesized that self-identification and the way someone is perceived by the close social environment directly influence one another.

To test our hypotheses, we analysed the co-evolution of aspects of students' ethnicity during the first six months of 27 Hungarian secondary school communities that just started their studies together. We used information about ethnic self-identification of students (Roma, Hungarian or both) and about which classmates perceived them as Roma. We found evidence for others' Roma categorizations affecting both Roma and Hungarian self-identifications: those who are perceived as Roma by more a more likely to develop or maintain a self-identification as Roma and less likely as Hungarian. At the same time, we also confirmed that self-identifications influence perceived ethnicity: those with Hungarian self-identification were less likely, and those with Roma self-identification were more likely, to attract Roma categorizations by others. This way, we identified patterns of ethnic shifts, both in how one self-identifies and how one is perceived by others. By looking at memberships in two ethnic groups (Roma and Hungarian) and showing that they are both related to Roma perceptions in opposite ways, we provide evidence that perception along one dimension (Roma) can be related to self-identification along another (Hungarian). This highlights the interconnectedness of various ethnic dimensions and categories and may be relevant for the study of certain disadvantaged ethnic groups in other contexts, such as for biracial individuals, or members of immigrant groups in the U.S. or Western-Europe. Studies find that for students with immigrant backgrounds, identification with both the host and the origin culture enjoy higher levels of well-being through better adjustment and flexibility (see Yoon et al., 2013): a drive away from majority self-identification based on others' perceptions as a minority member may be detrimental for minority students' mental health.

Our article is unique in that it presents quantitative evidence for aspects of ethnicity mutually affecting each other in a meaningful social context and supports the claim that ethnicity is indeed fluid on the individual level. This offers a major contribution to the sociological and social psychological literature of the nature of ethnicity, identity, and social categorizations, and adds an important piece to the growing body of literature that aims at understanding how 'ethnicity works' (Brubaker 2009:29).

Our results highlight that some individuals who are able to pass for members of the dominant group may lose their minority self-identification over time. This has important implications for social inequalities. Due to prejudice and stereotypes (Yuval-Davis et al., 2017), those who may pass for members of the dominant group may become conventionally more successful in the education system or labour market. At the same time, the loss of minority self-identification among conventionally successful minority-origin individuals and their assimilation to the majority group will most likely prohibit these individuals from serving as sources of advice or information within their original group (e.g. advice on educational decisions; help finding jobs). Indeed, Boda and Néray (2015) found that self-identified Roma students dislike those they perceive as Roma but who identify as non-Roma. Disadvantaged minority individuals aiming for success within the dominant culture therefore lose essential help for their social mobility.

Our article also has a number of limitations. The first and most important one is generalisability. Our sample, like many social network datasets, is not representative in the first place, though schools were carefully selected to altogether provide sufficient heterogeneity along important dimensions (see our Data subsection as well as Vörös et al, 2022 for more detail). However, we could only conduct our analysis on a subsample that included self-identified Roma people, which resulted in a lower-SES subsample of the data. Therefore, it needs to be highlighted that the sample of our analyses does not represent the Hungarian population. At the same time, the results were replicated using subsamples of different sizes, and they appear mostly robust, which gives us some confidence in the results. In terms of generalisability more broadly, the context of the analysis is specific to the situation of Roma people in Hungary. This means that the results cannot be generalized to other contexts. We argue, however, that our findings could still be of interest for other contexts as well. Most directly, Roma populations exist and have a long history in many other Eastern-European countries as well, in which social integration and assimilation processes are somewhat similar (though research shows that there are important differences as well, see

e.g. Ladányi and Szelényi 2006, Csepeli and Simon, 2004). Within Eastern Europe, the effect of peers on Roma self-identifications may be to some extent comparable. In addition, our results are interesting because they empirically support the theoretical claim that ethnic self-identifications can indeed be subject to the influence of the social environment, at least under some conditions. These conditions can now be established more precisely by further research in other empirical contexts. We highlighted in our theory section that ethnic changes and mis-categorisations have been shown to be quite frequent in some other contexts as well (e.g. those with Hispanic and native origins in the U.S.). When boundaries are relatively blurred between populations, or when certain individuals have physical or other attributes that allow them to pass as members of the majority group, peers can have similar effects on self-identifications, though the extent of this should be determined empirically in each context.

Second, we unfortunately cannot distinguish between missing answers and 'not Roma' answers in our perception measurement. This means that we have a bias towards non-Roma as opposed to Roma perceptions and there may be a difference between perceivers in how much they 'underreport' their Roma perceptions. This bias may be reflected by our descriptive results, which show that people are less likely to be reported as Roma than self-identify as Roma – though the descriptive results could also partly stem from majority groups being likely the 'default category' cognitively (Merritt and Harrison, 2009), with minority nominations only being made if the perceiver is more certain about the membership. The 'default category' explanation is supported by the fact that by the second wave, when students knew each other better, self-identified Roma-only and dual students received about 50% more Roma nominations, whereas Hungarian-only students were perceived as Roma by a much more similar (small) number of peers in both waves. The potential underreporting of Roma perceptions could become a problem when explaining the relationship between perceptions and self-identifications if the underreporting depended on the perceiver's characteristics. In a supplementary analysis, we investigated various characteristics of the perceiver (ethnic self-identification, SES, having a peer reputation as clever, academic motivation, number of friends) and found that ethnic self-identification and academic motivation are significantly related to the number of Roma perceptions one reports (see Table C1 in Appendix C). However, in this particular article, we focus on the number of incoming Roma nominations one receives when explaining self-identifications, and this aggregation on the perceived-peer level should mitigate any issues with variation on the perceiver level. In line with this, additional supplementary analyses

(see Table C3, models iii and iv, in Appendix C) show that these characteristics of the perceiver do not change how their perception affects others' self-identification.

Third, we have a substantial proportion of students missing from the data, which mostly stems from being absent from school at the time of data collection. Whereas we do not know the ethnicity of the students missing from the data, it is possible that patterns of school attendance differ both based on ethnic self-identification and based on characteristics that are used to determine ethnic perceptions. Roma students, who might be missing at larger proportions, could have otherwise been more accurate in categorizing others as Roma (that is, more matching others' self-identifications) than non-Roma students.

An important contribution of our study is a focus on ethnicity perceived by multiple people and by those whose perceptions matter for everyday life of students: classmates, whereas previous analyses typically relied on categorizations by only one person, who was previously unknown to the individual (i.e. an interviewer). This is an important advantage our dyadic approach, which allows us to consider multiple perceivers at the same time, and of our unique dataset, which gives us insight into perceptions of classmates. The dyadic approach can be flexibly used for nuanced analyses of the influence of different types of others on one's self-identification. To show this, we conduct supplementary analyses investigating more subtle influence processes: whether those who have more self-identified Roma or non-Roma friends will be more likely to maintain/adopt these self-identifications (Table C.3, model i); if the perception of friends matters more than the perception of non-friends for self-identifications (Table C1.3, model ii), and, as described in the previous paragraph, whether the perception of Roma peers, or peers with higher academic motivation, matters more for self-identification (Table C1.3, models iii and iv, respectively). Finally, we consider the role of the immediate social context, by modelling if students are more likely to adopt Roma or Hungarian self-identifications in classrooms with more Roma students, and whether the role of others' perception is smaller in these contexts. We find that the number of Hungarian-only-identifying friends increases the probability of identifying as Hungarian and decreasing that of identifying as Roma (whereas the number of dual-identifying and Roma-only-identifying friends did not matter). In addition, students in classrooms with more Roma peers are more likely to develop a Roma self-identification (controlling for their previous self-identification), and in these contexts, the perception of classmates also matters less. (Hungarian self-identifications as not significantly affected by the proportion of Roma classmates.) Note that our main findings still stand in all of these models. The ability

to distinguish between the influence of specific others (e.g. friends, same-ethnic peers, those the student looks up to, those the student spends time with) still opens new, exciting possibilities to study ethnicity and ethnic differences.

Our study establishes a bidirectional link between perceived ethnicity (by relevant peers) and self-identifications. This way, we show empirical evidence for dialectic processes between the individuals and their social environment negotiating individual ethnic identities. However, more research is needed to directly investigate possible underlying mechanisms. One of these is reflected appraisals: people develop their self-concepts in relation with how they think others see them (Mead, 1934; Goffman, 1963; Khanna, 2004). In this case, the perceived ethnicity (how others see someone) would influence self-identifications through reflected ethnicity (how people think others see them). The relationship between reflected ethnicity and self-identification is supported by the literature (Khanna, 2004; Khanna and Johnson, 2010). The link between perceived and reflected ethnicity, though intuitively plausible, could only be tested directly if future datasets included both reflected- and perceived-ethnicity measures. Further, perceived ethnicity may influence self-identifications through social ties. Those who perceive someone as part of their own ethnic in-group are more likely to befriend this person (Boda and Néray, 2015), and having many ties with members of an ethnic group increases this person's likelihood to identify with the group (Schulz and Leszczensky, 2016). Here, we find in supplementary analysis, described above (see Appendix C, Table C3, Model iii), that those with more Hungarian-only friends are more likely to identify as Hungarian and less likely to identify as Roma. Combined with findings of previous research (Boda and Néray, 2015), which established same-ethnic friendship tendencies among Roma and non-Roma students in Hungary, this supports the idea. Future research should investigate these explanations in more depth.

Overall, this article proposed a unique approach to look at the nature of ethnicity. We showed strong evidence that in freshly brought-together school communities, ethnic self-identifications and perceived ethnicity of students develop in interaction with each other. This offers a major contribution to our understanding of race, ethnicity, and identity, and opens new possibilities for studying the effect of these on various outcomes. Most importantly, future research could use more nuanced conceptualization and operationalization of ethnicity, taking its multidimensionality and changeability into account. The study also has important implications for those studying education systems. Well-being, academic outcomes, and future life chances of students can be strongly affected by how they negotiate their ethnicity, which is a factor studies rarely consider. Our article thus provides an important step towards a more complex—but more realistic—understanding of ethnicity and its role in social inequalities.

Supplementary Data

Supplementary data are available at *ESR* online.

Acknowledgements

Data availability statement

The data underlying this article are available via the UK Data Service, at https://reshare.ukdataservice.ac.uk/855460/

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Zsófia Boda is a senior lecturer (associate professor) of sociology at the University of Essex. She is the PI of the ERC grant "Applied stereotypes, social networks, and self-fulfilling prophecies: how stereotypes reinforce social inequalities", a Co-I of the ESRC Centre for Micro-Social Change, and a Humboldt Fellow at the Berlin Institute for Empirical Integration and Migration Research. She is interested in ethnic, gender and socioeconomic inequalities, education, social networks, stereotypes, and interpersonal perceptions. Her work has been published in Nature Human Behavior, PNAS, European Sociological Review, Sociology of Education, and Sociological Science.

Bálint Néray is an independent researcher, who is interested in sociology, network science, and health science, especially in relation with ethnicity. He has published in Social Forces, Social Networks, Social Psychology Quarterly, and Prevention Science