sociological science

The Ethnic Lens: Social Networks and the Salience of Ethnicity in the School Context

Clemens Kroneberg,[a] Mark Wittek[a]

a) Institute of Sociology and Social Psychology, University of Cologne

Abstract: Research on ethnic segregation in schools regularly assumed that ethnic homophily—the tendency to befriend same-ethnic peers, above and beyond other mechanisms of tie formation—is associated with salient ethnic boundaries. We devise a more direct test of this assumption based on a novel measure of ethno-racial group perceptions. In a network study of more than 3000 students in 39 schools of a metropolitan region in Germany, we asked students to indicate which cliques they perceived in their school grade and to describe these groups in their own words. We find that ethno-racial labels are more likely directed at larger cliques that include a higher share of Muslim students or more students with stronger ethnic identification. Still, ethno-racial labels are rarely employed, both absolutely and relative to other modes of classification. Moreover, net ethnic segregation in friendships ("ethnic homophily") and the reverse pattern in dislike relations ("ethnic heterophobia") are not associated with a more frequent use of ethno-racial labels. Our results have substantive and methodological implications for the study of social networks and diversity in educational settings.

Keywords: ethnic boundaries; social networks; ethnic homophily; ethnic labels; peers; exponential random graph models

ETHNIC diversity and its impact on social cohesion have received increasing public and scientific attention during the last decades (Baldassarri and Abascal 2020). A recurring concern is that ethnic diversity may undermine social cohesion by promoting segregated social networks which may lead to prejudice, threat perceptions, or even intergroup hostility.

To examine such questions, social scientists have repeatedly studied social networks and their segregation in the educational settings (Moody 2001; Mouw and Entwisle 2006; Wimmer and Lewis 2010; Boda and Néray 2015; Smith et al. 2016; Boda 2018; Kisfalusi, Pál, and Boda 2018; Boda, Néray, and Snijders 2020; Leszczensky and Pink 2019; Kruse and Kroneberg 2019; Wittek, Kroneberg, and Lämmermann 2020; Lorenz et al. 2021; Zhao, 2023). Schools are influential institutions where adolescents are exposed to fellow students of different backgrounds and develop their identities, groups, and attitudes in a particularly formative period. The literature has often problematized schools as sites of ethnic boundary-making that may fail to realize their integrative potential and even contribute to ethnic divides. In particular, a common assumption is that a lack of positive inter-ethnic ties is a sign of salient ethnic boundaries, which may lead to ingroup favoritism, threat perceptions, or even hostility towards out-group members (Agirdag et al. 2011; Boda and Néray 2015; Durkin et al. 2012; Kawabata and Crick 2011; Smith et al. 2016; Thijs and Verkuyten 2014; Walsh et al. 2016).

In our study, we re-examine this fundamental assumption by introducing a novel measure of ethnicized group perceptions. By collecting data on whether students perceive the cliques in their school grade in ethno-racial terms, we answer the call to study ethnicity not only as categorical commonality (i.e., shared ethnic origin) and relational connectedness but also as acts of classification (Boda 2018; Brubaker 2004; Jenkins 2008; Wimmer 2008, 2013). In a network study of more than 3,000 students in 39 schools of an urban region in Germany, we asked students to indicate which cliques they perceive in their school grade and to describe these groups in their own words. Based on this measure, we examine (1) how frequent ethno-racial labels are absolutely and relative to other modes of classification, (2) how characteristics of students, cliques, and school contexts relate to the use of ethno-racial labels, and (3) to what extent net ethnic segregation in friendships ("ethnic homophily") and dislike relations ("ethnic heterophobia") is associated with a more frequent use of ethno-racial labels.

Our findings suggest that ethno-racial labels are rarely employed, both absolutely and relative to other modes of classification. Although the ethno-racial labeling of cliques becomes more likely when they include a higher share of Muslim students or more students with stronger ethnic identification, the use of such labels remains exceptional also in their case. Finally, and contrary to common interpretations of "ethnic homophily" and "ethnic heterophobia", net ethnic segregation in friendship and dislike relations is not associated with a more frequent use of ethno-racial labels.

Our results call on scholars of social networks and diversity in educational settings to re-think their assumptions about the nature of ethnic segregation in students' social networks. Rather than interpreting tie formation tendencies through an ethnic lens, large-scale quantitative research needs to devise new ways of assessing the salience of ethnicity. Only thereby can we arrive at a more adequate and robust understanding of ethnic boundary-making in the school context.

Theory and Previous Research

The Theoretical Ambiguity of Objectivist Measures of Ethnic Homophily

Social scientists have a long tradition of studying ethnic diversity in the school context. A large body of qualitative research has documented nuanced and complex intersections between ethnic, gender, and other cultural identities and how these identities matter in particular schools (e.g., Adler and Adler 1998; Eder, Evans, and Parker 1995; Carter 2005; for a review, see Warikoo and Carter 2009). Using interview-based and observational ethnography, researchers were able to reconstruct how students make sense of their everyday school life and peer relations and the ways in which they use ethnic and racial categories in this process (Milner 2013). Due to the time-intensive and localized nature of these studies, they usually focus on one or relatively few schools, which has led to the call to investigate the generalizability of their findings in more wide-scale studies of social identities in schools (Warikoo and Carter 2009: 385).

Another, largely separate stream has used social network analysis to infer the relevance of ethnicity from the structure of social ties between students (e.g., Moody 2001; Baerveldt et al. 2004; Mouw and Entwisle 2006; Leszczensky and Pink 2015; Kruse et al. 2016; Smith et al. 2016; Lorenz et al. 2021). This line of research commonly focuses on the extent to which friendship ties tend to be more frequent among co-ethnics than would be expected by chance, controlling for a set of potential confounders (McPherson, Smith-Lovin, and Cook 2001; Wimmer and Lewis 2010). Compared to qualitative studies, this approach to ethnicity is much more objectivist and indirect. In particular, a social-psychological preference for interacting with same-ethnic or same-race peers is typically inferred from homogeneity according to group membership in close social relationships such as friendship (Bojanowski and Corten 2014; Kruse and Kroneberg 2019; Moody 2001; Mouw and Entwisle 2006; Smith et al. 2016; Wimmer and Lewis 2010). More precisely, network researchers speak of "ethnic homophily" to the extent that the data exhibit a tendency for positive ties between students of the same-ethnic origin rather than across ethnic groups after taking into account other aspects which organize networks, such as the opportunity structure for tie formation or endogenous network processes (Moody 2001; Smith et al. 2016; Wimmer and Lewis 2010). However, scholars have repeatedly pointed out that such ethnic net segregation does not allow for an unequivocal theoretical interpretation (Schaefer 2018; Schaefer and Kreager 2020; Wimmer and Lewis 2010). For example, rather than a genuine social-psychological preference, a relative tendency for intra-ethnic ties could be due to unmeasured aspects of the opportunity structure, such as same-ethnic peers being more likely to share the way to school, recreational activities, or membership in associations.

Bridging the method-induced gap between these two lines of research is crucial to counter their respective weaknesses and to arrive at a more adequate and robust understanding of ethnic boundary-making in the school context. One possibility would be mixed-methods studies that use multi-site ethnography and complement in-depth interviewing and participant observation with quantitative methods such as social network analysis. Another possibility—which we pursue in this article—takes the quantitative tradition as the point of departure and devises new measures that take respondents' subjective construals more seriously than previous survey research on social networks (van Loon, Goldberg, and Srivastava 2020).

Wimmer (2009: 262) has argued that it is necessary "to de-ethnicize research designs by taking non-ethnic units of observation to see both the emergence of ethnic closure and its absence or dissolution." His criticism is mainly directed at research designs that focus on ethnic communities, ethnic neighborhoods, race relations, et cetera and that thereby have difficulties in recognizing the relevance of non-ethnic attributes and processes. In principle, social network studies avoid this problem: by taking individuals and their ties as units of analysis, they offer an estimate of ethnic net segregation that recognizes a great variety of tie formation mechanisms that could underlie ethnic segregation (including relative group sizes, reciprocity, triadic closure, or other shared attributes) (Wimmer and Lewis 2010). However, even if ethnic net segregation approximates ethnic homophily, it can be problematic to pre-suppose the subjective relevance and contextual salience of ethnicity without data on individuals' meaning making (Erikson 2013; Fuhse and

Gondal 2022). Despite the potential of social network analysis as a de-ethnicized research design, its application to the study of ethnicity in the school context has often bought into strong and untested assumptions when it comes to theoretical interpretation (for a similar issue in experimental research, see Crabtree et al. 2022).

In particular, a common assumption is that a lack of positive inter-ethnic ties is a sign of salient ethnic boundaries, which may lead to ingroup favoritism, threat perceptions, or even hostility towards out-group members (Agirdag et al. 2011; Boda and Néray 2015; Durkin et al. 2012; Kawabata and Crick 2011; Smith et al. 2016; Thijs and Verkuyten 2014; Walsh et al. 2016). For example, scholars have turned to social identity theory, competition and threat theory to argue that "having out-group class peers leads to a heightened awareness of ethnicity and feelings of ethnic threat" (Smith et al. 2016: 1230).

Recent studies on negative ties in Western Europe suggest that these relationships are far from clear. A British study found that the segregation of seating patterns at the cafeteria of a mixed school was not associated with negative out-group attitudes (Al Ramiah et al. 2015). An analysis of panel data from two Dutch high schools found no support for the hypotheses that aggression, antipathy, and avoidance are more likely directed towards minority students and a more likely across ethnic groups (Kros, Jaspers, and van Zalk 2021). Finally, a study of 39 German secondary schools showed that ethnic homophily was related to more physical aggression between same-ethnic peers, rather than fighting across groups (Wittek et al. 2020). It was only with respect to dislike relations that this study found ethnic net segregation of friendships to be associated with more negative ties across group divides. However, both patterns could be due to reduced cross-group contact which comes with fewer everyday opportunities for physical confrontation as well as for positive experiences that may reduce negative views of particular others. Hence, a greater frequency of dislike relations between students of different ethnic origin could remain at the inter-personal level and not coded as having an ethnic dimension by the students. Thus, it is a significant conceptual leap to interpret a net segregation of friendships ("ethnic homophily") or a higher frequency of dislike relations across groups ("ethnic heterophobia") as indicating a high salience of ethnic boundaries.

A Boundary-making Approach to Social Networks and Ethnicity in the School Context

Contemporary theories of ethnicity demand to treat ethnic groups not as self-evident units of analysis, but to focus on the group formation processes in which different ethnic boundaries may or may not emerge and attain varying contextual salience (Brubaker 2004, 2014; Wimmer 2013). Recent studies of social networks in the school setting have made significant progress along these lines. Findings suggest that the strength of ethnic boundaries in European schools partly depends on contextual characteristics such as the distribution of minority students across geographical and institutional spaces or classroom composition (Kroneberg, Kruse, and Wimmer 2021; Kruse and Kroneberg 2019; Zhao, 2023). Network scholars have also begun to study how ethnic identities relate to friendship formation in schools, demonstrating

the significance of both self-identification and assigned identities (Boda 2018; Boda and Néray 2015; Kisfalusi et al. 2018; Boda et al. 2020; Leszczensky and Pink 2019; Kruse and Kroneberg 2019). Using panel data from a regional study in Germany, Leszczensky and Pink (2019) showed that "ethnic homophily" was actually driven by homophily among students who share a strong identification with their ethnic origin. Focusing on the salient boundary between Roma and non-Roma in Hungary, Boda and collaborators asked students not only about their own identification with these categories but let them classify all other students in their school class (Boda 2018; Boda and Néray 2015; Boda et al. 2020; Kisfalusi et al. 2018). Analyses of this data consistently found that majority students tend to dislike peers whom they perceive as minorities (i.e., as Roma), regardless of these peers' self-declared ethnicity (Boda and Néray 2015; Boda et al. 2020). Compared to the dominant objectivist and indirect measures of "ethnic homophily" or "ethnic heterophobia," these studies have taken important steps towards capturing the subjective salience of ethnicity more directly.

We build on and advance this line of work by employing a de-ethnicized measure of social boundary-making that focuses on the categorization of cliques. Previous network studies on ethnicity in the school context focused on particular group divides that were pre-determined analytically—such as Roma versus non-Roma or classifications by national origin. However, the boundary-making approach demands that we assess the subjective relevance of ethnicity empirically in a way that remains equally open for and elicits the relevance of other markers and identities (Wimmer and Lewis 2010). We developed such a de-ethnicized measurement approach taking inspiration from psychological work on peer groups and social cognition (Kindermann 1996; Kindermann and Gest 2009). Our method asked students to list groups of students in their grade whom they knew to frequently "hang out" or spend time with each other, and then asked them to give these groups names or to describe them. In characterizing these peer groups, students could use ethno-racial labels, but did not need to. This open-ended question allowed us to assess the salience of ethnic boundaries in a school grade based on the frequency in which students use ethno-racial labels to characterize peer groups.

In addition to its de-ethnicized nature, this way to capture the salience of ethnic boundaries purposefully focuses on the categorization of cliques. Theoretically, one can view peer ecologies as being composed of different types of social relations (Bronfenbrenner 1995; Brown 1999). The most important ones are dyadic relations such as friendships, relatively small friendship cliques, more sizable crowds, and overarching youth culture. The vast majority of network studies uses only data on friendships to estimate the extent of "ethnic homophily" in a school context. As argued above, however, it is questionable whether a net segregation of friendship networks along categories of ethnic origin is indicative of salient ethnic boundaries that may even translate into inter-ethnic threat or conflict. Rather, these group-level phenomena are to be located at higher levels of aggregation, such as friendship cliques or crowds. Friendship cliques are groups of three to ten children who spend time with each other regularly, engage in joint activities and develop feelings of belonging to a community. Importantly, the development of such shared feelings involves not only ingroup identification but also out-group perception and cate-

gorization (Brubaker 2004: 64-87; Jenkins 2008; Wimmer 2008). With important exceptions (Boda 2018; Boda and Néray 2015), Jenkin's (2008: 76) criticism that previous analyses of ethnicity have "emphasized internal definition and group identification at the expense of external definition and social categorization" also holds for network research.

Taken together, a de-ethnicized measure of the ethno-racial labeling of cliques allows us to provide more direct evidence on the contextual salience of ethnicity in the school setting. Focusing on a sample of schools in an ethnically diverse metropolitan region in Germany, we use our measure to answer three research questions:

1. How frequent are ethno-racial labels absolutely and relative to other modes of classification?

2. Are students more likely to use ethno-racial labels to describe cliques with particular characteristics, such as cliques of ethnic minority students, ethnically homogeneous cliques, cliques with a high share of Muslim students, or cliques of students with strong ethnic identification?

3. To what extent is net ethnic segregation in friendships ("ethnic homophily") and the reverse pattern in dislike relations ("ethnic heterophobia") associated with a more frequent use of ethno-racial labels?

Our second research question examines the use of ethno-racial labels towards cliques of predominantly Muslim students because Muslims face specific stereotypes and othering discourses in Western Europe where our study was located (Fleischmann and Phalet 2018; Helbling 2012; Juang et al. 2021; Kruse and Kroneberg 2019). It therefore seems likely that ethno-racial labels are directed at cliques with a high share of Muslim students. Moreover, previous research leads us to expect that cliques of students who strongly identify with their ethnic origin are more likely to also be viewed in ethno-racial terms (Leszczensky and Pink 2019).

Data

We use data from a large-scale school survey among 7th graders in the German state of North Rhine-Westphalia. The data collection was part of the SOCIALBOND project ("Social integration and boundary making in adolescence") and focused mostly on the ethnically diverse Cologne metropolitan area, which allows us to examine the prevalence of ethno-racial labels. The survey was conducted between September 2018 and January 2019 and included 3017 students (76% response rate) in 39 schools. The schools were not chosen randomly, but the sample included schools of all major school types and both urban and rural schools. Within the selected schools, all 7th graders were eligible to participate in the study. Participation in the survey was voluntary and conditional on active parental consent. Out of the participating students, 2999 reported valid network information and were included in our analyses.

In Germany, school classes provide the most important unit of students' everyday school life (Kruse and Kroneberg 2019; Smith et al. 2016: 1227) as the students

in the class are taught the same courses and remain together in the same class for the duration of their schooling until at least the 9th grade. In our sample, grades consisted of at least two and up to nine school classes. The average number of students per grade was 75.56, the smallest grade consisted of 41 and the largest of 215 students. The gender composition of the sample is balanced (52% female students) and the average age of students was 13 years. The proportion of ethnic minority students (i.e., those with a migration background, as defined below) in the school grade was 61% on average, ranging from 25% to 96%.

The survey was conducted via audio-supported tablet assisted self-interviews. Respondents were able to listen to questions and answers over headphones to reduce potential problems with language comprehension and literacy. PhD students and student research assistants conducted the surveys separately for each school class over a course of two school lessons.

Measures

Ethnic Origin

We employ a widely-used measure of ethnic origin by considering information on students' and parents' country of birth (Kruse and Kroneberg 2019; Leszczensky and Pink 2019; Smith et al. 2016). We refer to students as minority students or as having a migration background if they either immigrated themselves (1st generation) or are descendants of parents who migrated (2nd generation). If students were born outside of Germany, we assigned their country of birth as ethnic origin. Only in the few cases in which parents were born in Germany but the child was born abroad (e.g., due to a temporary stay abroad), did we assign a German ethnic origin. If one parent was born in a foreign country, his or her country of birth was coded as the student's ethnic origin. If both parents were born in different foreign countries, the mother's country of birth was assigned (following Dollmann, Jacob, and Kalter 2014). In total, our sample was composed of students with 115 different foreign backgrounds. The seven largest categories of national origin made up around 70% of the entire sample and were German (42%), Turkish (12%), Polish (5%), Russian (4%), Moroccan (3%), Iraqi (2%), and Italian (2%).

We use our measure of ethnic origin for multiple purposes. First, we employed network models to investigate in which grades social networks are structured by ethnic group membership (see e.g., Wimmer and Lewis 2010). Second, we calculated the share of students with a migration background for each grade and the inverse Hirschmann-Herfindahl index (HHI) for the share of the student body with a migration background to capture the demographic composition of contexts (following Smith et al. 2016). This allows us to study whether contexts with higher compositional diversity are also more prone to exhibit ethno-racial labeling. Third, we calculated the ethnic composition of cliques reported by students to analyse whether cliques' ethnic makeup influences their probability to receive an ethno-racial label.

Network Information

The sociometric section of the questionnaire asked students about multiple types of relationships in their school grade. Each student received a list of all students visiting the same grade. The list was created beforehand by the research team and sorted by school class and last name. Next to each student's name an identification number was printed. Interviewers instructed respondents to report the identification numbers of students with whom they had a particular type of relationship. Based on this sociometric information, we constructed uniplex, grade-level networks with directed ties for friendship and dislike.

Friendship Networks

Friendships were measured by asking students "Who are your best friends in your grade? You can name up to ten students from your grade-level." Following previous research (e.g., McFarland et al. 2014), we counted reciprocated as well as non-reciprocated friendship nominations as friendship ties. This reduces the problem that respondents might not recall all their friends in the survey situation (Ball and Newman 2013).

Dislike Networks

Similar to previous studies (Boda and Néray 2015; Harrigan and Yap 2017; Wittek et al. 2020), we derived dislike networks based on a sociometric measure of interpersonal antipathy. Students were asked "Which students in your grade-level do you like the least? You can name up to ten students from your grade-level."

Perceived Peer Groups

Our new measure of the salience of ethno-racial boundaries among students was inspired by Social-Cognitive Mapping (Cairns, Perrin, and Cairns 1985; Cairns, Gariepy, and Kindermann 1990; Kindermann 1996, 2007).[1] Students were asked whether there are "groups or cliques of students" in their school grade who are "hanging out together" or spend time together during breaks. Students were then asked who belonged to the first group or clique, the second group or clique, et cetera. Students could list up to five groups and assign up to 10 members (including themselves). As shown in Table 1, 2323 out of 2999 respondents—which amounts to 77% (cf., Kindermann 2007)—provided information on 4905 perceived cliques. Only 5% listed five peer groups, indicating the appropriateness of this cut-off.

In addition, students were asked to describe the perceived groups: "Can you give this clique or group a name or describe it?" 1849 students (i.e., 62% of the full sample) reported at least one qualitative peer group description, producing a total of 3716 peer group descriptions. Open answers were sorted into a scheme of categories by four members of the research team (student assistants or PhD students). The initial scheme of 13 categories was improved in an iterative process in which we assessed the inter-rater reliability (Fleiß's Kappa) based on samples of clique descriptions. The raters' decisions whether a clique description falls under

Table 1: Number of perceived cliques reported by students.

	Number of students	Share of students
Students who named…		
No clique	676	0.23
1	925	0.31
2	676	0.23
3	359	0.12
4	206	0.07
5 cliques	151	0.05

a particular category (e.g., entails an ethno-racial connotation) were aggregated as follows: we coded the occurrence of a category only if three out of the four raters indicated that a clique description entailed the respective category. When consensus was too low, the category got adapted. After three rounds, the scheme had converged to 19 categories, all of which had a Kappa value higher than 0.5 (most of them higher than 0.7).

In our analyses, we investigate which characteristics of grades, cliques, and students are associated with the occurrence of ethno-racial labeling.

Other Individual-level Characteristics

Gender: We control for gender in all our statistical analyses as students who report the same gender are much more likely to be friends (e.g., McFarland et al. 2014; Smith et al. 2016). Moreover, previous research suggests gender differences in the perception of social networks (e.g., Brashears and Quintane 2015; Neal, Neal, and Cappella 2016).

Classroom membership: Network research stresses the importance of foci for interaction—i.e., places in which actors meet repeatedly which elevates the likelihood to form social relationships (Feld 1981). School classes are crucial foci for interaction in school and we therefore follow previous studies in accounting for classroom membership in our network analyses (e.g., Wittek et al. 2020).

Ethnic identification: Previous research illustrated the relevance of identification with the country of origin and the host society for network processes and the emergence of ethnic boundaries (Kruse and Kroneberg 2019; Leszczensky and Pink 2019). We constructed a measure of ethnic identification by combining five items asking for students' attachment to their country of origin into a normalized sum score ranging from 1 to 5 (similar to Leszczensky and Pink 2019). For ethnic majority students, the items referred to Germany. The five items are "Belonging to Germany/my family's country of origin is an important part of who I am."; "I am happy to belong to Germany/my family's country of origin."; "It bothers me if somebody speaks ill about Germany/my family's country of origin"; "I feel strongly attached to Germans/people from my family's country of origin"; and "I feel like I am part of Germany/my family's country of origin." Students answered on five-point scales ranging from "does not apply at all" to "neither nor" to "fully applies." Cronbach's alpha was 0.88 among students with a migration background and 0.83 among ethnic

majority students, suggesting a strong consistency of the items.

Religious denomination: To examine ethno-racial labeling against a particularly visible and contested religious minority group in Europe, we use a binary measure of religious denomination that distinguishes between Muslim (1) and non-Muslim students (0).

Grade-level Characteristics

Ethnic identity of students with a migration background (grade-level): To probe for the statistical association between the ethnic identification of the student body and the use of ethno-racial labels, we include the mean ethnic identification of students with a migration background as a grade-level characteristic.

Share of students with a migration background (grade-level): Similarly, we include the share of students with a migration background as control variable as past research suggests that the demographic composition of contexts influences ethnic segregation in friendships (Smith et al. 2016; Wittek et al. 2022).

Immigrant ethnic diversity (grade-level): We use the inverse Hirschman-Herfindahl index to measure the ethnic diversity among all students with a migration background in a grade (cf., Smith et al. 2016).

Share of female students (grade-level): We control for the share of female students in a grade as compositional characteristics on the grade-level can alter network processes (e.g., McFarland et al. 2014).

School type: We account for the different types of secondary school in Germany's stratified school system using a set of dummy variables: Lower secondary, comprehensive, and Middle schools. The reference category was "Gymnasium" (i.e., upper secondary schools).

Clique-level Characteristics

Size of clique: We control for the size of a reported clique as larger cliques may be more visible and receive more labels in general.

Share of female students: We control for the share of female students in a clique as gender is a relevant attribute in peer processes (e.g., Adler and Adler 1998; Eder et al. 1995).

Share of students with a migration background: We included a measure for the share of students with a migration background also on the clique level, as cliques with a higher share of students with a migration background should be more prone to receive an ethno-racial label.

Number of ethnic groups in clique: To capture the ethnic diversity of cliques, we counted the number of different migration backgrounds occurring in a clique. We decided not to use the Hirschman-Herfindahl index because this measure is strongly related to measures of ethnic concentration in majority settings (Koopmans and Schaeffer 2015), and the version of the index that measures only the ethnic diversity of the migrant group is often not applicable on the clique level as many cliques consist only of German students. Therefore, we decided to use the basic count measure for the total number of different ethnic backgrounds per clique.

Ethnic identification of clique: As cliques composed of students who strongly identify

with their country of origin may be more likely to receive ethno-racial labels, we calculated the mean ethnic identification on the clique level. For native majority students, we used the national identification as German.

Share Muslim students: We aggregated individuals' religious denomination into a measure that depicts the share of Muslim students per clique.

Descriptive statistics for our main variables are provided in Table A1 in the online supplement.

Methods

Our analysis is divided into three steps. First, we examine how frequently students use ethno-racial labels, absolutely and relative to other types of categories. Moreover, we estimate regression models to explore which individual-, clique-, and grade-level characteristics are associated with the use of ethno-racial labels. Second, we estimate network models for friendship and dislike ties to replicate results of previous research on the role of ethnic origin for network formation in the school setting. Finally, we bring both parts together by investigating whether ethnic homophily in friendships and ethnic heterophobia in dislike ties are associated with the occurrence of ethno-racial labels.

Regression Models

To explore which individual-, clique-, and grade-level characteristics are associated with the use of ethno-racial labels, we estimate a linear probability model and a rare events logistic regression model. In both models, we account for the hierarchical structure of the data by estimating cluster-robust standard errors at the highest level (i.e., the school grade). The linear probability model has the advantage of being easier to interpret as its coefficients directly refer to the probability scale. The rare events logistic regression model addresses a potential bias in the coefficients of standard logistic regression which can underestimate the probability of rare events in finite samples (King and Zeng 2001).

Network Models

We apply exponential random graph models (ERGMs) to model the structure of friendship and dislike ties. The ERGM framework is a versatile and process-oriented approach that starts with the assumption that ties are formed randomly and then assesses whether additional parameters enhance the model. Network structure itself is treated as the dependent variable and researchers specify parameters reflecting local network structures—such as the number of ties among same-ethnic students or the number of triads—to approximate the overall structure of an empirical network (Goodreau, Kitts, and Morris 2009; Lusher, Koskinen, and Robins 2013; Martin 2020). Hence, estimates indicate whether a particular local structure is helpful in recreating the overall structure of a network. Although we adopt common terminology in describing these estimates as "effects," we note that our analysis is descriptive, not causal.

Mirroring previous network studies, we use ERGMs to derive residual measures of ethnic homophily and ethnic heterophobia (Boda and Néray 2015; Goodreau et al. 2009; Grund and Densley 2015; Kruse and Kroneberg 2019; Leszczensky and Pink 2019; Moody 2001; Smith et al. 2016; Wimmer and Lewis 2010; Wittek et al. 2020). Like other network models, ERGMs allow analysts to account for the opportunity structure of tie formation (Blau 1977), endogenous network processes (McFarland et al. 2014), foci of interaction (Feld 1981), and other actor attributes (e.g., gender), that could confound the role of ethnic origin for network structure (McPherson et al. 2001).

We oriented our model specifications as closely as possible at previous accounts (Boda and Néray 2015; Smith et al. 2016; Wittek et al. 2020). Following an iterative modelling strategy that is typical for network studies (see e.g., Wimmer and Lewis 2010), we estimated a range of different model specifications and deviated from specifications used by previous research only if this led to considerable improvements of convergence and goodness of fit (GOF).

Structural effects: All ERGM specifications include the edges term, that counts all empirically observed ties and thereby accounts for the overall probability of a friendship or dislike tie. In addition, all models include the mutual term which represents the tendency to reciprocate ties—for example, if A reports a friendship with B, it is also likely that B reports a friendship with A. To capture actors' activity and popularity levels, we added the geometrically weighted in- and out-degree terms (GWIDEG and GWIODEG) in EGRMs for friendship networks and the geometrically weighted in-degree term in dislike networks (Hunter 2007).[2] Moreover, we included the geometrically weighted edgewise shared partner (GWESP) term in all models. This term accounts for transitivity in network formation, for example, as actors tend to form friendship ties with friends of friends (for applications and a detailed description of the term, see Smith et al. 2016; Wimmer and Lewis 2010).[3]

Actor attributes: The main parameters of interest in our ERGM specifications are terms capturing *ethnic homophily* in friendships and an analogously measured tendency for intra- versus inter-ethnic dislike ties. Therefore, we included terms that are based on count statistics of ties between students categorized as belonging to the same-ethnic group. Hereby, the total number of cross-ethnic ties serves as a reference. Note that a positive estimate of the *same-ethnic* term indicates ethnic homophily in friendship networks and a negative estimate for the *same-ethnic* term signals the presence of ethnic heterophobia in dislike networks. Moreover, all specifications control for the greater likelihood of ties between students who report the *same gender* or visit the *same class*.

Results

Perceived Peer Groups and Ethno-racial Labels

We first examined how often students used ethno-racial labels to describe perceived cliques in their school grade. Table 2 is based on the subsample of students who reported at least one qualitative clique description. For all categories of our rating scheme, it depicts the shares of students who used this type of label to describe

Table 2: Use of different categories of clique labels.

Category	Absolute occurrences	Relative to students who provided at least one qualitative clique description
Neighborhood	16	0.86%
SES	21	1.13%
Extrovert	41	2.20%
Introvert	43	2.31%
Low peer status	56	3.01%
Ethno-racial	61	3.28%
Gossip	96	5.16%
Outside school	181	9.73%
Aggression	189	10.16%
Crazy	228	12.26%
Cool	260	13.98%
Uncodeable	282	15.16%
Gender	305	16.40%
Negative	311	16.72%
Funny	329	17.79%
Positive	393	21.13%
Hobby	491	26.40%
Talk	742	39.89%
Unspecific	987	53.06%

one or more cliques. The most frequently used categories are unspecific activities, talking, and hobbies. Most students who provided a clique description used the "unspecific" category—that is, they described the clique members to "hang around", "chill out", "walk across the schoolyard," or engage in similar generic activities.

Table 2 shows that students rarely used categories usually associated with sociological inquiry, such as ethno-racial or socio-economic status (SES) labels. In total, 61 students used an ethno-racial label. In relative terms, this corresponds to 3.28% of all students who provided at least one qualitative clique description. Ethno-racial labels were neither among the five least frequently used labels—neighborhood (0.86%), SES (1.13%), extrovert (2.20%), introvert (2.31%), low peer status (3.01%)—nor among the five most frequent categories of labels—funny (17.79%), positive (21.13%), hobby (26.40%), talk (39.89%), unspecific (53.06%).

We provide all clique descriptions that were classified as containing an ethno-racial label in Table A2 in the online supplement. Most frequently, the students described cliques in ethno-racial terms using some lexical variant of the word Kanake (n = 37). In Germany, *Kanake* was originally used as a swear word for racialized people, mostly of Turkish origin. However, having been taken up in popular culture such as rap music and fiction books, the term is meanwhile also used by the children and grandchildren of immigrants in a self-empowering way to articulate their own identities (von Rath and Gasser 2021; Özbek 2017). Other ethno-racial labels include *foreigners, Turks, Nafris* (attributing a migration background from North Africa), or national origin labels, such as *Russians* or *Moroccans*.

One possible concern is that the rare use of ethno-racial labels may partly reflect underreporting, as open discussions of race and ethnicity may be regarded a taboo in some segments of German society (Juang et al. 2021). We therefore examined its prevalence across subsamples that should differ with regard to political correctness or social desirability. Reassuringly, we found no evidence that ethno-racial labels were used significantly more often in lower types of secondary schools which tend to be characterized by a lower socio-economic composition and lower academic orientation (Allmendinger 1989; Schindler 2017). Likewise, ethno-racial labels were not used less often by students who strongly agreed with cosmopolitan statements ("I am happy when I meet people from other countries." and "The country a person comes from does not matter to me."). These robustness checks are reported in more detail in online supplement A3.

Correlates of Ethno-racial Labels

To explore the correlates of students' use of ethno-racial labels at the individual, clique, and grade-level, we estimated regression models of the occurrence of an ethno-racial label in a clique's description. Table 3 shows that the linear probability model and the rare events logistic regression model produce substantively identical results.[4] Ethno-racial labels are more often employed by male students and by ethnic minority students. Most characteristics of the school grade are not associated with ethno-racial labeling, which is not surprising given that we control for characteristics of their students and perceived cliques.

At the perceived clique level, several characteristics of the reported clique members are systematically related to the use of ethno-racial labels. We find that ethno-racial labels are more likely directed at cliques that are larger. In contrast, neither the share of minority students nor their ethnic homogeneity seems not to matter much above and beyond the other clique characteristics. Although the coefficient for the number of different ethnic origins in a clique is negative, it is close to zero and not significant. As expected, ethno-racial labeling becomes more likely, the higher the share of Muslim students among the reported members of a perceived clique and the stronger the ethnic identification among the clique members. According to the linear probability model, the probability to receive an ethno-racial label is 4.4 percentage points higher if all perceived clique members are Muslim compared to a clique with no Muslim students. Comparing cliques in which all members identify in the strongest possible way with their ethnic origin with cliques in which they do not identify at all, the former are about three percentage points more likely to be labeled in ethno-racial terms (4 steps on the five-point scale * 0.7 percentage points).

To illustrate these last two associations, Figure 1 depicts all cliques, plotting the mean ethnic identification of reported clique members against the share of Muslim students in a clique. The curve is based on bivariate, locally weighted regressions (i.e., LOWESS scatterplot smoothing curves) and shows that both clique characteristics are positively related. Most importantly for our analytic interests, we see that cliques that receive an ethno-racial labels (marked in red) cluster in the upper right-hand area of the Figure. Hence, majority Muslim cliques with a high

Table 3: Regression models of the occurrence of ethno-racial labeling of cliques.

	M1: Linear Probability Model	M2: Logistic Rare Event Model
Constant	−0.04	−8.53
	−(0.09)	(4.72)
Grade characteristics		
School type (Ref.: upper secondary)		
Lower secondary	−0.02*	−0.87
	(0.010)	(0.76)
Comprehensive	0.004	0.27
	(0.006)	(0.40)
Intermediate secondary	0.006	0.25
	(0.008)	(0.41)
Size of grade/100	−0.007	−0.01)
	(0.010)	(0.80)
Share of female students	0.016	0.23
	(0.04)	(2.28)
Share of minority students	−0.019	−1.37
	(0.020)	(1.20)
Smith HHI student body	0.009	−0.24
	(0.072)	(3.29)
Student characteristics		
Female	−0.014*	−1.14*
	(0.006)	(0.52)
Migration background	0.010*	1.21
	(0.004)	(0.68)
Ethnic identification	0.002	0.15
	(0.002)	(0.22)
Clique characteristics		
Size of reported clique	0.003*	0.18
	(0.001)	(0.10)
Share of female students	0.001	0.10
	(0.001)	(0.40)
Share of minority students	0.005	−0.05
	(0.009)	(1.06)
Number of different ethnic groups	−0.004	−0.19
	(0.003)	(0.15)
Share of Muslim students	0.044†	2.13†
	(0.012)	(0.67)
Mean ethnic identification	0.007*	0.94*
	(0.003)	(0.45)
Adjusted R^2	0.028	− − −
$N_{Students}$	1804	1804
N_{Grades}	39	39
$N_{Cliques}$	3612	3612

Note: * $p < 0.05$ † $p < 0.01$ (two-sided). Both models use cluster-robust standard errors at the level of schools. M1 was estimated using OLS. M2 was fitted using STATA's relogit module (Tomz, King, and Zeng 2003). There is no adjusted R2 value for M2 as relogit models are not based on likelihood estimation.
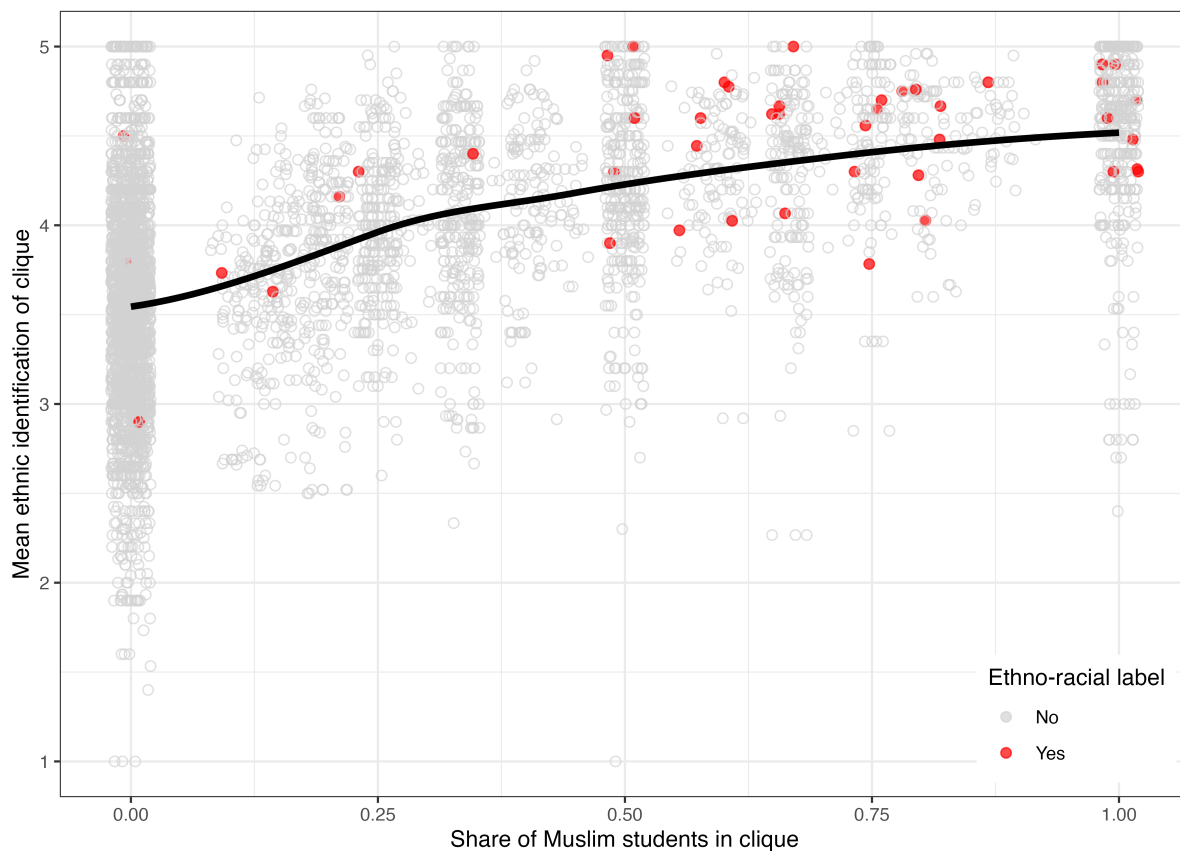
Figure 1: Share of Muslim students, mean level of ethnic identification, and ethno-racial labeling across reported cliques. *Note*: The curve is based on locally weighted scatterplot smoothing (LOWESS).

level of ethnic self-identification are most likely to be labeled in ethno-racial terms. Still, Figure 1 also shows that such labels are rarely employed even in their case.

Ethno-racial Labels and Social Networks

To answer the question of whether net ethnic segregation in students' social networks is associated with a more frequent use of ethno-racial labels, we estimated net ethnic segregation using social network analysis. We hereby focused on both net ethnic segregation in friendships ("ethnic homophily") and the net tendency to dislike ethnic out-group members ("ethnic heterophobia").

Table 4 summarizes the average strength of these tendencies across grade-level networks. The coefficients are based on a meta-analysis of ERGMs estimated for each of the 39 grade-level networks. In line with previous research, we find significant tendencies for "ethnic homophily" and "ethnic heterophobia" across schools (Boda and Néray 2015; Kruse and Kroneberg 2019; Leszczensky and Pink 2019; Smith et al. 2016; Wittek et al. 2020). The first tendency is captured by the positive and statistically significant same-ethnic parameter for friendship networks

Table 4: Meta-analyses of network models for friendship and dislike networks.

ERGM parameters	Friendship		Dislike	
	beta	*Q*	*beta*	*Q*
Edges	−5.33†	216.05†	−3.57†	216.33†
	(0.02)		(0.02)	
Mutual	2.00†	134.44†	0.74†	80.60†
	(0.03)		(0.05)	
GWODEG	1.61†	90.77†		
	(0.09)			
GWIDEG	1.16†	64.71†	−1.21†	245.49†
	(0.07)		(0.04)	
GWESP	0.87†	208.30†	0.53†	286.17†
	(0.01)		(0.01)	
Same class	0.62†	332.40†	1.07†	485.90†
	(0.01)		(0.02)	
Activity female	0.02	59.12†	0.07†	108.73†
	(0.02)		(0.02)	
Popularity female	−0.02	52.06∗	−0.17†	102.60†
	(0.05)		(0.03)	
Same gender	0.56†	173.70†	0.06†	139.27†
	(0.01)		(0.02)	
Same-ethnic	0.16†	124.46†	−0.14†	96.48†
	(0.01)		(0.02)	
AIC	643.65		1913.35	
N$_{Grades}$	36		38	
GOF	90%		90%	

Note: ERGM coefficients are weighted by their variance covariance matrix and combined in a fixed effects meta-analysis (for details, see An 2015). * $p < 0.05$ † $p < 0.01$ (two-sided).

which indicates that peers belonging to the same-ethnic group are more likely to form a friendship tie. The second tendency is measured by the negative and significant same-ethnic parameter for dislike networks, pointing to more dislike between than within ethnic groups (i.e., "ethnic heterophobia"). These results indicate that friendship ties and dislike relations are structured by ethnic origin, above and beyond the other mechanisms of tie formation accounted for in the ERGMs, which include key aspects of the opportunity structure, other bases of homophily, as well as basic endogenous network processes.

We also find that estimates for ethnic homophily and heterophobia show significant variation across school grades. In Table 4, this is indicated by the significant Q statistics which are based on Cochran Q-tests of the null hypothesis that a parameter does not differ between networks. This finding of significant variation in the extent to which ethnic origin structures social networks varies across contexts is again in line with previous research (Smith et al. 2016; Wittek et al. 2020). In the next step, we focus on this variation across contexts and ask whether net segregation along ethnic lines is related to the use of ethno-racial labels.

Table 5: OLS regression predicting the percentage of students using ethno-racial labels.

	Friendship		Dislike	
Constant	3.33†	2.85∗	3.27†	2.91∗
	(0.63)	(1.28)	(0.61)	(1.22)
Net ethnic homogeneity of ties	−0.40	−1.27	−0.44	−0.63
	(0.64)	(1.01)	(0.62)	(0.69)
Controls		Yes		Yes
Adj. R-squared	0.11	0.136	0.013	0.13
N_{Grades}	37	37	38	38

 Note: The outcome variable is measured in percentage points. Models control for the size of network, the type of secondary school (lower secondary, comprehensive, middle secondary; Ref.cat.: upper secondary), share of migrants, HHI immigrants only, and the share of female students. * $p < 0.05$ † $p < 0.01$ (two-sided).

While past research interpreted ethnic net segregation as evidence for the presence of ethnic boundaries, our measure of clique perceptions allows us to assess whether network-based estimates of ethnic homophily and heterophobia are associated with a more frequent use of ethno-racial labels. Figure 2 depicts how estimates of ethnic homophily (Figure 2a) and ethnic heterophobia (Figure 2b) are related to the share of students in a school grade who used ethno-racial labels to describe one or more cliques. We calculated average marginal effects to enhance comparability of estimates across networks (see Duxbury 2021).

As is evident from the figure, there is no bivariate relationship between the ethnic net segregation of networks and the use of ethno-racial labels. Remarkably, even in the two school grades that exhibit roughly two standard deviations more ethnic homophily in friendship networks compared to an average grade, ethno-racial labels were not used by a single student (see the upper panel of Figure 2). Conversely, the grade with the highest usage of ethno-racial labels (16% of the student body) exhibits below-average ethnic homophily in friendships. The bottom panel of Figure 2 also shows no association, although previous scholarship would suggest ethno-racial boundaries are more salient in school grades marked by more inter-personal dislike across ethnic groups.

Regression analyses confirm this picture. Table 5 reports the results of linear models that predict the percentage of students who used ethno-racial labels on the grade-level. Again, the network-based estimates of net ethnic homogeneity in friendships and dislike (z-standardized average marginal effects) are not significantly related to the use of ethno-racial labels. This holds both bivariately and when controlling for basic grade-level predictors.

To summarize, we found no association between the frequency of ethno-racial labels in clique descriptions and network-based measures of ethnic homophily or heterophobia that have commonly been interpreted as indicating the presence of ethnic boundaries in previous research.[5]
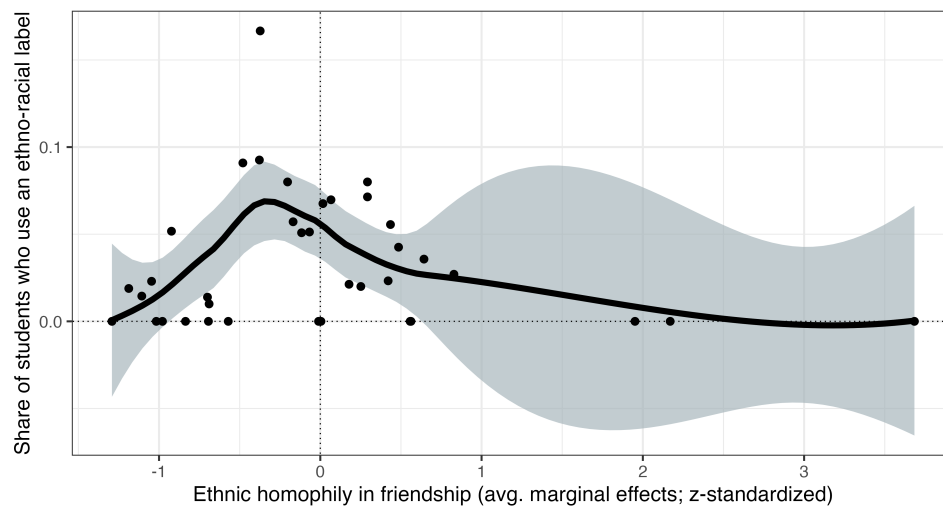
(a) Dislike
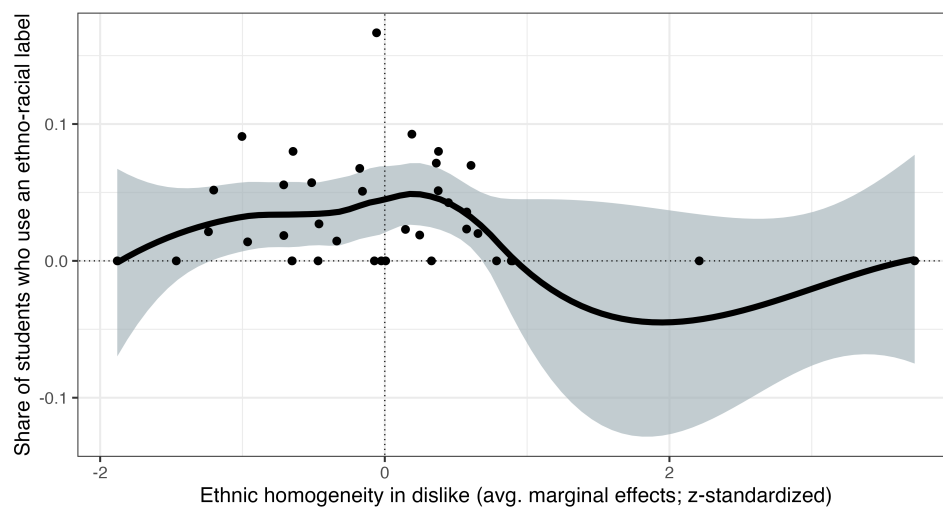
(b) Friendships

Figure 2: Associations between net ethnic segregation in friendship and dislike networks and the use of ethno-racial labels. *Note*: In Panel A, positive values on the x-axis indicate above average ethnic homophily in a grade's friendship network. In Panel B, negative values on the x-axis indicate above average ethnic heterophobia in a grade's dislike network (i.e., less clustering of inter-personal dislike inside ethnic groups). The curves and 95% confidence intervals are based on locally weighted scatterplot smoothing (LOWESS).

Discussion and Conclusions

Research on social networks in educational settings has shown that friendships tend to be more frequent between same-ethnic students than across ethnic divides, even after accounting for a wide range of confounding factors. This pattern of ethnic net

segregation has commonly been interpreted as ethnic homophily and assumed to be associated with salient ethnic boundaries, which may lead to increased prejudice, threat perceptions, or even intergroup hostility (e.g., Durkin et al. 2012, Smith et al. 2016, Walsh et al. 2016). However, this fundamental assumption has rarely been tested.

Whereas the risk to over-interpret ethnic net segregation has been noted before (e.g., Wimmer and Lewis 2010, Schaefer 2018, Schaefer and Kreager 2020), our study addressed this issue empirically. In a network study of more than 3,000 students in 39 schools of an urban region in Germany, we asked students to indicate which cliques they perceive in their school grade and to describe these groups in their own words. We argued that, to the extent that a school grade is characterized by salient ethnic boundaries, ethnic origin should not only be relevant for tie formation at the dyadic level, but students should be more likely to perceive of cliques in ethno-racial terms.

Our findings suggest that ethno-racial labels are rarely employed: Only 3.28% of all students who provided at least one clique descriptions used an ethno-racial label. This was true although our meta-analyses of grade-level network models revealed a net ethnic segregation in friendships ("ethnic homophily") as well as a net tendency to dislike ethnic out-group members ("ethnic heterophobia"). However, in contrast to common interpretations, both patterns were not associated with a more frequent use of ethno-racial labels across school grades. Further analyses revealed that larger cliques with a higher share of Muslim students or more students with strong ethnic identification were more likely to receive ethno-racial labels. However, these associations were rather weak and the use of ethno-racial labels was exceptional also in their case.

Our results call on scholars of social networks and diversity in educational settings to re-think their assumptions about the nature of ethnic segregation in students' social networks. This conclusion seems even more justified as our findings add to recent studies that found "ethnic homophily" in Western European schools to be less detrimental to inter-ethnic relations than often assumed (Al Ramiah et al. 2015; Kros et al. 2021; Wittek et al. 2020).

Still, there are several limitations to our study that need to be acknowledged and that point to important directions for future research. First, we cannot rule out that our novel measure of ethnicized group perceptions underestimates the prevalence and relevance of ethno-racial categories. To be sure, our robustness analyses suggest that the rare use of ethno-racial labels in our sample is not mainly driven by social desirability (see online supplement A3). However, it may be that such labels become accessible and articulated only after more intensive interviewing and processing, because they are secondary modes of classification, at least in the German context (Juang et al. 2021). Future studies may therefore turn to a different, complementary research design that uses multi-site ethnography or in-depth interviewing at selected schools where social network analyses suggest high or low levels of "ethnic homophily." Such mixed-methods studies (Small 2011) would also help to overcome the bifurcation of the study of ethnic boundary-making into large-scale objectivist and small-scale qualitative analyses. Another possibility to extend our approach would be to ask students to write longer paragraphs on each

clique and also to list all perceived members of each clique. This way, one could use recent advances in computational techniques of natural-language processing to identify memberships in broader categories (Hannan 2022). Note, however, that the higher demands for respondents and longer required questionnaire time would require incentivizing the identification and labeling of cliques in a grade or limiting this task to smaller units, such as school classes.

Second, similar to related social network studies that probed new ways of capturing ethnic boundary-making (Boda and Néray 2015; Leszczensky and Pink 2019; Wimmer and Lewis 2010), our analyses are based on a regional sample. It therefore remains to be seen to what extent our findings generalize to other regions and countries. In particular, our study was situated in a highly diverse and urban region with a long history of immigration. Practices of "othering" minority students might be more pronounced in regions where the mainstream has been ethnically more homogenous or is more dominant (Boda 2018; Kruse and Kroneberg 2019).

Given these possibilities, we do not claim that our study demonstrates in a definite way that ethnic homophily or ethnic heterophobia are not indicative of salient ethnic boundaries. Rather, our study is meant to stimulate a reflection and discussion on standards of evidence. The coupling between a residual-based measure of "ethnic homophily" and theoretical interpretations based on threat theory, social identity theories, and other approaches has been too loose. As social scientists, we should use a more comprehensive set of indicators before we diagnose that a school context is characterized by salient ethnic boundaries. Beyond different tie formation tendencies, such indicators should include attitudes towards students of different origin as well as measures of the strength and prevalence of ethno-racial self-identification and group categorizations (Brubaker 2004; Jenkins 2008; Wimmer 2008, 2009).

In addition to the empirical agenda of combining different traces of salient ethnic boundaries, scholars should also engage with the theoretical question "Salient for whom?" Attributing high salience of ethnic boundaries to entire school grades ignores that wide segments of the student body may not define themselves or others primarily in ethno-racial terms. It therefore seems more adequate and fruitful to approach this question at the level of friendship cliques and examine the conditions under which these self-define or become categorized in ethno-racial terms and what consequences this may have for tie formation in the wider network.

In closing, we would like to underscore Rogers Brubaker's (2002, 2004) warning that our reliance on ethnic groups as self-evident units of analysis may often reflect the success of ethnopolitical entrepreneurs who promote these categories and associated narratives to achieve their political goals. Consequently, social scientists may be "unjustifiably seeing ethnicity everywhere at work" reflecting a " 'coding bias' in the ethnic direction" (Brubaker 2002: 174). For the case of schools, our analysis suggests that researchers may invoke these categories in their interpretation of results although students themselves do not perceive their peer environment through an ethnic lens.

Notes

1 Despite their similarity, these measures serve different analytical aims. Whereas Social-Cognitive Mapping has been devised to measure objectively existing cliques—with the students serving as raters—, our interest was in the contextual prevalence of ethno-racial labels towards perceived peer groups (irrespective of the degree to which the existence of these peer groups can be objectively ascertained). Hence, our boundary-making perspective leads us to adopt both a more subjectivist and contextual perspective on perceived peer groups.

2 The geometrically weighted out-degree term led to convergence issues in all but two dislike networks and was therefore excluded from our specifications.

3 To ease comparison between models, we fixed the alpha parameter of all geometrically weighted parameters to one (Kruse et al. 2016; Wittek et al. 2020).

4 At the suggestion of a reviewer, we also estimated logistic multilevel models as a different way to account for the clustering of both students in schools and perceived cliques in reporting students. While convergence proved difficult given the rare-events character of our outcome variable, signs and significance of the coefficients were again substantively identical to the models reported in Table 3.

5 Additional analyses showed that the frequency of ethno-racial labels in clique descriptions is also unrelated to gross segregation in friendship and dislike networks, as measured by Moody's (2001) alpha index of network segregation.

References

Adler, Patricia A., and Peter Adler. 1998. Peer Power: Preadolescent Culture and Identity. New Brunswick, N.J: Rutgers University Press.

Agirdag, Orhan, Jannick Demanet, Mieke van Houtte, and Piet van Avermaet. 2011. "Ethnic school composition and peer victimization: A focus on the interethnic school climate." *International Journal of Intercultural Relations* 35(4):465–73. https://doi.org/10.1016/j.ijintrel.2010.09.009

Al Ramiah, Ananthi, Katharina Schmid, Miles Hewstone, and Christina Floe. 2015. "Why Are All the White (Asian) Kids Sitting Together in the Cafeteria? Resegregation and the Role of Intergroup Attributions and Norms." *The British journal of social psychology* 54(1):100–24. https://doi.org/10.1111/bjso.12064

Allmendinger, Jutta. 1989. "Educational systems and labor market outcomes." *European Sociological Review* 5(3):231–50. https://doi.org/10.1093/oxfordjournals.esr.a036524

Baerveldt, Chris, Marijtje A. van Duijn, Lotte Vermeij, and Dianne A. van Hemert. 2004. "Ethnic boundaries and personal choice. Assessing the influence of individual inclinations to choose intra-ethnic relationships on pupils' networks." *Social Networks* 26(1):55–74. https://doi.org/10.1016/j.socnet.2004.01.003

Baldassarri, Delia, and Maria Abascal. 2020. "Diversity and Prosocial Behavior." *Science* (New York, N.Y.) 369(6508):1183–87. https://doi.org/10.1126/science.abb2432

Ball, Brian, and Mark E.J. Newman. 2013. "Friendship networks and social status." *Network Science* 1(1):16–30. doi:10.1017/nws.2012.4.

Blau, Peter M. 1977. Inequality and Heterogeneity: A Primitive Theorie of Social Structure. London, New York: Collier Macmillan; Free Press.

Boda, Zsófia. 2018. "Social Influence on Observed Race." *Sociological Science* 5:29–57. doi:10.15195/v5.a3.

Boda, Zsófia, and Bálint Néray. 2015. "Inter-ethnic friendship and negative ties in secondary school." *Social Networks* 43:57–72. https://doi.org/10.1016/j.socnet.2015.03.004

Boda, Zsófia, Bálint Néray, and Tom A. B. Snijders. 2020. "The Dynamics of Interethnic Friendships and Negative Ties in Secondary School: The Role of Peer-Perceived Ethnicity." *Social Psychology Quarterly* 83(4):342–62. https://doi.org/10.1177/0190272520907594

Bojanowski, Michał, and Rense Corten. 2014. "Measuring segregation in social networks." *Social Networks* 39:14–32. https://doi.org/10.1016/j.socnet.2014.04.001

Brashears, Matthew E., and Eric Quintane. 2015. "The microstructures of network recall: How social networks are encoded and represented in human memory." *Social Networks* 41:113–26. https://doi.org/10.1016/j.socnet.2014.11.003

Bronfenbrenner, Urie. 1995. "Developmental ecology through space and time: A future perspective." Pp. 619–47, in Examining lives in context: Perspectives on the ecology of human development, edited by P. Moen, G. H. Elder, and K. Lüscher. Washington: American Psychological Association. https://doi.org/10.1037/10176-018

Brown, B. B. 1999. "Measuring the peer environment of American adolescents." Pp. 59–90, in Measuring environment across the life span: Emerging methods and concepts, edited by S. L. Friedman and T. D. Wachs. Washington: American Psychological Association. https://doi.org/10.1037/10317-003

Brubaker, Rogers. 2002. "Ethnicity without groups." *European Journal of Sociology* 43(2):163–89. doi:10.1017/S0003975602001066.

Brubaker, Rogers. 2004. Ethnicity without groups: Harvard University Press.

Brubaker, Rogers. 2014. "Beyond ethnicity." *Ethnic and Racial Studies* 37(5):804–08. https://doi.org/10.1080/01419870.2013.871311

Cairns, Robert B., Jane E. Perrin, and Beverley D. Cairns. 1985. "Social Structure and Social Cognition in Early Adolescence: Affiliative Patterns." *The Journal of Early Adolescence* 5(3):339–55. https://doi.org/10.1177/0272431685053007

Cairns, Robert B., Jean-Louis Gariepy, and Thomas Kindermann. 1990. "Identifying Social Clusters in Natural Settings." Unpublished Manuscript, University of North Carolina at Chapel Hill.

Carter, Prudence L. 2005. Keepin' it real: School success beyond black and white. New York: Oxford University Press (https://permalink.obvsg.at/).

Crabtree, Charles, Michael S. Gaddis, John B. Holbein, and Edvard N. Larsen. 2022. "Racially Distinctive Names Signal Both Race/Ethnicity and Social Class." *Sociological Science* (9):454–72. https://doi.org/10.15195/v9.a18

Dollmann, Jörg, Konstanze Jacob, and Frank Kalter. 2014. "Examining the diversity of youth in Europe: a classification of generations and ethnic origins using CILS4EU data (technical report)." (https://core.ac.uk/download/pdf/71743704.pdf).

Durkin, Kevin, Simon Hunter, Kate A. Levin, Dermot Bergin, Derek Heim, and Christine Howe. 2012. "Discriminatory peer aggression among children as a function of minority status and group proportion in school context." *European Journal of Social Psychology* 42(2):243–51. https://doi.org/10.1002/ejsp.870

Duxbury, Scott W. 2021. "The Problem of Scaling in Exponential Random Graph Models." *Sociological Methods & Research* 004912412098617. https://doi.org/10.1177/0049124120986178

Eder, Donna, Catherine C. Evans, and Stephen Parker. 1995. *School Talk: Gender and Adolescent Culture.* New Brunswick, NJ: Rutgers Univ. Press.

Erikson, Emily. 2013. "Formalist and Relationalist Theory in Social Network Analysis." *Sociological Theory* 31(3):219–42. https://doi.org/10.1177/0735275113501998

Feld, Scott L. 1981. "The Focused Organization of Social Ties." *American Journal of Sociology* 86(5):1015–35. https://doi.org/10.1086/227352

Fleischmann, Fenella, and Karen Phalet. 2018. "Religion and National Identification in Europe: Comparing Muslim Youth in Belgium, England, Germany, the Netherlands, and Sweden." *Journal of cross-cultural psychology* 49(1):44–61. https://doi.org/10.1177/0022022117741988

Fuhse, Jan A., and Neha Gondal. 2022. "Networks from culture: Mechanisms of tie-formation follow institutionalized rules in social fields." *Social Networks*. doi:10.1016/j.socnet.2021.12.005.

Goodreau, Steven M., James A. Kitts, and Martina Morris. 2009. "Birds of a Feather, or Friend of a Friend? Using Exponential Random Graph Models to Investigate Adolescent Social Networks." *Demography* 46(1):103–25. https://doi.org/10.1353/dem.0.0045

Grund, Thomas U., and James A. Densley. 2015. "Ethnic Homophily and Triad Closure." *Journal of Contemporary Criminal Justice* 31(3):354–70. https://doi.org/10.1177/1043986214553377

Hannan, Michael T. 2022. "Measuring Memberships in Collectives in Light of Developments in Cognitive Science and Natural-Language Processing." *Sociological Science* 9. https://doi.org/10.15195/v9.a19

Harrigan, Nicholas, and Janice Yap. 2017. "Avoidance in negative ties: Inhibiting closure, reciprocity, and homophily." *Social Networks* 48:126–41. https://doi.org/10.1016/j.socnet.2016.07.003

Helbling, Marc, editor. 2012. *Routledge advances in sociology, Islamophobia in the West: Measuring and Explaining Individual Attitudes*. Abingdon, Oxon, New York: Routledge (https://www.taylorfrancis.com/books/9781136900808).

Hunter, David R. 2007. "Curved Exponential Family Models for Social Networks." *Social Networks* 29(2):216–30. https://doi.org/10.1016/j.socnet.2006.08.005

Jenkins, Richard. 2008. *Rethinking Ethnicity: Arguments and Explorations.* Los Angeles: Sage.

Juang, Linda P., Ursula Moffitt, Maja K. Schachner, and Sharleen Pevec. 2021. "Understanding Ethnic-Racial Identity in a Context Where "Race" Is Taboo." Identity 21(3):185–99. https://doi.org/10.1080/15283488.2021.1932901

Kawabata, Yoshito, and Nicki R. Crick. 2011. "The Significance of Cross-Racial/ethnic Friendships: Associations with Peer Victimization, Peer Support, Sociometric Status, and Classroom Diversity." *Developmental psychology* 47(6):1763–75. https://doi.org/10.1037/a0025399

Kindermann, Thomas A. 1996. "Strategies for the Study of Individual Development within Naturally-Existing Peer Groups*." *Social Development* 5(2):158–73. https://doi.org/10.1111/j.1467-9507.1996.tb00078.x

Kindermann, Thomas A. 2007. "Effects of Naturally Existing Peer Groups on Changes in Academic Engagement in a Cohort of Sixth Graders." *Child development* 78(4):1186–203. https://doi.org/10.1111/j.1467-8624.2007.01060.x

Kindermann, Thomas A., and Scott D. Gest. 2009. "Assessment of the Peer Group: Identifying Naturally Occurring Social Networks and Capturing Their Effects." Pp. 100–17, In *Handbook of Peer Interactions, Relationships, and Groups*, edited by W. M. Bukowski, B. P. Laursen, and K. H. Rubin. New York, London: The Guilford Press.

King, Gary, and Langche Zeng. 2001. "Logistic Regression in Rare Events Data." *Political Analysis* 9(2):137–63. doi:10.1093/oxfordjournals.pan.a004868.

Kisfalusi, Dorottya, Judit Pál, and Zsófia Boda. 2020. "Bullying and victimization among majority and minority students: The role of peers' ethnic perceptions." *Social Networks* 60:48–60. https://doi.org/10.1016/j.socnet.2018.08.006

Koopmans, Ruud, and Merlin Schaeffer. 2015. "Relational Diversity and Neighbourhood Cohesion. Unpacking Variety, Balance and in-Group Size." *Social science research* 53:162–76. https://doi.org/10.1016/j.ssresearch.2015.05.010

Kroneberg, Clemens, Hanno Kruse, and Andreas Wimmer. 2021. "When Ethnicity and Gender Align: Classroom Composition, Friendship Segregation, and Collective Identities in European Schools." *European Sociological Review* 37(6):918–34. https://doi.org/10.1093/esr/jcab013

Kros, Mathijs, Eva Jaspers, and Maarten van Zalk. 2021. "Avoidance, antipathy, and aggression: A three-wave longitudinal network study on negative networks, status, and heteromisos." *Social Networks* 64:122–33. https://doi.org/10.1016/j.socnet.2020.08.006

Kruse, Hanno, and Clemens Kroneberg. 2019. "More Than a Sorting Machine: Ethnic Boundary Making in a Stratified School System." *American Journal of Sociology* 125(2):431–84. https://doi.org/10.1086/705561

Kruse, Hanno, Sanne Smith, Frank van Tubergen, and Ineke Maas. 2016. "From neighbors to school friends? How adolescents' place of residence relates to same-ethnic school friendships." *Social Networks* 44:130–42. https://doi.org/10.1016/j.socnet.2015.07.004

Leszczensky, Lars, and Sebastian Pink. 2019. "What Drives Ethnic Homophily? A Relational Approach on How Ethnic Identification Moderates Preferences for Same-Ethnic Friends." *American Sociological Review* 84(3):394–419. https://doi.org/10.1177/0003122419846849

Lorenz, Georg, Zerrin Salikutluk, Zsófia Boda, Malte Jansen, and Miles Hewstone. 2021. "The Link between Social and Structural Integration: Co- and Interethnic Friendship Selection and Social Influence within Adolescent Social Networks." *Sociological Science* (8):371–96. https://doi.org/10.15195/v8.a19

Lusher, Dean, Johan Koskinen, and Garry Robins. 2013. *Exponential Random Graph Models for Social Networks*: Cambridge University Press.

Martin, John L. 2020. "Comment on Geodesic Cycle Length Distributions in Delusional and Other Social Networks." *Journal of Social Structure* 21(1):77–93. https://doi.org/10.21307/joss-2020-003

McFarland, Daniel A., James Moody, David Diehl, Jeffrey A. Smith, and Reuben J. Thomas. 2014. "Network Ecology and Adolescent Social Structure." *American Sociological Review* 79(6):1088–121. https://doi.org/10.1177/0003122414554001

McPherson, Miller, Lynn Smith-Lovin, and James M. Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27(1):415–44. https://doi.org/10.1146/annurev.soc.27.1.415

Milner Jr., Murray. 2013. *Freaks, Geeks, and Cool Kids*: Routledge. https://doi.org/10.4324/9780203484838

Moody, James. 2001. "Race, School Integration, and Friendship Segregation in America." *American Journal of Sociology* 107(3):679–716. https://doi.org/10.1086/338954

Mouw, Ted, and Barbara Entwisle. 2006. "Residential Segregation and Interracial Friendship in Schools." *American Journal of Sociology* 112(2):394–441. https://doi.org/10.1086/506415

Neal, Jennifer W., Zachary P. Neal, and Elise Cappella. 2016. "Seeing and Being Seen: Predictors of Accurate Perceptions About Classmates' Relationships." *Social Networks* 44:1–8. https://doi.org/10.1016/j.socnet.2015.07.002

Özbek, Tülay. 2017. "Living in Germany as a Kanak: Some Thoughts About Nonbelonging." *Psychoanalytic review* 104(6):707–21. https://doi.org/10.1521/prev.2017.104.6.707

Schaefer, David R. 2018. "A Network Analysis of Factors Leading Adolescents to Befriend Substance-Using Peers." *Journal of Quantitative Criminology* 34(1):275–312. https://doi.org/10.1007/s10940-016-9335-4

Schaefer, David R., and Derek A. Kreager. 2020. "New on the Block: Analyzing Network Selection Trajectories in a Prison Treatment Program." *American Sociological Review* 85(4):709–37. https://doi.org/10.1177/0003122420941021

Schindler, Steffen. 2017. "School tracking, educational mobility and inequality in German secondary education: developments across cohorts." *European Societies* 19(1):28–48. https://doi.org/10.1080/14616696.2016.1226373

Small, Mario L. 2011. "How to Conduct a Mixed Methods Study: Recent Trends in a Rapidly Growing Literature." *Annual Review of Sociology* 37(1):57–86. https://doi.org/10.1146/annurev.soc.012809.102657

Smith, Sanne, Frank van Tubergen, Ineke Maas, and Daniel A. McFarland. 2016. "Ethnic Composition and Friendship Segregation: Differential Effects for Adolescent Natives and Immigrants." *American Journal of Sociology* 121(4):1223–72. https://doi.org/10.1086/684032

Thijs, Jochem, and Maykel Verkuyten. 2014. "School Ethnic Diversity and Students' Interethnic Relations." *The British journal of educational psychology* 84(1):1–21. https://doi.org/10.1111/bjep.12032

Tomz, Micheal, Gary King, and Langche Zeng. 2003. "ReLogit; Rare Events Logistic Regression." *Journal of Statistical Software* 8(2). doi:10.18637/jss.v008.i02.

van Loon, Austin, Amir Goldberg, and Sameer B. Srivastava. 2020. *Differences beyond Identity: Perceived Construal Distance and Interparty Animosity in the United States*. Stanford University, Graduate School of Business. Stanford University, Graduate School of Business (https://econpapers.repec.org/paper/eclstabus/3883.htm).

von Rath, Anna, and Lucy Gasser. 2021. "10 terms related to identities that require sensitivity in translation." Retrieved February 2, 2023 (https://www.goethe.de/ins/gb/en/kul/lue/art/art/22106974.html).

Walsh, Sophie D., Bart de Clercq, Michal Molcho, Yossi Harel-Fisch, Colleen M. Davison, Katrine R. Madsen, and Gonneke W. J. M. Stevens. 2016. "The Relationship Between Immigrant School Composition, Classmate Support and Involvement in Physical Fighting and Bullying Among Adolescent Immigrants and Non-Immigrants in 11 Countries." *Journal of youth and adolescence* 45(1):1–16. https://doi.org/10.1007/s10964-015-0367-0

Warikoo, Natasha, and Prudence Carter. 2009. "Cultural Explanations for Racial and Ethnic Stratification in Academic Achievement: A Call for a New and Improved Theory." *Review of Educational Research* 79(1):366–94. https://doi.org/10.3102/0034654308326162

Wimmer, Andreas. 2008. "The Making and Unmaking of Ethnic Boundaries: A Multilevel Process Theory." *American Journal of Sociology* 113(4):970–1022. https://doi.org/10.1086/522803

Wimmer, Andreas. 2009. "Herder's Heritage and the Boundary-Making Approach: Studying Ethnicity in Immigrant Societies." *Sociological Theory* 27(3):244–70. https://doi.org/10.1111/j.1467-9558.2009.01347.x

Wimmer, Andreas. 2013. *Ethnic Boundary Making: Institutions, Power, Networks*. Oxford: Oxford Univ. Press.

Wimmer, Andreas, and Kevin Lewis. 2010. "Beyond and Below Racial Homophily: ERG Models of a Friendship Network Documented on Facebook." *American Journal of Sociology* 116(2):583–642. https://doi.org/10.1086/653658

Wittek, Mark, Clemens Kroneberg, and Kathrin Lämmermann. 2020. "Who is fighting with whom? How ethnic origin shapes friendship, dislike, and physical violence relations in German secondary schools." *Social Networks* 60:34–47. https://doi.org/10.1016/j.socnet.2019.04.004

Zhao, Linda. 2023. "From Superdiversity to Consolidation: Implications of Structural Intersectionality for Interethnic Friendships." *American Journal of Sociology* 128(4):1114–57. https://doi.org/10.1086/723435

Clemens Kroneberg: Institute of Sociology and Social Psychology, University of Cologne. E-mail: c.kroneberg@uni-koeln.de.

Mark Wittek: Institute of Sociology and Social Psychology, University of Cologne. E-mail: wittek@wiso.uni-koeln.de.