

Studying systemic racism via attitudes and their functions among youth in friendship networks

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Abstract

The study of attitudes and their functions is essential to understand the systemic nature of racism and differential treatments of ethnic and religious minorities. Once attitudes are committed, they foster the segregation of social environments into cohesive bubbles with conflicting motivations and corresponding social norms. To promote sustainable changes in attitudes, it is necessary to understand how they are tied to motivations, and how they evolve in gradually expanding social environments. Research investigating how attitudes are formed and socialised, how motivational and contextual conditions determine the way they are used and expressed in differential treatments of ethnic- and religious minorities has seen a remarkable growth. However, changes in attitudes as well as motivational-, developmental- and systemic aspects of their functions have thus far not been investigated jointly. Thus, drawing on stochastic actor-oriented network models, we study the co-evolution of attitudes and values in the dynamic context of 21 childhood- and 68 adolescent friendship networks. We find that attitudes serving knowledge- or adjustment functions are adapted to secure access to frames of reference for their validation or to preserve social affiliations respectively. Moreover, we find that attitudes serving value-expression- and ego-defence functions are tied to conflicting values, and thus not only diverge in opposite directions, but also trigger selective exposure, a tendency that facilitates the segregation of friendship networks.

Keywords: Attitude change | Friendship network evolution | Stochastic actor-oriented network models | Children and adolescent networks

INTRODUCTION

Just like a pandemic that won't go away without a fight, racism and discrimination against ethnic- and religious minorities is a problem that has been haunting societies and circulating around the globe for centuries Quillian et al. 2017; Bertrand and Mullainathan 2004; Adida, Laitin, and Valfort 2010; Baldini and Federici 2011; Carlsson and Rooth 2007; Di Stasio et al. 2019. Moreover, just like a pathogen that keeps mutating, racist ideologies change in the way they are

manifested. Apart from overt forms, encompassing actions that openly display intentions to harm, oppress or offend ethnic- or religious minorities, and thus clearly identify as discriminatory offenses that are punishable by law, the currently most prevalent forms of racism are often more covert and subtle. Ethnic- and religious minorities are disenfranchised and experience differential treatment in many contexts, such as education Wenz and Hoenig 2020; Massey 2006, hiring and promotion McConahay 1983; Rydgren 2004, consumption Ayres and Siegelman 1995; Harris, Henderson, and Williams 2005, lending Williams, Nesiba, and McConnell 2005 and housing Yinger 1986; Logan, Stults, and Farley 2004, as well as policing Antonovics and Knight 2009 and incarceration Barnes and Motz 2018. The ubiquity and systemic nature of racism and discrimination that ethnic- and religious minorities face in these contexts facilitate the emergence and persistence of segregation based on occupations, career opportunities and residential areas Williams and Collins 2001. Meanwhile, disparate impacts are observed in both health- Cheadle et al. 2020; Cuevas et al. 2021; Sawyer et al. 2012; Hoffman et al. 2016 as well as financial- or human capital impairments Kraus, Rucker, and Richeson 2017; Sampson, Sharkey, and Raudenbush 2008; Tomaskovic-Devey, Thomas, and Johnson 2005; Legewie and Fagan 2019; Pager 2003 of ethnic- and religious minorities.

But what is racism, and what are the forces driving its emergence or persistence? According to Quillian 2006, racism is an ideology combining prejudices – predispositions to evaluate ethnic- or religious minorities in an unfavourable way – with motivations for subjects to put corresponding attitudes into action or inaction, in such a way that target groups experience differential treatment based on their ethnic- or religious affiliations or otherwise unjustified disparate impact.

The past decades have seen a remarkable growth in our understanding of attitudes. We have learned how they are formed and activated when subjects are exposed to perceptual stimuli Fazio 2007. Moreover, we understand how they are validated and adapted according to specific motivational- Feather 1990; Herek 1987 or contextual conditions Gawronski and Bodenhausen 2007; Conrey and Smith 2007; Petty, Briñol, and DeMarree 2007. There is also consensus among scholars that such conditions affect the way ethnic- and religious minority groups are linked to cognitive-, affective- and behavioural elements in associative networks, and thus determine how corresponding targets are evaluated Petty and Cacioppo 1986; Kruglanski et al. 2007. Ultimately, we also know how they are reflected, expressed or implied in subjects' differential treatments of ethnic- and religious minority groups Ajzen and Madden 1986 or in the selection and maintenance of their social environments Briñol and Petty 2009.

THEORETICAL FRAMEWORK AND HYPOTHESES

Despite the considerable body of research on the formation of partial or prejudiced attitudes, there is a growing interest in understanding potential reasons for their expression Kleppetø et al. 2019. However, in order to obtain a more comprehensive picture of the purposes, for which attitudes are being instrumentalized, several aspects require further investigation. According to Katz 1960, attitudes can serve four different purposes; value expression, ego-defence, knowledge- and adjustment. First, attitudes can be expressed to serve different purposes, depending on how values and associated motivational goals are prioritized across subjects who express them. Second, the purpose for expressing attitudes can also vary, depending on a subject's social environment, and thus determine the way they are used to mediate social relationships to the corresponding peers. Third, attitudes can also be expressed to serve different purposes, depending on a subject's stage of development Olson and Zanna 1993.

The motivational aspect of instrumentalizing attitudes is conceptualized according to the framework of basic human values S. H. Schwartz et al. 2012. Values are defined as cross-cultural and trans-situational goals, which vary in importance and serve as guiding principles or frames of reference for groups or in an individual's life Schwartz 1992; Skimina et al. 2018. They are structured according to dimensions that are cast in terms of motivational conflicts S. H. Schwartz et al. 2012, or the degree to which they are self-expansive or self-protective in nature. So the question of whether attitudes serve value-expression- or ego defense functions, and thus change in favour- or disfavour of ethnic- and religious minority groups may depend on the nature of values to which they are tied. In our framework, the way basic human values co-evolve with attitudes towards ethnic or religious minorities is modeled as the main effect of a time-dependent covariate. In a study investigating associations between basic human values and political attitudes towards immigrants among adult populations across 15 countries, Shalom H Schwartz et al. 2014 consistently found positive associations for self-expansion related values and negative associations for self-protection related values.

Hypothesis 1 (H1) *Attitudes change in favour or disfavour of ethnic- and religious minorities when they are tied to self-expansive- or self-protective values respectively.*

The systemic aspect of instrumentalizing attitudes is investigated based on the dual framework of informational- and normative social influence Deutsch and Gerard 1955 in friendship networks. Empirical research on informational social influence is manifold, and suggests that through inter-group friendships, youth can broaden their knowledge Goto and Chan 2005; Holmes et al. 1999; Robbins, Cooper, and Bender 1992, reduce anxiety Berrenberg et al. 2002; Levin, Van Laar, and Sidanius 2003; Paolini et al. 2004 or trigger empathy and perspective-taking Aberson and Haag 2007; Harwood et al. 2005; Vescio, Sechrist, and Paolucci 2003. Attitudes that serve the knowledge function are instrumentalized in order to preserve access to the corresponding frames of reference, both in an effort to understand their social environments, and to internalize motivations underlying attitudes that are expressed by their friends. To identify whether children's or adolescents' attitudes serve the knowledge function, and find out whether they change in favour- or disfavour of ethnic or religious minorities, our framework uses an effect that is known as "average alter covariate" to investigate how attitudes depend on the way basic human values are expressed among friends within their social environment on average.

Hypothesis 2a (H2a) *In social environments prioritizing self-expansive- or self-protective values, attitudes change in favour- or disfavour of ethnic- and religious minorities respectively.*

While children and adolescents are using attitudes serving the knowledge function as instruments to understand their social environment and internalize corresponding social norms, attitudes in the service of the adjustment function are instrumentalized to show compliance with social norms, and thus realize social rewards and avoid social sanctions. Empirical research on normative social influence is also abundant Roi et al. 2020; Leszczensky and Pink 2020, 2015. Our framework identifies "average similarity" as an effect that is perfectly designed to investigate the degree to which children's or adolescents attitudes are unconditionally aligned with those observed among their friends to find out whether attitudes are susceptible to normative social influence, and thus serve the adjustment function.

Hypothesis 2b (H2b) *Attitudes towards ethnic- and religious minorities are adjusted according to the way they are expressed among friends on average.*

The developmental aspect of instrumentalizing attitudes is conceptualized according to the framework of parental- and peer relationship transformation between children and adolescents Berndt 1979. During adulthood, the social environment is unlikely to operate beyond normative social influence, which may be trigger or inhibit the expression of attitudes, but their strong ties to the personality make them quite resistant to change. However, venturing out of the protected social environment of their families Shanahan 2000, children gradually shift their reference for the expression- and validation of personality features away from their parents in order to assert their independence De Goede et al. 2009; Fuligni and Eccles 1993. Thus, in a gradually expanding social environment, adolescents are not only exposed to a variety of stimuli from a growing number of socialization agents Orben, Tomova, and Blakemore 2020; Lam, McHale, and Crouter 2014, but are also quite susceptible to normative social influence Large et al. 2019; Rodman, Powers, and Somerville 2017, as their self-concepts or personalities continue to be explored.

Hypothesis 2c (H2c) *During adolescence, attitudes towards ethnic- and religious minorities are more aligned with friends than during childhood.*

Our objective is to understand the role motivational-, developmental- and systemic conditions play during the formation of partial- or prejudiced attitudes towards ethnic- and religious minorities among youth. In order to fully capture systemic conditions for the formation and change of attitudes towards ethnic- and religious minorities, we also need to investigate the formation and segregation of social networks McPherson, Smith-Lovin, and Cook 2001 in the multi-dimensional space of socio-economic and -cultural traits as well as evolving value- and attitude structures. Social networks are conceptualized on the basis of friendship ties Granovetter 1973 that reflect the amount of time corresponding peers are in contact, and thus exposed to each other's worldviews. At the local level, peers in the resulting networks are expected to show considerable preference for reciprocity or cohesion. At the global level, the number of peers' existing ties is expected to reinforce their sociability on the one hand, but on the other hand restrict their popularity.

Through the unique contexts of socialization they imply, socio-demographic characteristics could potentially play an important role in the segregation of social networks based on attitudes that are also being polarized through social influence among friends. According to social identity-Tajfel and Turner 1979 and inter-group contact perspectives Pettigrew and Tropp 2008, youth who belong to an ethnic- or religious minority, and youth who live in more privileged families or social environments that otherwise facilitate frequent inter-group contact have fewer prejudices than youth of the majority who live in less privileged or -culturally homogeneous social environments. Moreover, according to the social dominance perspective, girls or children who live in social environments that are predominantly female have fewer prejudices than boys or children who live in male-dominated social environments.

However, our framework suggests that none of these socio-demographic traits can better discriminate between partial and prejudiced attitudes towards ethnic or religious minorities than values. Once youth are committing to an attitude, they are trying to eliminate cognitive dissonance Izuma et al. 2010; Festinger 1962 by avoiding exposure to contradictory information, and thus spend most of their time in bubbles among peers with similar worldviews Lazarsfeld and Merton 1954; McPherson, Smith-Lovin, and Cook 2001 within their social environment. Empirical evidence can be found for both attitude- Leszczensky and Pink 2020 and value based homophily Kindschi et al. 2019. A segregation of this kind can reinforce the polarization of attitudes Leong et al. 2020, and thus create a conducive environment for systemic racism.

Hypothesis 3 (H3) *Social environments segregate according to members' attitudes towards ethnic- and religious minorities and values to which they are tied.*

DATA AND METHOD

Our study is designed as a longitudinal, three-wave panel. From October 2015 until December 2016, we commissioned three waves of surveys in both Switzerland and Poland. Each sample includes two cohorts – children who transitioned from the first to the second cycle of primary education in the 4th grade, and adolescents who entered compulsory or voluntary secondary education in the 7th and 9th grade – with 540 children and 3'990 adolescents in clusters of 192 newly formed school classes. Thus, for all students participating in the study, the observation period starts at a point when they are reassembled in new classes and assigned new teachers, such that, overall, they are equally exposed to a new pool of peers whom they did not know before.

Figure 1: Value orientations and socio-demographics across Europe: Based on the European Social Survey (ESS), the animation shows the evolution of cultural value orientations in European countries from 2002 until 2018. The scatterplots on the left map dissimilarities fitted by multidimensional scaling (MDS) between aggregated value orientations across countries on a two dimensional space. Iterative k-means clustering identifies cluster solutions that minimize the variance within- and maximize the variance between clusters. The radarplots in the center visualize the relative priorities assigned to basic human values by European residents, aggregated by countries within clusters, and visualized in both multi-dimensional value space (orientations, colors) – three bipolar dimensions (autonomy, darkblue) vs. (embeddedness, brown), (egalitarianism, darkgreen) vs. (hierarchy, darkred) and (harmony, darkgold) vs. (mastery, darkmagenta) – as well as geographical space. The radarplots on the right describe average relative proportions of European residents based on socio-demographic properties, aggregated by clusters (colors, fill), each highlighted by one representative country (colors, labels).

Context

From mid 2015 to mid 2016, students all across Europe were placed in a unique geo-political environment. Since 2015, multiple conflicts and poverty throughout the Middle East and Africa have raised the level of forced displacement to more than 65 million people, which generated one of the largest refugee movements since the end of World War II. By 2016, more than 50% of Syria's population, and around 25% of the respective populations in South Sudan and Somalia have been forced to seek refuge, but as the capacities of their neighbouring countries were reaching their limits, people started to embrace the possibility of finding refuge in Europe *United Nations High Commissioner for Refugees (UNHCR), Global Trends: Forced displacement in 2016* 2016. As a consequence, European countries were facing unparalleled challenges, not only in terms of their humanitarian- and placement capacities Martén, Hainmueller, and Hangartner 2019, but also in terms of how well their native populations could adjust to the rapid growth in ethnic diversity

and religious pluralism Marsh et al. 2017. At the peak of immigration flows around 2016, the continent experienced a bipolar segregation, both in multidimensional value- and geographic space, separating embeddedness- or hierarchy oriented countries located in the southeast from autonomy- or egalitarianism oriented countries located in the northwest, as illustrated in Figure 1.

Sites and samples

Our study is designed as a longitudinal, three-wave panel with two cohorts. From November 2015 until November 2016, we commissioned three waves of surveys with students from both Switzerland and Poland who transitioned from the first- to the second cycle of primary education (3rd to 4th grade) or moved on to compulsory (7th grade) or voluntary secondary education (9th grade), respectively. Thus, for all students participating in the study, the observation period starts at a point when they are reassembled in new classes and / or assigned new teachers, such that – overall – they are equally exposed to a new pool of peers.

The waves of our longitudinal design correspond to the schedule according to which students were interviewed. The dynamics of the processes under consideration in this study are expected to be the highest at the beginning of the group formation process Friemel 2012. Thus, the timing of the administration of the surveys to students is designed with proportionally increasing time windows between waves of data collection. Coincidentally, the longitudinal design also captures the waves of refugees' immigration into Europe. Students are initially observed in November 2015, when the first wave of immigration into European countries has passed. Thus, the expansion of their social universe – as triggered by their educational transition – coincided with elevated exposure to attitude socialization efforts by parents, peers, as well as media coverage, which are likely to have triggered the formation of attitudes towards ethnic- and religious minority groups among participants of our study. The following observations then captured students' attitudes in February 2016, when immigration levels balanced on a floor between waves and – after passing the peak of the second wave in November 2016 – ultimately returned to their origin.

Furthermore, the longitudinal design is intended to limit the exposure of respondents to surveys while ensuring that all dynamics in the processes under consideration are captured. The subjects in our children cohort transitioned into the second cycle of compulsory primary education at the age of 9 or 10, while subjects in our adolescent cohort entered into a relatively novel school environment of compulsory and voluntary secondary education at the age of 12 or 13 and 15 or 16 respectively. Samples and cohorts are visualized in Figure 2.

Procedures

All procedures contributing to this work are in compliance with the ethical standards of the relevant national and institutional committees. The surveys commissioned in the various school classes were supervised by trained student assistants. Across the entire schedule in each cohort, data were collected in the controlled environment of school classes during a full school period of 45 minutes. To eliminate method bias, data were collected using the same method across all waves for each student. Respondents assessed in Switzerland were provided with questionnaires in paper and pencil form, whereas the surveys commissioned in Poland were administered on-line. Students and their parents were informed about the design and purpose of the study several weeks before data collection started. Due to different regulations concerning data protection, we used different approaches to obtain parents' active consent for the participation of Swiss and Polish students in our study. Parents in Switzerland were provided with an opt-out possibility. Of the

1,193 adolescents and 188 children sampled in Switzerland, none of the parents made use of that possibility. Parents in Poland were specifically asked to opt-in. From a total of 2,743 adolescents and 400 children sampled in Poland, approximately 68% of parents provided their active consent.

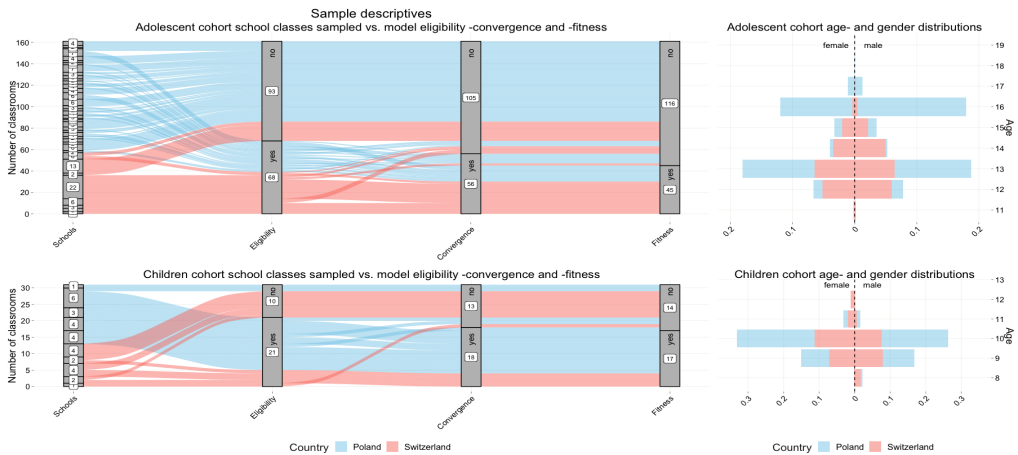


Figure 2: Sample descriptives: Alluvium charts (left panels) demonstrate that 42% of all adolescents' school classes (top) and 68% of all children's school classes (bottom) that were sampled in this study (stratum 1) are found eligible for model specification (stratum 2: below 50% missing observations - eligible, above 50% - not eligible), and while 83% of all models that were eligible for model estimation show adequate convergence (stratum 3: convergence below 0.25 - yes, above 0.25 - no) goodness of fit parameter simulations are sufficiently close to the observed data for 84% of all models that were included in the meta-analysis (stratum 4: χ^2 test probability below 0.05 - good fit, above 0.05 - insufficient fit). Colors show the trajectories of 57 vs. 104 school classes of the adolescent- and 13 vs. 18 of the children cohorts from Switzerland (salmon) vs. Poland (skyblue) across these stages. Bar charts (right panels) show age pyramids of 1'193 Swiss- and 2'743 Polish adolescents (top) as well as 188 Swiss- and 363 Polish children (bottom) that were sampled in this study by gender (female - left, male - right) and country (Poland - skyblue, Switzerland - salmon)

To make the school classes in the two countries comparable in terms of participation rates, we excluded 103 secondary school classes, where absentees in any given wave exceeded 50% due to the opt-in and opt-out procedures. The result of this process can be seen in Figure 2. The sample we used for our analyses includes 68 secondary school classes and 21 primary school classes from Switzerland and Poland.

Measures

To investigate the formation of value- and attitude structures among youth in the context of their evolving friendship networks at school, this study combines information on students' value-, attitude- and social network structures with information on a variety of students' socio-demographic traits.

Attitudes. To measure students attitudes towards ethnic- and religious minorities, we concentrated on children's intentions to have contact with peers that are members of an ethnic- or religious minority. This aspect is closely tied to the concept of social distance Hindriks, Verkuyten, and Coenders 2014. Students were provided with vignettes showing two pairs of immigrant children and asked to evaluate how close they would like their social bond to be, which yields an instrument

that can be classified as an explicit attitude measure Becker et al. 2020. We developed two vignettes that are designed to portray a girl and a boy who belong to two groups of common immigrant minorities in European societies, Muslims and blacks. Each child or adolescent participant of the study was shown both vignettes, as displayed in Figure 2. Each vignette was introduced by a short description of the illustrated children. The vignette representing Muslim immigrants was introduced as follows: “Mustafa and Salma are new in town. Mustafa and Salma’s families are not from Switzerland/Poland.” The vignette was followed by four questions inquiring about the extent to which participants would be happy (1) if Salma or Mustafa would live in their neighbourhood, (2) if they were friends with one of them, (3) if they could work together on a school project, and (4) if Salma or Mustafa invited them over. Respondents were asked to answer each of these questions on a six-point scale ranging from “do not agree at all” to “fully agree”. The description and questions used for the vignette representing black immigrants were the same except for the names – which were adapted to Jamal and Laila. This measure not only facilitates the study of attitude formation among youth across developmental stages, but also encompasses some of the more subtle forms of discrimination in knowledge transfer-, collaboration-, companionship or friendship networks at school or in the neighbourhood.

Values. In order to collect data on adolescents’ value priorities, our study used two versions of the Portrait Value Questionnaire (PVQ) S. H. Schwartz et al. 2012. The original version contains 58 items from which 13 items are extracted in the short version. In both versions of the PVQ, respondents are asked to compare themselves to people described in brief statements and to evaluate how similar they are to these persons on a six-point scale ranging from “not similar at all” to “very similar” Beierlein et al. 2014. To assess children’s value priorities, our study uses the Picture Based Value Survey (PBVS), which contains 20 items Döring et al. 2010 asking respondents to compare themselves to people depicted in pictures and to evaluate how similar they are on an identical scale. Upon confirmation of measurement invariance across countries and cohorts Cieciuch et al. 2015; Cieciuch et al. 2014, we aligned both questionnaires by appropriately pairing items of the 20-item PBVS to match the items in the 13-item PVQ to make our findings comparable. As visualized in Table 1, the alignment was successful for all items, except for the concern component of universalism in the PVQ, which has no matching pictures in the PBVS as well as the pleasure component of hedonism in the PBVS, which does not match any item in the PVQ. This measurement not only captures important drivers for creating-, maintaining- or dissolving friendship ties, but also facilitates the study of motivational aspects in the formation of attitudes among youth.

Friendship. Data on networks were collected with a roster design. The names of all students in each class were displayed in a roster, including those who did not participate in the survey or students that were absent from class on the dates scheduled for data collections. Students were asked “How strong is your friendship with your classmates?” They responded on a six-point scale ranging from “no friendship at all” to “very close friends”. According to the companionship dimension of friendship Granovetter 1973, students were instructed to think about their total leisure time and assign points to their classmates according to the average time they currently spend with each other. As the methodology we applied in our analyses is restricted to the analysis of binary network data, all possible thresholds for dichotomization were tested. Thresholds above and below the cut-off level of five on the six-point scale create very sparse or dense networks, respectively, which result in little network dynamics. Therefore, the weighted friendship networks were dichotomized at the cut-off level of five. Consequently, students’ decisions not only cover situations in which strong friendship ties are created from non-existing relationships but also

situations in which weak- or casual ties are upgraded to strong friendship ties. Similarly, pupils' decisions are not restricted to situations in which strong friendship ties are dissolved completely but also include situations in which strong friendship ties are downgraded to casual- or weak ties. Using this measurement, we can map the systemic nature of the context where attitudes are formed among youth over time

Analytical approach

In this section, we provide an overview of the stochastic actor-oriented modeling approach. Using stochastic actor-oriented models (SAOMs), we can overcome three major restrictions of earlier approaches to model friendship selection and social influence through their global conception of network structure and macro-level behavioral or attitudinal trends as the accumulation of micro-level decisions by individual actors. Alternative approaches Hanneke and Xing 2007; Robins and Pattison 2001; Frank and Strauss 1986 conceptualize each observation as a single discrete "event" and model the probability of observing a network with a given structure in relation to every possible permutation using a set of statistics. In SAOMs, panel waves are viewed as "snapshots" of an underlying process of continuous social change – meaning that differences between successive observations can be explained by any given network transformation or behavioral vs. attitudinal trend over time. The process of change is disassembled into the smallest possible components, referred to as "microsteps". In any given "microstep", a single actor is probabilistically selected to receive an adjustment opportunity – either on the network structure (tie creation, - dissolution or maintenance of the current structure) or the behavior (attitude increase, -decrease or maintenance of the current level). At any given "microstep", no more than one adjustment can be made. Thus, each actor's decisions include the corresponding social context summarizing decisions made by other actors. The estimation procedure is meant to imitate the process whereby friendships evolve. In a first stage, rate functions specify the frequency and order of receiving adjustment opportunities. Although they may depend on individual attributes or network positions, we assume that both frequency and order are equally distributed among all actors for each transition between waves. In a second stage, an objective function – a selection of goals that the selected actors tend to pursue when opportunities to evaluate potential adjustments in their network- and behaviour- or attitude space present themselves – needs to be specified. The first component for decisions regarding network structures is given as $e_i^{net}(x) = \sum_k \gamma_k^{net} s_{ik}^{net}(x)$. In Equation 1, $e_i^{net}(x)$ is the value of the objective function for actor i depending on the network state x and behavioural- or attitudinal state z of all network members. $s_{ik}^{net}(x)$ are effects that correspond to possible objectives or norms an actor might follow when changing a network tie, and γ_k^{net} are corresponding effect strengths. Following theoretical considerations based on previous research, we consider "network endogeneous" effects such as reciprocity, triadic closure (the tendency of friends-of-friends to become friends), and preferential attachment (the tendency for actors with many existing ties to become more sociable or attractive), and "assortative" effects reflecting homophily based on gender, age, migration- or socioeconomic status and value-attitude structures, as well as gregariousness and popularity (the tendency for students with specific value-attitude structures to become more sociable or attractive). Formulae for all effects are presented in the Appendix.

In order to investigate the coevolution of network- and value-attitude structures, effects that specify how the evolution of network structures depends on students' sociocultural- or socioeconomic traits and value-attitude structures, must be complemented with effects for decisions regarding changes in attitudes, which is given as $e_i^{att}(x, z) = \sum_{m=1}^{M-1} \sum_i \beta_k^{att} s_{ik}^{att}(x(t_{m+1}) -$

$x(t_m), z$). Instead of specifying the goals by which actors make decisions regarding their network structures, effects in Equation 2 drive actors' choices with respect to attitude change. Effects $s_{ik}^{att}(x, z)$ reflect the various goals, according to which actors might choose to adapt their attitudes, and βk^{att} are effect strengths. These effects include linear- and quadratic terms, controlling for the tendency to change attitudes in general and depending on the current level, a term specifying the tendency of students with different demographic traits (boys vs. girls, students with foreign- vs. domestic- as well as rich vs. poor socioeconomic backgrounds) to change attitudes, a term specifying peer influence conceptualized as students' tendency to converge towards the attitudes expressed by their friends. In summary, when given the opportunity to make an adjustment, actors will tend to emphasize goals that maximize the value of the relevant objective function. In the network structure component, students can do so by forming new ties, dissolving existing ties, or doing nothing; and in the behavioral component, they can do so by increasing- or decreasing their attitudes, or maintaining their current level. The study's multi-level research design calls for a two-stage procedure. First, an unconventional Method of Moments is used to separately estimate parameters for each school class, while goodness-of-fit tests are used on data that is simulated on auxiliary statistics. To compare simulated- and observed data, auxiliary statistics cannot be compiled from the set that is used to estimate parameters. Complying with the guidelines for publications using SAOMs, adequate fit is required for auxiliary statistics on distributions of indegrees, outdegrees and attitudes, which was achieved for 62 out of 89 school classes that were eligible for model specification. Second, the parameters that are separately estimated for each school class are aggregated in a meta-analysis according to Snijders and Baerveldt 2003; Ripley, Snijders, Preciado, et al. 2011. Given that objective functions reveal how attractive specific tie configurations and behavioral- or attitudinal changes are for any given actor, parameters can be interpreted in a way that is similar to those obtained by logistic regression. Full model results are presented in the Appendix.

RESULTS

First, we report our findings on motivational aspects. Hypothesis 1 regarding the respective impact of self-expansion- and self-protection related values as a motivation to change attitudes according to value-expression- and ego-defense functions could be confirmed, as demonstrated by the coefficient plots in the first panel of Figure 3. Adolescents show positive changes in their predispositions to evaluate ethnic- and religious minority groups, the higher their emphasis on self-expansion related values (openness to change values in general $\theta_{eth} = 0.127$; OR = 1.135, as well as "tolerance"- $\theta_{eth} = 0.093$; OR = 1.097, $\theta_{rel} = 0.106$; OR = 1.112 and "equality" $\theta_{eth} = 0.142$; OR = 1.153 in particular). Self-expansion related values (self-transcendence values in general $\theta_{eth} = 0.092$; OR = 1.096, $\theta_{rel} = 0.090$; OR = 1.094 as well as "nature" $\theta_{eth} = 0.075$; OR = 1.078, $\theta_{rel} = 0.120$; OR = 1.127 in particular) also foster positive changes in corresponding attitudes among children. Furthermore, our findings reveal negative ties as expected between predispositions to evaluate ethnic- and religious minority groups and self-protection related values, explicitly "security" ($\theta_{eth} = -0.048$; OR = 0.953) and "wealth" ($\theta_{rel} = -0.044$; OR = 0.957) among adolescents, as well as "conformity" ($\theta_{eth} = -0.082$; OR = 0.921) and "achievement" ($\theta_{rel} = -0.087$; OR = 0.917) among children.

Second, we outline our findings on systemic aspects. Hypothesis 2a regarding the respective impact of a collective prioritization of self-expansion- and self-protection related values in friendship networks as a frame of reference for the validation of attitudes according to the



Figure 3: Attitude functions and friendship network segregation. Estimates θ for effects from values (panel of value expression- and ego defense functions), values average alter effects (panel of knowledge function), average similarity effects (panel of adjustment function), children's gender-, age-, as well as parental migration-, education-, occupation similarity effects and interactions with attitudinal similarity effects (panel of status homophily driven segregation), value similarity-, attitudinal similarity and interactions between value- and attitudinal similarity effects (panels of value homophily driven segregation), along with 90% and 95% confidence intervals are shown for models investigating children's and adolescents' predispositions to evaluate peers with a different ethnicity θ_{eth} (skyblue) and religion θ_{rel} (navyblue). Models are cast in facets according to higher order- and basic human values or demographic traits, and control for endogeneous processes of attitude- and friendship network formation. Full results are reported in Tables S6-S18 of the SI Appendix. Cross-country comparisons in Tables S9, S11, and S13 suggest that the findings largely represent the situation in both countries.

knowledge function could also be confirmed. The odds for adolescents to change their attitudes in favor of religious minorities are 18% higher compared to the counter-event, the more self-expansion related “benevolence” values are emphasized in their friendship networks on average ($\theta_{rel} = 0.164$; OR = 1.178). Conversely, adolescents are 29% and 37% more likely to change their attitudes in disfavor of ethnic- and religious minorities respectively compared to the counter-event, the more self-protection related values are prioritized among friends on average (generally $\theta_{rel} = -0.459$; OR = 0.632; $\theta_{eth} = -0.343$; OR = 0.710 but particularly for “achievement”: $\theta_{rel} = -0.167$; OR = 0.846, “wealth”: $\theta_{rel} = -0.121$; OR = 0.886, and “power”: $\theta_{rel} = -0.170$; OR = 0.844), as demonstrated by the coefficient plots in the second panel of Figure 3. The negative impact of a collective prioritization of self-protection related values in friendship networks on attitude change is also present among children – particularly for “wealth” ($\theta_{rel} = -0.219$; OR = 0.803).

Furthermore, hypothesis 2b suggesting that attitudes are instrumental in preserving social affiliations, and thus converge towards their average expression in friendship networks according to the adjustment function is fully confirmed among adolescents. The coefficient plots in the third panel of Figure 3 indicate that adolescents’ attitudes towards ethnic- and religious minorities are between 6 and 15 times more likely to converge towards the average expression observed among their friends ($1.714 < \theta < 2.677$; $5.538 < OR < 14.542$) as opposed to remaining constant or diverging further away from their average expression in friendship networks. Moreover, our findings also provide support for hypothesis 2c, as children don’t seem to care about the social rewards for conforming- or social sanctions for non-conforming attitude change according to the adjustment function.

As shown in the remaining panels of Figure 3, our data further provide sufficient evidence to support hypothesis 3 investigating the dynamic context of friendship networks, where attitude change takes place. Apart from parental education ($-0.244 < \theta < -0.168$; $0.783 < OR < 0.845$ among adolescents in Poland) and age ($-0.269 < \theta < -0.289$; $0.749 < OR < 0.764$ among children in Poland), our findings reveal consistent tendencies for status homophily, particularly on gender ($0.386 < \theta < 1.027$; $1.471 < OR < 2.793$ among children and adolescents in both countries), age ($0.333 < \theta < 0.452$; $1.395 < OR < 1.571$) and migration status ($0.121 < \theta < 0.151$; $1.129 < OR < 1.163$) among children and adolescents in Switzerland respectively. Our results also show consistent tendencies for value homophily, particularly for values indicating conflicts between self-enhancement ($\theta = 0.507$; OR = 1.660) – or “power” in particular ($0.259 < \theta < 0.334$; $1.296 < OR < 1.397$) – and self-transcendence ($0.283 < \theta < 0.415$; $1.327 < OR < 1.514$) – or “tolerance” in particular ($0.255 < \theta < 0.269$; $1.290 < OR < 1.310$). Among children, however, value homophily is concentrated on self-protection related values – explicitly “achievement” ($0.504 < \theta < 0.524$; $1.655 < OR < 1.689$), “power” ($0.310 < \theta < 0.478$; $1.363 < OR < 1.613$), “conformity” ($\theta = 0.567$; OR = 1.763) and “tradition” ($\theta = 0.353$; OR = 1.423).

Homophilous tendencies on attitudes are only found among children ($0.629 < \theta < 1.135$; $1.876 < OR < 3.111$). However, our findings indicate a mutually reinforcing interaction between value homophily dimensions among adolescents. Friendship ties are up to 10 times more likely to emerge or persist, if shared predispositions to evaluate ethnic- and religious minorities are combined with a common emphasis on self-enhancement ($\theta = 2.032$; OR = 7.629) or self-transcendence values ($2.095 < \theta < 2.321$; $8.125 < OR < 10.186$).

DISCUSSION

The study of attitude change – particularly during the formative years in the systemic context of children's and adolescents' social networks – is extremely important. Knowledge about how attitudes towards ethnic- and religious minority groups are embedded in children's and adolescents' hierarchical value structures, how they are socialized in the context of social networks within school classes, and how shared value- and attitude structures are used to form and maintain social relationships within these organizational foci, is vital to understand systemic racism. This article makes several contributions to our understanding of the formation and evolution of value- and attitude structures in the dynamic context of social networks.

The functional perspective on attitude change Katz 1960 proposes that predispositions perform specific functions depending on the way they are embedded in value systems among youth on different stages of their development or the social context where they are expressed. Children highlighting the protection of the natural environment and adolescents emphasizing tolerance of different world views, equality in opportunities across socio-economic- or -cultural strata, as well as independence through self-direction or stimulation through novel experiences tend to express partiality by changing their attitudes in favor of ethnic- and religious minority groups. In contrast, children highlighting conformity with social norms or the demonstration of personal achievement and adolescents emphasizing personal or collective security as well as power in terms of control over resources appear to view ethnic- or religious minority groups as a threat to achieving their goals as well as convenient targets for the expression of their prejudices in the form of unfavourable predispositions. But how are these prejudices put into action or inaction? Surprisingly, an additional investigation into the interaction between value priorities and socio-cultural homophily revealed that the social exclusion of peers with a different migration status is less pronounced among youth emphasizing self-protection related values, as shown in Tables S16 & S17 of the Appendix. One could deduce that youth emphasizing power- and influence over others, or social affirmation regarding the safety and security in their country, tend to refrain from using overt forms of discrimination, such as the social exclusion of ethnic- and religious minorities, but disguise their prejudices in covert forms such as tolerant, benevolent or patronizing racism Ikuenobe 2011.

The emergence of the tendency for predispositions to evaluate ethnic- and religious minority groups to converge towards the average expression among friends according to the adjustment function that we find upon entry into secondary education, suggests a socio-developmental shift in relative importance from parents to peer groups at this transition. The significant expansion of social universes that comes with such a reorientation facilitates the construction of a more complete sense of social identity Orben, Tomova, and Blakemore 2020; Fuligni and Eccles 1993. However, there is no sizeable difference in the ability to reflect on- and validate mental states between children at the end of primary education and adolescents at the beginning of secondary education Flavell et al. 1999; Perner, Ruffman, and Leekam 1994. Attitude change was found to serve as an instrument for both children and adolescents to manipulate their social environment according to the knowledge function, and thus secure access to different worldviews. As their personalities grow, value priorities gradually provide more structure to accurately store cues about attitudes towards ethnic- and religious minority groups in memory. However, for such cues to be considered salient, the corresponding perceptual information needs to pass a certain threshold in terms of clarity and consistency. On the dimension representing conflicts between self-enhancement and self-transcendence values, children and adolescents are able to assign fairly accurate positions for their peers and thus use the corresponding information as a guide. However,

openness to change- and conservation values are not perceived as explicitly conflicting Kindschi et al. 2019, and thus yield ambiguous or inconsistent information that children and adolescents cannot rely on as a guide.

The segregation of friendship networks in cohesive and impermeable bubbles with conflicting value- and attitude structures can make attitudes diverge even further in opposite directions, and thus lead to a polarization of societies. Due to their high visibility-, as well as the societally engendered stereotypes that are associated with them, socio-demographic traits appear so salient that attitudes don't seem to be relevant for friendship selection among adolescents, if considered separately. But in combination with values, there is a mutually reinforcing effect, by which attitudes will become more accessible through their consistent connection with motivational goals in associative networks, and values will gain clarity through their ties to attitudes. In combination, value- and attitude structures can even overcome the gravitational forces of demographic traits in the creation and maintenance of friendship networks. On the society level, this process might trigger movements that aim to establish institutions, which foster the social integration of ethnic- and religious minorities. However, polarized societies often also provide conditions that are ideal for the emergence of movements that seek to establish institutions and structures of power preserving the traditions and lifestyles of the majority. Meanwhile, systemic changes such as these can reinforce individual predispositions and thus further escalate and perpetuate the potential for goal conflicts across different groups within societies.

In order to create an environment that encourages positive changes in predispositions to evaluate ethnic- and religious minorities through the formation of self-expansion related value orientations, three intervention designs are considered. In self-confrontation based intervention designs Maio et al. 2009, subjects are confronted with fictitious feedback on norms within their social environment that is designed to trigger perceived inconsistency between their self-concept and the way specific values are currently prioritized, and suggested to change their value priorities as a way of reducing the corresponding dissatisfaction. In self-persuasion based intervention designs Heslin, Latham, and VandeWalle 2005, subjects are primed with the prevalence of specific values and their utility to themselves and others, and convinced to change their current value priorities based on self-persuasion through the reflection and advocacy of desired value priorities Arieli, Grant, and Sagiv 2014. Moreover, systemic attitude change can also be achieved in network intervention designs Valente 2012 that assign opinion leaders and -followers to treatment- and control groups, and foster the diffusion of desired value priorities based on post-treatment manipulations of classroom seating arrangements Gremmen et al. 2018. However, future studies should place special emphasis on ascribed characteristics such as gender, age, socio-cultural- and socio-economic status – not only as controls for the composition of classrooms in sampling designs, but potentially also as instruments for seating arrangements in intervention designs.

LIMITATIONS

The current study is not without limitations. In order to capture systemic forms of discrimination against ethnic- and religious minorities, this study assumes utility functions that are common across all social systems. However, meta-analyses investigating key tendencies revealed some heterogeneity across classrooms. Random coefficient models that capture structural properties, such as classroom size, -composition and -organization – Hallinan 1979 or models that control for teachers' value priorities Algesheimer, Bagozzi, and Dholakia 2018 might capture unobserved or observed heterogeneity to a greater extent. Furthermore, models capturing key effects driving

friendship selection and attitude change within and across the confines of classrooms would account for social activities that transcend these boundaries and provide invaluable contributions regarding their impact.

CONCLUSIONS

We conclude that future research should account for the heterogeneity in tendencies regarding attitude change and friendship selection. Further research is also needed to study the extent to which general and specific forms of discrimination against ethnic minorities transcend beyond the boundaries set by the structure and composition of social networks in classrooms. Furthermore, we call on future research to cross-validate our findings in other countries, which would fill the gaps in the multi-dimensional space of cultural value orientations Schwartz 2006.

CONFLICTS OF INTEREST

All authors have nothing to disclose.

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