

Understanding the causes and consequences of segregation in youth's friendship networks

Opportunities and challenges for research

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How does friendship segregation arise? Preferences, opportunities, and relational mechanisms

Ethnic, racial, and religious segregation are among the most persistent characteristics of youth's friendship networks in modern societies (Leszczensky & Pink, 2015, 2017; Moody, 2001; Quillian & Campbell, 2003; S. Smith, Maas, & van Tubergen, 2014).¹ A natural starting point for understanding the emergence of segregation are individual *preferences*, that is, people's desire to associate with certain people. As social animals, nearly all people have a baseline preference to have some friends instead of no friends at all (Blau, 1977). This tendency especially applies to adolescents, because peers are particularly important at this life stage (Giordano, 2003; Steinberg & Morris, 2001). But what kind of friends do they seek? The most important preference is *homophily*, the preference to associate with people who are similar to oneself (Lewis, 2015; McFarland, Moody, Diehl, Smith, & Thomas, 2014). Similar others tend to understand each other better, can often communicate more easily, and find each other more likeable and predictable (Byrne, 1971). Since race and ethnicity are among the most important determinants of friendship decisions (McPherson, Smith-Lovin, & Cook, 2001), it is not surprising that youth in Western societies report stronger preferences for same-ethnic than for inter-ethnic friends (Phinney, Ferguson, & Tate, 1997; Verkuyten & Kinket, 2000).

The decision to form a friendship, however, is not only affected by one's own preferences but also by preferences of others. An adolescent might desire to befriend a particular classmate, but whether or not this friendship materializes depends on the willingness of the other classmate as well. Surprisingly, this point has been largely neglected in research on intergroup friendships that mainly focused on mutual friendship nominations and overlooked differences in individual preferences. Considering preferences of members of both involved parties does not only complicate matters for friendship-seeking youth, it also illustrates the need for a network perspective when studying friendship

formation. For instance, ethnic majority group members may be reluctant to befriend minority group members, but minority groups may likewise prefer friends of their own ethnic group (Smith et al., 2016; Vermeij, van Duijn, & Baerveldt, 2009). In a similar vein, understanding religious friendship segregation requires us to consider the perspectives of members of different religious groups (Leszczensky & Pink, 2017). By focusing on one specific group, research that neglects the network typically fails to map the interplay of preferences of different social groups, which may lead to wrong conclusions.

Besides the preferences of all involved parties, the development of inter-group friendships and thus the emergence of friendship segregation crucially depends on the *opportunities* to meet in- and outgroup members. The composition of important contexts such as schools, neighborhoods, or clubs determines how frequently youth encounter peers of their own or other groups and, accordingly, their chances to befriend them. Thus, relative group size in a given context is one of the most basic features of the opportunity structure (Blau, 1977; Feld, 1982). If there is no Chinese kid in a school, even a kid with strong preferences for Chinese friends will not be able to satisfy this preference. Such opportunity effects contribute to friendship segregation because in most countries ethnic groups are not randomly distributed across schools; instead, ethnic minority groups often are overrepresented in lower educational tracks, and there also is ethnic clustering because of residential segregation (Kruse, Smith, van Tubergen, & Maas, 2016; Mouw & Entwisle, 2006). Also, similar people tend to spend time in similar social contexts (Lomi & Stadtfeld, 2014). For instance, Vermeij and colleagues (2009) found a preference for inter-ethnic friendships (and thus less ethnic segregation) only among Dutch majority group students who lived in more ethnically diverse neighborhoods where they could meet minority friends but not among those living in less diverse neighborhoods (note that Munniksmas and colleagues (2017) found a stronger preference for ingroup friends in more ethnically diverse neighborhoods). Inferring preferences without considering the availability of in- and outgroup members as potential friends in a given social context thus may lead to misleading conclusions.

Finally, the opportunity to form friendships is also affected by processes that directly point to social network analysis. *Relational mechanisms* explain how existing relationships affect the creation of new ones (Rivera, Soderstrom, & Uzzi, 2010; Wimmer & Lewis, 2010). Friends of friends tend to become friends as well, and this “triadic closure” can be traced back to both opportunities and preferences (Schaefer, Light, Fabes, Hanish, & Martin, 2010; Stark, 2015). On the one hand, individuals with mutual friends tend to encounter each other, thus having an increased opportunity to spend time together. On the other hand, individuals prefer balanced relations (J. A. Davies, 1963; Heider, 1946), thus desiring good relations with their friends’ friends. Valuing balance and symmetry in social relations also makes people more likely to reciprocate friendship; that is, they

are likely to consider those as friends who initiate a friendly relationship. Both triadic closure and reciprocity may increase friendship segregation even if individuals hold only weak preferences for ingroup friends because many of these additional friendships will be formed within their own group (Stark, 2015; Wimmer & Lewis, 2010). People can also differ in their tendency to initiate friendships and their likelihood of being chosen as friends, and group differences in this sociability can also contribute to segregation (Goodreau, Kitts, & Morris, 2009).

Methodological advantages of social network analysis

Measurement

In contrast to traditional self-reported information on the share of friends of different groups, whole network data provide information about relationships between *all* individuals in a given context.² Thus, these data do not only identify who is connected to whom but also who is not connected with each other (Marsden, 2011). The latter information is necessary for inferring preferences from friendship connections, because doing so requires us not only to know the number of in- and outgroup friends but also how many in- and outgroup members are actually available. Moreover, relational mechanisms such as reciprocity and triadic closure can only be taken into account if the structure of the whole network is known.

Social network data also provide more accurate information on segregation than self-reports (Kalter, 2015). T. W. Smith (2002) showed experimentally that asking people directly how many inter-racial friendships they have leads to much higher reports of such friendships compared to when friends have to be identified by name. He suspected that direct questions lead to an overreporting of inter-racial friendships, perhaps due to social norms about the desirability of such relationships. T. W. Smith (2002) thus concluded that social network data should be preferred. In whole network studies, adolescents only need to indicate who their friends are; and from these friends' self-reports researchers can infer whether these are same-ethnic or inter-ethnic friendships of their ethnicity. This information is more accurate than asking how many friends of other ethnic groups one has because all friends report their own ethnicity (Kalter, 2015). This advantage is even more relevant when characteristics of friends are considered that cannot easily be observed, such as attitudes or identity (Leszczensky, Stark, Flache, & Munniksma, 2016). Friends' reports about who their friends are can even be used to identify indirect relationships with people from other ethnic groups (Munniksma et al., 2013; Wölfer et al., 2017; Wölfer, Schmid, Hewstone, & van Zalk, 2016).

Disentangling preferences, opportunities, and relational mechanisms

Researchers who want to analyze friendship networks are well advised not to use traditional statistical methods, such as regression analysis or structural equation modeling, because whole network data violate the assumption of independent observations inherent to these models. As illustrated above, friendship choices are not made in a vacuum but depend, for instance, on the choices potential friends have made. Ignoring such dependencies can result in overestimation of central effects, such as homophily (Goodreau et al., 2009; Wimmer & Lewis, 2010).

Sophisticated methods of social network analysis acknowledge the complex interdependencies between network ties by considering and modeling the relationships of all individuals in a given context. This feature is inherent both to cross-sectional models such as exponential random graph models (ERGM, Lusher, Koskinen, & Robins, 2013; Robins, Pattison, Kalish, & Lusher, 2007) and to longitudinal models such as the stochastic actor-oriented model (SAOM, Snijders, van de Bunt, & Steglich, 2010). Both ERGM and SAOM also have the key advantage of being able to disentangle preferences, opportunities, and relational mechanisms (Kalter, 2015; Lewis, 2015). First, by considering the number of available members from different groups in a given context, ERGM and SAOM provide estimates of homophily that are not biased by relative group size. That is, estimates obtained from these models are conditional on opportunity structure; for example, ERGM and SAOM acknowledge that a student with no same-ethnic classmates cannot make ethnically homophilous friendship choices.

Second, by modeling friendship choices of members from different groups, researchers can consider the perspective of different groups as well as the interplay of these perspectives. Thus, researchers can not only study differential preferences for majority and minority group members but also how these preferences interact to form inter-ethnic friendships (see next section). Third, ERGM and SAOM allow us to model relational mechanisms such as reciprocity and triadic closure. These models can thus account for the fact that not all same-ethnic friendships are formed due to a preference for such friendships but also because adolescents reciprocate friendship nominations and become friends with their friends' friends. Finally, SAOM have the additional benefit of allowing us to disentangle selection and influence mechanisms that both can be the cause of the so-called "network autocorrelation," that is the phenomenon that adolescents who are socially related are similar on behavioral (e.g., smoking) or attitudinal (e.g., prejudice) dimensions. SAOM allow us to establish whether observed similarity in friends' attitudes or behavior stems from youth preferring to befriend peers who are similar to themselves or from friends' influencing each other (or both of these processes). This is achieved by modeling the co-evolution of networks and

behavior and their reciprocal relationship. Steglich, Snijders, and Pearson (2010) explain the statistical model; various exemplary applications in research on adolescents are discussed in a special issue edited by Veenstra, Dijkstra, Steglich, and Van Zalk (2013).

Key findings on the causes of friendship segregation

There is strong evidence that segregation in friendship networks is at least in part driven by preferences for ingroup friends: even in mixed schools, with vast opportunities to engage in intergroup friendship, ingroup friendships are formed more often than would be expected by chance (Moody, 2001; Quillian & Campbell, 2003). These findings have been backed by studies using state-of-the-art network analyses mentioned in the previous section that adequately accounted for relative group size and relational mechanisms (Leszczensky & Pink, 2015; S. Smith et al., 2014; Vermeij et al., 2009).

Still, even if they are able to account for the opportunity structure and relational mechanisms with the help of social network analysis (SNA), researchers should not hastily conclude that there are strong ingroup preferences. For instance, it has been shown that racial homophily largely is a by-product of more fine-grained ethnic homophily; for example, “Asian” homophily is largely spurious, arising from, for instance, Chinese or Japanese youth befriending peers of the same ethnicity but not of other Asian ethnicities (Wimmer & Lewis, 2010). And such ethnic homophily might in turn be overestimated if alternative mechanisms of friendship formation are not properly accounted for. For instance, if ethnicity is correlated with leisure time behavior or certain opinions, the overrepresentation of same-ethnic friendships might actually be due to homophily (i.e., personal preferences) on this kind of behavior rather than due to ethnic homophily (Stark & Flache, 2012). Such correlations are likely because people who are similar on one dimension tend to be similar on other dimensions as well (Block & Grund, 2014).

Social network studies also stress the importance of considering the perspective of different groups when assessing homophily. For instance, Blacks in the U.S. seem to have stronger ingroup preferences than Whites or Asians (Goodreau et al., 2009; Wimmer & Lewis, 2010); likewise, Turkish and Moroccan minority students in Western Europe appear to have stronger preferences for same-ethnic friends than other ethnic minorities have (S. Smith, 2018). Consistent with these patterns, majority group members seem to have lower ingroup preferences than minority group members (Vermeij et al., 2009).

Further stressing the importance of considering all groups, preference hierarchies also differ between groups. For example, the study by Leszczensky and colleagues (2016) indicates that native youth prefer to befriend

ethnic minority classmates with strong rather than weak identification with the ethnic majority group. Jugert and colleagues (Jugert, Leszczensky, & Pink, 2018) found that native youth even appear to be indifferent between fellow native peers and peers with a migration background who identify with the native majority group or have a dual identification. However, they are less likely to befriend peers with a migration background who exclusively identify with an ethnic minority group.

In addition to a preference for ingroup friends, youth can also have a preference against having intergroup friendships. Longitudinal studies found that youth with ethnic prejudice avoid forming friendships or friendly relationships with peers from other ethnic groups (Binder et al., 2009; Stark, Flache, & Veenstra, 2013). A social network studied showed that this is partly due to a relational mechanism: prejudiced youth prefer having friends who do not have outgroup friends. Because people become friends with their friends' friends, these youth are then more likely to form even more ingroup friendships than their less prejudiced peers (Stark, 2015).

There is also clear evidence of how the opportunity structure affects preferences. Controlling for homophily, social network studies found that not only the composition of school classes matters but also the composition of other meeting points, such as the neighborhood (Kruse et al., 2016; Mouw & Entwisle, 2006; Munniksmas et al., 2017; Vermeij et al., 2009) or intra-school tracking and extra-curricular activities (Moody, 2001; Schaefer, Simpkins, & Ettekal, 2018). A key finding of network studies in schools is that homophily seems to peak in highly diverse contexts (Moody, 2001). However, a recent study of classrooms in four European countries suggests that the effects of ethnic composition differ for majority (native) and minority (immigrant-origin) group members. Mirroring the findings of Moody (2001), ethnic minority group youth's preference for same-ethnic friends was strongest in ethnically mixed classrooms and less pronounced in classrooms with both low and high ethnic diversity (Smith, McFarland, Van Tubergen & Maas, 2016). For native majority youth, by contrast, the relation between ethnic composition and ethnic homophily is less pronounced. However, native youth's preference for same-ethnic friends was stronger in classrooms in which ethnic minority youth formed dense friendship networks. Ethnic school composition may also affect the extent to which identification-based friendship preferences of ethnic majority and minority group members can be translated into actual friendship choices. For example, ethnic minority youth who do not identify with the majority group may prefer minority to majority group friends. However, they cannot avoid befriending native majority group members if they attend a school with not enough ethnic minority schoolmates to choose from and still want to have some friends (Leszczensky, 2018). Finally, homophily seems to be stronger for relationships that require additional effort such as, for instance, friendships between students who attend different classrooms

within the same school (Leszczensky & Pink, 2015) or friendships out of school that need the approval of third parties such as parents (Windzio & Bicer, 2013).

Finally, social network studies have provided evidence that relational mechanisms contribute significantly to segregation. For example, Wimmer and Lewis (2010) showed that the extent of racial homophily is considerably exaggerated if relational mechanisms such as triadic closure are not accounted for. This is because triadic closure intensifies even weak preferences for ingroup friends, which can considerably amplify segregation (Stark, 2015). Likewise, the tendency to form or attract friendships can vary between ethnic groups. For instance, mixed-race college students in the U.S. (Wimmer & Lewis, 2010) and ethnic minority high school students in Germany tend to form more friendships than their peers from the majority group (Stark, Leszczensky, & Pink, 2017).

Key findings on the consequences of friendship segregation

Ethnic segregation means there are few inter-ethnic friendships. This is foremost detrimental to intergroup attitudes as more than 60 years of research on intergroup contact have provided clear evidence that such friendships reduce prejudice (K. Davies, Tropp, Aron, Pettigrew, & Wright, 2011; Pettigrew & Tropp, 2006). A recent network study showed that this is particularly problematic if there is not only a lack of inter-ethnic friendships but also negative relationships between youth of different ethnic groups (Wölfer et al., 2017).

However, this does not mean that existing segregation will prevent future integration. Social network research found that positive attitudes toward intergroup contact promote the creation of intergroup ties and, importantly, adolescents transmit these attitudes to their friends, which can promote intergroup friendships even among those who initially avoid the outgroup (Rivas-Drake, Saleem, Schaefer, Medina, & Jagers, 2018).

Such processes of *social influence* among friends play important roles for many other life domains of youth, ranging from substance abuse to social identification (Brechtwald & Prinstein, 2011; Veenstra et al., 2013). Since similar people tend to associate, it is essential to control for selection effects in order to empirically identify social influence mechanisms. As mentioned earlier, this can be achieved by modeling the co-evolution of friendship networks and individual characteristics using SAOM (Steglich et al., 2010). Studies using such models found that adolescents not only befriend peers with similar attitudes toward other ethnic outgroups but are also influenced by their friends' attitudes (Stark, 2015; Van Zalk, Kerr, Van Zalk, & Stattin, 2013).

This feature of SAOM also has made it possible to more rigorously study the long-held argument that friends affect the development of adolescents' ethnic identity. Controlling for friendship selection, research in the United States has shown that ethnic-racial identity development of youth is indeed influenced by friends' ethnic-racial identity (Santos, Kornienko, & Rivas-Drake, 2017). On the other hand, research in European countries has shown that the strength of ethnic minority youth's host country identification is not affected by the level of their friends' identification (Leszczensky, 2018; Leszczensky et al., 2016). Friends can also affect the perception of ethnicity attributed to peers. Using SAOM, Boda (2018) recently showed that friends tend to adopt their friends' judgment of ethnicity of classmates, independently of these classmates' ethnic self-identification.

Besides interethnic attitudes or ethnic identity, friendship segregation can also affect outcomes that are not directly related to ethnicity. One example is adolescents' academic achievement. Longitudinal social network studies have shown that friends affect each other's academic achievement and school-related behaviors (Kretschmer, Leszczensky, & Pink, 2018; Rambaran et al., 2017). A study in Germany found the influence of academic achievement to be stronger among same-ethnic friends than among cross-ethnic friends, and that ethnic minority youth tend to not befriend high achieving peers (Stark et al., 2017). Other research suggests that they will only do so if they can find high achieving peers among their own ethnic ingroup (Flashman, 2012). Such preferences can eventually lead to structural inequality. In many Western countries, students from most minority groups perform less well in school than their majority peers. For members of such disadvantaged groups (e.g., students of Turkish origin in Germany or Latinos in the U.S.), the preference for same-ethnic friends may prevent minority students from gaining access to better performing friends who might help them succeed in school.

Opportunities and challenges for future research

As demonstrated throughout this chapter, SNA helps to facilitate theoretical and empirical innovation by providing insights into the processes underlying the development of social relationships among youth as well as how these relationships in turn shape individual outcomes. While SNA no longer is in its infancy, it is still a relatively young field. We close by pointing to new research questions, methodological challenges and related developments, and the possibility of reducing segregation via network interventions.

New research questions

Precisely because so much progress has been made in the last couple of years, new questions on the causes of segregation have emerged. Disentangling the

role of preferences, opportunities, and relational mechanisms remains a key task for further research. Building on the evidence we reviewed in this chapter, researchers now face the task of digging deeper, for example by examining whether preferences or relational mechanisms vary across ethnic groups or whether their importance differs over time as friendship networks emerge and evolve (Lewis, 2015; Rivera et al., 2010). An especially important question for understanding segregation concerns the interplay of the preferences of different groups. For instance, Muslim youth are especially homophilous (Leszczensky & Pink, 2017), but more research is needed to say whether this is due to a genuinely strong ingroup preference, or whether it is rather a reaction to exclusion from the non-Muslim majority group.

Additional effort is also needed to better understand how and why different opportunity structures, both within and out of school, shape preferences. As mentioned above, ethnic friendship segregation is strongest in ethnically diverse schools (Moody, 2001). Other research found that there is more inter-ethnic and also intra-ethnic bullying in ethnically more diverse schools (Tolsma, van Deurzen, Stark, & Veenstra, 2013) and that youth's ethnic identification is heightened in such settings (Leszczensky, Flache, Stark, & Munniksmma, 2018). It remains to be studied whether these processes are a direct consequence of ethnic segregation in more diverse schools.

Relatively little research has explored the role of ethnicity in negative interactions, and existing findings are inconsistent and restricted to specific contexts. For example, a recent study found that Hungarian majority youth were more likely to dislike minority (Roma) members than fellow majority members, but minority (Roma) youth did not reciprocate such negative ties (Boda & Néray, 2015). Instead, both minority (Roma) and majority (non-Roma) youth were more likely to bully classmates they perceived to be from the minority group (Kisfalusi, Pál, & Boda, 2018). In contrast, a study in the Netherlands found that ethnicity did not affect who is bullied in a school class, but ethnic minority youth were more often the perpetrators of bullying than their majority group classmates (Tolsma et al., 2013). Moreover, research in the United States has shown that sharing negative relationships with the same network member affects the formation and stability of friendships (Rambaran, Dijkstra, Munniksmma, & Cillessen, 2015). Which role ethnicity plays in these processes, however, has not been explored yet.

Methodological challenges and current developments

In spite of its numerous advantages, the study of whole social networks comes at some costs. First, researchers have to pre-define network boundaries that closely resemble the reality of the life of the target group. As youth spend a considerable amount of time in schools, schools are a natural context that might define friendship networks. But even in schools, researchers have to decide whether to focus on the classroom, the

grade-level, or other units. This decision is important, as research has shown ethnic segregation to be more pronounced across classrooms than within classrooms (Leszczensky & Pink, 2015; Valente, Fujimoto, Unger, Soto, & Meeker, 2013). Second, each member of the potential network has to be identified upfront so that adolescents can easily nominate their friends in a questionnaire, and so that it is clear who were not chosen even though they were in the given context. This raises ethical questions about gathering information before the students could give their permission and about the collection of data about people who may not give permission at all (Stark, 2018). Third, even though network data provide more objective measures of segregation, for some research questions the perception of inter-ethnic friendships may be more important than the objective reality of such friendships (Zhou, Page-Gould, Aron, Moyer, & Hewstone, 2019).

Also, even when using sophisticated methods of SNA such as ERGM or SAOM, researchers need to be aware of the fact that inferring preferences from observed network patterns still relies on strong assumptions (VanderWeele & An, 2013). For example, these models assume that every member of a network has the same meeting opportunities and is perfectly informed about the relationships and characteristics of everybody else. These assumptions become unrealistic in larger networks or require additional modeling steps that take, for instance, meeting opportunities due to academic tracking in schools into account.

Reducing segregation via network intervention?

Given the persistence of ethnic friendship segregation and its negative consequences of various kinds of individual attitudes and behavior, one of the most pressing questions in ethnically diverse societies is how segregation can be reduced and how positive intergroup relations can be promoted. School-based intervention programs that promote intergroup contact can improve intergroup relations and even reduce ethnic prejudice (Lemmer & Wagner, 2015). However, many of these intervention programs target large groups such as the whole classroom (Stathi, Cameron, Hartley, & Bradford, 2014) and are accordingly complex and expensive to implement. This limits their applicability and potential impact.

SNA provides a potential solution to this problem. So-called “network interventions” either (1) try to change the network structure to reduce segregation or (2) make use of the existing structure to disseminate information or endorse positive behavior change among a large group of people (Valente, 2012). Most interventions aimed at promoting positive relationships between members of different groups are in line with the first type of network interventions, yet very few have explicitly examined the impact of the intervention on the amount of segregation in the network. Using SAOMs, DeLay and colleagues (2016) found that a social-emotional learning intervention reduced ethnic segregation in the friendship networks of participating schools.

The idea of the second type of network intervention is to involve only a few highly influential individuals in the intervention who will subsequently influence their network contacts, who will then influence their own contacts and so on (Valente, 2012). For instance, a recently implemented network intervention successfully reduced social conflict in 56 large schools (with 432 students on average) by training only 20–32 students per school in the intervention program (Paluck, Shepherd, & Aronow, 2016). Other studies have used this approach in an anti-smoking intervention (Steglich, Sinclair, Holliday, & Moore, 2012) or in an intervention aimed at reducing harassment in schools (Paluck & Shepherd, 2012).

The central challenge for the development of effective network interventions is our limited knowledge about who to select as participants for the intervention to make dissemination of the attitude or the behavior most effective. In the search for the most effective “seeds” for behavior change, Paluck and Shepherd (2012) point to “social referents” who can either be widely known adolescents or clique leaders that are more likely to be paid attention to than other peers. Other researchers expect the most popular adolescents to be most influential (Steglich et al., 2012). Little research exists that compares the influence of adolescents in certain positions that may guide future network interventions and it is very likely that who is most influential may vary across domains (Valente, 2012).

Conclusion

Social network analysis has facilitated innovative contributions to our understanding of the causes and consequences of segregation among adolescents. It has illustrated why it is important to simultaneously model the friendship preferences of majority and minority members to understand how they interact in producing segregation. Thereby, it is crucial to account for other factors that affect adolescents’ social networks such as meeting opportunities, social influence among friends, and structural factors such as the tendency to become friends with one’s friends’ friends. The development of various advanced statistical models provides applied researchers with toolkits that allow teasing these factors apart. This relatively recent progress has led to new exciting research questions and exciting ideas for how insights from SNA may guide social interventions to reduce segregation.

Notes

- 1 Studies in the U.S. tend to focus on racial segregation whereas scholars in Europe tend to study ethnic segregation. Because the assumed fundamental processes are similar, we mostly refer to ethnicity in this chapter.

- 2 There are two types of social network data with their own type of network analysis (Marsden, 2011; Stark, 2018). We focus mainly on *whole network* data in which all persons in a given social context are interviewed (e.g., a school class). Since the entire network is mapped, these data are particularly well suited to study segregation. This is different in *ego centered* network data, in which participants provide information on their network contacts who typically are not interviewed so that information on the network structure is either lacking or restricted to the perspective of focal actors.

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