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Selection and influence processes in academic achievement—More pronounced for girls?

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ABSTRACT

Friends tend to be similar in their academic achievement. In this study, we investigate whether this similarity results from students selecting friends with similar achievement or from friends influencing students' achievement. In particular, we argue that selection and influence effects should be stronger among girls than among boys. Using friendship network data on 1273 German secondary school students and stochastic actor-oriented models for the co-evolution of networks and behavior, we find selection effects only among girls, which is in line with our theoretical arguments. By contrast, influence effects contribute to achievement similarity among both boys and girls.

1. Introduction

Adolescents tend to have friends with similar academic achievement levels (e.g., Ide et al., 1981; Kandel, 1978; Kiuru et al., 2008). This well-established pattern of similarity in academic achievement may result from two potentially simultaneous processes: Indicating a *selection* effect, students may choose to befriend peers with similar academic achievement (Brechwald and Prinstein, 2011; Ryan, 2000); indicating an *influence* effect, students may adapt to their friends' achievement over time (Flashman, 2012; Kiuru et al., 2008). Previous network studies have found evidence for both of these processes (Flashman, 2012; Gremmen et al., 2017; Shin and Ryan, 2014; Rambaran et al., 2017). Less clear, however, is whether selection and influence effects in academic achievement are equally strong for boys and girls. As elaborated in detail below, there are substantive as well as network-related reasons to expect that girls are both more likely than boys to befriend peers with similar levels of academic achievement and more prone to be influenced by their friends' achievement. While Dieterich (2015) and Fortuin et al. (2016) did not find significant gender differences in selection and influence effects, these studies were based on comparatively small networks with limited statistical power for detecting gender-specific effects. In this study, we use stochastic actor-oriented models (SAOM) to empirically investigate whether selection and influence effects based on academic achievement differ between boys and girls. Improving upon earlier research, we rely on longitudinal data from nine German secondary schools that provide information on 12 grade-level networks and a total of 1273 students.

Understanding gender-specific selection and influence effects in academic achievement is important both from a substantive and from a social network perspective. Substantively, selection and influence effects in academic achievement may exacerbate social inequality in educational outcomes (Flashman, 2012). If students befriend peers with similar achievement levels and adapt to their friends' achievement, academic outcomes may diverge over time. While groups of high achievers stay successful or even further improve their achievement, their low-achieving peers remain unsuccessful or may even be stuck in a downward spiral of declining achievement. If—as expected theoretically—selection and influence effects are more pronounced among girls than among boys, the achievement divergence between high- and low-achievers that results from achievement-based segregation is likely to be even stronger among girls. Such gender heterogeneity in selection and influence processes may even contribute to the educational disadvantages of boys in many Western societies (Buchmann et al., 2008; DiPrete and Buchmann, 2013; van Houtte, 2004): if well-performing girls tend to befriend peers with similar academic achievements, and are also more strongly influenced by them, their

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initial academic advantage over boys is likely to be maintained over time.

The investigation of gender-specific selection and influence effects also is important from a more general social network perspective. Especially in early adolescence, the vast majority of friendship ties are formed between students of the same gender (Hartup, 1993; McDougall and Hymel, 2007; Poulin and Pedersen, 2007; Rose and Rudolph, 2006). Boys and girls further are known to differ in how they make friends, in what they seek from friendships, and in how they react to their friends. For example, girls tend to place higher importance on friendships characterized by emotional closeness than boys do (Benenson and Benarroch, 1998; Dornbusch, 1989; Lansford and Parker, 1999; Rose and Rudolph, 2006). This tendency is also reflected in the fact that girls' friendships tend to be organized in dyadic interactions whereas boys are inclined to interact in larger peer groups (Maccoby, 1990; Rose and Rudolph, 2006). Therefore, it is likely that boys and girls employ different friendship selection criteria. Furthermore, past research suggests that boys and girls differ in their susceptibility to friends' influence (Eagly, 1987; Maccoby, 1990). Important heterogeneity in such effects may be overlooked if gender-specific effects are not studied systematically.

2. Theoretical background

2.1. Why students may prefer to select friends with similar academic achievement

Previous research among adolescents largely supports the notion that selection effects contribute to achievement similarity, as most studies found that adolescents are more likely to befriend peers with similar academic achievement (Dieterich, 2015; Flashman, 2012; Gremmen et al., 2017; Rambaran et al., 2017; Shin and Ryan, 2014; but see Fortuin et al., 2016). This tendency may stem from three different mechanisms.

First, similarity in academic orientation and motivation increases *mutual understanding* among students by facilitating communication and interaction due to shared knowledge and similar values (Newcomb, 1956; Thibaut and Kelley, 1959). Mutual understanding and effective communication in turn are important prerequisites for friendship formation (McPherson et al., 2001). By contrast, interaction is less effective among peers with diverging academic motivation; for example, a student with low academic aspirations may have troubles understanding his or her highly motivated peer's behavior (Flashman, 2012), such as focusing on doing homework and preparing for exams. His or her high-achieving counterpart, on the other hand, may not understand the low achiever's desire to spend his or her free time relaxing and hanging out instead of engaging in activities related to his or her academic success. This lack of shared values thus complicates effective interaction and communication, impeding friendship formation.

Second, while students may not necessarily be primarily interested in their friends' academic achievement, they may interpret achievement as a *signal* for other desirable but less observable characteristics (Flashman, 2012; Lomi et al., 2011). For instance, students may infer a peer's trustworthiness or their broader character and related patterns of spending their leisure time from his or her academic performance (Lomi et al., 2011). For example, low-achieving students may perceive their high-achieving peers as serious and boring. Preferring friends who are as easygoing as themselves, they may seek to befriend other low-achieving students rather than their academically more successful schoolmates. Therefore, academic achievement might affect friendship formation because students perceive it as a signal for hard-to-observe characteristics.

Third, preferences for friends with similar academic achievement may result from an *instrumental* approach to friendship formation (Harris, 2010; Shin and Ryan, 2014). From this perspective, students with a positive academic orientation are likely to befriend other high-achieving peers, as these peers provide resources that help them to boost or uphold their own academic achievement (Dieterich, 2015). Students with a low academic motivation, by contrast, may be less eager to form friendships with well-performing peers since they attach less value to the academic resources that could be provided by these friends. High-performing students' lack of interest in friendships with low-achieving peers may further prevent such relationships. Theories of social exchange (Homans, 1974; Thibaut and Kelley, 1959) suggest that high-achieving students may not regard friendships with low-performing peers as attractive because they do not receive sufficient resources from them (Hartl et al., 2015). Anticipating refusal of high-achieving peers to befriend them, low-achieving students may have to turn to other low-performing ones.

In sum, these arguments let us expect that *students with similar academic achievement are more likely to become or stay friends than students with dissimilar academic achievement* (Hypothesis 1).

2.2. Why students may adapt to their friends' academic achievement

Besides selection, influence is the second potential source of similarity in academic achievement among friends, with individual achievement assimilating to friends' academic achievement over time (Kiuru et al., 2008). Again, most previous network studies on achievement similarity suggest that influence indeed contributes to clustering according to achievement (Fortuin et al., 2016; Gremmen et al., 2017; Rambaran et al., 2017; Shin and Ryan, 2014; but see Dieterich, 2015). Like selection effects, influence effects may operate through three different mechanisms.

First, influence may stem from the achievement *norms* that are prevalent in peer groups (Dieterich, 2015; Dokuka et al., 2015; Flashman, 2012). While striving for academic achievement may be a common goal in some peer groups, other groups may attach more value to non-academic activities such as having fun or hanging out. Such norms encourage the assimilation of friends' academic achievement in two ways. On the one hand, norms operate through peer pressure, with peers rewarding behavior that mirrors their own achievement orientation and sanctioning deviant behavior, for example by means of teasing or gossiping (Brechwald and Prinstein, 2011; Kiuru et al., 2008; Ryan, 2000, 2001). On the other hand, students may be intrinsically motivated to adapt to the achievement norms of their friends, as they prefer to be like them (Brechwald and Prinstein, 2011; Kiuru et al., 2008).

Second, *exchange* of information and ideas among friends may lead to increased similarity of their academic achievement over time (Altermatt and Pomerantz, 2003; Ryan, 2000). For example, their friends' school-related efforts may make students think about the meaning and importance of educational outcomes (Hasan and Bagde, 2013; Ryan, 2001). Discussions among friends about the importance of education may further contribute to the alignment of students' perceptions of the value of education with that of their friends (Berndt et al., 1990; Kiuru et al., 2008), with corresponding consequences for academic achievement. In contrast, having friends with non- or even anti-academic orientations may make students doubt the value of academic achievement.

Third, friends' achievement may become similar over time because of the *support* and education-related *resources* that friends provide (Frank et al., 2008; Hasan and Bagde, 2013). For example, high-achieving peers may help their friends with demanding learn-

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