Stability and Change in Student Classroom Composition and Its Impact on Peer Victimization

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Although peer victimization in school mainly takes place between children in the same classroom or grade and bullying is generally seen as a group process, little is known about how stability and change in classroom composition affect peer victimization. Hence, this study addressed the following questions: (a) Are newcomers in the classroom more likely to become victims? (b) Does a stable classroom, where children generally have the same classmates over time, lead to less change in bully nominations? To address these questions, this article examined 3 waves of bully nominations in a sample of 3,254 children (50% boys; age 8–12) in 31 elementary schools, displaying three types of schools: stable or unstable administrative or pedagogical multigrade. Both research questions were answered by longitudinal social network analyses of the school-wide networks. The meta-analyzed results of these analyses with small effect sizes showed that (a) although stable classrooms do not necessarily show less change in bully nominations than in unstable classrooms, victim-bully ties are more likely to develop among students in the same grade or same classroom and (b) newcomers were more likely to become victims, more so in unstable schools than in stable schools.

Educational Impact and Implications Statement
This study contributes to the existing bullying literature by providing first insights into the formation and development of bullying relationships within the school context by examining changes in victim-bully networks in schools that do and do not combine classrooms or grades over the school years. The findings of this study suggest that school and classroom stability and change have a minor impact on the formation of victim-bully relationships between children. Bullying relationships were found to develop most easily between children in the same grade, more so in stable classrooms than in classrooms with changing classroom composition, with no clear evidence that newcomers are more at risk of becoming victimized. The formation and development of bullying relationships among students within the same grade was weakest in unstable pedagogical multigrade schools, after controlling for school size. These findings may be beneficial to schools that consistently deal with changing compositions in their student population and highlight that a context-specific approach may be necessary to tackle bullying in stable and unstable schools.

Keywords: social networks, peer victimization, student classroom composition, stability and change, childhood

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Peer victimization is widespread in elementary schools across the world. Although prevalence of peer victimization at school varies between countries, figures from nationally representative samples in Europe and North America show that on average 30% of children are occasionally victimized by schoolmates and 10% are chronic victims (Chester et al., 2015). The long-term effects of peer victimization can be devastating for victims of school bullying, including poor academic functioning, anxiety, depression, and
future delinquent and aggressive behavior (Ladd, Ettekal, & Kochenderfer-Ladd, 2017; McDougall & Vaillancourt, 2015; Wolke & Lereya, 2015). Prevention efforts to stop bullying behavior has been at best moderate, making it an ongoing concern for schools, teachers, and parents (for a review see Rivara & Le Menestrel, 2016). It is, therefore, important to understand when and under what conditions bullying emerges and persists.

Peer victimization is largely studied as phenomenon that takes place between classmates (Salmivalli, 2010). Yet, little is known about how the school or classroom context affects peer victimization (Juvonen & Graham, 2014). A contextual factor to consider is stability of the classroom composition across the school years. It is reasonable to expect that classroom composition changes are likely to impact the interactions between children because it minimizes their opportunities to connect with each other (Valente, 2012).

Using individual-level bullying measures, previous research found lower self-reports of bullying and victimization among students who moved to a different location during the transition to middle school compared with students who stayed in the same school (Farmer, Hamm, Leung, Lambert, & Gravelle, 2011; Wang, Brittain, McDougall, & Vaillancourt, 2016). An explanation is that such transitions break up the dominance structures and the accompanying bullying. Bullying may also be the reason why children move to a different school. Thus, changing the classroom composition may break up victim-bully relationships and help in reducing bullying.

Researchers increasingly recognize that bullying is relational, and that a relational approach allows for a more nuanced understanding of who bullies whom in the classroom (Rodkin, Espelage, & Hanish, 2015; Veenstra et al., 2007). Bullies target specific victims, particularly the classmates with the weakest positions, and victim-bully ties are also subject to change over time (Huitsing, Snijders, van Duijn, & Veenstra, 2014; Rambaran, Dijkstra, & Veenstra, 2019). Classmates generally have a good sense of each other’s social positions (Farmer, Lines, & Hamm, 2011), and it is reasonable to assume that this is greater in a stable classroom (Farmer, Hamm, et al., 2011). In addition to established classroom members with weak positions, newcomers may also suffer from an initially weak social status when transitioning to a new school environment, although still relatively little is known about this group.

We examine the dynamics in victim-bully relationships and focus on individual effects (newcomers) and dyadic effects (number of times a child shared the same classroom with a peer) that capture the complexity of stability and change in classroom composition. To this end, we examine three waves of victim-bully relationships in a sample of elementary schools in middle to late childhood that differ in the extent to which students are organized in same or different classrooms over time, using longitudinal social network analysis.

**Positions in Peer Groups in Middle and Late Childhood**

Middle and late childhood is an important developmental period in which children develop social skills that help them establish positive peer relationships. During this period, children become more aware of their own and other’s position in the peer group (Kolbert & Crothers, 2003). Within the school context, peer groups are largely formed within the classroom as children spend most of their school time there. The way children behave and interact with each other plays an important role in how positions and roles are defined (Farmer, Hamm, et al., 2011). During the middle and late childhood period, children differentiate peers who are prosocial (referring to being nice and cooperative), from peers who are coercive (referring to being harmful and aggressive), to obtain social positions in the group based on social status and acceptance from peers (Howley, 1999). Both behaviors form the basis for youth in defining positions and roles in the classroom. For instance, children who are generally prosocial may receive more friendships and likes, which makes others perceive them as social leaders among peers. However, children differ in their abilities to be prosocial, and, some may turn to coercive (aggressive) strategies to obtain dominant positions among peers, most likely by bullying others in the group. Bullies are considered to be socially skilled children that use proactive aggressive strategies to obtain dominance and social status among peers (Sijtsma, Veenstra, Lindenberg, & Salmivalli, 2009). In doing so, bullies tend to enhance their position in the peer group by targeting weaker peers (Rodkin et al., 2015; Salmivalli, 2010; Veenstra, Lindenberg, Munnikema, & Dijkstra, 2010). Moreover, bullies often seek social support from peers that help them to maintain a high position, by becoming friends with others who join their bullying (Rambaran et al., 2019) and by receiving help against defenders of victims (Huitsing et al., 2014). Once positions are formed, children may settle with their group position, as bully, victim, or uninvolved. However, children’s positions and roles in the classroom are not necessarily stable and it is reasonable to assume that this depends on changes in the classroom composition.

**Classroom Composition Changes and Victim-Bully Networks**

Changes in the classroom composition and its impact on peer victimization may take different forms. To clarify this, it is important to consider school networks as nested structures with individual students nested in classrooms in schools. Of further importance is that peer victimization is nested in dyads as it describes a relationship between two students (e.g., student i nomintates another student j as his or her bully). Figure 1 provides an illustration of a school-wide victim-bully network with transitions across three school years. The network consists of 93 students clustered in five classrooms in Year 1 (T1) and Year 2 (T3), but four classrooms in Year 3 (T5) because the students in one classroom moved on to secondary education at T5. The students are represented with colored nodes, where each color represents a different classroom. Their victim-bully ties to each other are represented with directed arrows. Three of the five classrooms at T1 (Grade 2, 3, and 5) remained relatively stable over time (the students remained in the same class together over the school years). Two other classrooms with the same grade (Grade 5A and Grade 5B) were “mixed” at T3. In addition to changes at the classroom (or school) level (referring to classroom mixing), there are changes at the individual level. For instance, one student joins the classroom (network) at T3, whereas 17 students leave the (school) network (at either T3 or T5). As shown
in Figure 1, most victim-bully ties are clustered within classroom or grade, and the number of victim-bully ties gradually decreases over time.

To capture the above-described complexities and changes within a school victim-bully network, we examine the individual effect of being a newcomer, referring to students who enter a rather stable classroom, and the dyadic effect of same classroom before, referring to the number of times a student shared the same classroom with a peer. The same classroom now effect refers to students being in the same classroom only once; whereas the same grade effect refers to children being grademates. Together, these effects capture how changes in classroom composition affect changes in victim-bully relationships. This is done by including “regular” schools where children typically move classrooms in a following school year with most of their classmates from a previous year. In our study, these schools are referred to as stable schools as compared with other schools that (consistently) combine classrooms or grades, which are referred to as unstable schools. In addition, we take into account the multigrade classrooms based on administrative and pedagogical reasons. The distinction between the two types of classrooms is important as the motivation for having multigrade classrooms may affect the relation between change in classroom composition and peer victimization because of school climate (Rambaran, van Duijn, Dijkstra, & Veenstra, 2019a).

Individual Changes

The student population of classrooms change because of children who repeat a grade, skip a grade, or move houses. In addition, children may have to move to another school, because of low academic achievement, behavioral problems, special learning needs, or parents’ request (OECD, 2013). These individual changes affect the amount of change in classroom composition and ultimately children’s positions in the classroom. Children who are new in a classroom may experience more difficulties with social adjustment than established classroom members (Geven, Weesie, & van Tubergen, 2016; Lubbers, Snijders, & van der Werf, 2011). In a stable classroom, children generally know each other, as they have a shared history. Newcomers might experience more difficulties to integrate within the group and establish friendships. Therefore, we expected that in stable classrooms, newcomers are more likely to become targets for peer victimization (H1).

Classroom Changes

In a stable classroom context children know about each other’s positions, including whom to target (Farmer, Hamm, et al., 2011; Farmer, Lines, et al., 2011). This implies that, in such a context, once children have a weak position they cannot easily change that (Evans & Eder, 1993). In this situation, victims do not have a chance for a “fresh start” and cannot easily escape their bullies and

Figure 1. Transition of students (nodes) and their victim-bully ties (arrows) in classes in a stable (single-grade) school (*n* = 93 students) with two parallel groups that are mixed at T3. * For practical reasons (ease of interpretation), we removed eight isolates from the networks (students who were uninvolved in victim-bully ties from T1 to T5). Sec. Edu. = secondary education. See the online article for the color version of this figure.
remain socially isolated. Hence, a stable classroom group is likely to lead to persistent peer victimization. Stability in the classroom context may contribute to ongoing bullying of the same targets (Farmer, Lines, et al., 2011; Wang et al., 2016). In an early study, it was found that the stability of bullying behavior was weaker in low-stability classrooms (Salmivalli, Lappalainen, & Lagerspetz, 1998). More recent empirical findings point in the direction that higher group stability results in higher bullying (Farmer, Lines, et al., 2011; Wang et al., 2016). Yet, it remains unclear who the victims are because previous research focused on general bullying behavior.

In contrast to stable schools, some other (typically smaller) schools (yearly) combine classrooms or grades for practical reasons, for example, to deal with low enrollment and uneven classroom sizes (Mulryan-Kyne, 2007; Veenman, 1995). Classroom “mixing” greatly affects the amount of stability and change in classroom composition. Entering a new classroom context offers opportunities to reestablish group positions and hierarchies through bullying (Farmer, Hamm, et al., 2011). Bullying research on the effects of changing peer groups generally focused on the transition to middle or junior high school (Farmer, Hamm, et al., 2011; Pellegrini & Bartini, 2000; Pellegrini & Long, 2002; Wang et al., 2016). School transitions are a risk period for peer victimization because existing peer groups are reshuffled and new social structures are established that are linked to bullying, as children compete over status through bullying in a new social environment (Farmer, Hamm, et al., 2011; Farmer, Lines, et al., 2011; Pellegrini, 2002; Pellegrini & Bartini, 2000; Pellegrini & Long, 2002). Reshuffling of peer groups or classrooms results in loss of existing friendships (Neckerman, 1996), which may lead to adjustment problems for victims (Hodges, Boivin, Vitaro, & Bukowski, 1999), as in a new classroom environment victims may find it difficult to find new friends. At the same time, it may also provide an opportunity to escape from their previous bullies. This is probably a reason why children reported less bullying and victimization if they changed classrooms (Farmer, Lines, et al., 2011; Wang et al., 2016). Following this line of reasoning, we expected that, in stable schools as compared with unstable schools, victim-bully relationships are more likely to be formed among children who are in the same classroom over multiple school years (H2).

In a stable school context, same classroom typically refers to same grade (referring to same classmates within the same grade). However, same-grade victim-bully relationships may occur also outside the own classroom when there are multiple classrooms of the same grade in the same school (see, e.g., the two Grade 4 classes 4A and 4B at Time 1 in Figure 1). In this perspective, same-grade students to be victimized by higher-grade students (H5).

In addition, research points in the direction that in a stable school environment, higher-grade students in school seek out lower-grade victims because they form an easy target (Huiting et al., 2014). In view of this power imbalance, we expected lower-grade students to be victimized by higher-grade students (H5).

School Climate

The hypothesized effects described above (individual newcomer, and dyadic same classroom before, same classroom now, and same grade) may vary between school types because of school climate. The evolutionary model of risky child/adolescent behavior (Ellis et al., 2012) posits that mixed-age settings, rather than age-segregated school and peer environments, are the natural context for child development. The presence of both older and younger children in mixed-age settings provides a natural hierarchy based on age. In this context, both older and younger children settle more easily with their position in the social group, which decreases the tendency to compete for dominance and status. Evolutionary psychologists argue that older children can serve as positive role models, and that the positive association between status and prosocial behavior reduces the need to gain status through antisocial means. When older children are assigned to younger children as caregivers, buddies, or playmates, they tend to behave less aggressive and more prosocial towards younger children and same-age peers in other contexts as well (Gray, 2011). Thus, the presence of younger children in mixed-age settings reduces aggression and promotes nurturance and compassion in children (Gray, 2011). In contrast, age-segregated schools and peer environments, such as stable schools (with single-grades), have been argued to evoke aggression and conflict in children, and, in such a stable classroom context, children may actively search for dominance (Ellis et al., 2012).

We distinguish unstable schools with administrative multigrade (mixed-age) classrooms from schools with pedagogical multigrade classrooms because the latter aims to stimulate prosocial relations among children by encouraging the provision of help across grades within the same classroom (Gray, 2011; Lillard & Else-Quest, 2006), whereas schools with administrative multigrade classrooms do not have such an explicit goal (Mulryan-Kyne, 2007; Veenman, 1995). By contrast, teachers in administrative multigrade classrooms were generally found to teach the grades separately (Mulryan-Kyne, 2007; Veenman, 1995), which decreases opportunities for prosocial behavior between older and younger children as such multigrade classrooms emphasize individualized work and do not necessarily encourage interactions between children from different grades (Juvonen, 2018). Schools with pedagogical multigrade classrooms also encourage inclusive behavior, which reduces the probability of (repeated) victims or students who enter a new classroom environment (newcomers) being rejected. The findings of a recent study show that schools engaged in practices to promote inclusiveness and equity as a school program foster positive relationships (Rivas-Drake, Saleem, Schaefer, Medina, & Jagers, 2019). Moreover, a positive school climate, for instance through school and student support, community building, and cooperative learning, was shown to reduce the prevalence of peer victimization (Cornell, Shukla, & Konold, 2015; Fink, Patalay, Sharpe, & Wolpert, 2018; Van Ryzin & Roseth, 2018). Following this line of reasoning, we expected to find smaller effects (indi-
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vidual, classroom, and grade) in schools that formed multigrade classrooms based on pedagogical reasons compared with stable schools or schools that formed multigrade classrooms based on administrative reasons (H6).

The Present Study

We investigate the extent to which stability and change in classroom composition affects the formation of victim-bully relationships among children. We address the following questions: (a) Are newcomers in the classroom more likely to become victims? (b) Does a stable classroom, where children generally have the same classmates over time, lead to less change in bully nominations? To address our research questions, we used a large data set from the Netherlands and selected schools that differ in the extent to which students are organized in same or different classrooms across three school years. We defined three types of schools in the available data: (a) schools that generally form single-grades and are relatively stable in terms of classroom composition, and schools that are relatively unstable in terms of classroom composition because of generally forming multigrades either for (b) administrative or (c) pedagogical reasons. Based on information provided by the school office about the school’s educational philosophy, only schools that mentioned to have a specific educational philosophy were considered as multigrade for pedagogical reasons (e.g., Montessori or Jenaplan schools).

We tested our hypotheses by investigating the changes in victim-bully relationships in three measurements of social networks containing students’ bully nominations (“By whom are you victimized?”). We analyzed the longitudinal social network data using SIENA (Simulation Investigation for Empirical Network Analysis; Snijders, van de Bunt, & Steglich, 2010; Steglich, Snijders, & Pearson, 2010). We controlled for sex and grade (age), because it is relevant in victim-bully relationships, with boys being more dominant and aggressive toward girls (Cook, Williams, Guerra, Kim, & Sadek, 2010) and higher-grade (older) students in school may be seeking out lower-grade (younger) victims because they form an easy target (Chaux & Castellanos, 2015; Huitsing et al., 2014).

Method

Sample

Schools were drawn from the Dutch KiVa study (Huitsing et al., 2019; Kaufman, Kretschmer, Huitsing, & Veenstra, 2018; Rambaran et al., 2019a) in three consecutive years (Spring, 2012, 2013, and 2014, corresponding to Wave 1, 2, and 3, and 5). KiVa is an intervention program, originally developed in Finland (Kärnä et al., 2011, 2013), and aimed to reduce bullying among children from Grades 2–5 in elementary education (7–11 years) in the Netherlands. As part of the intervention program, the participating schools (n = 99) were randomly assigned by the Netherlands Bureau for Economic Policy Analysis (CPB) to either the control condition (33 schools) or to the intervention condition (66 schools). The 33 control schools were selected for the analysis to avoid that differences between schools were a result of the intervention (Kaufman et al., 2018; Rambaran et al., 2019a). Two control schools were dropped: one school did not participate after Wave 4, and in another school, 35 of the children participating in Wave 1 (12.5%) transitioned from a control school to an intervention school, which made the school a special case and unfit for comparison.

The 31 remaining schools, with 3,254 students (school size varies between 36 and 276) over the 3 years, were categorized as stable (n = 8; 1,203 students), unstable administrative multigrade (n = 18; 1,436 students), and unstable pedagogical multigrade (n = 5; 615 students). Of all students, 49.9% were boys, the average age of the sample at T1 was 9.6 years (SD = 1.4), 76.1% of students were native Dutch, 18.5% were non-Dutch (minority), and for 7.3% information about their parent’s ethnic background was missing.

Of the 2,607 Grade 2–5 students who were targeted to participate in the KiVa control sample in T1 (the “eligible participants”), 2,562 students (98.3%) participated at T1 (Grade 2–5 in May, 2012), 2,415 (92.6%) at T3 (Grade 3–6 in May, 2013), and 1,734 (66.5%) at T5 (Grade 3–6 in May, 2014). The significant drop in participation rate at T5 is because Grade 6 students at T3 continued their educational career in secondary education. The difference between the total sample size of 3,254 students and the number of “eligible participants” at T1 is explained by classroom composition changes (students who joined the school at later time points), and inclusion of students (mainly students who were in Grades 1 or 6 at T1) who did not participate themselves but could be nominated (as bully) by peers.

On each measurement occasion, in an instructional movie, a professional actress explained to students what bullying means, using the following text:

Bullying is when some children repeatedly harass another child. The child who gets bullied has problems defending itself against this. Bullying is not the same as having a fight between two people who are equally strong. Bullying should also not be confused with joking around. Bullying is treating someone repeatedly in a mean way.

Several examples of bullying were given to students, including physical and material forms (e.g., hitting someone, kicking or pinching; stealing or damaging someone’s belongings) and relational and verbal forms (e.g., making fun of someone, calling names, saying mean things; gossip about someone; excluding from social activities).

Procedure

Students filled in an Internet-based questionnaire in their classroom during regular school hours. The process was administered by the teachers, who were present to answer questions and to assist the students when needed. Before the data collection, teachers were given detailed instructions concerning the procedure. During the data collection, support was available through phone and e-mail.

At the beginning of the questionnaire, students received information about the goal of the study, and how to fill in the questionnaire. They were told not to talk to each other or to discuss their answers when they filled out the questionnaire or afterward to ensure each other’s privacy. It was explained to students that their answers would remain confidential. The teachers ensured that students who could not complete the questionnaire at the day of the data collection participated at another day within a month.
Before the first measurement (and for students who were new in school, after the first measurement), schools sent information letters to students’ parents. A passive consent procedure allowed students or parents to opt out of student participation. At the start of data collection (2012), universities in the Netherlands did not require Institutional Review Board (IRB) permission for this type of research. All procedures performed in this study were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. A few students did not want to participate; also a few parents objected to their child’s participation. Accordingly, for the first wave participation rate among the “eligible participants” was high (98.3%).

Measures

**Dependent variable.** Peer victimization was measured with network nominations for bullying following a two-stage procedure. To identify the victims for the second stage (the nomination procedure, detailed below), all participating students were first asked to indicate how often they were victimized in general in the previous months (T1 and T5: “since the Christmas break”; T3: “since the summer break”), according to Olweus’ (1996) self-reported bullying items, and, to indicate this for specific forms of victimization; physical harm (e.g., kicked), verbal harm (e.g., name calling), relational harm (e.g., gossiping), and cyber victimization. Answers were given on a five-point scale: (1) “Not at all,” (2) “Once or twice,” (3) “Two or three times a month,” (4) “Once a week,” and (5) “Several times a week.” If participants indicated that they were victimized by classmates at least “once or twice” (score 2) on any item, they were presented with a roster showing the names of all classmates, and asked whom of their classmates victimized them (referring to “By whom are you victimized?”). In addition, respondents could type in the names of other schoolmates who victimized them by typing in the first letters of their names on the computer screen (a name generator was used). In this nomination procedure, victims nominated their bullies as perceptions and experiences of victims particularly matter. For that reason, we look at bullying by the point of view of the victim. Bullying nominations were measured as present (1) or absent (0). Students who indicated not being victimized by classmates or other schoolmates did not fill out the nomination question. Their “answers” were considered as absent nominations. Based on these nominations, school-wide victim-bully (referring to victim sender and bully receiver) networks were obtained containing all bully nominations in a school or classroom (from the victim’s perspective). The obtained school-wide victim-bully networks were used in the longitudinal social network analysis.

**Explanatory variables.** Individual (newcomers) and dyadic (same class before, same class now, and same grade) variables were constructed to examine whether and to which extent stability and change in student classroom composition affects changes in victimization relations.

**Newcomers.** We determined for students to which extent they were new in school (transferred from another school) or in a classroom (transferred from another classroom in the same school). This was done by calculating the proportion of classmates with which each student remained together in the same classroom across two consecutive school years (referring to between T1 and T3, between T3 and T5). After subtracting the proportion scores from 1, we obtained a continuous covariate that ranged from 0 (students share a classroom with all of their classmates from a previous school year) to 1 (students do not share a classroom with classmates from a previous school year; newcomers).

**Same class before.** We determined for every pair of students in school how long they had been together in the same classroom, by counting the shared classrooms at T3 (0 or 1) and T5 (0, 1, or 2).

**Same grade and same class now.** These two binary dyadic variables indicate whether pairs of children are currently (at T3 and T5) in the same classroom or grade.

**Control variables.** We included sex (1 = boy). Students’ grade was obtained from the school’s office.

Analytic Strategy

The stochastic actor-based model implemented in SIENA allows us to examine to which extent changes in victim-bully networks are related to endogenous network effects (e.g., reciprocity) and exogenous individual (newcomers and sex) and dyadic (number of shared classrooms and grade) effects that may explain the changes in the ties in these networks.

School network is the unit of analysis. In most schools, student classroom composition change (Figure S1 in the online supplemental materials), particularly in schools that mixed or combined classrooms over time. To facilitate the composition changes in each school, we analyzed each school network including the participants who were present at the first observation moment as well as students who joined or left the networks at the third or fifth observation. In addition, students who were not part of the study design at T1 (the “eligible participants”) but were part of a combination group were also included because they could be nominated as bully by schoolmates, making them part of a school victim-bully network. This enabled us to make full use of the available information and to analyze the networks according to the “method of joiners and leavers,” which uses information about composition changes in an efficient way (Huisman & Snijders, 2003; Ripley, Snijders, Boda, Vörös, & Preciado, 2019). Each school network was estimated with the same model specification. In some (larger) school networks, however, additional effects were necessary to achieve acceptable model fit. Ultimately, all models showed good convergence and fit statistics (see for details Table S2 and Figure S3 in the online supplemental materials). Goodness of fit (GoF) was examined using four network statistics: outdegree distribution, indegree distribution, geodesic distance, and triad census, by investigating how well these statistics are captured in a sample of networks simulated according to the estimated model. For each of these statistics, the differences between the values in the observed school network (summed across the three waves of data) and the estimated values (summed across 1,000 simulated networks) are assessed with the Mahalanobis distance (Ripley et al., 2019). Fit for a particular statistic is good or acceptable when the Mahalanobis is small as expressed by a p value larger than .05. The violin plots in Figure S3 in the online supplemental materials can be used for a graphical inspection of the departure of the simulated values from the observed value of the statistics (in red). A good network fit is essential to interpret the effects of main interest more reliably.
The effects were first analyzed for each school network separately, and the parameter estimates were then summarized with a meta-analysis using R-package metafor (in a random effects model using the default REML function; Viechtbauer, 2010). Two analyses were performed: one “simple” model (without covariates) rendering the mean model parameter estimates, obtained in the SIENA analysis per school with the accompanying standard errors as weights as well as a test for between-school heterogeneity, and a model with school type and school size as “explanatory variables” (that can best be understood together, referring to a combination of school type and school size). We controlled for school size because unstable schools are generally smaller compared with stable schools. Thus, to understand the effects of unstable schools school size was taken into account.

Model Specification and Effect Interpretation

To adequately capture important features of the victim-bully networks, we followed previous research in choosing the structural parameters in the stochastic actor-based models (Huitsing et al., 2014; Rambaran et al., 2019). Several structural network effects were included to account for changes in the overall network structure. Network rate effects indicate the number of changes in the victim-bully networks. Out-degree (density) is included to indicate that students start sending bully nominations to schoolmates (victim \(i\) nominates \(j\) as his or her bully). Out-degree isolates is included to inversely indicate that students are not likely to start sending bully nominations to schoolmates (nonvictimized students or having zero out-degree). By including these three basic structural effects, it was possible to capture many of the network properties of the school-wide victim-bully networks (as indicated by fit statistics). For most school networks, one or two additional effects were necessary to capture dispersion in out- or in-degrees (referring to individual differences in sending and receiving bully nominations).

Next to these structural effects, we included effects related to sex and grade, to account for sex and grade differences in victim-bully ties by including alter, ego, and similarity effects. The alter and ego effects indicate that boys or higher-grade students are more likely to receive and send bully nominations than girls or lower-grade students; the same-sex and same-grade effects indicate that victim-bully ties are more likely to be formed among same-sex or same-grade students than among cross-sex and cross-grade students. The combination of these three effects is necessary to adequately capture selection tendencies based on sex and grade in the victim-bully networks (Snijders et al., 2010).

Are newcomers in the classroom more likely to become victims? To answer our first research question, we included an ego effect for newcomers. This newcomer ego effect assessed whether newcomers were more likely to start sending bully nominations than established classroom members (H1).

Does a stable classroom lead to less change in bully nominations? To answer our second research question, we included three parameters. To test H2, the same class before effect assessed whether the formation of victim-bully ties was more likely among students who had been classmates before. To test H3, the same grade effect was included. To test H4, the same class now effect, tests whether changes in victim-bully ties are more likely among same classmates being in the same classroom concurrently.

Additional analyses. To assess effect sizes, we calculated the relative importance of each effect on the probability of a tie change (Indlekofer & Brandes, 2013). For this analysis, each school was analyzed using the exact same model specification to ensure the comparability of model parameters and relative effect sizes across schools. The parameter estimates of these models were not very different from those in the full models (see online supplemental materials Table S6 and Table S8).

Results

Descriptive Analysis

Table 1 summarizes the descriptive information on the sample and network characteristics. Table S4 in the online supplemental materials provides information for each school separately. Table S5 in the online supplemental materials summarizes this information per school type (stable, unstable administrative multigrade, and unstable pedagogical multigrade).

The density of the school-wide victim-bully networks was relatively low (average density was .019 at T1; see Table 1), which is because density takes into account network size. At the first time point, children nominated on average 1 to 2 other schoolmates who victimized them (average degree); this varied between schools (minimum = 0.6, maximum = 3.5; see Table 1). Children’s involvement in victim-bully relationships decreased over time: whereas most children at Time 1 received a bully nomination (sinks), sent one (sources) or both sent and received one (actives), this was no longer the case at Time 3 and Time 5 (increasing number of isolates).

Victimization occurred equally often among same-sex and cross-sex peers per and between school types (Table S5 in the online supplemental materials). Occurrence of victimization was also similar across school types, whereas same-grade victimization was higher in stable schools compared with the two unstable school types. Almost three-quarters of victim-bully ties were within classroom, and this was similar in all three school types. Victim-bully ties were unstable from one time point to the next: Many new victim-bully ties were created, and even more victim-bully ties dissolved each school year. This can also be seen in Figure 1, where the number of victim-bully ties decreases significantly over time. Only about 10% of the victim-bully ties were stable from one time point to the next. This did not much differ between the three school types (Table S5 in the online supplemental materials). Over 50% of the victim-bully ties at Time 3 and Time 5 were between children who had shared the same class before; this was higher in stable schools than in unstable (administrative and pedagogical multigrade) schools.

SIENA Analysis

Table 2 provides the summary of the SIENA findings (using RSiena Version 1.1–307), meta-analyzed over the 31 school-wide victim-bully networks. The first column in Table 2 shows the mean estimates across all schools. The next column shows the mean estimates across stable schools (as reference), the three other columns show the degree to which administrative multigrade
schools and pedagogical multigrade schools deviate from this, taking into account school size. Findings are also summarized for the three different types of schools (stable, unstable administrative multigrade, and unstable pedagogical multigrade), and this will be used to discuss differences in the four effects of main interest (newcomers, same class before, same class now, and same grade).

Figure S7 in the online supplemental materials provides forest plots of these analyses, which are used to inspect outliers.

**Network effects.** The rate effects indicate that the average number of changes in bully nominations was 18 between the school years (T1–T2 and T3–T5), with significant variation between schools. In accordance with the low density of the victim-bully networks, the negative outdegree (density) effect indicates a low probability of students sending bully nominations to schoolmates. The accompanying negative outdegree-isolates effect indicates that students who were not victimized tended to remain nonvictimized. Compared with stable schools, density and isolates effects were stronger (positive) in smaller schools, which typically corresponded with unstable (administrative and pedagogical multigrade) schools.

**Sex effects.** The three included sex-selection parameters in Table 2 (sex ego effect, sex alter effect, and same sex effect) are interpreted with so-called ego-alter selection tables, representing the relative contribution to the evaluation function for the four alter and ego sex combinations (Ripley et al., 2019). The positive values on the diagonal in the left panel of Table 3 show that victim-bully ties were more likely to be formed among students of the same sex. This was similar between the three school types. In addition, Table 3 also shows that girls were rather victimized by boys (positive value for girl sender to boy receiver) than vice versa, more so in pedagogical multigrade schools than in the two other school types.

**Individual effects.** We expected that newcomers would be more likely to become victims in schools where the group or classroom is stable over time rather than unstable (H1). The summary across all schools in Table 2 shows a positive (nonsig-
A positive effect one time point to the next. As a possible solution, the rate parameters were fixed at the observed value (see Ripley et al., 2019). b School size was mean centered around the rounded mean school size of the reference category (here stable schools). Intercept represents the “baseline effect” of the reference category. Using density as an example, a 10-unit (estimates and standard errors were multiplied by 10 for convenience) increase in school size (referring to +10 above the rounded mean school size of stable schools, which was 150) results in a −.13 decrease in density in terms of the average effect estimate for a particular school type.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Illustration</th>
<th>n</th>
<th>All schools</th>
<th>Stable schools (intercept)</th>
<th>Unstable administrative multigrade schools</th>
<th>Unstable pedagogical multigrade schools</th>
<th>School size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate effects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network rate w1–w3</td>
<td></td>
<td>28</td>
<td>18.53***</td>
<td>1.34*</td>
<td>22.06***</td>
<td>2.34*</td>
<td>−2.25</td>
</tr>
<tr>
<td>Network rate w3–w5</td>
<td></td>
<td>27</td>
<td>18.37***</td>
<td>2.35*</td>
<td>22.54***</td>
<td>3.59*</td>
<td>−4.4</td>
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<td></td>
</tr>
<tr>
<td>Density</td>
<td></td>
<td>31</td>
<td>−3.88***</td>
<td>−0.29</td>
<td>−5.28***</td>
<td>0.33</td>
<td>1.24**</td>
</tr>
<tr>
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<td>−4.06***</td>
<td>0.18</td>
<td>−4.73***</td>
<td>0.30</td>
<td>0.77*</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sex (boy) alter</td>
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<td>−0.40***</td>
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<td>−0.41**</td>
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<td>−0.08</td>
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<tr>
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<td>−0.16</td>
<td>0.12</td>
<td>−0.01</td>
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<tr>
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<td>0.28***</td>
<td>0.08</td>
<td>0.22**</td>
<td>0.13</td>
<td>0.20</td>
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<tr>
<td>Individual effects</td>
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<td></td>
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<td>Newcomer ego</td>
<td></td>
<td>31</td>
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<tr>
<td>Grade effects</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade alter</td>
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<td>0.15**</td>
<td>0.06</td>
<td>0.22</td>
<td>0.10</td>
<td>−0.11</td>
</tr>
<tr>
<td>Grade ego</td>
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<td>31</td>
<td>−0.15**</td>
<td>0.05</td>
<td>−0.21</td>
<td>0.10</td>
<td>0.11</td>
</tr>
<tr>
<td>Same grade</td>
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<td>1.13***</td>
<td>0.11</td>
<td>1.44***</td>
<td>0.17</td>
<td>−0.45*</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same class now</td>
<td></td>
<td>31</td>
<td>0.03</td>
<td>0.11</td>
<td>0.34†</td>
<td>0.18</td>
<td>−0.25</td>
</tr>
<tr>
<td>Same class before</td>
<td></td>
<td>31</td>
<td>0.02</td>
<td>0.09</td>
<td>−0.03</td>
<td>0.14</td>
<td>0.16</td>
</tr>
<tr>
<td>Number of schools</td>
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<td>8</td>
<td>18</td>
<td>18</td>
<td>5</td>
<td>3.254</td>
</tr>
<tr>
<td>Number of students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows small (nonsignificant) effects of same class now and same class before. Contrary to our expectation, no evidence was obtained for an additional effect on victim-bully relationships being formed between students who shared the same class before (H2). The same class before effects were not larger in stable schools compared with the two other unstable school types, when taking into account their present classroom sharing status. The effect was stronger in larger schools (Figure S7.M). The same class now effect was positive in the four largest stable schools (Figure S7.L), indicating that victim-bully ties occurred between children who were currently (at T3 and T5) in the same classroom. This effect was as expected (H4) and stronger in larger schools.

### Classroom effects

The summary across all schools in Table 2 shows small (nonsignificant) effects of same class now and same class before. Contrary to our expectation, no evidence was obtained for an additional effect on victim-bully relationships being formed between students who shared the same class before (H2). The same class before effects were not larger in stable schools compared with the two other unstable school types, when taking into account their present classroom sharing status. The effect was stronger in larger schools (Figure S7.M). The same class now effect was positive in the four largest stable schools (Figure S7.L), indicating that victim-bully ties occurred between children who were currently (at T3 and T5) in the same classroom. This effect was as expected (H4) and stronger in larger schools.

### School climate: Administrative versus pedagogical multigrade schools

Finally, we expected to find smaller classroom effects in schools that formed multigrade classrooms based on pedagogical reasons compared with schools that formed multigrade classrooms based on administrative reasons (H6). Our findings provided some evidence for this for same-grade victimization (Figure S7.J), whereas the difference in parameter estimates as shown in Table 2 is not significant. It should be noted, however, that this finding is based on a small sample (only five pedagogical multigrade schools were included).

### Relative importance of effects

Network structure is the most important determinant of change in the school-wide victim-bully networks (Figure S9 in the online supplemental materials). Con-
Effects depend on stability of the classroom composition. In Figure 2, no indication was obtained that the strength of all schools. In view of the absence of a pattern in the relative dyadic effects, same grade was the most important, although not for explaining changes in victim-bully ties. In particular, of the three dyadic effects, were more important than individual effects in general social network analysis. In doing so, our study contributes to understanding the formation of victim-bully relationships. Following a relational approach, victim-bully relationships were examined with longitudinal social network analysis. In doing so, our study contributes to the existing bullying literature by providing first insights into the formation and development of victim-bully relationships within the school context by examining changes in victim-bully networks in schools that do and do not combine classrooms or grades over the school years.

### Are Newcomers in the Classroom More Likely to Become Victims?

Although based on a small number of schools and not significant, the results indicate that newcomers in unstable (administrative and pedagogical multigrade) schools are at risk to become victimized by peers. In stable schools on the other hand, victimization occurs mainly between students in the same grade, with no indication for newcomers being more at risk. An explanation is that a new classroom context, for example, through school transitions, can be a stressful event for many children by disrupting their friendships with peers (Benner & Graham, 2009; Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). These negative experiences are associated with loneliness and stress that form risk factors for peer victimization (Farmer, Hamm, et al., 2011; Farmer, Lines, et al., 2011; Wang et al., 2016). Research also shows that some children are affected by classroom changes because of disrupted social hierarchies, which requires them to “reestablish” their social position by engaging in aggression or bullying (Pellegreni, 2002).

### Table 3

Bully Nominations Based on Sex (Left) and Grade (Right) Summarized Across All 31 School-Wide Victim-Bully Networks and for the Three Different School Types

<table>
<thead>
<tr>
<th>Bully sex</th>
<th>Bully grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>victim</td>
<td>Grade 2</td>
</tr>
<tr>
<td>Girl (0)</td>
<td>.17</td>
</tr>
<tr>
<td>Boy (1)</td>
<td>-.29</td>
</tr>
<tr>
<td>C: unstable administrative multigrade schools (18 schools, 1,436 students)</td>
<td></td>
</tr>
<tr>
<td>Girl (0)</td>
<td>.10</td>
</tr>
<tr>
<td>Boy (1)</td>
<td>-.28</td>
</tr>
<tr>
<td>D: unstable pedagogical multigrade schools (5 schools, 516 students)</td>
<td></td>
</tr>
<tr>
<td>Girl (0)</td>
<td>.32</td>
</tr>
<tr>
<td>Boy (1)</td>
<td>-.27</td>
</tr>
</tbody>
</table>

Note. The values on the diagonal indicate the likelihood of bully nominations when the individual and peer have exactly the same score on sex or grade. The values in the cells in these tables can be transformed to odds by taking the exponential function (exp(\(k\)); calculation based on the estimates in Table 2. A Table S2 in the online supplemental materials reports the model specification with all the effects.
Classroom mixing may impact positive relationships between students as it could lead to a loss of friendships (Neckerman, 1996), which seems especially problematic for the victims (Hodges et al., 1999; Pellegrini, Bartini, & Brooks, 1999; Sainio, Veenstra, Huitsing, & Salmivalli, 2011). It is plausible that the dispositional or behavioral characteristics of newcomers, for instance, being aggressive, withdrawn, or previously victimized (Geven et al., 2016; Lubbers et al., 2011) are part of the explanation for why newcomers might become a target of victimization. Moreover, other behavioral or reputational risks for victimization, such as low acceptance or an isolated position in the group (e.g., no or few friends), may increase the chance of being victimized. Although not an easy task, taking these individual factors into account in the study of victim-bully networks might lead to a more nuanced understanding of the effects of newcomers in terms of victimization in school. At the same time, classroom mixing offers an opportunity for victims to find new friends or defenders that help victims against a vicious cycle of victimization and its negative experiences (Hodges et al., 1999; Pellegrini et al., 1999; Sainio et al., 2011). An avenue for further research is to understand how victim-bully relationships develop in the context of friendships within stable and unstable schools (for an example in stable peer groups see Rambaran et al., 2019).

**Does a Stable Classroom Lead to Less Change in Bully Nominations?**

To answer our second research question, we tested complementary hypotheses. First, contrary to our expectation, the analyses provided no evidence that students who shared the same class before (referring to the number of shared classrooms) were more likely to be victimized in the stable schools as compared with unstable schools. An explanation might be that change in victim-bully ties is high, as shown in our analysis, and in line with previous findings (Huitsing et al., 2014; Rambaran et al., 2019). In light of bullying as strategic and goal-oriented behavior (Salmivalli, 2010; Sijtsema et al., 2009; Veenstra et al., 2010), recent research on the dynamic network interplay between bullying and popularity reveals that bullies frequently change victims to maintain a high social status (van der Ploeg, Steglich, & Veenstra, 2019). Other recent research also shows that, contrary to conventional notions (Salmivalli, 2010), many children involved in bullying switch roles: they may be a bully at one time point, a victim at another, and uninvolved at the next time point (Zych et al., 2019).

Second, we expected that in a stable school context same grade (typically referring to same classroom) may already capture a large proportion of the victim-bully ties between the children who were classmates before. In line with our expectation, our findings did show that the formation and development of victim-bully relationships occurred more often among same-grade students in stable schools than in unstable multigrade schools. An obvious explanation is that students in stable schools remain together with their classmates from a previous school year. This increases opportunities for bullying between classmates who are in the same grade each year as their classroom composition remains stable. The negligible effect of a shared classroom history in our analyses might already be accounted for by being consistently in the same grade over time. Multigrade schools are highly unstable in terms of classroom composition across the school years. However, in this unstable school context bullying occurs more often among same-grade than cross-grade students, and this was more
strongly in the administrative multigrade schools than in pedagogical multigrade schools.

To summarize, our analyses showed that although stable classrooms do not necessarily show less change in bully nominations than in unstable classrooms, victim-bully ties are more likely to develop among students in the same grade or same classroom.

### Does School Climate Affect the Relation Between Change in Classroom Composition and Peer Victimization?

Pedagogical multigrade schools share many features with administrative multigrade schools, but there is an important distinction: classroom or grade mixing occurs purposefully to foster positive interactions between cross-grade students in a classroom (Gray, 2011; Lillard & Else-Quest, 2006). Our tentative findings suggest that same-grade victim-bully relationships occur less in unstable pedagogical multigrade schools than in unstable administrative multigrade schools and particularly stable schools, but at the same time, there is also a relatively higher chance of cross-grade victimization. This points at a potential trade-off effect: while higher-grade students are encouraged to demonstrate their value as social leaders toward their lower-grade classmates it might also come across as social dominance for lower-grade students, who are then at the bottom of the hierarchy.

### Implications, Limitations, and Directions for Future Research

Our findings may have implications for school policy about classroom organization. Overall, results of this study suggest that school and classroom stability and change have a small impact on the formation of victim-bully relationships between children. Bullying relationships were found to develop most easily between children in the same grade, more so in stable classrooms than in classrooms with changing classroom composition, with no clear evidence that newcomers are more at risk of becoming victimized. In addition, rates of bullying relationships appear to be very low in schools with changing classroom composition as compared with schools with stable classrooms. To some extent these findings are reassuring for classrooms with changing classroom composition, with no clear indication that children in childhood because adolescents have more diverse social interactions with peers in school and outside of the own school context. Within school, students share the same homeroom but switch classes on a daily basis as they start to follow different school programs (school courses and school subjects). Outside of school, adolescents are often online or meet others that they know from their neighborhood, or the sport club.

Despite this, our findings on peer victimization extend previous research on sociocognitive outcomes, which also found no clear indication that children in administrative multigrade classrooms are worse off in terms of academic achievement and social adjustment (Mulyan-Kyne, 2007; Veerman, 1995, 1996; but see Mason & Burns, 1996). Multigrade schools may be beneficial, however, when they have explicit goals in terms of enhancing the school climate. This stimulates prosocial behavior and the provision of help across the grades within a classroom (Lillard & Else-Quest, 2006; Moller, Forbes-Jones, & Hightower, 2008), but also developing less bullying between grademates.

These findings may be useful for school-wide or whole-group interventions. Teachers should be aware of the fact that most bullying-victimization situations occur between students in the same grade or same classroom. As classmates or grademates probably know each other better, the solution lies within the group, for example by developing positive relations and helping behavior between members of the classroom. This is supported by recent research on the effects of intraschool dynamics among peers, showing that a positive school climate enhances friendships and acceptance of others (Cornell et al., 2015; Fink et al., 2018; Rivas-Drake et al., 2019; Van Ryzin & Roseth, 2018).

Not only the potential importance of school climate and classroom stability but also other school factors are worth considering (Juvonen, 2018; Juvonen & Graham, 2014). Where it was argued that peer dynamics and hierarchies might differ across the different school settings, it is not unlikely that also within the same school setting the dynamics might differ, across classrooms, or grades. However, a clear-cut measure of peer hierarchy, dominance or classroom norms is not readily available and is a topic of study on its own (Rambaran, van Duijn, Dijkstra, & Veenstra, 2019b; Salmivalli, 2010).

We measured peer victimization by asking the victims to nominate their bullies (referring to *by whom are you bullied?*). We note that by doing so we did not take into account the perspective of the bullies. It is plausible that some of the bullies did not consider themselves as a bully of (some of) the victims who nominated them, which would lead to a discrepancy (low agreement) between both sources of informants (Oldenburg et al., 2015). An avenue for future research is to validate our findings by examining victim-bullying networks using a multi-informant approach, with the perspectives of both the victims and the bullies.

Future research would also benefit from examining victim-bully networks in adolescence as bullying processes are likely to differ between childhood and adolescence. The number of bullies increases or remains stable in early adolescence, whereas the number of victims decreases during this time (Nansel et al., 2001; Pellegri & Long, 2002). This increase in bullying during early adolescence is followed by a decrease during mid- and late adolescence (Kretschmer, Veenastra, Deković, & Oldehinkel, 2017), which suggests that victims are especially in a vulnerable position in early adolescence when bullying peaks. Investigation of victim-bully networks in adolescence may be more complicated than in childhood because adolescents have more diverse social interactions with peers in school and outside of the own school context. Within school, students share the same homeroom but switch classes on a daily basis as they start to follow different school programs (school courses and school subjects). Outside of school, adolescents are often online or meet others that they know from their neighborhood, or the sport club.

### Conclusion

Our study shows that the impact of stability and change in classroom composition on victim-bully relationships was relatively small: students who shared the same class before were not more likely to be victimized in the stable schools as compared with students in unstable multigrade schools. Next, the general tendency to form victim-bully ties or to remain uninvolved in victim-bully ties over time, same-grade victimization appeared to be the strongest predictor of victim-bully ties, particularly in stable schools. In view of the strong same-grade effects, there was no extra effect to be found of being in the same classroom before. The
formation and development of victim-bully relationships among students within the same grade was weakest in unstable pedagogical multigrade schools, after controlling for school size. Taken together, the findings highlight that a context-specific approach may be necessary to tackle bullying in stable and unstable schools.

References


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