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Individual and classroom-level associations of within classroom friendships, friendship quality and a sense of peer community on bullying victimization

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Abstract

For most students, attending school entails daily intense social interactions with classmates in a classroom context. While many of these interactions are positive and lead to the development of friendships and a shared classroom community, some students instead suffer peer harassment and bullying. According to the social-ecological theory these disparate social phenomena may be linked. The aim of this study was to examine how number of friends, perceived friendship quality, and a sense of peer community were associated with bullying victimization at both the individual and classroom level. Additionally, to thoroughly investigate the nuances of different types of friendship qualities the concept was analyzed both as one unified construct and as five distinct dimensions (companionship, conflict, help, security, and closeness). Survey data from 587 Swedish upper elementary school students (56.22% girls; $M_{age} = 11.72$, $SD = 0.96$) across 54 classrooms was collected and analyzed using multilevel regression. Results showed that having at least one friend was negatively associated with victimization and that victimization was less prevalent in classrooms where students experienced a shared sense of community. Furthermore, while high-quality friendships were associated with less victimization at both the individual and classroom level, when the five dimensions where considered, only conflictual and helpful friendships were significantly associated with victimization (on both levels of analysis for conflictual friendships and only on the individual level for helpful friendships). Together these results highlights the importance of schools helping students cultivate high-quality friendships, teaching constructive conflict management and promoting a more prosocial classroom community.

Keywords Bullying · Peer victimization · Peer friendships · Classroom climate

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1 Introduction

Upon entering the schooling system, most children are inserted into groups not of their choosing, made up of peers approximately the same age as them with whom they are expected to share a classroom over the next few years. Through the ample time spent together, as well as the shared activities the classmates engage in, friendships between likeminded students may begin to bloom (Homans, 1950; Rohrer et al., 2021). While these kinds of school-based interactions are often experienced as positive, this is not always the case. For some, being involuntarily placed into a group filled with peers with whom they are not necessarily compatible (be it due to differing interests, prior biases, or otherwise), can be a recipe for disaster. For these students, it may instead entail difficulties in finding friends and the risk of not being able to acquire important social experience while at school. Worse yet, it can also lead to exclusion, loneliness, and even outright harassment and abuse (Horton, 2018; Modecki et al., 2014).

Bullying is often defined as intentional and repeated negative acts carried out by one or more individuals towards an individual within a power imbalance that does not allow the victim the possibility to properly defend themselves (Olweus, 1986). It is a social issue that is found worldwide (Biswas et al., 2020) and is associated with a multitude of negative and long-lasting effects, suffered primarily by those victimized. These effects range from lower academic performance, to physical, relational, and psychological suffering, including suicidal ideation and behaviors (Gini & Pozzoli, 2013; Moore et al., 2017). Additionally, being the victim of school bullying may have long-lasting consequences that follow students well into adulthood, as the experience of school bullying has been associated with an increased risk of depression later in life (Malamut & Salmivalli, 2023). However, rather than just a severely harmful relationship between bullies and their victims, through the social-ecological theory (Bronfenbrenner, 1979), bullying can be better understood as a social phenomenon emerging from the interaction between individual and contextual systems (Hong & Espelage, 2012). As part of these contextual systems, the social ecological-theory define the microsystems as those with which the individual is in direct contact (Bronfenbrenner, 1979). Within any given social context, individuals may then inhabit several, overlapping microsystems which may influence one other. Adopted into the context of bullying, it means that the risk of being victimized may in part hinge on the social context surrounding the individual, including both the individuals own relationships within the classroom (i.e., their more proximal relational microsystems) as well as the wider social climate inside their classrooms (i.e., their less proximal but more encompassing classroom microsystem) (Hong & Espelage, 2012; Saarento et al., 2015).

1.1 Friendships and victimization

Previous research has shown that having at least one friend can usually be considered a protective factor against peer victimization (Boulton et al., 1999; Schacter &

Juvonen, 2018). However, not all friendships are equally beneficial and the number of friends a student has beyond the first has not been associated with a decreased risk of victimization (Schacter & Juvonen, 2018). In fact there is some evidence to the contrary, as students who report having many friends or inhabiting central or key position in friendship networks have been found to be at increased risk of victimization (Faris & Felmlee, 2014; Faris et al., 2020; Lodder et al., 2016).

Furthermore, while friendships are often experienced as positive, bullying has also been theorized as being associated with poor friendships in several ways. For victims, it has been theorized that, due to the reduced status and stigma associated with bullying victimization, their choice of meaningful relationships becomes limited, leading to a "default selection." In these scenarios, due to their low status, victims may only be able to befriend those who are deemed undesirable by others (Prinstein & Giletta, 2016; Strindberg, 2023). Then, in lieu of selection based on preference or shared interests, this default selection risks matching peers who would otherwise be unlikely get along, potentially resulting in less rewarding or even harmful relationships. For example, because low status and bullying victimization are often associated with both internalized and externalized symptoms, pairing similarly troubled peers leads to an increased risk of conflicts stemming from dissimilarities and poor social skills, or worsening symptoms through processes such as co-rumination and deviant affiliation (Prinstein & Giletta, 2016; Rose, 2021; Rudolph et al., 2014). Moreover, being popular does not exempt students from the risk of harmful friendships and earlier studies have shown how struggles for both social status and friendship exclusivity may result in bullying between "friends" (see e.g., Closson & Watanabe, 2018; Faris & Felmlee, 2014; Faris et al., 2020).

Thus, since friendships do not guarantee protection in and of themselves, and poor friendships may even be associated with an increased risk of bullying, these relationships must be considered in conjunction with some form of actual friendship quality. High *friendship quality* involves low levels of conflict/fights and high levels of positive features such as prosocial behavior, loyalty, intimacy, and self-esteem support (Berndt, 2002). Bukowski and colleagues (1994) identified the following five dimensions of friendship quality: (1) *companionship*, referring to the extent to which friends spend time together in and out of school; (2) *conflict*, referring to the extent to which friends argue, fight, and annoy one another; (3) *help*, referring to whether friends provide aid and protection to one another (i.e., protection from victimization); (4) *security*, referring to whether friends can rely upon and trust each other, and whether they are capable of transcending conflicts within the friendship; and (5) *closeness*, referring to the degree of affective bonds and appraisal in the friendship. Accordingly, a high friendship quality is characterized by high scores on each dimension, apart from *conflict*, where low scores are preferred.

Previous research looking specifically at best friendships has shown that higher quality friendships, in terms of the above dimensions, are negatively associated with bullying victimization in early adolescence (Bollmer et al., 2005; Etkin & Bowker, 2018; Kim & Kim, 2019). Moreover, studies looking at specific friendships dimensions, though still scarce, have also shown a positive association between bullying victimization and friendship conflict (Bernasco et al., 2022; Schwartz-Mette et al., 2020), and a negative association to friendship help (Bernasco et al., 2022;

Turanovic et al., 2023). However, as students may well have multiple friendships within the classroom, and adolescents often congregate into larger friend groups while at school, understanding their perceptions of friendship quality more generally may be particularly important. Indeed, within the complex social context of school, students often juggle multiple relationships, and becoming too close with "the wrong person" (e.g., a social rival or a bullied peer) may even be the reason why one becomes a target of bullying in the first place (Closson & Watanabe, 2018; Faris et al., 2020; Lundström, 2020).

1.2 Sense of peer classroom community, classroom friendship quality and bullying victimization

Enveloping the relationships between individual students are their respective classroom units in which they are situated. As such, these units provides the broader social context for all students within through their respective classroom microsystem. In Sweden, and in many other countries, upper-elementary schoolchildren are usually organized into classrooms of approximately 20–30 students, with whom they spend most of their time while at school. Furthermore, these classroom groups remain largely unchanged from grades 4 through 6 and, over the months and years during which this same small group of students share a classroom, norms dictating social interactions are established, negotiated, and become entrenched. This naturally includes norms concerning bullying which, accordingly, play an important role in the viability of bullying within each classroom (Bjärehed et al., 2021; Salmivalli et al., 2011). In fact, previous studies have even detected variance in bullying prevalence based on classroom differences to be on a par with, or even exceeding, between-school differences (Kärnä et al., 2011; Thornberg et al., 2024).

Of particular importance to the prevalence of bullying victimization is the extent to which particular classrooms provide their students with a sense of peer community. A *sense of peer community* can be defined as the degree to which a social setting satisfies the group members' need for belonging, and where the lack thereof results in feelings of alienation and normlessness (Battistich et al., 1995). Applied to the classroom peer context, a *sense of classroom peer community* refers to classmates' perceptions of their classroom peer unit as a shared community where they care about and support each other, actively participate and collaborate in this group's life and activities, and feel a sense of belonging and identification with this group (Battistich et al., 1997). When this is measured and aggregated to the classroom level, though more focused on the community aspect, it has considerable conceptual overlap with the broader concept of *class climate*, which, among other things, refers to the classroom-level quality of interpersonal relationships among students belonging to the same school class (Thornberg et al., 2022; Wang et al., 2020). Although there are still very few studies on whether class climate (or sense of classroom peer community) at the classroom level is linked to bullying, earlier studies have, in fact, consistently shown that a positive class climate is associated with significantly less bullying victimization (Košir et al., 2020; Stefanek et al., 2011; Thornberg et al., 2018, 2022, 2024), while a more immoral climate at the classroom

level has been linked to greater peer aggression and bullying (Bjärehed et al., 2021; Gini et al., 2022; Kollerová et al., 2018; Thornberg et al., 2021). With reference to these studies, it would be plausible to assume that bullying victimization is lower in classrooms with a stronger sense of classroom peer community.

Somewhere between the individual and the larger classroom unit, friend groups emerge, ranging from isolated friendship dyads to large groups involving most of the students in a classroom. These groups can often be hard to pin down as friendships in early adolescence are continually shifting, resulting in studies reporting friendship stability (i.e., students nominating the same friends over time) during this stage to be only around 50% (Chan & Poulin, 2007; Poulin & Chan, 2010; Rambaran et al., 2020). Although somewhat distinct from the larger classroom unit, through the interactions within and between friend groups, they may transcend their respective microsystems and become major influences at the level of the broader classroom microsystem, affecting the wider social climate and the sense of peer community therein. Hence, individual-level perceived friendship quality, aggregated to a classroom level, may help to further elucidate the social context within classrooms and, through the five dimensions presented by Bukowski and colleagues (1994), provide additional nuance.

1.3 The present study

Guided by the social-ecological theory, and utilizing a sample of Swedish fourth through six graders (approximately ages 10 to 13), the aim of the present study was to examine whether number of friends and perceived friendship quality at the individual level, as well as a sense of classroom peer community and friendship quality at the classroom level, were associated with bullying victimization. Additionally, acknowledging that friendship quality contains several potentially important dimensions, this study examined whether the dimensions of companionship, conflict, help, security, and closeness at both the individual and classroom level were associated with bullying victimization.

Given previous research (e.g., Boulton et al., 1999; Schacter & Juvonen, 2018) showing that having at least one friend is a protective factor against bullying victimization, this was hypothesized to be the case here too. However, no similar hypothesis was proposed for additional friends beyond that point. Moreover, since the experience of a generally high-quality best-friend relationship has been associated with less bullying victimization (e.g., Bollmer et al., 2005; Etkin & Bowker, 2018; Kim & Kim, 2019), this was hypothesized to hold true even when perceived friendship quality was broadened to include the individuals' friendships in the classroom more generally. Similarly, due to a positive class climate having previously been associated with less bullying victimization (e.g., Košir et al., 2020; Thornberg et al., 2024), it was hypothesized that a sense of peer community at the classroom level would also be negatively associated with bullying victimization. In addition, high-quality friendship, when aggregated to the classroom level, was likewise hypothesized to be negatively associated with bullying victimization.

In addition to investigating friendship quality as a global construct, the current study further examined whether each of its five dimensions was associated with bullying victimization. Regarding friendship conflict, several studies (see Schwartz-Mette et al., 2020 for a meta-analysis) have found, specifically, that the presence of negative friendship qualities (as opposed to the absence of positive qualities), including conflictual relationships, come with several negative consequences that may increase the risk of victimization (i.e., loneliness and internalized symptoms). Moreover, as conflict within and between friend groups may make the social climate within the classroom generally more hostile and conducive to bullying, it was hypothesized that friendship conflict is positively associated with bullying victimization at both the individual and classroom levels when friendship dimensions are considered. Furthermore, because the friendship help dimension is theoretically conceptualized to include protection from victimization (Bukowski et al., 1994) and similar measured have shown a negative association between friendship help and victimization (Bernasco et al., 2022; Turanovic et al., 2023), it was hypothesized to be negatively associated with bullying victimization at the individual level. Similarly, as classrooms where students generally feel that their friends will protect them should make any bullying less feasible overall, the same was hypothesized at the classroom level. Due to the lack of prior research in a bullying victimization context, no hypothesis was suggested for the three friendship dimensions: companionship, closeness, and security. Consequently, the analyses conducted with these dimensions at both individual and classroom levels were considered exploratory.

Since previous meta-analyses have shown no significant association between gender and bullying victimization (Cook et al., 2010; Kijakovic & Hunt, 2016), gender was only included as a control variable without any associated hypothesis. Likewise, this study controlled for immigrant background but without hypothesizing whether it was linked to bullying victimization because, although often theoretically important (e.g., Wiltgren, 2022), by itself ethnicity tends to only show very small effects on bullying victimization (Vitoroulis & Vaillancourt, 2015). Finally, while recognizing that the age of students has been connected to the prevalence of bullying, the focal middle-school period has been shown to be the peak of a curvilinear association between age and bullying (Hong & Espelage, 2012). Accordingly, participant age was considered here as a control variable without any hypothesis.

2 Method

2.1 Participants and procedure

This study targeted upper-elementary school students in grades four through six. Data was gathered through a web-based questionnaire during the months of November and December 2021. The participating students completed the questionnaire during school hours, using either their own computer or a computer provided by the university. In total, 632 Swedish students across 66 classrooms and 15 schools answered the questionnaire. However, due to a low number of participants in some of the classrooms a 25% participation rate cut-off was implemented. The vast

majority of non-participation was due to students lacking the written caretaker consent necessary for participation.

After the cut-off was implemented 587 students from 54 classrooms and 15 schools remained (4th grade = 38.21%, 5th grade = 31.15%, 6th grade = 30.64%; M_{age} = 11.72, SD = 0.96; female = 56.22%). The number of participating students in each classroom ranged from 5 to 23 (participation rate = 25.00–82.35%) with a mean of 10.87 participating students per classroom (M classroom participation rate = 47.38%). The collection was mostly conducted class by class, with all the participating students in each classroom completing the questionnaire at the same time, either in the students' own classrooms or in another available room at their school. Throughout the process, a member of the research team or a teacher was present to provide reading support, clarify specific questionnaire items as needed, or just answer the students' questions regarding the project. Average completion time for the questionnaire was around 30 min. Before the initiation of the study, ethical approval from the Regional Ethical Review Board was obtained.

2.2 Measures

2.2.1 Gender and age

Participants in the study were first asked whether they identified as either a boy or a girl (boy = 0, girl = 1). They were then asked to provide both the year and month of their birth, which was later used to calculate their age at the time of data collection.

2.2.2 Immigrant background

Participants in the study were asked whether they themselves were born in Sweden or if at least one of their parents had been born in Sweden. They were considered to have an immigrant background if they answered that they and/or both of their parents had been born outside of Sweden (0 = Swedish background, 1 = immigrant background). In total 15.16% of participating students reported having an immigrant background which is below the Swedish national average of 26.27% for students in grades 4 through 6 (Swedish National Agency for Education, 2022).

2.2.3 Bullying victimization

The degree to which students experienced bullying was measured using an 11-item self-report bullying victimization scale (Thornberg et al., 2018a, 2018b). This scale, rather than providing a definition of bullying and asking if the participant has been bullied, something which has been associated with underreporting (Modecki et al., 2014), instead asks the extent to which students have been subjected to different behaviors that together constitute bullying. It instructs participants to: "Think about the past three months: How frequently have one or more students who are stronger, more popular, or more in charge compared to you done the following things to you?" This was then followed by 11 items, each describing different bullying behaviors

(e.g., "Excluded me from their group," "Joked about me in a way I disliked," and "Hit or kicked me to hurt me or make me sad"). Participants answered how often they had been subjected to each behavior on a five-point scale ranging from 1 = *Has not happened to me* to 5 = *Several times a week*. Hence, this scale addresses all aspects of bullying (i.e., negative acts within a power imbalance, repeated over time) without referring to it as such. A mean score was then calculated for each participant (Cronbach's $\alpha = 0.91$, McDonald $\omega = 0.92$).

2.2.4 Within-classroom friendship quality and number of friends

A prerequisite for rating participants' within-classroom perceived friendship quality was that they experience having friendships within the classroom which to rate. Participants were therefore asked to write the names of classmates whom they considered to be their friends. They could nominate any number of friends within their own classroom and the number of nominations were then manually counted, with ineligible nominations (e.g., "grandma" or friends from other classrooms) ignored. Each eligible nominated friend was counted as a friend of the nominator. This lenient definition avoids the associated risk of underreporting that comes with only considering reciprocated nominations (Furman, 1996), and while it may risk participants overreporting friendships (Schacter & Juvonen, 2018), differences between the associations of unilateral and reciprocated friendship nominations and other study variables are often slight or non-existent (Poulin & Chan, 2010; Schwartz-Mette et al., 2020). Moreover, it has been argued that the subjectivity in unilateral nominations is a potentially important feature because the subjective experience of having a friend might be enough in and of itself to warrant attention (Furman, 1996; Poulin & Chan, 2010). Participants who reported having no within-classroom friends were specifically coded as *friendless* (as opposed to having one or more friends), and skipped the subsequent friendship quality questionnaire.

For participants who reported having one or more classroom friends, perceived friendship quality was measured using a version of the Friendship Quality Scale (FQS; Bukowski et al., 1994), with questions rephrased to be about the friend(s) nominated in the previous step. This scale included 23 items covering 5 friendship dimensions: *Companionship* (4 items), *Conflict* (4 items), *Help* (5 items), *Security* (5 items), and *Closeness* (5 items). These items took the form of statement regarding the students friendships and were reported on a seven-point scale ranging from 1 = *Not at all accurate* to 7 = *Completely accurate*. Depending on the analysis, these subscales were then either recalculated into a mean general friendship quality score for each participant (with the *Conflict* subscale reverse coded; Cronbach's $\alpha = 0.89$, McDonald $\omega = 0.88$) or kept as five separate variables for the more exploratory models (Companionship Cronbach's $\alpha = 0.68$, McDonald's $\omega = 0.72$; Conflict Cronbach's $\alpha = 0.78$, McDonald's $\omega = 0.78$; Help Cronbach's $\alpha = 0.80$, McDonald's $\omega = 0.80$; Security Cronbach's $\alpha = 0.67$, McDonald's $\omega = 0.69$; Closeness Cronbach's $\alpha = 0.76$, McDonald's $\omega = 0.79$).

Furthermore, because perceived friendship quality could be conceived of as pertaining to both the experienced friendship qualities of individual students and the classroom norms surrounding friendships and friendship qualities (a classroom-level

variable), the scores were divided into two parts. Firstly, a classroom mean was calculated based on the individual scores of students within each classroom and, secondly, the individual scores were kept as they were or transformed based on the extent to which these scores differed from their respective classroom averages (i.e., the classroom mean was subtracted from the individual scores). This was done to emphasize either the experience of the individual student (by keeping individual FQS scores as they were) or to emphasize the role of the classroom context (by calculating individual scores as the difference from the classroom average).

2.2.5 Sense of classroom peer community

The sense of peer community among students in their classrooms was reported using the Sense of peer community scale (Battistich et al., 1995; Madill et al., 2014). This scale consists of five items and participants rated the degree to which they found that their respective classroom unit (school class) was a place where students were cooperative, friendly, and respectful to one another, on a five-point scale ranging from 1 = *Not at all accurate* to 5 = *Completely accurate*. Since this was conceived as a classroom variable, where individual scores from the same classroom ostensibly pertained to their whole classroom, an average classroom score was calculated from the scores of the individual students within each respective classroom (Cronbach's $\alpha = 0.88$, McDonald $\omega = 0.88$).

2.3 Analytical strategy

Due to both the clustered nature of the data and the interest in classroom-level variables, two sets of two-level multilevel models were utilized. In both sets, the first level represented the individual students, while the second level represented the classroom unit, with the intercept being allowed to vary between classrooms.

The first set of analyses was conducted to test hypotheses relating to both the protective effect of having at least one friend and a sense of peer community. To that end, the analyses were conducted in four steps. After an initial, unconditional model, which contained only residuals, the control variables of age, gender, and immigrant background were added (Model 1):

$$y_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 Gender_{ij} + \beta_3 Immigrant\ background_{ij} + v_j + \varepsilon_{ij}$$

here y_{ij} represents the bullying victimization score of individual i in classroom j and α is the overall intercept. β_{1-3} represents the regression slope for age, gender, and immigrant background, respectively. Lastly, v_j is the residual for classroom j and ε_{ij} is the residual for individual i in classroom j.

In the third step, a dummy variable representing whether a student had at least one friend was added (Model 2):

$$y_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 Gender_{ij} + \beta_3 Immigrant\ background_{ij} + \beta_4 At\ least\ one\ friend_{ij} + v_j + \varepsilon_{ij}$$

where β_4 is the regression slope for the newly added variable.

In the fourth step, a sense of peer community was added as a classroom-level variable (Model 3):

$$y_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 Gender_{ij} + \beta_3 Immigrant\ background_{ij} + \beta_4 At\ least\ one\ friend_{ij} + \beta_5 Peer\ community_j + v_j + \varepsilon_{ij}$$

where β_5 is the regression slope for the classroom average scores for a sense of peer community in classroom j.

The second set of analyses was conducted to examine and test the hypotheses relating to perceived friendship quality. As in the first set, these analyses were conducted in four steps. After an initial, unconditional model, the variables age, gender, immigrant background, and number of friends were introduced in a second step (Model 1):

$$y_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 Gender_{ij} + \beta_3 Immigrant\ background_{ij} + \beta_4 Number\ of\ friends_{ij} + v_j + \varepsilon_{ij}$$

here y_{ij} represents the bullying victimization score of individual i in classroom j, α is the overall intercept, and β_{1-4} is the regression slope for each of the four variables introduced.

With the introduction of the friendship quality variables in the third step, the model followed two parallel routes, one in which perceived friendship quality was treated as a single variable representing a general friendship quality (Model 2a):

$$y_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 Gender_{ij} + \beta_3 Immigrant\ background_{ij} + \beta_4 Number\ of\ friends_{ij} + \beta_5 FQS_{ij} + v_j + \varepsilon_{ij}$$

And one where the variable was divided into the five dimensions of perceived friendship qualities (Model 2b):

$$y_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 Gender_{ij} + \beta_3 Immigrant\ background_{ij} + \beta_4 Number\ of\ friends_{ij} + \beta_5 Closeness_{ij} + \beta_6 Security_{ij} + \beta_7 Help_{ij} + \beta_8 Conflict_{ij} + \beta_9 Companionship_{ij} + v_j + \varepsilon_{ij}$$

here β_5 represents the regression slope for overall perceived friendship quality in Model 2a, whereas β_{5-9} are the regression slopes for each of the five friendship dimensions.

In the final step, classroom-level friendship quality was introduced and, in order to avoid overlapping variance between individual and classroom variables (O'Keefe & Rodgers, 2017), the FQS variable and the five dimensions of FQS were divided into within-classroom and between-classroom parts. This was achieved through group mean centering, resulting in Model 3a:

$$y_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 Gender_{ij} + \beta_3 Immigrant\ background_{ij} + \beta_4 Number\ of\ friends_{ij} + \beta_5 \left(FQS_{ij} - FQS_j\right) + \beta_6 FQS_j + v_j + \varepsilon_{ij}$$

And model 3b:

$$y_{ij} = \alpha + \beta_1 Age_{ij} + \beta_2 Gender_{ij} + \beta_3 Immigrantbackground_{ij} + \beta_4 Numberoffriends_{ij} + \beta_5\left(Closeness_{ij} - Closeness_j\right) + \beta_6\left(Security_{ij} - Security_j\right) + \beta_7\left(Help_{ij} - Help_j\right) + \beta_8(Conflict_{ij} - Conflict_j) + \beta_9(Companionship_{ij} - Companionship_j) + \beta_{10} Closeness_j + \beta_{11} Security_j + \beta_{12} Help_j + \beta_{13} Conflict_j + \beta_{14} Companionship_j + v_j + \varepsilon_{ij}$$

Here the regression slopes for the within-classroom friendship quality variables are represented by β_5 in Model 3a, and β_{5-9} in Model 3b, whereas the between-classroom friendship quality variables are represented by β_6 in Model 3a and β_{10-14} in Model 3b. All analyses were conducted through RStudio (Version 1.4.1106) using the *lme4* and *lmerTest* packages.

3 Results

3.1 Descriptive statistics

Bullying victimization scores were relatively low for both girls and boys, with no significant difference between them. Similarly, there were no significant differences between girls and boys in either friendlessness or number of nominated friends. However, the two differed in reported perceived friendship quality. In general, girls reported having significantly higher perceived friendship quality than boys, both generally and across all dimensions except conflict where no significant difference was found. Unlike with perceived friendship quality, boys perceived the broader classroom peer community to be significantly more positive

Table 1 Variable means, standard deviations, and gender differences

	Girls		Boys		Total		*t*	*d*
	M	*SD*	*M*	*SD*	*M*	*SD*		
Victimization	1.65	0.66	1.66	0.78	1.65	0.71	0.23	0.02
Friendlessness	3.33%	–	3.11%	–	3.24%	–	0.15	0.01
No. Friends	3.80	2.50	3.84	2.22	3.82	2.38	0.16	0.01
FQS	5.38	1.34	5.01	1.43	5.22	1.39	3.24**	0.40
Closeness	5.74	1.45	5.33	1.52	5.56	1.50	3.26**	0.40
Security	5.50	1.49	5.09	1.62	5.32	1.56	3.14**	0.34
Help	5.50	1.51	5.04	1.63	5.30	1.58	3.47***	0.38
Conflict	2.78	1.48	2.97	1.56	2.86	1.52	1.55	0.17
Companionship	5.13	1.51	4.85	1.54	5.01	1.53	2.17*	0.21
Peer Community	3.48	0.84	3.69	0.77	3.57	0.82	3.19**	0.26

No. Friends number of friends, *FQS* Friendship quality scale, * $p < .05$, *** $p < .001$

than girls. All means, standard deviations, and gender comparisons can be found in Table 1.

At the individual level, bullying victimization was positively correlated with student age and friendship conflict, but negatively correlated with all other friendship quality measures and sense of classroom peer community. Student age was also positively correlated with number of friends and friendship conflict but negatively correlated with general perceived friendship quality, friendship help, companionship, and a sense of peer community. In addition, number of friends was positively correlated with friendship closeness, companionship, and sense of classroom peer community. Finally, general perceived friendship quality, all five friendship dimensions, and sense of classroom peer community were all strongly positively intercorrelated, with the only exception being friendship conflict, where the correlations were reversed.

Classroom-level correlations were much the same, with bullying victimization being negatively correlated with a sense of classroom peer community along with all friendship quality measures, except friendship conflict (which was positively correlated) and companionship (which had no significant association). The classroom-level age mean was only positively correlated to friendship conflict. As on the individual level, all friendship-related variables, along with classroom peer community, were positively correlated, with friendship conflict again being reversed. The only exceptions being the correlation between classroom companionship and both classroom conflict and sense of peer community, which were both non-significant. Individual- and classroom-level correlations can be found in Table 2.

3.2 Multilevel analyses

Two main sets of multilevel analyses were conducted to investigate this study's hypotheses. The first set of analyses was performed to investigate whether friendlessness (i.e., students who could not be included in the analysis targeting perceived friendship quality) at the individual level and a sense of classroom peer community at the classroom level were associated with bullying victimization. Initially, an unconditional model was fitted, which showed an $ICC = 0.1246$, revealing that 12.46% of the variance in bullying victimization in this sample could be found at the classroom level. The control variables of age, gender, and immigrant background were then added in Model 1. These additions did improve model fit (see likelihood ratio test; $p = 0.038$) and immigrant background was revealed to be positively associated with bullying victimization. This was followed by the addition of the dummy variable "at least one friend" in Model 2. The inclusion of this variable again led to a significantly improved model fit ($p < 0.001$) and revealed that being friendless was significantly associated with an elevated degree of bullying victimization. Then, to calculate the proportion of explained variance, the following formula was used throughout: 1—current model remaining variance/unconditional model remaining variance. Afterwards, to determine how much additional variance had been explained compared to earlier models, the proportion of variance already explained by previous models was subtracted from the proportion of variance explained by the

Table 2 Pairwise correlations between study variables

	1	2	3	4	5	6	7	8	9	10
1. Victimization	–	0.08*	−0.01	−0.34***	−0.19***	−0.28***	−0.29***	0.33***	−0.16***	−0.30***
2. Age	0.13	–	0.15***	−0.13**	−0.02	−0.08	−0.10*	0.19***	−0.09*	−0.10*
3. No. Friends	0.14	0.24	–	0.06	0.10*	0.06	0.06	0.07	0.09*	0.12**
4. FQS	−0.45***	−0.22	0.01	–	0.79***	0.84***	0.85***	−0.55***	0.72***	0.44***
5. Closeness	−0.35**	−0.09	0.13	0.84***	–	0.63***	0.69***	−0.17***	0.55***	0.37***
6. Security	−0.42***	−0.13	0.11	0.89***	0.73***	–	.67***	-.34***	.48***	.35***
7. Help	−0.37***	−0.19	0.01	0.87***	0.74***	0.72***	–	−0.25***	.56***	.40***
8. Conflict	0.56***	0.31*	0.26	−0.62***	−0.27*	−0.49***	−0.45***	–	−0.19***	−0.21***
9. Companion	−0.10	−0.08	0.05	0.78***	0.64***	0.60***	0.65***	−0.28	–	0.34***
10. Peer com	−0.53***	−.15	0.07	0.47***	0.27*	0.47***	0.42**	−0.51***	0.22	–

Values above the diagonal are individual-level correlations, values below are classroom-level correlations. In gender, boys = 0, girls = 1. *No. Friends* number of friends, *FQS* Friendship quality scale, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

current model. This method revealed that the addition of the variable "at least one friend" only helped to explain a further 2.04% (1−(0.43272/0.44569)−0.00868 = 0 .02042) of individual-level variance while increasing classroom-level variance by 0.65% (1−(0.06852/0.06923))−0.01676 = −0.00650) compared to Model 1.

In the next step, a sense of classroom peer community was entered into Model 3, which further improved model fit ($p < 0.001$). Like having at least one friend, a positive classroom peer community was negatively associated with bullying victimization, implying that classrooms where students generally perceived a stronger sense of classroom peer community suffered less from bullying victimization. Furthermore, classroom peer community helped to explain a further 35.07% (1−(0.044 24/0.06923)−0.01026 = 0.35071) of classroom-level variance, but also increased the unexplained individual-level variance by 0.01% (1−(0.43278/0.44569)−0.02910 = − 0.00013). These analyses are presented in more detail in Table 3.

The second set of analyses investigated whether perceived friendship quality and the number of friends (beyond the first) were related to bullying victimization at both the individual and classroom levels. As in the previous set, an unconditional model was fitted, which only included the dependent variable and residuals for individuals and classrooms. After the unconditional model, the three control variables of age, gender, and immigrant background, along with the study variable number of friends, were added in Model 1. This addition significantly improved model fit ($p = 0.016$). However, only age and immigrant background had a significant association with bullying victimization, such that students who were younger and had a non-immigrant background were less likely to be victimized. When excluding students with no classroom friends, number of friends was not significantly related to victimization. Furthermore, adding these variables only reduced individual variance by 1.66% (1−(0.42567/0.43285) = 0.01659) while increasing classroom variance by 1.99% (1−(0.06914/0.06779) = −0.01991).

After Model 1, the analysis followed two branching paths. In Models 2a and 3a, perceived friendship quality was used as a single measure (FQS), whereas in Models 2b and 3b it was split into five dimensions (closeness, security, help, conflict, and companionship). The addition of perceived friendship quality in Models 2a and 2b significantly improved model fit in both cases ($p < 0.001$). In Model 2a, a better perceived friendship quality at the individual level was associated with significantly less bullying victimization. However, out of the five friendship dimensions, the more nuanced Model 2b showed that only greater friendship help and less friendship conflict at the individual level were associated with less bullying victimization. This means that students who reported having more helpful friendships were less likely to be victimized, while conflictual friendships were associated with an increased risk. Moreover, in both models, these friendship variables also helped to explain a considerable proportion of both individual and classroom-level variance. In Model 2a, following the inclusion of the friendship variable, the remaining unexplained variance at the individual level was reduced by an additional 6.46% (1−(0. 39771/0.43285)−0.01659 = 0.06459) and classroom level variance was reduced by 41.73% (1−(0.04085/0.06779)−(−0.01991) = 0.41731). In Model 2b, the inclusion resulted in the remaining unexplained variance at the individual level being reduced

Table 3 Multilevel regression models for bullying victimization featuring the "at least one friend" variable

	Unconditional		Model 1		Model 2		Model 3	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	1.679***	0.046	1.660***	0.057	2.202***	0.164	2.146***	0.162
Individual level								
Age			0.079†	0.043	0.075†	0.043	0.049	0.039
Gender			−0.015	0.057	−0.013	0.057	−0.013	0.056
Immigrant background			0.179*	0.083	0.198*	0.082	0.183*	0.082
At least one friend					−0.563***	0.160	−0.505**	0.160
Classroom level								
Peer community							−0.370***	0.095
Residuals								
Classroom residual	0.0692	0.0681 (1.68%)	0.0685 (1.03%)	0.0442 (36.10%)				
Individual residual	0.4457	0.4418 (0.87%)	0.4327 (2.91%)	0.4328 (2.90%)				
AIC	1248.7	1246.2	1235.9	1223.6				
Likelihood ratio test		$\chi^2(3)=8.42$*	$\chi^2(1)=12.32$***	$\chi^2(1)=14.32$***				

$N=587$, Classroom $N=54$. Gender boys = 0, girls = 1. Based on the Unconditional model $ICC=0.1246.2$. Percentages inside brackets next to residuals refer to the proportion of explained variance at each level for the respective models. The likelihood ratio tests compare Model 1 to the Unconditional model, and Model 2 to Model 1. † $p<0.10$, * $p<0.05$, ** $p<0.01$, *** $p<0.001$

by 9.06% (1−(0.38177/0.42861)−0.01871 = 0.09057) and variance at the classroom level was reduced by 43.39% (1−(0.03942/0.07014)−0.00413 = 0.43385).

In Models 3a and 3b, the perceived friendship quality variables were divided into an individual component and a classroom component. This reframing significantly improved model fit for Model 3a ($p = 0.034$) but not for 3b ($p = 0.135$). In Model 3a, both students who scored higher than their classmates in perceived friendship quality, and students who belonged to classrooms with higher levels of friendship quality, were shown to be less prone to being victimized. In the more nuanced Model 3b, students who scored higher than their classmates in friendship help and lower in friendship conflict, and students who belonged to classrooms with lower levels of friendship conflict, were less likely to be victimized. This meant that, regardless of their personal perceived friendship quality, students in classrooms where conflict between friends was common were more likely to be victims of bullying. Furthermore, the addition of the classroom-level friendship variables helped to further explain a small amount of individual-level variance, amounting to 0.16% (1−(0.39703/0.43285)−0.08118 = 0.00157) and 0.40% (1−(0.38220/0.43285)−0.11302 = 0.00400) for Model 3a and 3b, respectively. Similarly, the reframing further reduced unexplained classroom-level variance by 5.43% (1−(0.03717/0.06779)−0.39740 = 0.05429) and 1.09% (1−(0.03703/0.06779)−0.44284 = 0.01091) for Model 3a and 3b, respectively. All the models are presented in more detail in Table 4.

4 Discussion

When considering bullying through the social-ecological theory it becomes inseparable from the wider social context in which it takes place. Bullying affects and is affected by both the individual friendships (and each of their associated microsystems) and the social climate therein (i.e., the shared classroom microsystem). This study adds to the bullying literature in three ways: firstly, by examining the classroom association between bullying and a sense of peer community; secondly, by considering five different dimensions of friendship quality, revealing their distinct associations with bullying victimization; and thirdly, by contrasting the individual's experience of friendship quality against that of the wider classroom and mapping the effects.

As in previous research (Faris & Felmlee, 2014; Lodder et al., 2016; Schacter & Juvonen, 2018), the present study found friendless students to be at a significantly increased risk of being victimized. However, it did not find a similar association between bullying victimization and the number of reported friendships beyond that point. The protective effect of having at least one friend might be accounted for in several ways. For example, having one or more friends means that the befriended students are more likely to have someone who protect them and might assist them if someone tried to bully them, which may signal to would-be aggressors that these students are not such easy targets (Boulton et al., 1999; Dawes & Malamut, 2020). Alternatively, having at least one friend may be an indication that the befriended student is adequately able to integrate into the social context of the classroom and follow the social norms all the while not

Table 4 Multilevel regression models for bullying victimization featuring all friendship variables

	Model 1		Model 2a		Model 3a		Model 2b		Model 3b	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Intercept	1.647***	0.058	1.594***	0.052	1.593***	0.051	1.597***	0.051	−1.605***	0.051
Individual level										
Age	0.089*	0.043	0.047	0.038	0.033	0.038	0.025	0.038	0.020	0.039
Gender	−0.018	0.058	0.062	0.056	0.065	0.056	0.058	0.056	0.053	0.056
Immigrant background	0.219*	0.084	0.181*	0.080	0.173*	0.080	0.170*	0.079	0.161*	0.079
No. friends	−0.015	0.013	−0.006	0.012	−0.005	0.012	−0.011	0.012	−0.011	0.012
Ind. FQS			−0.263***	0.035	−0.240***	0.037				
Ind. closeness							0.036	0.044	0.056	0.046
Ind. security							−0.042	0.037	−0.035	0.038
Ind. help							−0.147***	0.038	−0.155***	0.040
Ind. conflict							0.118***	0.021	0.107***	0.022
Ind. companionship							0.021	0.031	0.014	0.033
Classroom level										
Avg. FQS					−0.457***	0.099				
Avg. closeness									−0.289	0.174
Avg. security									−0.074	0.146
Avg. help									0.001	0.127
Avg. conflict									0.217**	0.077
Avg. companionship									0.137	0.105
Residuals										
Classroom residual	0.0691 (−1.99%)		0.0409 (39.74%)		0.0372 (45.17%)		0.0378 (44.28%)		0.0370 (45.38%)	
Individual residual	0.4257 (1.66%)		0.3977 (8.12%)		0.3970 (8.28%)		0.3839 (11.30%)		0.3822 (11.70%)	
AIC	1174.1		1123.1		1120.7		1106.1		1107.7	

Table 4 (continued)

	Model 1		Model 2a		Model 3a		Model 2b		Model 3b	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Likelihood ratio test	$\chi^2(4) = 12.23$*		$\chi^2(1) = 52.94$***		$\chi^2(1) = 4.48$*		$\chi^2(5) = 77.93$***		$\chi^2(5) = 8.41$	

$N = 561$, Classroom $N = 54$. Gender boys = 0, girls = 1. Based on the Unconditional model residuals, Classroom residual = 0.0678, Individual residual = 0.4329, $ICC = 0.1354$. Percentages inside brackets next to residuals refer to the proportion of explained variance at each level for the respective models. The likelihood ratio tests compare Model 1 to the Unconditional model, Model 2a and 2b to Model 1, and Model 3a and 3b to 2a and 2b, respectively. *No. Friends* number of friends beyond 1, *FQS* Friendship quality scale; Ind. = Individual FQS scores referring either to the individual mean in models 2a and 2b, or to the difference compared to classroom average in models 4a and 4b; Avg. = Classroom average FQS scores. Age and No. Friends were both grand mean centered. All FQS-related variables were grand mean centered in models 2a and 2b, but were centered around classroom means in models 3a and 3b. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

suffering from other social antecedents to bullying (e.g., social anxiety or internalized symptoms) (Faris & Felmlee, 2014; Schacter & Juvonen, 2018), which would otherwise make friendships harder to maintain regardless of bullying victimization status. Although additional friendship ties beyond one may signal both a stronger support network and greater social competence among potential victims, the differences may be small and may be offset by an increase in associated risks. For instance, with increased perceived popularity, students may be viewed as a greater social threat to potential bullies both within and outside their friend group, leading to a greater risk of bullying victimization (Closson & Watanabe, 2018; Estévez et al., 2022; Faris & Felmlee, 2014; Faris et al., 2020). The fact that friendlessness here only explained a small amount of variance is likely a reflection of the small number of friendless participants in the sample.

At the classroom level, this study found that the degree to which students experienced a sense of peer community within their classrooms accounted for a considerable proportion of classroom-level variance in bullying victimization. Although more focused on the community aspect, this too was in line with previous research examining the related concept of class climate (i.e., the quality of peer relationships at the classroom level, e.g., Košir et al., 2020; Thornberg et al., 2024). This implies that students belonging to classrooms with a higher sense of peer community may be more protected from bullying victimization, alternatively, that the presence of bullying in a classroom may negatively affect any emerging sense of classroom peer community.

Regarding perceived friendship quality, the present findings likewise support earlier studies (e.g., Bernasco et al., 2022; Kim & Kim, 2019; Schwartz-Mette et al., 2020; Turanovic et al., 2023) and suggest a strong association between individual-perceived friendship quality and bullying victimization. Here, better perceived friendship quality was negatively associated with bullying victimization at both the individual and the classroom level. Furthermore, it also accounted for nearly half of between-classroom variance and a considerable proportion of individual variance. The fact that individual ratings of friendship quality, when taken together, accounted for such a large part of classroom variance underlines the significance of friendships when considering the wider social milieu of the classroom.

When perceived friendship quality was divided into the five dimensions, only friendship conflict and help were significantly associated with bullying victimization. The significant impact of negative friendship traits mirrors prior research (Bernasco et al., 2022; Schwartz-Mette et al., 2020). Likewise, the significance of friendship help support prior similar findings (Bernasco et al., 2022; Turanovic et al., 2023) and can perhaps be attributed to the fact that the subscale included the degree to which students felt that their friends would defend them if they were targeted, which is known to discourage bullying (Lambe et al., 2019). However, the non-significant associations between bullying victimization and the other friendship qualities (closeness, security, and companionship) suggest that, although these dimensions of perceived friendship quality may have a range of positive outcomes, they do not seem to protect students from being bullied in school. Regarding the significant connection between friendship conflict and bullying victimization, this could be the

result of causal processes in either direction. For example, increased bullying victimization could be the result of conflicts that have been allowed to develop within a friend group, eventually turning into bullying (Closson & Watanabe, 2018; Faris et al., 2020). Alternatively, the social and emotional strain of bullying victimization could have led to an increased risk of conflicts in the victims' other relationships, particularly if friends believe that they may be at increased risk of bullying victimization themselves through their association with the victim (Eriksson & Horton, 2024; Lodder et al., 2016).

Looking at the classroom level, although general classroom friendship quality had a significant negative association with bullying victimization, only the friendship conflict dimension was significant. When students within in a particular classroom generally experience conflictual friendships, it may be indicative of a more general negative and conflictual social climate. Hence, this result may mirror previous research pointing to a negative class climate being associated with bullying (e.g., Košir et al., 2020; Thornberg et al., 2024). As at the individual level, this classroom-level association may be the result of causal processes in either direction. For example, with increased intra- and inter-group conflict within the classroom, the likelihood that some conflicts devolve into bullying may increase. Alternatively, because just witnessing bullying has negative psychological consequences for the observers (Midgett & Doumas, 2019), the presence of bullying may make the social climate in the classroom more tense, hostile and conducive to conflict. The fact that perceived friendship help had a significant negative association to bullying victimization on an individual level but not on a classroom level (contrary to the study hypothesis) may imply that, when it comes to bullying victimization, it is only the helpful behavior (or lack thereof) of the victim's own friends that matter. For example, when seeking victims, a bully may avoid classmates whose friends are likely to intervene and instead choose targets whose friends are less willing or able to stop them (Dawes & Malamut, 2020), leaving classroom victimization unchanged.

4.1 Limitations

Some limitations of the study should be noted. The cross-sectional nature of the present study precluded any attempt to establish the temporality of effects. Future studies examining this phenomenon should therefore consider utilizing a longitudinal design. However, due to the intense and daily social interaction between students sharing a classroom, the friendship process leading up to and following bullying victimization may be relatively rapid. This, in turn, may make the actual progression of effects at the individual level difficult to catch without frequent data collections. Still, while this may be true at the individual level, at the classroom level the changes may be slower to permeate and thus more easily detectable.

Furthermore, even after introducing a 25% participation rate cut-off, the low participation rate in some of the included classroom remained a limitation of the study. From a statistical standpoint an inadequate sample size may result in biased estimates. However, a simulation study have found that two-level multilevel estimates can be reliably obtained with as few as five observations per group (Clarke, 2008)

which is less than half of the average 10.87 participants per classroom utilized in this study. Furthermore, by imposing a higher cut-off point the number of groups would be reduced which may itself result in more biased estimates (McNeish & Stapleton, 2016). From a theoretical standpoint, a low participation rate may increase the risk of self-selection bias among participants with certain groups of students within the classroom being more likely to participate than others. On the other hand, requiring a high classroom participation rate may, in practice, result in similar issues but on the classroom level. For example, students within classrooms that experience a dysfunctional social climate may have less energy, time, or lack the motivation for participating compared to students in more harmonious classrooms. These students may also find it harder to obtain the written caretaker consent necessary for participating (Overbeek et al., 2024). Nevertheless, to minimize the risk of bias stemming from a low participation rate, future studies should strive to secure a high participation rate in all groups by, for example, avoiding overly long questionnaires or by assisting students in obtaining the necessary documentation.

The fact that this study was conducted in Sweden may also limit the generalizability. For example, bullying victimization may interact with student relationships differently in schooling systems with less stable classroom units, where classrooms units tend to be either larger or smaller, or where friendly social interactions between students are otherwise disincentivized (e.g., harsh teacher control or a focus on competition; Di Stasio et al., 2016; Horton, 2018).

Finally, despite having a sample of close to 600 students, given the relative rarity of bullying victimization and the sometimes high correlation between variables in this study, the current sample may have been too small to accurately map some of the weaker associations. This is particularly true for the classroom-level associations, where the sample was considerably smaller. For example, friendship closeness was highly correlated with friendship help ($r = 0.69$ and 0.74 for the individual and classroom levels, respectively), potentially confusing the effects of each of these variables in such a small sample. Future studies may therefore consider either using a larger sample or merging similar friendship quality subscales to better differentiate the effects.

4.2 Practical implications

The results of this study show the importance of schools taking student relationships and sense of classroom peer community into account when addressing bullying, and emphasize the necessity of encouraging healthy relationships among students. This is because healthier student relationships are not only valuable in their own right, but they also seemingly reduce the likelihood of bullying, both for individual students and within the broader classroom context.

To that end, teachers should make sure to acquaint themselves with the inter-student relationships within their classrooms and work towards ensuring that no students find themselves friendless and thus at greater risk of bullying victimization. To this end, teachers may encourage new friendships through group-based learning activities and cooperative learning (Van Ryzin & Roseth, 2019). Additionally, to

reduce conflicts between students, teachers may both practice and teach constructive conflict resolution strategies and peer mediation (Ibarrola-García, 2024). Teachers may also seek to promote prosocial, helpful behaviors and attitudes in their classrooms to both facilitate high-quality friendships between students and further the development of a sense of peer community in the classroom. Here, schools can assist teachers by, for example, adopting social and emotional learning programs, which have been found to increase prosocial attitudes and behaviors among students, including helping others (Durlak et al., 2022).

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Declarations

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