

# Inequality Matters: Classroom Status Hierarchy and Adolescents' Bullying

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**Abstract** The natural emergence of status hierarchies in adolescent peer groups has long been assumed to help prevent future intragroup aggression. However, clear evidence of this beneficial influence is lacking. In fact, few studies have examined between-group differences in the degree of status hierarchy (defined as within-group variation in individual status) and how they are related to bullying, a widespread form of aggression in schools. Data from 11,296 eighth- and ninth-graders (mean age = 14.57, 50.6 % female) from 583 classes in 71 schools were used to determine the direction of the association between classroom degree of status hierarchy and bullying behaviors, and to investigate prospective relationships between these two variables over a 6-month period. Multilevel structural equation modeling analyses showed that higher levels of classroom status hierarchy were concurrently associated with higher levels of bullying at the end of the

school year. Higher hierarchy in the middle of the school year predicted higher bullying later in the year. No evidence was found to indicate that initial bullying predicted future hierarchy. These findings highlight the importance of a shared balance of power in the classroom for the prevention of bullying among adolescents.

**Keywords** Bullying · Status hierarchy · Popularity · Multilevel structural equation modeling

## Introduction

The emergence of dominance or status hierarchies within human peer groups is considered a natural and pervasive phenomenon (see Fournier 2009), but its effect on individuals' behavior and adjustment is controversial (Anderson and Brown 2010). Some studies of adolescents have underlined the virtues of status hierarchies; they appear to decrease intra-group conflict and improve organization of group tasks by enhancing the predictability and stability of social relationships (Pellegrini and Long 2002; Savin-Williams 1979). However, a growing body of research is challenging this functionalist perspective and supports a "balance-of-power" view by showing that status inequality within classrooms, and even societies, is associated with victimization (Wolke et al. 2009), bullying (Elgar et al. 2009), and other violent behaviors (Wilkinson and Pickett 2009). According to this "balance of power" perspective, the power differential inherent in hierarchical contexts is detrimental to peer relationships.

Bullying itself involves an imbalance of power between the perpetrator and the target of repeated aggression (Olweus 1996). Most adolescent bullies, though generally disliked, are high in perceived popularity—an indicator of

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social prominence in the peer group—while victims tend to be unpopular (Caravita et al. 2009; de Bruyn et al. 2010). Accordingly, bullying should occur more easily in classrooms of high status hierarchy, characterized by large inter-individual variation in status (i.e., by the presence of both popular and unpopular students), compared to classrooms in which students share a similar status. Recent studies have revealed that the aggressive conduct of high-status students in a group may influence their peers' behavior more so than the average of all students' (Dijkstra et al. 2008; Shi and Xie 2012), suggesting that particular attention should be paid to the division of status within peer groups.

The present study aims to clarify the link—both concurrent and prospective—between status hierarchies and bullying in an adolescent sample. In this study, status hierarchy refers to within-classroom variability in perceived popularity (measured by peer nominations of the “most popular” classmates) and social impact (measured by summing nominations of those most liked and least liked). These two constructs are conceptually close (Cillessen and Marks 2011) and both reflect visibility and dominance among peers. We hypothesized that a higher degree of classroom status hierarchy would be concurrently associated with higher levels of bullying in secondary school classrooms. In addition, we examined the directionality of effects and expected that classroom hierarchy would predict high rates of bullying at a later time point. Similarly, we also expected to observe an effect of bullying on the subsequent formation of a high classroom hierarchy.

#### The Functionalist Perspective

Status hierarchies are often assumed to promote social order and harmony, as they should contribute to a better organization of activities through everyone's awareness of their position in relation to others. Accordingly, observed decreases in rates of aggressive behaviors across a school year have been interpreted as resulting from the establishment and stabilization of status hierarchies (Pellegrini and Long 2002; Savin-Williams 1979). From this perspective, the existence of a strong status hierarchy should deter everyone from engaging in aggressive actions as it should make aggression appear more costly than rewarding. Those at the bottom of the ladder should recognize that any attempt at aggressively challenging a higher-positioned peer is likely to fail, while individuals at the top of the hierarchy should find it unnecessary to attack lower-positioned peers due to their already granted advantage in accessing resources.

Nevertheless, studies suggesting that status hierarchies may serve to minimize aggression or bullying have not directly examined between-group differences in the

degree of status hierarchy. Therefore, they did not clearly demonstrate that a higher level of status hierarchy in a group was associated with a lower prevalence of aggressive behaviors. While the reduction of aggression has often been viewed as the primary function of hierarchies, clear evidence that status hierarchy is associated with low levels of intra-group aggression is still lacking (Rowell 1974).

#### The “Balance of Power” Perspective

Research increasingly suggests that aggressive behaviors may be more prevalent in more hierarchical social contexts. For instance, early studies have demonstrated that children's peer groups with a hierarchical organization displayed more conflicts and hostile behaviors than groups with a more egalitarian structure (Lewin et al. 1939; Lippitt 1939; Sherif 1956). In middle childhood, belonging to a classroom with a stronger status hierarchy (measured by variation in social impact) is associated with an increased likelihood of becoming a victim of relational aggression 2–4 years later (Wolke et al. 2009). Further studies showed that individuals of average status are less likely than low- and high-status individuals to engage in aggressive or deviant behaviors (Closson 2009; Phillips and Zuckerman 2001); this implies that bullying should be less frequent in low-hierarchy groups where most members are of average status than in groups that include a significant proportion of both high- and low-status students. Research on ethnic diversity in schools has emphasized the benefits of a shared balance of power by showing that self-reported victimization in sixth grade was lower in more diverse classrooms with equal representation of multiple ethnicities (Juvonen et al. 2006). These findings support the idea that bullying should be facilitated in classrooms where the balance of power is tipped in favor of some students.

The adverse effects of a context of social inequalities have received increased attention in recent years (see Wilkinson and Pickett 2009). Specifically, a study focusing on inequalities in socio-economic status on a nationwide scale has found higher inequalities to be associated with higher rates of school bullying (Elgar et al. 2009). Although within-country discrepancies in socio-economic status are conceptually different from inequalities in popular status in youth peer groups, these findings indicate that some characteristics inherent in unequal social environments may be detrimental to adolescents' peer relations. The characteristics essential to highly hierarchical groups—higher status salience, higher concentration of power, and higher rewarding of aggression—may account for these deleterious effects and indirectly facilitate the emergence of bullying.

### *Status Salience and Competition*

An individual's status is always relative to the status of other individuals in a group. While status loses its relevance in egalitarian contexts, it gains particular significance and visibility in situations of high status hierarchy. Inequality in status implies that all the benefits associated with high status, such as attention from others, are not equally available to everyone. This scarcity confers value to status itself and should lead individuals to compete for it more intensely. Those at the top of the hierarchy should be concerned with maintaining their status due to the possibility of losing it, whereas those further down the hierarchy should be motivated to strive for higher status.

Bullying is considered by many researchers to be a strategic behavior designed to acquire or maintain status (e.g., Salmivalli 2010). Studies find that aggressive adolescents or bullies are more likely than other youth to endorse agentic goals, which involve achieving power and status (Li and Wright 2013; Sijtsema et al. 2009), especially when they are popular (Caravita and Cillessen 2012). At the group level, competitive contexts have been shown to be conducive to aggression in middle childhood (DeRosier et al. 1994; Nelson et al. 1969). By increasing status competition, strong status hierarchies may encourage bullying in adolescent peer groups.

### *Concentration of Power*

In highly hierarchical groups, some members have more power than others, and being in a position of power may facilitate bullying behaviors through several processes. Power has been shown to affect adult attitudes and behaviors; holding a position of power can lead individuals to treat others like objects (i.e. as a means to an end; Gruenfeld et al. 2008), experience reduced distress and compassion in response to others' suffering (Van Kleef et al. 2008), have a decreased capacity to take the perspectives of others (Galinsky et al. 2006), and become more vulnerable to stereotyping, which can encourage hate and discrimination (Fiske 1993). These outcomes of power, combined with its disinhibiting effects on social behaviors (Keltner et al. 2003), should promote the enactment of deviant behaviors, such as bullying.

### *Rewarding of Aggression*

Social environments with a high status hierarchy may also promote bullying by rewarding the behavior itself. In primary school, aggressive children are more popular in classrooms where the connections among children are unequally distributed (i.e., with higher variation in children's level of network centrality) compared to classrooms

with a more even distribution of ties (Ahn et al. 2010), as well as in classrooms of higher variation in perceived popularity (Garandeau et al. 2011, but see Zwaan et al. 2013). Similarly, bullies were found to be better accepted, compared to victims, in classrooms with a higher variation in social impact (Schäfer et al. 2005). Young bullies' higher peer status in more hierarchical classrooms should encourage them to pursue their negative actions.

### *Direction of Effects*

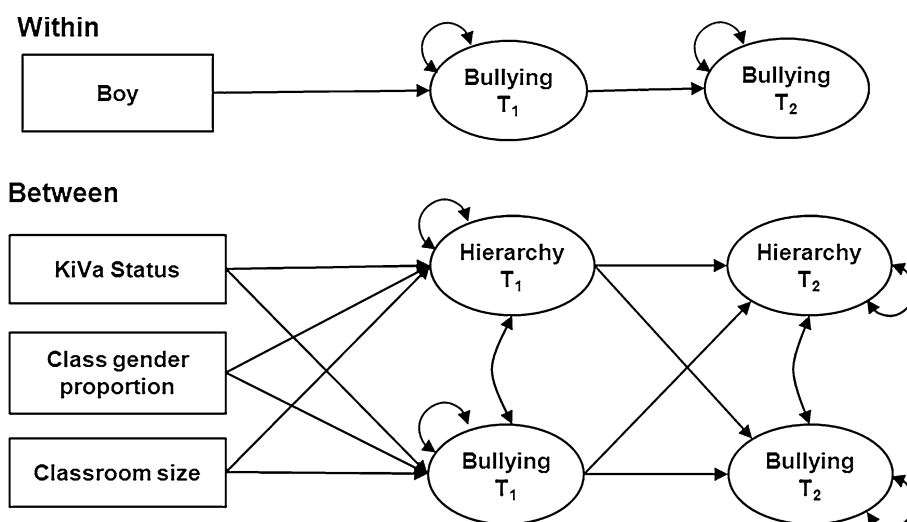
Findings of a positive association between bullying and status hierarchy may indicate that higher hierarchy promotes bullying, but also that bullying induces a higher degree of hierarchy. A high prevalence of classroom bullying may instigate larger status differences among peers. Many ethnographic studies have described how clique leaders resort to aggressive means in order to retain their dominance over others (e.g., Merten 1997). Bullying others can lower the targets' status by highlighting their weaknesses and damaging their reputation, thereby increasing status discrepancies in the group. The possibility for some individuals to affect their group's structure, and specifically to create power inequalities through coercion in an initially egalitarian context, has been documented (Pratto et al. 2008). Therefore, it is necessary to examine the effects of prior bullying on later hierarchy in addition to the effects of prior hierarchy on later bullying.

### **The Present Study**

This study investigates concurrent and longitudinal associations between classroom levels of status hierarchy and bullying in an adolescent sample. Studies of bullying and hierarchy in school settings have often focused on transition periods when students enter a new social environment, in which the uncertainty regarding everyone's status prevails (e.g., Pellegrini and Long 2002). In order to obtain a valid test of differences in status hierarchy, this study analyzes data collected from a non-transition period, in the middle (T1) and at the end (T2) of the school year, when low hierarchy is less likely to be confounded with unformed hierarchy. Positive associations between degree of status hierarchy and bullying were anticipated at each time point. To address the question of directionality, we implemented a cross-lagged model (at the classroom level) to examine whether T1 status hierarchy predicts T2 bullying and whether T1 bullying predicts T2 status hierarchy (see Fig. 1).

We controlled for variables known or suspected to be correlated with bullying and/or hierarchy. Gender was included as a predictor at the individual level, as adolescent

**Fig. 1** Multilevel structural equation model testing autoregressive bullying relationships within classrooms as well as the concurrent and predictive associations between classroom status hierarchy and bullying



males have been found to bully more than females (e.g., Pepler et al. 2008). At the classroom level, we controlled for classroom gender distributions. Studies examining status hierarchies in children's peer groups have paid great attention to gender distribution, but findings have been inconsistent: Savin-Williams (1979) found hierarchies to be higher and more stable among boys, whereas other studies found no difference between boys' and girls' groups (Gest et al. 2007; Xie and Shi 2009). In our sample, both bullying and hierarchy were strongly associated with the number of students in the class ( $r = -.19, p < .001$  and  $r = -.44, p < .001$ , respectively), prompting us to add classroom size as a covariate. Finally, as half of the participating schools were implementing an anti-bullying program, we added intervention status (versus control) as a predictor.

## Methods

### Sample and Procedure

Data were collected as part of a large randomized controlled trial designed to test the effectiveness of the KiVa anti-bullying program in Finland. Participants were 9,723 eighth- and ninth-graders who belonged to 583 classrooms in 71 schools. They provided data on a total of 11,296 classmates ( $M_{age} = 14.57, SD = .79$ ; 50.6 % female) through a peer nominations' procedure.<sup>1</sup> The schools were selected from all five provinces in mainland Finland, ensuring that the participants are representative of the Finnish population.

<sup>1</sup> All participants could nominate any of their classmates. Therefore, some of the students in the sample have peer-reported scores for bullying and status measures although they did not make any nominations themselves, either because they were absent or because they failed to provide parental consent to participate.

Among participants, there was little variability in socio-economic status and 2 % were immigrants. The classrooms selected had a minimum 50 % participation rate, where data were available for at least 14 students. The average participation rate of our sample was 86 %. All participants received active parental consent. The program and evaluation design were developed at the University of Turku prior to establishment of an Institutional Review Board. However, the data collection procedure was consistent with the Finnish Human Subjects Protection regulations.

Among the schools, 37 were implementing KiVa and 34 served as control schools. The second and third waves of data from a three-wave longitudinal study were analyzed, as they were collected within the same school year with no change in classroom composition. In Finnish secondary schools, students remain together for most their courses, much like in primary school in many countries. Therefore, classrooms are clearly identifiable units. The first wave of data collection took place at the end of one school year (May 2008) before program implementation. The second and third waves (T1 and T2 in this study) were collected in December 2008/February 2009 and May 2009. Students filled out internet-based questionnaires in the schools' computer labs and were supervised during regular school hours by teachers, who were instructed on the data collection process. Participants were informed of the strict confidentiality of their answers. Anonymity was ensured by the use of individual passwords to log into the surveys. Each student was assigned an anonymous ID number at the beginning of the study; these IDs were used across the three waves of data collection.

### Measures

At the beginning of the survey, the following definition of bullying was read out loud to the participants (and shown

on their computer screens): Bullying occurs when students repeatedly perform any of the following behaviors directed towards another: “say mean and hurtful things or call him/her names, completely ignore or exclude him or her from their group of friends, hit, kick, push, shove, or tell lies or spread false rumors” (Olweus 1996). This definition also differentiates bullying from similar behaviors by requiring a power differential between perpetrator and victim: “Friendly and playful teasing is not bullying. Nor is it bullying when two more or less equally strong students argue or fight.” Participants were requested to keep this definition in mind when answering the questions. Bullying, popularity and social impact were peer-reported measures. Participants were presented with a roster of their classmates and could make unlimited nominations.

### *Bullying*

A measure of bullying from the Participant Role Questionnaire (Salmivalli et al. 1996) was used, in which participants nominated classmates who fit the description provided for three items: (a) starts bullying; (b) makes the others join in the bullying; (c) always finds new ways of harassing the victim. For each item, proportion scores were computed by dividing the number of received nominations by the number of participants in the class. The three items formed an internally consistent scale ( $\alpha = .92$  at T1,  $\alpha = .89$  at T2).

### *Classroom Status Hierarchy*

The degree of status hierarchy of each classroom was assessed using indices of popularity and social impact. For popularity, participants were asked “Who are the most popular in your class?” and requested to check the names of the classmates who fit the description. Proportion scores were computed by dividing the number of received nominations by the number of respondents. Participants were also asked to nominate who they liked the most and who they liked the least, providing measures of acceptance and rejection. An index of social impact was created by summing the proportion scores for these two variables. The standard deviations of the popularity and social impact score distributions were computed within each classroom; these statistics reflect classroom dispersion of status. The standard deviations of the popularity score distribution ranged from .04 to .31 ( $M = 0.16$ ,  $SD = .05$ ) at T1 and from .02 to .35 ( $M = 0.14$ ,  $SD = .06$ ) at T2. Those of the social impact score distribution ranged from .07 to .27 ( $M = 0.13$ ,  $SD = .03$ ) at T1 and from .06 to .34 ( $M = 0.12$ ,  $SD = .04$ ) at T2.

### *Demographic Variables*

Classroom size, gender distribution and intervention status were included as covariates of T1 bullying and hierarchy outcomes. Classroom size was the number of students in each class and ranged from 14 to 28 ( $M = 19.8$ ,  $SD = 2.9$ ). Gender distribution was indicated by the classroom proportion of boys and ranged from .20 to 1.0 ( $M = .49$ ,  $SD = .11$ ). Intervention status was included as a binary predictor (1 = KiVa, 0 = control).

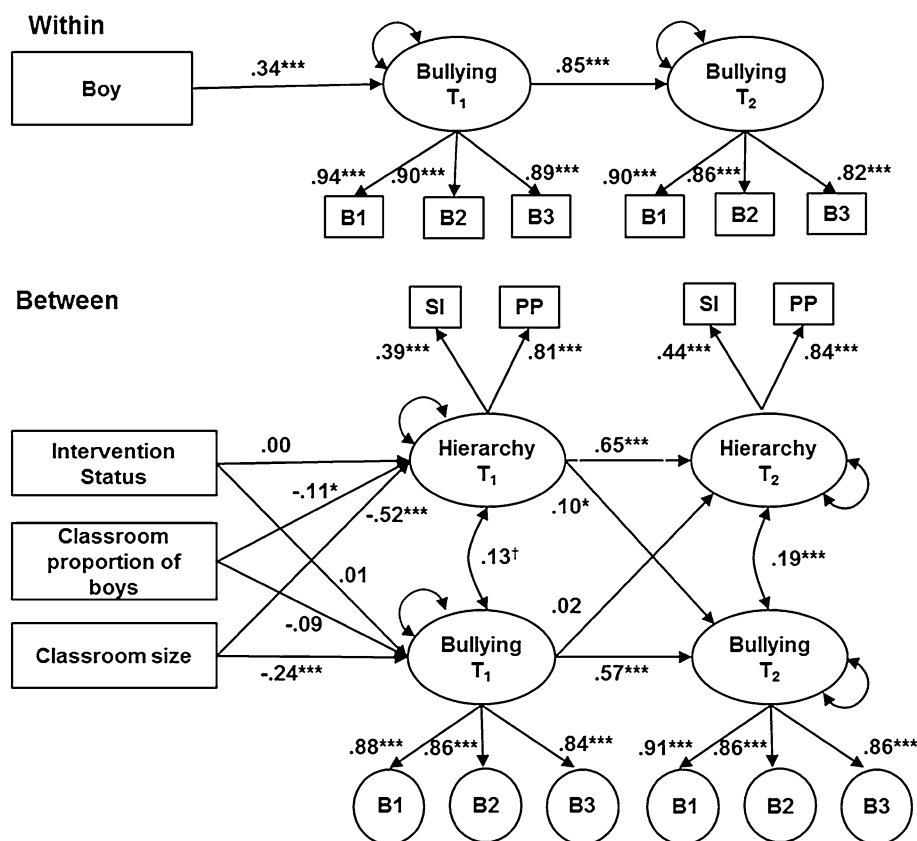
### *Analytical Strategy*

Our data had a hierarchical structure, with students nested in classrooms (9 % of the variance in bullying at T1 and 14 % of the variance at T2 were due to classroom differences). Therefore, we used a multilevel structural equation modeling (MSEM) approach (Muthén and Asparouhov 2008) to examine concurrent and longitudinal relationships between classroom bullying and status hierarchy. We constructed a panel model with cross-lagged relations at the classroom level to test the effects of T1 hierarchy on T2 bullying and of T1 bullying on T2 hierarchy. At the within-classroom level, we examined the autoregressive relationship of bullying at T1 to T2. Analyses were conducted using Mplus v.6.1 (Muthén and Muthén 1998–2010).

The measurement model consisted of T1 and T2 latent bullying variables, as measured by their three corresponding items. Two latent status hierarchy variables at T1 and T2, as measured by within-classroom standard deviations of popularity and social impact scores, were included. Correlated residuals were estimated between the same items measured at T1 and T2. The scale for the latent constructs was set by an effects-coding method, which constrains the factor loadings and intercepts to average 1.0 and 0.0, respectively, in order to obtain optimally weighted estimates (Little et al. 2006). As the latent hierarchy factors were defined by only two indicators, their residuals were equated for purposes of model identification.

In MSEM, model fit is evaluated using the same procedures as in a single-level SEM (e.g., RMSEA, Browne and Cudeck 1993; CFI, Bentler 1990; TLI, Tucker and Lewis 1973; SRMR). However, in the MSEM context, this global model fit evaluation is limited in that it does not indicate if the model misspecification occurs at the within or between level. To address this issue, we used a level-specific approach to evaluating model fit (Ryu and West 2009) that estimates all item variances and covariances (or saturates the model) at one level (e.g., the within model) to obtain model fit at the other level (e.g., the between model). A saturated model has perfect fit, thus any misfit reflects misspecification in the unsaturated model.

**Fig. 2** Standardized factor loadings and path coefficients for the within- and between-classroom models (N = 11,296). Residual variances and correlated residuals, though included in the model, are not depicted for clarity. † $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$



## Results

### Measurement Model

At the classroom level, the standardized factor loadings ranged from .84 to .91 for the bullying measures ( $ps < .001$ ) and were slightly dissimilar—from .39 to .84—for the hierarchy indicators ( $ps < .001$ ); thus, hierarchy is weighted in favor of the popularity measure and should be interpreted as such. At the student level, the factor loadings ranged from .82 to .94 for the bullying items ( $ps < .001$ ). Residual variances were generally low (from .01 to .32) in both between- and within-classroom models, and residual correlations between corresponding T1 and T2 items were positive (from .00 to .72). The model fit well at the student level ( $\chi^2(7) = 25.36$ , RMSEA = .015, CFI = .999, TLI = .995, SRMR-within = .006) and classroom level ( $\chi^2(33) = 59.42$ , RMSEA = .008, CFI = .999, TLI = .998, SRMR-between = .049), based on existing guidelines (Hu and Bentler 1999). Overall, the measurement model results indicate that the bullying and hierarchy indicators are valid representations of the underlying latent constructs. Strong factorial invariance was established for all constructs across T1 and T2, based on recommended guidelines (Cheung and Rensvold 2002).

### Structural Model

The model had excellent fit at the student level ( $\chi^2(12) = 47.51$ , RMSEA = .016, CFI = .999, TLI = .992, SRMR-within = .005) as well as at the classroom level ( $\chi^2(57) = 127.68$ , RMSEA = .010, CFI = .998, TLI = .997, SRMR-between = .046). At the student level, gender was a significant predictor of bullying ( $\beta = .34$ ,  $p < .001$ ), such that boys were more likely than girls to bully others. Bullying rates were stable from T1 to T2. Students who bullied mid-year were likely to continue bullying at the end of the year ( $\beta = .85$ ,  $p < .001$ ). At the classroom level, the proportion of boys negatively predicted hierarchy ( $\beta = -.11$ ,  $p = .021$ ) such that the degree of hierarchy was lower in classrooms with a higher male–female ratio. However, the gender distribution was not significantly associated with bullying ( $\beta = -.09$ ,  $p = .107$ ). Classroom size was negatively associated with both bullying and hierarchy ( $ps < .001$ ). As the number of students in the class increased, the levels of bullying and hierarchy declined. No effect of intervention status was observed on bullying ( $\beta = .01$ ,  $p = .834$ ) or hierarchy ( $\beta = .00$ ,  $p = .991$ ). All estimates are displayed in Fig. 2.

Bullying and hierarchy levels were stable across time. T1 levels of classroom bullying and hierarchy predicted the corresponding levels at T2 ( $ps < .001$ ). Classroom bullying

rates and status hierarchy at T1 were positively correlated ( $r = .13$ ) but only marginally significant ( $p = .076$ ). By the end of the year (T2), this association was significant ( $r = .19, p = .001$ ), controlling for prior levels of bullying and hierarchy. With regard to cross-lagged relationships, T1 bullying did not predict T2 hierarchy ( $\beta = .02, p = .666$ ). However, T1 hierarchy significantly predicted T2 bullying ( $\beta = .10, p = .032$ ). Bullying rates were higher at the end of the year in classrooms with a higher degree of status hierarchy in the middle of the year.

## Discussion

A growing body of research shows that children and adolescents' bullying behavior at school is not only determined by personal factors but depends on the social context. In particular, classroom behavioral norms, as reflected by the prevalence of bullying and/or defending behaviors, are known to influence individual bullying (e.g., Salmivalli et al. 2011). More recently, studies have begun to show that the hierarchical structure of peer relations in the classrooms may play an important role in the emergence and reinforcement of aggression and bullying (Garandeau et al. 2011; Schäfer et al. 2005; Wolke et al. 2009). Although the emergence of status hierarchies in adolescent peer groups is a pervasive phenomenon that is sometimes believed to serve to reduce intra-group aggression (e.g., Pellegrini and Long 2002), we expected that the power inequalities inherent in highly hierarchical classrooms would facilitate bullying, a behavior characterized by the repeated abuse of power.

In line with our hypotheses, the results showed that higher levels of classroom status hierarchy in adolescence were associated with higher levels of bullying, one of the most serious problems that youth experience at school. Our findings demonstrated the temporal precedence of status hierarchy over bullying behaviors, supporting the view that the classroom imbalance of power facilitates the emergence of subsequent bullying. No evidence indicated that initial bullying increases the degree of status hierarchy. Overall, these results do not support the proposition that status hierarchies serve an adaptive function over time. On the contrary, they highlight the importance of a shared balance of power among students in maintaining a safe environment.

Classrooms were no more or less hierarchical when males outnumbered females. In that respect, our results are consistent with studies showing no differences in the degree of hierarchical organization between boys' and girls' peer groups (Gest et al. 2007; see Underwood 2004). Classroom size was included in our analyses only as a control, but the somewhat counterintuitive finding that

there is less bullying in larger classrooms deserves further explanation. Although student supervision and social support are believed to be more difficult in larger classrooms or schools, some studies have found that children were more often victimized in smaller classes (Saarento et al. 2013; Wolke et al. 2001), and rates of bullying offenses were higher in smaller schools (Klein and Cornell 2010). Larger, more diversified student networks offer more opportunities for affiliation. Therefore, adolescents who do not "fit in" and are at risk for victimization may find it easier in larger classrooms to find at least one friend, a known protective factor against victimization (Hodges et al. 1999). In addition, bullies' influence on the behavior of the entire peer group may be stronger in smaller classrooms. Many bullies are popular leaders who can lead others to join in bullying, and they may be less likely to achieve this control over an entire classroom when it is large. A greater number of friendship options combined with a possible diminished power for bullies might explain the lower rates of bullying in larger classrooms.

Our findings have important implications for school professionals striving to reduce bullying behaviors and enhance the well-being of students. A recent study found that bullying problems were more prevalent following the move from fifth to sixth grade in schools without a transition (i.e., school change between grades 5 and 6) than in schools with a transition, indicating that challenging the existing hierarchical peer structure could promote safer school environments (Farmer et al. 2011). According to a study of teaching practices, teachers themselves can directly affect the social dynamics of their classrooms (Gest and Rodkin 2011): Classrooms are more egalitarian with regard to popularity status when teachers encourage the fostering of new friendships by creating small student groups and managing seating charts. Evidence of a hierarchy-attenuating effect of teachers' efforts at providing higher levels of instructional support and creating academically diverse groups was also found.

## Limitations

One limitation of the present study lies in the choice of the classroom as the cluster unit of analysis. Several reasons prompted that decision. The classroom is a relevant unit of analysis to the extent that students share the same teachers as well as the same physical space, and spend most of their school time interacting with their classmates. Furthermore, the measures used in this study were within-classroom peer nominations. However, we acknowledge that children and adolescents typically do not interact equally with every other student in the class. Within each classroom, a varying number of peer groups or cliques can generally be identified. This is potentially problematic for the assessment of

classroom hierarchy. A high level of status hierarchy in a class may comprise different configurations. For instance, high status differences may be observed between peer groups while the members of a peer group may share the same status. Alternately, the classroom may be composed of one or many highly hierarchical peer groups. Although the hierarchy level in these two types of classrooms may be equally high, the intra-group power dynamics are radically different. This difference in configurations of hierarchy was not considered in our analysis. Using the peer group as the unit of analysis would prevent this confusion.

Examining the effects of hierarchy within peer groups could also evaluate whether the status level of the group moderates the effects of hierarchy on bullying, as group influence on behavior may vary depending on the status of the group (Ellis and Zarbatany 2007). A recent study with adults has also suggested that power dispersion is associated with more power struggles and less resolution of conflicts in high-power groups only (Greer and Van Kleef 2010). Using the peer group as the unit of analysis may also be the only alternative to study the effects of status hierarchy on adolescents' behaviors in countries where the classroom is not a distinct unit.

Although the present study has the advantage of examining prospective relationships between status hierarchy and bullying, the longitudinal analyses are limited by the number and closeness of assessments. While our findings demonstrate the short-term deleterious effects of status hierarchy, it remains unknown whether these effects would be sustained for longer time periods (e.g., greater than 6 months). The long-term stability of the degree of hierarchy in adolescent classrooms and its possible cascading effects on bullying behaviors are important questions to address in future research. Nevertheless, such investigations require classrooms or groups whose composition remains similar over long periods of time (e.g., having the same classroom or peer group membership), which may be difficult to obtain.

The study focuses on bullying behavior, which is a specific form of aggression. We reasoned that a social context of power inequalities would favor the emergence of bullying as it is characterized by a power differential between target and perpetrator. However, by limiting our investigation to bullying, we did not test whether the negative effects of hierarchy would hold for other forms of aggression. This raises the possibility that there is not less aggression in low-hierarchy compared to high-hierarchy classrooms, but simply that the aggression occurring in low-hierarchy classrooms does not meet the specific criteria of bullying. This limitation should be kept in mind when interpreting our findings.

The present study is also limited by the lack of diversity among participants. This nationwide sample is representative

of the Finnish population, which is relatively egalitarian in terms of socio-economic status (see Wilkinson and Pickett 2009) and ethnically homogeneous. Within-classroom ethnic distributions and inequalities in socio-economic status among adolescents may contribute to behavioral problems—as suggested by Elgar et al. (2009). Further studies conducted with more heterogeneous groups of participants could clarify if the detrimental effects of hierarchy are restricted to peer status hierarchy or extend to other types of intragroup inequalities.

#### Future Research

One avenue for future research is in investigating individual differences that could moderate the effect of status hierarchy on bullying. The behavioral profile of students who are highly ranked probably plays an important part. Despite the positive relationship between aggression and high status, non-aggressive adolescents who display mainly prosocial behaviors may become leaders of some peer groups. In such cases, even highly hierarchical peer groups might be characterized by positive peer relationships and low rates of bullying. The effects of hierarchy may also depend on whether the popularity of high-status group members was attained through dominance, which involves coercion and induction of fear, or prestige, which characterizes individuals respected for their skills or knowledge (Henrich and Gil-White 2001). According to Fast et al. (2011), individuals are most aggressive when they are in a position of power (asymmetric outcome control) but lack status (respect and admiration). Unfortunately, our measure of peer standing did not allow us to make the distinction between these different forms. Another possible moderator is the degree of accuracy in self-perception of one's social standing. Groups experience more conflicts when some members overestimate their own status within the group (Anderson et al. 2008).

Future research could also examine whether hierarchy plays a moderating role in the success or failure of anti-bullying intervention programs. For instance, students in peer groups with a strong and established hierarchy may find it more difficult to challenge a popular bully by defending an unpopular victim. Classroom status hierarchy may also mediate the effects of an intervention program on bullying. In other words, bullying could be reduced by making it less rewarding for bullies and by decreasing power discrepancies among classmates.

Finally, an examination of the link between hierarchy and bullying with a developmental perspective would be informative. Several studies attest to the emergence of dominance hierarchies already among preschoolers (Pellegrini et al. 2007; Strayer and Strayer 1976), as well as a link between victimization and the degree of hierarchical structuring in



primary school classrooms (Wolke et al. 2009). In addition, a study found secondary school classrooms to be significantly more hierarchical than primary school classrooms (Schäfer et al. 2005). More research is needed to determine if hierarchy in classrooms and/or peer groups increases with age, and to evaluate if the association between degree of status hierarchy and bullying changes over time.

## Conclusions

The ubiquity of status hierarchies in human peer groups may promote the belief that they are beneficial. Despite their pervasiveness in school peer groups, informal hierarchies are not a desirable feature of adolescent networks and, on the contrary, promote bullying among peers. The positive link between classroom status hierarchy and bullying problems suggests that minimizing status discrepancies among classmates would be advantageous for youth. Fortunately, research shows that status hierarchy is a classroom characteristic that teachers have the capacity to influence (e.g., Gest and Rodkin 2011). Nonetheless, the task will be challenging: Hierarchical relationships have been found to be easier to process and memorize than egalitarian relationships, and this processing fluency is believed to contribute to the liking and maintenance of hierarchies (Zitek and Tiedens 2012). This automaticity of hierarchy suggests that the achievement of equality in social relationships may require a stronger and more conscious effort. By raising awareness of the risks of high status hierarchies, we hope that our findings will incite school professionals to channel their efforts in such a direction.

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**Author contributions** All persons who have contributed significantly to this work have been listed as authors. CG conceived of the study, participated in its design and coordination, and drafted the manuscript. IL designed the statistical models, performed the statistical analyses, and helped in data interpretation and manuscript writing. CS obtained funding, helped in the interpretation of the results and has been involved in critical revision of the manuscript. All authors read and approved the final manuscript.

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