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Who bullies who online : a social network analysis of cyberbullying in a school context

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Abstract

Young adolescents' online bullying behavior has raised a significant amount of academic attention. Nevertheless, little is known about the social context in which such negative actions occur. The present paper addresses this issue and examines how the patterns of traditional bullying and cyberbullying are related and how electronic forms of bullying can be linked to the social context at school. To address these questions, social network analysis was applied to examine the networks of social interactions and (cyber)bullying among an entire grade of 1,458 thirteen to fourteen year old pupils. The results show that (1) cyberbullying is an extension of traditional bullying, as victims often face the same perpetrators offline and online, (2) there is evidence of mutual cyberbullying among youngsters and (3) cyberbullying is more likely to occur in same-gender and same-class students. The implications for future research and prevention of cyberbullying are discussed.

Keywords: cyberbullying, adolescents, bully patterns, extension, social network analysis

Who Bullies Who Online: A Social Network Analysis of Cyberbullying in a School Context

In the past decade the issue of cyberbullying has increasingly gained academic attention. Cyberbullying can broadly be defined as “an aggressive, intentional act carried out by a group or individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him or herself” (Smith, Mahdavi, Carvalho, Fisher, Russell & Tippett, 2008: 376). Empirical research has found that roughly 10 to 20% are victimized by means of mobile phones or the Internet (Kowalski & Limber, 2007; Williams & Guerra, 2007), particularly at the age of 12 to 14 (Tokunaga, 2010). Cyberbullying affects victims in a profoundly negative way. Studies have reported, for instance, that victims experience distress, fear and powerlessness (Hoff & Mitchell, 2009; Staude-Müller, Hansen, & Voss, 2012; Ybarra, Mitchell, Wolak, & Finkelhor, 2006).

Previous research has greatly enhanced our knowledge about the prevalence of (different forms of) cyberbullying, the profiles of victims and perpetrators, and the impact of cyberbullying. However, little attention has been paid to the social context in which cyberbullying occurs. To advance theory and empirical understanding of cyberbullying, the current paper examines how adolescents’ interaction patterns in the offline environment can contribute to explaining cyberbullying. More specifically it will focus on the school environment to address (1) how patterns of bullying and cyberbullying relate and (2) how electronic forms of bullying can be linked to existing offline social context. For this purpose social network analysis (SNA) will be applied. SNA explores “social networks” made up by ties (or interactions) between different actors (such as individuals). It allows a detailed analysis of these networks and explains behavior of individuals and groups by looking at the tie patterns (Wasserman & Faust, 1998).

Studying the patterns of online bullying can enhance school prevention programs. It provides insight into whether prevention should focus on cyberbullying and traditional

bullying separately, or whether both phenomena should be discussed together and tackled in a similar manner, which has been debated by Olweus (2012) and Menesini (2012). In addition, linking offline contextual factors and social relationships to online bullying may offer insight into the kind of ties that perpetrators and victims have and thus shed light on the reasons why perpetrators choose particular targets. This provides information for schools and organizations about what kind of social interactions should be strengthened (or prevented) in order to decrease cyberbullying. Furthermore, it can be studied how involvement in online victimization and perpetration may co-occur and how school prevention and intervention strategies can adapt to such practices.

Patterns of (cyber)bullying

Research has indirectly suggested that different forms of bullying are connected and that perpetration and victimization are related. First, it was found that victims and perpetrators of traditional bullying tend to adopt the same role online (Dehue, Bolman, & Völlink, 2008; Li, 2007; Raskauskas & Stoltz, 2007; Smith et al., 2008). In Hinduja and Patchin's study (2008) adolescents who reported being bullied offline were more than twice as likely to indicate cyberbullying victimization. Similarly, self-reported offline perpetrators have an increased likelihood of admitting cyberbullying (Hinduja and Patchin, 2008). In contrast, no support was found for the hypothesis that offline victims would commit cyberbullying as a possible revenge strategy. Raskauskas and Stoltz (2007) found no significant relationship between traditional victimization and electronic perpetration. Second, research has shown that students who are subject to cyberbullying are also more frequently involved as perpetrators of cyberbullying. Hence, for adolescents, being involved as an online perpetrator is a key factor in predicting cyber victimization (Beran & Li, 2007; Walrave & Heirman, 2011).

Although this research successfully explained perpetrator and victim positions in bullying, it did not describe particular patterns of (cyber)bullying. More specifically, it did not

unravel, first, whether victims are bullied by the same perpetrator offline and online, identifying cyberbullying as an *extension* of offline bullying and, second, if adolescents reciprocally bully one another online, i.e. *mutual cyberbullying*. The notion of extension implies that one may, for instance, be subject to harmful actions at school as well as online, because a fellow pupil chooses to extend the bullying to the online environment.

Alternatively, as Hinduja and Patchin (2008) note, individuals may have unique characteristics which elevate their risk of victimization in multiple contexts, possibly by different perpetrators. Data on the overlap between offline and online bullying at the individual level are sparse however. In one survey, it was found that four out of ten victims of cyberbullying indicated they had faced the same perpetrator at school (Ybarra, Diener-West & Leaf, 2007). Being victimized by the same person online and offline was also demonstrated to induce higher amounts of distress, which indicates that an extension of traditional bullying to the online environment is particularly problematic (Ybarra, Diener-West & Leaf, 2007).

With regard to mutual cyberbullying, multiple studies suggested the possibility of “retaliation” or “two way” cyberbullying (Li, 2007; Livingstone, Haddon, Görzig & Olafsson, 2011; Vandebosch & Van Cleemput, 2008). In interviews, for instance, youth mentioned online revenge as a possible reaction to electronic forms of bullying (Vandebosch & Van Cleemput, 2008). While few studies have assessed the importance and magnitude of this phenomenon, evidence suggested that almost one out of five adolescents is involved in “fighting back” online (Smith et al., 2008).

In sum, the limited literature on individual overlap between victimization and perpetration of (cyber)bullying suggests a certain degree of extension (from the offline to the online context or vice versa) and mutual cyberbullying. The single question measurements in former studies, however, do not allow to fully map the ways in which individuals are involved

in bullying. More in-depth analysis is needed to disentangle the complex system of offline and online bully interactions to test the following hypotheses:

H1: Being victimized offline is associated with being cyberbullied by the same perpetrator (extension).

H2: Being victimized online is associated with online cyberbullying of the perpetrator (mutual cyberbullying).

Social context and bullying

In addition to the patterns of bullying described above, social relationships among actors involved in cyberbullying also warrant further investigation. Victims and perpetrators may know one another from prior interactions and they may be, in some ways, socially involved. In studying social relationships it is useful to consider offline social environments, particularly schools, as adolescents spend a significant amount of time in this context and their social life is often grounded in the school environment (Blyth, Hill, & Thiel, 1982). Research has also found that it is fellow pupils who are indicated most frequently as sources of cyberbullying (Kowalski & Limber, 2007; Juvonen & Gross, 2008; Slonje & Smith, 2008; Smith et al., 2008).

Despite the expected and documented importance of the social environment, the connection between online bullying and social relationships at school is unclear. In particular, it is unsure to what extent friends are a source of cyberbullying for adolescents. In Kowalski and Limber's research (2007) 27.5% of the victims reported that the online bully was a friend and 22.5% indicated having cyberbullied a friend. Qualitative research confirms the notion that some teenagers may turn against their friends and cyberbully them as a means of "backstabbing" (Mishna, Saini, & Solomon, 2009). A subsequent study has found that perpetrators and victims tended to belong to the same friendship groups, but that they were not often direct friends (Festl & Quandt, 2013). Some limitations are present in the former

studies however. In the study by Kowalski and Limber (2007) it is unclear how exactly the respondents have interpreted the concept of friendship. The term may have been understood as close friendship, but it may also have been interpreted as a weaker connection. In the research by Festl and Quandt (2013) it could not be assessed whether cyberbullying was directed at peers from the same friendship group or at targets from another group.

Based on the literature, it seems unlikely that friends would bully one another. It is commonly assumed that there exists an asymmetric power relationship between the perpetrator and the victim, and that it is not bullying when two people of about equal strength fight or quarrel (Olweus, 1993). Hence, bullying may not be found in strong friendship relationships, because they are characterized by equality in power (Veniegas & Peplau, 1997). Additionally, evidence has shown that having a best friend and perceiving higher levels of protection from that friend lowers children's risk of being bullied (Hodges, Boivin, Vitaro, & Bukowski, 1999). As adolescents tend to be protected by their best friends, those relationships may not be the source of bullying. In contrast, weaker friendships may not offer this kind of protection and such ties may even act as sources of cyberbullying. Adolescents may want to be friends with popular individuals, who are more likely to bully and display aggressive behavior (Salmivalli, 2010), but they may not want to engage in a close relationship with them. Based on the distinction between strong friendship and weaker friendship, the following hypotheses are proposed:

H3: Being best friends (strong ties) is negatively associated with cyberbullying one another.

H4: Being "just friends" (weak ties) is positively associated with cyberbullying one another.

In a school social context, gender and class membership are two additional factors that may explain cyberbully patterns. Research found both same-gender and different-gender traditional bullying (Craig, Pepler, Connolly, & Henderson, 2001; Rodkin & Berger, 2008; Russell & Owens, 1999). If the type of behavior is taken into account as well, mainly indirect

and verbal aggression (rather than physical harm) is directed at same-gender individuals (Russell & Owens, 1999). Because cyberbullying relates more to indirect and verbal types of bullying (Kowalski & Limber, 2007) it is hypothesized that cyberbully interactions are more likely to occur among same-gender students. With regard to class membership the results on cyberbullying are mixed. In one study perpetrators were found most often in the victim's own class (Slonje & Smith, 2008), whereas in another study bullies mainly originated from outside the victim's class (Smith et al., 2008). Because social interactions and bullying at school are mainly constructed in the classroom context (Salmivalli, Huttunen, & Lagerspetz, 1997), it is expected that negative actions such as cyberbullying are more likely among classmates.

H5: Having the same gender is positively associated with cyberbullying one another.

H6: Being members of the same class is positively associated with cyberbullying one another.

Method

Sample and procedure

To gather data on the patterns of (cyber)bullying and offline social relationships, the entire eighth grade of eleven secondary schools was surveyed. The school environment was selected because adolescents spend a large amount of time interacting with fellow pupils and because it is the main venue for prevention programs. Moreover, in 13 to 14 year old pupils traditional bullying is still an important phenomenon, whereas cyberbullying becomes more prevalent (Livingstone et al., 2011). The sampling was based on the school size (preference for larger schools) and the type of education (vocational and general/technical). Additionally, all schools are located in the larger region of [region and country deleted]. In total 92% of the selected students participated in the study ($n = 1,458$). The sampled grades had 133 pupils on average, $SD = 72.04$, with the largest grade containing 263 pupils and the smallest 29. Ten out of eleven schools had both vocational and general/technical education, whereas one school had only general education. In total 60.2% of the students were boys and 67.4% were 13 or 14

years old at the end of the data collection. The proportion of students who had at least one parent from a foreign country was 23.9%. During school time the pupils filled in a personal survey copy which featured a unique number and which was handed out by the researcher. By connecting the respondents with their peer nominations, a full reconstruction of same-grade social and bullying networks. The pupils were provided with oral instructions from the researcher and were able to ask questions in private during completion.

With regard to ethics, approval was sought from the relevant actors and steps were taken to protect the respondents. Before data collection, the social network approach of studying cyberbullying in early adolescence was approved by the review board of the project's funding institution. Subsequently, schools were selected, provided with information regarding the research and asked to cooperate. In the schools that approved the pupils and their parents received an informational letter in which (passive) parental consent was sought. The details regarding the survey design were repeated at the time of survey administration and the respondents were guaranteed absolute confidentiality in processing their data. In addition, all survey copies included a separate sheet which indicated where to find more information regarding bullying and safe Internet use, as well as what to do and who to contact in case of (cyber)bullying. Following the data collection, the schools were provided with a report on the prevalence and main features of traditional and electronic bullying at their school. These results were based on grade level data, without reference to individual pupils or classes.

Measures

Involvement in (cyber)bullying. To measure involvement in bullying, respondents were given a definition of what constitutes bullying (and what does not). In correspondence with Olweus (1993) the description referred to the hurtful nature, the perpetrator's intention to harm and the difficulty for victims to defend themselves. Both measures of traditional bullying as well as cyberbullying included this definition, as well as five examples of what

would be considered offline and online bullying respectively. It was also stated that it is not bullying when friends tease one another or have an argument. After reading this description, the pupils indicated how often they had been involved in (cyber)bullying during the last six months. They answered on a six-point scale (ranging from “never” to “multiple times per week”), both for victimization and perpetration. If pupils indicated being involved once or more, they were able to select in which categories the perpetrators (or victims respectively) could be found. For traditional bullying the options were: same-grade pupils, different grade pupils and others not from the same school. For cyberbullying “Internet-only contacts” and “unknown people” were also included.

Patterns of (cyber)bullying. When respondents reported being (cyber)bullied by students from their own grade or (cyber)bullying same-grade pupils themselves, they were asked to indicate who the perpetrators or victims had been. These questions applied to all victims and perpetrators who had been involved in bullying during the past six months, including bully incidents that occurred once. For each question on victimization and perpetration, the respective targets and bullies were indicated by writing down their first and last names. Based on the results from a pilot study, the respondents could nominate up to eight students for traditional bullying and up to four students for cyberbullying. To aid in this process a reference sheet was provided with the names of the pupils in all eighth grade classes.

School context and social relationships. The adolescents reported who they consider to be best friends and just friends. Best friends were described as people they “often hang out with, talk about very personal things with” and whom they “can count on”. Pupils who are “just friends” were referred to as “people whom you regularly hang out with and talk to (but less often than to your best friends, and less about really personal things)”. For each nomination question the respondents were free to nominate up to eight same-grade pupils. In

addition, data regarding their gender (self-report) and class membership (reported by the school) were available.

Analyses

The collected data are actor by actor matrices of different networks: best friendship, “just” friendship, same-gender, same-class and (cyber)bullying. Two networks of “who cyberbullies who” were constructed: one based on the victims’ nominations and the other based on the perpetrators’ assessments. Both networks included all reported cases of cyberbullying among same-grade pupils, including single incidents. The online victim-bully ties in these networks were predicted based on other bully interactions among those pupils, their social relationship and their gender and class characteristics. Logistic regression analysis was applied on the network ties by means of the “sna” package for the R system for statistical computation (R Development Core Team, 2011). Significance tests for all analyses on dyadic ties were performed through the Quadratic Assignment Procedure (QAP) (Krackardt, 1987).

Results

Descriptives

With respect to social relationships, respondents on average wrote down the names of four to five same-grade pupils they consider to be their best friends, $M = 4.41$, $SD = 2.29$. A similar number of nominations occurred, when asked to identify who are “just friends”, $M = 4.43$, $SD = 2.37$. For (cyber)bullying, pupils who had been involved as either victims or perpetrators nominated their aggressors and targets respectively. On average fewer than one same-grade pupil was indicated as a perpetrator by the victims, $M = 0.42$, $SD = 1.03$, and as a victim by self-reported perpetrators, $M = 0.21$, $SD = 0.58$. For involvement in cyberbullying a lower number of nominations was given by the victims, $M = 0.06$, $SD = 0.30$, as well as the perpetrators, $M = 0.03$, $SD = 0.23$.

In general 33% of the respondents had been a victim of traditional bullying once or more during the last six months. If only bullying that occurred multiple times is considered, 17.8% of the students had been victimized. With regard to perpetration, 30.8% of the respondents indicated having bullied someone themselves. Approximately one out of five pupils (17.8%) indicated having bullied more than once in the past six months. Cyberbullying occurred less frequently, with 14.3% of the respondents indicating having been cyberbullied once or more. Although most of these instances were isolated incidents, 4.8% had fallen victim to frequent cyberbullying. From the perpetrators' point of view a lower number (10%) reported having been involved in bullying through the Internet or mobile phone (once or more), while 2.4% indicated having been cyberbullied more than once. For each question on bullying involvement 1.1% to 1.6% of the respondents did not provide an answer.

Looking at where perpetrators and victims originate from, the results show that 33.8% of the victimized pupils had been cyberbullied by someone from the same grade ($n = 70$), whereas 15.9% of the victims had been bullied online by a different-grade pupil ($n = 33$). Other instances of cyberbullying had been performed by people not from school (33.8% of the victims, $n = 70$) unknown people (30.9% of the victims, $n = 64$) and Internet-only acquaintances (14% of the victims, $n = 29$).¹ When viewed from the perpetrators' perspectives, 27% of the online offenders reported having targeted same-grade pupils ($n = 38$) and 14.2% reported having cyberbullied other-grade pupils ($n = 20$). Compared to victims, a higher percentage of perpetrators had been involved in cyberbullying others who are not schoolmates (49.6% of the perpetrators, $n = 70$) and Internet-only contacts (19.1% of the perpetrators, $n = 27$). Unknown targets had been cyberbullied by 16.2% of the perpetrators ($n = 23$). These numbers indicate that, for victims in particular, a substantial proportion of cyberbullying occurred among same-grade students.

Networks of cyberbullying

To assess if cyberbullying is an extension of offline bullying (H1), the patterns of involvement in (cyber)bullying are explored from the victims' point of view (see Figure 1), as well as from the perpetrators' perspective (see Figure 2). Logistic regression analysis was run to describe how one bully interaction correlates with another, controlling for all other ways of involvement in bullying. For victims of cyberbullying the results in Table 1 show that being the victim of traditional bullying by a fellow pupil significantly increased the likelihood of online victimization by the same person, $B = 8.463$, $p = 0.014$. The evidence is also visualized for a single school in Figure 1, which shows that victims rarely indicate being only bullied online, whereas being bullied in the offline and online context by the same pupil is much more common. In contrast, no association is found between being victimized online by a pupil and having bullied this person in the offline environment, $B = 0.558$, $p = 0.885$. Hence, for victims, the patterns of offline bullying tend to extend to the online context, rather than being reversed, which is in line with Hypothesis 1.

[Table 1 about here]

[Figure 1 about here]

A similar analysis was run to predict who perpetrators identified as their online victims. Table 2 shows that perpetrators tended to indicate having bullied the same victim offline and online, $B = 6.576$, $p = 0.018$. Figure 2 illustrates this finding by showing a significant number of bully interactions that occur both offline and online. In correspondence with the perspective of victims, perpetrators as well did not indicate having taken online revenge on their offline aggressors, $B = -1.336$, $p = 0.982$. Therefore, Hypothesis 1 is also confirmed from the perpetrators' perspective.

[Table 2 about here]

[Figure 2 about here]

The logistic regression analyses are also used to test if the studied adolescents mutually bully one another online (H2). Table 1 shows that this hypothesis is confirmed for victims. Targets of cyberbullying reported having bullied their aggressors in the online environment, $B = 8.266$, $p = 0.034$. For perpetrators the pattern of mutual cyberbullying is reflected in Table 2. The analysis shows that online perpetrators most likely reported “their online offenders” as the individuals they cyberbully, $B = 7.551$, $p = 0.017$. The hypothesis that adolescents are engaged in mutual cyberbullying (H2) was thus confirmed for victims and perpetrators.

Victims’ nominations of perpetrators are not only related to involvement in offline bullying, but also to the broader offline social context. To test if victim-perpetrator ties are negatively associated with strong ties (H3) and positively associated with weak ties (H4) friendship nominations are introduced as predictors. In addition, it was assessed if cyberbully interactions are positively related to having the same gender (H5) and being members of the same class (H6). Table 3 displays the results of a logistic regression analysis predicting the victims’ nominations of cyber perpetrators by the above-mentioned variables. There was no significant relationship between the victims’ nominations of their online perpetrators and the victims’ nominations of their best friends, $B = -0.132$, $p = 0.984$, or pupils who are “just a friend”, $B = 0.057$, $p = 0.997$. Hypotheses 3 and 4 could thus not be confirmed for victims. School class membership and gender did affect the likelihood of cyberbully interactions. Victims were more likely to report having been cyberbullied by members of the same class, $B = 4.214$, $p = 0.007$, and same-gender pupils, $B = 1.200$, $p = 0.000$.

The same effects were assessed for the perpetrators’ nominations of online victims. Table 4 shows that the patterns of cyberbullying from the perpetrators’ point of view were not significantly influenced best friend nominations, $B = 1.732$, $p = 0.414$, and nominations as “just a friend”, $B = 0.725$, $p = 0.837$. Hence, hypotheses 3 and 4 could not be confirmed for

perpetrators. Same-class membership was positively related to online perpetrator-victim nominations, but it did not reach significance, $B = 3.711$, $p = 0.058$. Having the same gender was the only significant predictor for the perpetrators' reports of cyberbullying. Perpetrators were more likely to report having cyberbullied same-gender pupils, $B = 0.672$, $p = 0.030$, which is consistent with Hypothesis 5.

[Table 3 about here]

To study whether or not the effects differed between boys and girls, all analyses were repeated for male and female students separately. The results were consistent with the analyses based on the total sample. Victims reported having been bullied and cyberbullied by the same perpetrators in both male and female subgroups, $B = 7.183$, $p = 0.005$ for boys, $B = 3.922$, $p = 0.010$ for girls. Also, male and female respondents indicated having been cyberbullied by the students they had victimized online, $B = 7.672$, $p = 0.010$ for boys, $B = 8.033$, $p = 0.025$ for girls. From the perpetrators' perspective both subgroups tended to have bullied and cyberbullied the same victims, $B = 6.562$, $p = 0.005$ for boys, $B = 6.889$, $p = 0.010$ for girls, as well as to have cyberbullied their online offenders, $B = 8.449$, $p = 0.005$ for boys, $B = 2.112$, $p = 0.040$ for girls. In terms of school context, classmates were a more likely source of cyberbullying for victims, $B = 4.534$, $p = 0.045$ for boys, $B = 3.895$, $p = 0.000$ for girls. Correspondingly, male and female perpetrators were more likely to have cyberbullied same-class students, $B = 3.550$, $p = 0.035$ for boys, $B = 4.695$, $p = 0.005$ for girls. The latter effect only neared significance in the full sample, which included mixed-gender interactions.

Discussion

Cyberbullying is a form of negative behavior, which has been shown to be a source of discomfort, stress and fear for youngsters who are victimized (Staupe-Müller et al., 2012; Ybarra et al., 2006). Electronic forms of bullying often take place between individuals who know one another in real life, such as schoolmates (Slonje & Smith, 2008), implying that they

may be involved in multiple kinds of social as well as bully interactions. In current studies, however, the contextual factors that may affect cyberbullying have remained largely unexplored. In order to address this issue, the present paper focused on the school environment and assessed (1) how patterns of bullying and cyberbullying relate and (2) how electronic forms of bullying can be linked to the social context at school. A social network analysis was performed to answer both research questions.

The results showed that victims tend to be cyberbullied by the same pupils who bully them offline, i.e. the patterns of school bullying are related with who bullies who in the online context. This finding can be linked to a previous study in which respondents indicated that they are often cyberbullied by their offline aggressors (Ybarra et al., 2007). What the present study adds, however, is that offline bully patterns affect cyberbullying, even when controlling for other negative interaction patterns between the victim and perpetrator, such as online revenge taking or mutual cyberbullying. Thus, strong support was provided for the notion that cyberbullying is an extension of the bullying which occurs at school. Additionally, evidence showed that adolescents who face victimization on the Internet or mobile phone, tend to respond by bullying back online. It suggests that technology can “empower” online victims to respond in undesirable ways, such as bullying back online.

In terms of social relationships, the hypothesized effects of strong and weak friendships were not found in the present study. There was no significant association between cyberbullying and friendship nominations in the entire sample, nor was there in male and female subsamples. It is possible that friendship effects still exists, but that they are more context-dependent. For instance, Duffy and Nesdale (2009) have found that young adolescents are more likely to be targeted by friends when the targets have a more peripheral position in the friendship group. Hence, individual friendship nominations alone may not be

adequate to explain who cyberbullies who, because the position in a higher-order structure matters as well, as suggested by Festl and Quandt (2013).

Gender and class membership did influence the patterns of cyberbullying. Electronic forms of bullying were more likely to occur among students of the same school class, rather than among members of different classes. This result suggests that the class context is still highly relevant for studying cyberbullying, as it is for traditional bullying (Salmivalli et al., 1997). In addition, cyberbully interactions occurred more frequently in same-gender students rather than different-gender dyads. The aim to maintain affection from fellow pupils may lead perpetrators to target same-gender peers, as this strategy has proven most useful in traditional bullying (Veenstra, Lindenberg, Munniksma & Dijkstra, 2010).

The present findings have implications for the kinds of theories that are used for explaining cyberbullying. The current literature mainly refers to theoretical concepts such as disinhibition (Kowalski, Limber & Agatson, 2008), deindividuation (Brandtzæg, Staksrud, Hagen & Wold, 2009) and cues-filtered-out (Dehue et al., 2008) to argue why online and mobile phone bullying can be easier. However, while such theories may explain online victims bullying back their aggressors on the Internet, they provide no explanation of why traditional victims refrain from taking online revenge or why many online perpetrators also bully their targets in the offline context. The present findings put to question the usefulness of the aforementioned theories to understand cyberbullying in the everyday social environment of adolescents. To explain why the same bully-victim patterns emerge in the offline and online context, it may be more appropriate to consider how perpetrators choose their targets in the offline context and to investigate if the same strategies apply for cyberbullying. For instance, Veenstra et al. (2010) have found that perpetrators bully particular victims in order to acquire social status and maintain affection from peers. Future research may address how

such motivations affect perpetrators' choice of platforms (Internet versus mobile phone) and applications (social network sites versus Instant Messaging) to cyberbully specific targets.

For prevention and intervention programs, the results point to more effective ways of addressing cyberbullying in offline contexts. First, because offline bullying extends to the online environment, it is advisable to talk about both forms of bullying when discussing the grounds for such behavior in class, as well as to include cyberbullying in the broader anti-bullying policy at school. Additionally, when pupils are victimized at school, attention should also focus on the way school peers interact with these pupils online. For instance, if offline victims are also bullied online anonymously, it is likely that school aggressors are using the Internet as an additional venue to harass their victim. Third, to prevent cycles of mutual online bullying, adolescents should be taught more appropriate ways of coping with cyberbullying, such as talking to others about their negative online experiences and blocking or ignoring sources of hurtful messages online. Fourth, because cyberbullying tends to originate from same-class students, the class level may still be the most relevant context for discussing inappropriate online behavior and bullying.

In view of these findings and their implications, some limitations of the present study are pointed out. First, the patterns of bullying and cyberbullying are based on self-reported involvement of victims and perpetrators. This can be problematic, as some victims may wrongly categorize behavior as bullying or perpetrators may downplay their involvement. Further research could compare victims', perpetrators' and bystanders' assessments to study when cyberbullying is acknowledged by those involved (and when not). Second, in terms of social interactions, the present paper was limited to studying how offline social ties are related to online bullying. It did not include the online communication among schoolmates, which can also be conceived as a set of interaction networks through different applications (Van Cleemput, 2010). Such networks may clarify which applications perpetrators and victims use

to contact one another, and how those actors interact with their schoolmates online. The third limitation concerns the focus on dyadic interactions to explain cyberbully patterns. The analysis of higher-level (group) structures was beyond the scope of the present study. Nevertheless, a more structural approach would be useful in future research, as it may elaborate on the structural influence of friendship on cyberbullying.

In summary, social network analysis has proven a useful perspective and method to study the patterns of cyberbullying, and to relate them to other bully interactions, as well as the school social context. It demonstrates the importance of studying offline (school) contexts to improve the understanding of adolescent bullying, also when it is committed in an online context. This should not come as a surprise, because the offline context is the main source of adolescents' social interactions with peers. It is therefore essential to relate electronic forms of bullying to the social contexts that matter for young adolescents and to the school environment in which most prevention programs operate.

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Footnotes

¹ These numbers do not add up to 100%, because multiple categories could be selected.

Table 1

Whom Victims Are Cyberbullied By (Prediction Based on Victims' Nominations)

	B	Exp(B)	p
Intercept	-11.043	0.00002	0.000
Their offline offender	8.463	4735.62	0.014
Their offline victim	0.558	1.74735	0.885
Their online victim	8.266	3890.37	0.034

Table 2

Who Perpetrators Cyberbully (Prediction Based on Perpetrators' Nominations)

	B	Exp(B)	p
Intercept	-10.895	0.00002	0.000
Their offline offender	-1.336	0.26281	0.982
Their offline victim	6.576	717.775	0.018
Their online offender	7.551	1902.78	0.017

Table 3

Whom Victims Are Cyberbullied By (Prediction Based on Victims' Relation to Their Perpetrator)

	B	Exp(B)	p
Intercept	-11.478	0.00001	0.000
Class member	4.214	67.6042	0.007
Same-gender pupil	1.200	3.31982	0.000
Best friend	-0.132	0.87666	0.984
Just a friend	0.057	1.05820	0.997

Table 4

Who Perpetrators Cyberbully (Prediction Based on Perpetrators' Relation to Their Victim)

	B	Exp(B)	p
Intercept	-11.715	0.00001	0.000
Class member	3.711	40.9027	0.058
Same-gender pupil	0.672	1.95835	0.030
Best friend	1.732	5.65078	0.414
Just a friend	0.725	2.06437	0.837

Figure 1. Who is Being Bullied By Whom in a Single school (Victim's Perspective)



