

Longitudinal relationships between sexting and involvement in both bullying and cyberbullying

Mónica Ojeda, University of Seville

Simon C. Hunter, University of Strathclyde

Rosario Del Rey, University of Seville

Abstract

Introduction: Sexting is a new way to explore sexuality among adolescents that can be associated with bullying behaviors. Previous studies have focused on peer-victimization but relationships between bullying and different forms of sexting have not been explored. This study evaluates the reciprocal relationships between the perpetration of traditional bullying and cyberbullying are associated with four subsequent forms of sexting (sending, receiving, third-party forwarding, and receiving sexts via an intermediary).

Methods: The sample consisted of 1736 Spanish High School students (46.3% female; $M_{age} = 13.60$, $SD = 1.25$). Four direct questions were used to assess sexting, the EBIPQ to measure traditional bullying and the ECIPQ to evaluate cyberbullying. These measures were completed twice, four months apart. A cross-lagged panel analysis evaluated the reciprocal associations of all study measures.

Results: Traditional bullying and cyberbullying were positively, reciprocally associated with each other. Generally, those young people who engaged in sexting at T1 were more likely to report engaging in sexting at T2. Third-party forwarding of sexts (forwarding on sexts which have been sent to a young person by others) displays clear relationships with bullying. Young people who reported using traditional bullying behaviours at T1 were more likely to report third-party forwarding of sexual content at T2. Bullies are more likely to later report third-party forwarding of sexts.

Conclusions: A focus on bullying behavior may be important for intervention efforts targeting to prevent possible negative outcomes of engaging in sexting. Recommendations are provided for educational and prevention efforts.

Keywords: sexting, bullying, cyberbullying, longitudinal, adolescence, implications.

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Adolescent social relationships fundamentally take place in virtual as well as real-world environments (Houghton et al., 2015). Digital communications can involve positive interactions and present multiple benefits, but also entail a certain degree of risk that can hinder the adequate socio-emotional development of young people (Young & Abreu, 2017). One such risk is young people's use of electronic media to share content of a sexual nature, that is, sexting (Choi, Van Ouytsel, & Temple, 2016). Many definitions of sexting refer exclusively to the sending of sexually explicit images (e.g., Choi et al., 2016; Wolak et al., 2012; Ybarra & Mitchell, 2014), though sexting can also include further dissemination of content (Mitchell, Finkelhor, Jones, & Wolak, 2012). Content can include explicit or suggestive images, videos, and text messages which are distributed via the internet or mobile networks (Barrense-Dias, Berchtold, Suris, & Akre, 2017). In this study, sexting is defined as sending, receiving, and forwarding of sexually suggestive and explicit images, videos or text messages through mobile phones, the internet, and other electronic media (Mitchell et al., 2012).

The estimated prevalence of sexting in adolescence varies depending on the type of action referred to (Madigan, Ly, Rash, Van Ouytsel, & Temple, 2018). In general, receiving sexts seem to be more frequent than sending them or forwarding them on (Barrense-Dias et al., 2017). Between 5% (Rice et al. 2012) and 31% (Woodward, Evans, & Brooks, 2017) of young people report sending sexts, 7% (Mitchell et al., 2012) to 49% (Lippman & Campbell, 2014; Woodward et al., 2017) report receiving them, and 2% (Lippman & Campbell, 2014) to 25% (Strassberg, Cann, & Velarde, 2017) report third-party forwarding of sexting media. In addition, the possibility of sending sexual content without consent is 12% and the possibility of receiving sexual content without consent is 8.4% (Madigan et al., 2018). In general, prevalence increases with age (Gómez-Guadix & De Santisteban, 2018) while reports of gender differences have been mixed: some studies indicate that girls are more likely to share sexual images than boys (Ybarra & Mitchell, 2014) while others report the opposite (Gómez-Guadix, De Santisteban, & Resett, 2017; West et al., 2014). Furthermore, a number of studies have found no gender differences in rates of sending and receiving sexual messages or images (Campbell & Park, 2014; Gómez-Guadix & De Santisteban, 2018). However, it seems that boys forward and ask for sexual images and messages to a

greater extent than girls, while girls recognize that boys request them more often sexual content (Norman, 2017; Symons, Ponnet, Walrave, & Heirman, 2018).

Consensual sexting has become one more way of intimate sexual communication that takes place using contemporary forms of communication (Döring, 2014). However, the third-party forwarding of sexual content without consent, the difficulty in sending sexual content safely, the peer pressure to get involved, and its association with other risks make sexting a new risk (Klettke, Hallford, & Mellor, 2014; Olivari & Confalonieri, 2017; Van Ouytsel, Walrave, Ponnet, & Heirman, 2015). Both public and scientific concern regarding this phenomenon has increased in recent years (Gewirtz-Meydan, Mitchell, & Rothman, 2018), in part because the ease with which images can be created and shared has increased the number of potentially unintended and negative consequences (Van Ouytsel, Walrave, & Van Gool, 2014).

Currently, there is no consensus on the degree to which sexting should be considered to be a risk behavior (Souza & Alves, 2018). Some authors defend the freedom of online sexual expression, since the risks of this behavior are not found in the electronic transfer of files, but in the possible diffusion and the speed at which this happens online, increasing the receiving audience (Livingstone & Görzig, 2014). However, others consider that it is necessary to act against any type of online behavior that may be potentially risky, since the actual behavior of sexting can have negative consequences. The consequences of this practice can affect the physical and psychological health of the people involved, leading to problems involving group pressure, bullying, and mental health difficulties (Englander & McCoy, 2017; Van Ouytsel et al., 2015). The existence of a double sexual standard has also been confirmed. Problems associated with sexting may be most evident for girls since it is more often their reputations that are damaged and they suffer most of the consequences. Boys, in contrast, receive fewer negative consequences and can even experience positive consequences, such as an increase in popularity (Dobson & Ringrose, 2016; Symons et al., 2018; Wood, Barter, Stanley, Aghtaie, & Larkins, 2015).

The majority of research considers only the sending and/or receiving of this type of content between peers or romantic couples. In contrast, the third-party forwarding of sexual content presents a clear danger associated with sexting because intimate sexual/personal content can spread quickly and be viewed by unintended recipients, increasing the audience and affecting the reputation of the victim (Van

Ouytsel et al., 2014). As a result of this diffusion, sexting is associated with other possible consequences such as blackmail, extortion, bullying or cyberbullying (Kopecký, 2015; Medrano, Lopez Rosales, & Gámez-Guadix, 2018; West et al., 2014; Woodward et al., 2017). Thus, it is important to consider third-party forwarding of content when investigating sexting (Strassberg et al., 2017).

Social, moral, and ethical conflicts, as well as important questions regarding privacy and the protection of personal material (Schubert & Wurf, 2014), make sexting a practice which may be closely linked to the use of bullying and cyberbullying behaviors by young people. Both bullying and cyberbullying are types of aggressive behavior where there is an imbalance of power (whether physical, psychological or social) that occurs intentionally and repeatedly over time (Olweus 2012). Bullying and cyberbullying share characteristics that have been commonly noted in sexting interactions, most notably the presence of a power imbalance (Dooley, Pyżalski, & Cross, 2009). Traditional bullying and cyberbullying both involve the access and misuse of power and, particularly germane to sexting, the latter can involve differences in access to technology and technological ability, which are harnessed to manipulate and harass others (Olweus & Limber, 2018). Specific to cyberbullying, there may also exist a power imbalance present in the form of greater knowledge and control of an online network or the knowledge of how to appear anonymous online. Additionally, a single image or message can be repeatedly disseminated and reproduced in multiple places and by different people, increasing exponentially the audience of a cyberbullying episode (Hinduja & Patchin, 2008). Thus, despite the observed overlap in the use of both traditional bullying and cyberbullying behaviors (Olweus 2012) there are elements of these phenomena which may make them particularly likely to be associated with sexting behaviors. While sexting may be consensual, it is therefore clear that it can also involve manipulative and/or aggressive intent. Thus, sexting involves a range of behaviours including some which are likely to clearly involve the misuse of power (e.g., third-party forwarding, receiving from an intermediary) and those that may less clearly involve misuse of power but which may still involve this in many instances, such as peer pressure (e.g., sending sexts or receiving them directly from the sender).

The association between peer-victimization and sexting has been studied (Frankel, Bass, Patterson, Dai, & Brown, 2018; Van Ouytsel, Lu, Ponnet, Walrave, & Temple, 2019), but there is no longitudinal work examining the associations between different sexting behaviors (sending, receiving, third-party forwarding) and young people's use of traditional bullying or cyberbullying behaviors. As

such, it is not clear if any sexting behaviors place young people at risk for subsequently engaging in bullying behavior or whether the use of bullying behaviors places young people at risk for later involvement in different sexting behaviors. Given the possible consequences of sexting, unpacking the nature of these possible relationships is important for intervention and prevention efforts aimed at either behavior. Therefore, this longitudinal study utilized a cross-lagged panel design to understand the relationships between sexting behaviors and the perpetration of both bullying and cyberbullying.

Current Study

The present study took place in Spain with adolescents attending Compulsory Secondary Education (four years; from 12 to 16 years old). In Spain, as in countries like Belgium, UK or Italy, among others, the average age of onset of internet use is decreasing: young people start using the internet at age 7, although they have their first mobile phone at 10 (Garmendia, Jiménez, Casado, & Mascheroni, 2016; Mascheroni & Cuman, 2014). In relation to health risks, in Spain, the average age of onset of alcohol and tobacco consumption is 16.6 years (Ministry of Health, Consumer Affairs and Social Welfare, 2017). According to the latest HBSC report, which takes into account European and North American participation, fewer Spanish adolescents have an early start at 13 years of consumption of these substances than the average of other countries. Regarding cannabis use, the same number of Spanish adolescents use this at 13 years old as other young people in other countries included in the HBSC study (Inchley et al., 2016). Regarding sexual relationships, in Spain the average age of first intercourse is 17.7 years (Alpha Research, 2017). Comparing this to other HBSC countries, girls report sexual relationships beginning slightly later than average, while boys match the average age elsewhere (Inchley et al., 2016). In these ways, young people in Spain are largely comparable to young people internationally.

In this context, the goal of the current study is to assess the degree to which the perpetration of traditional bullying and/or cyberbullying are associated with four forms of subsequent sexting (sending, receiving, third-party forwarding, and/or receiving sexts from an intermediary). The cross-lagged panel design also permitted assessment of the reverse, that is, whether four forms of sexting (sending, receiving, third-party forwarding, and/or receiving sexts from an intermediary) are associated with subsequent perpetration of traditional bullying and/or cyberbullying. Based on the previous literature, the main

hypothesis is that there is a positive and reciprocal relationship between third-party forwarding of sexting and both bullying and cyberbullying. This is based on the theoretical similarities between these behaviors as outlined above.

Methods

Participants

The sample consisted of a total of 1736 Spanish high school students (46% female), aged between 12 and 16 years ($M = 13.60$, $SD = 1.25$) from 8 secondary schools of the Andalusian community. Their distribution by year in Compulsory Secondary Education (1st- 4th grade) was as follows: 35.5% in 1st, 24.0% in 2nd, 22.7% in 3rd, and 17.8% in 4th.

Opportunity sampling of schools and young people was employed. The attrition rate was 12.0% (280 students who participated in T1 did not participate in T2).

Procedure

Permission was obtained from the Andalusia Biomedical Research Ethics Coordination Committee (0568-N-14), which follows the guidelines of the International Conference on Good Clinical Practice. Subsequently, schools' management teams were contacted to request their collaboration. After the acceptance of the schools' management teams and their approval by the school council, data were collected in February 2017. Schools, guardians, and young people were all informed of the anonymous and voluntary nature of participation and of the confidential treatment of the data. The administration of the questionnaires was agreed with the faculty and was carried out by trained personnel during class time, taking approximately 40 minutes to complete. The questionnaires were administered on paper and an anonymous code was assigned to each student to enable linking of T1 and T2 data from each participant. The second data collection point took place four months after the first, in June 2017, under the same conditions.

Measures

Following investigations where direct questions have been used to assess involvement in sexting (Gewirtz-Meydan et al., 2018; Temple & Choi, H, 2014; Ybarra & Mitchell, 2014), four items were used

to evaluate sexting, each with five response options (0 = Never, 1 = Rarely, 2 = Occasionally, 3 = Often, and 4 = Frequently). The questions assessed were sending (“I have sent erotic-sexual videos, images or messages to my boyfriend/girlfriend”), receiving (“I have received erotic-sexual videos, images or messages from my boyfriend/girlfriend”), third-party forwarding (“I have forwarded or shared erotic-sexual videos, images or messages of other boys or girls”), and receiving via an intermediary (“Someone sent me erotic-sexual videos, images or messages of other boys or girls”).

The aggression subscale of the European Cyberbullying Intervention Project Questionnaire, ECIPQ (Del Rey et al., 2015) was used to assess use of cyberbullying behaviors. This scale consists of 11 items that evaluate the frequency of cyber-aggression in the last two months, with responses in a Likert format: 0 = No, 1 = Yes 1 or 2 times, 2 = Yes 1 or 2 times a month, 3 = Yes about 1 time a week, 4 = Yes more than once a week. An example item is “I have insulted someone through social networks or WhatsApp”. The scale displayed good internal reliability at both T1 ($\alpha = .70$) and T2 ($\alpha = .80$).

To assess the perpetration of bullying, the aggression subscale of the European Bullying Intervention Project Questionnaire (EBIPQ (Ortega-Ruiz, Del Rey, & Casas, 2016)) was used. This scale is composed of seven Likert-type items and evaluates the frequency of aggression with the same response options as the scale used to assess cyberbullying. An example item is “I have insulted and said offensive words to someone”. This scale displayed good internal reliability at both T1 ($\alpha = .71$) and T2 ($\alpha = .79$).

Analytic plan

SPSS25 was used to complete data coding and to obtain descriptive statistics. A cross-lagged panel analyses was estimated using Mplus (Version 7.31). All measures were dichotomised because they were severely skewed as reflected by the Shapiro-Wilks tests (all $ps < .001$) and inspection of both histograms and Q-Q plots. Both indicators of bullying (traditional and cyber) were dichotomised to reflect involvement in those activities (0 = No, 1 = Yes), as were all four sexting indicators (0 = No, 1 = Yes). The dichotomization of bullying, cyberbullying and sexting was recoded from the direct scores of each of the items. The cut-off point for both bullying measures was that the young person had aggressed against another “at least once or twice a month” in the last two months (Del Rey et al., 2015). For sexting, active involvement was classified as those who reported at least one instance of the behaviors/experiences described.

The cross-lagged panel model included all six study variables at T2 regressed onto their T1 counterparts (i.e., autoregressive paths) and onto each other. Both gender and age were included as covariates by regressing all T2 variables onto these indicators. All variables at T1 were allowed to covary, as were all variables at T2. The model was estimated using a robust weighted least squares (WLSMV) approach as is appropriate for dichotomous dependent variables. As a result of the number of effects being estimated, we reduced alpha to 1%.

Results

Descriptive statistics are shown in Table 1, and in all cases young people who report bullying are more likely to also report being involved in some form of sexting. Extreme examples of this include that 43% of those who reported traditional bullying at T1 also reported sexting, while sexting was reported by only 8% of young people who did not report engaging in traditional bullying at T1. Similarly, among those who reported engaging in cyberbullying at T1, 53% also reported receiving sexts while only 18% of those who did not report engaging in cyberbullying at T1 reported receiving sexts. Such stark differences were not always evident when comparing bullies and non-bullies, but the rates of all forms of sexting were always higher among those who reported using either of the two forms of bullying.

Table 1 about here

The cross-lagged panel analysis accounted for substantial portions of the variance in all six variables. Specifically, the model accounted for 24% of the variance in Bullying, 23% in Cyberbullying, 31% in Sending, 28% in Receiving, 25% in Third-party forwarding, and 25% in Receiving via an intermediary. Model results are summarized in Table 2 (for T2 Bullying and T2 Cyberbullying) and Table 3 (for T2 sexting).

Table 2 about here

Table 3 about here

All six autoregressive paths were significant. In addition, there was a reciprocal association between bullying and cyberbullying, indicating that higher scores on each measure at T1 were associated with greater involvement in the other measure at T2. In terms of associations between earlier sexting and

later involvement in traditional bullying and cyberbullying, no T1 sexting variable was associated with bullying/cyberbullying at T2.

Sending sexts at T2 was significantly associated with both sending and receiving sexts at T1. Receiving sexts at T2 was positively associated with earlier sending, receiving, and receiving via an intermediary. Third-party forwarding at T2 was positively associated with T1 reports of traditional bullying, third-party forwarding of sexts, and receiving sexts via an intermediary. Finally, receiving sexts via an intermediary at T2 was positively associated with both sending sexts and receiving sexts via an intermediary at T1.

Neither of the covariates (Gender, Age) were associated with involvement in later bullying or cyberbullying, though both were associated with certain sexting behaviours. Compared to girls, boys were more likely to report both receiving (26.0% of boys and 16.5% of girls at T2) and third-party forwarding of sexts (12.8% of boys and 6.0% of girls at T2). However, there were no effects of Gender on sending sexts or on receiving sexts via an intermediary. Age was significantly and positively associated with sending, third-party forwarding and receiving via an intermediary, but not with receiving sexts.

Discussion

This study advances our understanding of the prospective links between a diverse range of sexting behaviors and the use of bullying behaviors (both traditional and cyber) among adolescents. The study analyzes sexting not only as sending and receiving messages, images or videos of a sexual nature, but also as the third-party forwarding of such material and even receiving sexts via an intermediary. In line with previous research (Barrense-Dias et al., 2017), in this study the forms of sexting that refer to passive attitudes (receiving and receiving via an intermediary) are more frequent than active forms (sending and third-party forwarding). Earlier cyberbullying was not associated with engagement in any subsequent sexting and neither was any form of earlier sexting associated with later cyberbullying or traditional bullying. In contrast, reports of traditional bullying were associated with later involvement in third-party forwarding of sexts.

Involvement in bullying and cyberbullying appears to be a vicious cycle, with engagement in either form of aggression associated with a raised likelihood of later involvement in the other. A similar

pattern has been observed in terms of *victimization* in bullying and cyberbullying episodes (Olweus, 2012), but there is less evidence concerning whether the *use of bullying behaviors* follows the same pattern. The results presented here are therefore amongst the first to document these effects and indicate that bullying and cyberbullying are both associated with higher levels of each other at four-month follow-up among adolescents. Such effects suggest that interventions which work to reduce one but not the other are likely to be less effective than those that focus on both. An example of this is the “Asegúrate” programme (Del Rey, Mora-Merchán, Casas, Ortega-Ruiz, & Elipe, 2018).

The use of traditional bullying behaviors was also associated with later third-party forwarding of sexts. This link may offer support for the hypothesised overlap between characteristics of sexting and bullying in terms of an abuse of power. Evidence suggests that around as many as 17% of young people forward texts without the consent of those pictured (Van Ouytsel et al., 2014) and in our results later third-party forwarding of sexts is predicted by earlier bullying behavior. It is therefore possible that bullies are most likely to share sexts non-consensually. This reinforces the idea that, within sexting, the behavior of third-party forwarding of sexual content plays a very important role in understanding the consequences of this phenomenon (Livingstone & Görzig, 2014; Strassberg et al., 2017). Specifically, the third-party forwarding of sexual content may be one way in which bullies can harass others, causing serious reputational damage due to the rapid dissemination of content and the potentially large audience (Van Ouytsel et al., 2014).

Our study reinforces the need for greater emphasis on prevention and educational efforts that address especially the third-party forwarding of sexual content as riskier sexting behavior related to bullying and to focus on power relationships between boys and girls during adolescence. In addition, while the legal consequences of sexting were not the focus of the current study, it is important to emphasize to young people that there can be serious, life-changing repercussions associated with sexting. Most obviously, there is the fact that minors who distribute sexual content of other minors can be accused of distributing child pornography (Rhyner, Uhl, & Terrance, 2018). Young people need to be aware that such risks are real and serious, yet they do not seem to take such threats seriously (Strassberg, McKinnon, Sustaíta, & Rullo, 2013) and that sending a sext or receiving a sext can be legally problematic (Villacampa, 2017).

The lack of any significant associations between cyberbullying behaviors and sexting may reflect the fact that this study was able to model effects while taking into account the overlap between traditional and cyberbullying behaviors at both the start and end of the project. It may also bolster arguments suggesting that cyberbullying behaviors are best characterised as sub-types of traditional bullying in the same way that verbal, direct, or indirect bullying behaviors are thought of that way (Olweus & Limber 2018). However, in terms of victimization, it is important to bear in mind that the literature has shown that there is a significant relationship between the cyber-victimization and the sending of sexual content (Dake, Price, Maziarz, & Ward, 2012; Frankel et al., 2018; Medrano et al., 2018; Van Ouytsel et al., 2019).

The cross-lagged relationships between the four forms of sexting were novel and interesting in a number of ways. First, there was a reciprocal relationship evident between sending and receiving sexts, with each related to higher levels of the other over the four-month period of this study. Cross-sectional associations between these behaviors have been reported before (Rice et al., 2018) but no longitudinal studies have documented such effects. Sexting can be viewed as a way for partners to share intimate communication with a healthy relationship (Van Ouytsel et al., 2014), and the reciprocal relationships we have observed may reflect deepening and developing partnerships. Future longitudinal research could therefore seek to explore the degree to which sexting may help enhance the longevity and positive nature of adolescents' romantic relationships.

Second, there is also a link between later third-party forwarding of sexts to others and earlier reports of receiving sexts via an intermediary. These activities may lead to networks of sharing and to compromising material being distributed through a wide network. To test such a proposition, it would be helpful to find out how many people sexts are shared with and to examine sharing networks using techniques such as social network analysis. To date, we are not aware of any such work, though it is notable in this context that bullies may forward sexual content as a form of attack (Van Ouytsel et al., 2014) and that the rapid dissemination and increased breadth of potential audiences can magnify any harm that the bully intends.

It was also notable that all forms of sexting displayed significant stability across time. This speaks to the extent to which the use of such behaviors may be rewarding for young people, leading to

greater likelihood of involvement in future. At the same time, it may also indicate that young people who are pressured into sexting experience such pressure over extended periods and that they are more likely to give in to it in the future if they do so at an earlier point. Helping young people to develop skills to manage such requests *before* they experience them is therefore likely to be important for intervention efforts.

Supporting previous research (e.g., Gámez-Guadix & De Santisteban, 2018) there was a positive association between age and sending sexts. Given that the emergence of romantic relationships is a natural and normative development across adolescence (Lantagne & Furman, 2017) it may not be surprising that sending sexts increases. However, there was also a rise in third-party forwarding of sexting and in receiving sexts forwarded on by a third party as adolescents grew older, highlighting that sharing such material may entail the risk that a partner will subsequently share it. So, it is important that educational efforts raise awareness about the importance of respect and sexual ethics in intimate relationships (Walker, Sanci, & Temple-Smith, 2011; Wolak, Finkelhor, Walsh, & Treitman, 2018) and engage in sexting education from an early age (Ahern, Kempainen, & Thacker, 2016; Gámez-Guadix et al., 2017). It was also interesting to note that receiving sexts was not associated with age. This seems counterintuitive, since one might expect an increase in sending sexts to go hand-in-hand with an increase in receiving sexts. Future research should seek to further investigate this.

In terms of gender differences, boys reported engaging in more receiving sexts and third-party forwarding of sexual content. Research has shown that girls seem to be more involved as victims in sexting, suffering the negative consequences of this phenomenon (Dobson & Ringrose, 2016; Ringrose, Gill, Livingstone, & Harvey, 2012; Symons et al., 2018; Wood et al., 2015). Our results suggest that this may be because boys are more likely to participate in sexting in ways which are more risky for their partner than for themselves, i.e. receiving and third-party forwarding of sexual content. This supports previous work contending that sexting is not a gender-neutral activity (Burén & Lunde, 2018; Walker et al., 2011; Wood et al., 2015). The fact that boys receive and forward sexual content to a greater extent supports the proposal that exchange of this type of material may facilitate status and popularity among boys (Baumgartner et al. 2015; Ringrose et al. 2013). Therefore, these results emphasize the need to place greater focus on the promotion of respect for privacy, gender equality, consent, promoting sexual ethics and healthy relationships (Dobson & Ringrose, 2016; Döring, 2014; Wurtele & Miller-Perrin, 2014).

This study has numerous strengths including a large sample size, a cross-lagged longitudinal cohort design, the analysis of multiple forms of involvement in sexting, and the inclusion of a focus on the use of both traditional and cyber bullying behaviors. However, the reliance on self-report instruments is a limitation since it raises the possibility that associations are inflated due to shared-method variance, although the extent to which this is a problem is contentious and different variables and measures can impact on how much variance is actually shared (Richardson, Simmering, & Sturman, 2009). In addition, recent evidence has placed a question mark over the accuracy with which young people are able to self-report their online behavior (Ellis, Davidson, Shaw, & Geyer, 2018) though independently recording and verifying sexting behaviors would be extremely challenging to achieve. Also, despite being a longitudinal study, the time between collections is 4 months and future work may benefit from including both shorter and longer follow-up periods in order to identify whether any effects that exist only last for a short duration or, conversely, do not emerge until after the 4-month period. Associated with this issue is the use of a measure of bullying in the current study which was restricted to a two-month window for reports. This may have missed bullying episodes which happened during the period between data collection points and researchers may consider addressing this in future. Future studies could also clearly differentiate the different types of sexting behaviors and continue to specifically analyze the behavior of third-party forwarding of sexting. Likewise, future research could explore the degree to which sexting may help enhance the longevity and positive nature of adolescents' romantic relationships.

Conclusion

The current study present novel and important findings concerning the links, across four months, between traditional bullying, cyberbullying, and four forms of sexting. Results suggest that intervention and prevention efforts directed toward sexting should focus on the different ways in which sexting is both experienced and expressed. Interesting questions were also raised concerning the speed with which sexts may disseminate among a peer group and about the degree to which sexting can safely engaged in as a positive element of adolescent romantic relationships. Finally, this study was the first to note the presence of longitudinal relationships between traditional bullying and third-party forwarding of sexting, and this

may highlight the need for education and prevention to focus on power relationships between boys and girls during adolescence.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The article does not contain any studies with animals performed by any of the authors.

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Table 1

Involvement in sexting and traditional bullying / cyberbullying at Time 1 and Time 2.

Form of Sexting and Time Point		T1 Traditional Bully		T2 Traditional Bully		T1 Cyberbully		T2 Cyberbully	
		Yes N (%)	No N (%)	Yes N (%)	No N (%)	Yes N (%)	No N (%)	Yes N (%)	No N (%)
Sending T1	Yes	52 (16.5%)	105 (7.4%)	33 (16.1%)	104 (8.4%)	34 (27.6%)	123 (7.7%)	28 (26.9%)	1082 (8.1%)
	No	263 (83.5%)	1306 (92.6%)	172 (83.9%)	1137 (91.6%)	89 (72.4%)	1479 (92.3%)	76 (73.1%)	1225 (91.9%)
Sending T2	Yes	48 (18.3%)	103 (8.8%)	44 (21.9%)	107 (8.7%)	28 (26.7%)	123 (9.3%)	32 (32.0%)	118 (8.9%)
	No	215 (81.7%)	1065 (91.2%)	157 (78.1%)	1123 (91.3%)	77 (73.3%)	1200 (90.7%)	68 (68.0%)	1211 (91.1%)
Receiving T1	Yes	112 (35.6%)	244 (17.3%)	73 (35.6%)	220 (17.7%)	66 (53.7%)	290 (18.1%)	45 (43.3%)	247 (18.5%)
	No	203 (64.4%)	1165 (82.7%)	132 (64.4%)	1020 (82.3%)	57 (46.3%)	1310 (81.9%)	59 (56.7%)	1085 (81.5%)
Receiving T2	Yes	82 (31.2%)	225 (19.3%)	70 (34.8%)	237 (19.3%)	45 (42.9%)	262 (19.8%)	49 (49.0%)	257 (19.4%)
	No	181 (68.8%)	941 (80.7%)	131 (65.2%)	991 (80.7%)	60 (57.1%)	1059 (80.2%)	51 (51.0%)	1070 (80.6%)
Forwarding T1	Yes	57 (18.1%)	107 (7.6%)	37 (18.0%)	97 (7.8%)	42 (34.1%)	122 (7.6%)	27 (26.2%)	107 (8.0%)
	No	258 (81.9%)	1304 (92.4%)	168 (82.0%)	1144 (92.2%)	81 (65.9%)	1480 (92.4%)	76 (73.8%)	1227 (92.0%)
Forwarding T2	Yes	50 (19.0%)	87 (7.4%)	45 (22.4%)	92 (7.5%)	29 (27.6%)	108 (8.2%)	30 (30.0%)	107 (8.0%)
	No	213 (81.0%)	1082 (92.6%)	156 (77.6%)	1139 (92.5%)	76 (72.4%)	12316 (91.8%)	70 (70.0%)	1223 (92.0%)
Receiving Via ¹ T1	Yes	136 (43.2%)	356 (25.2%)	81 (39.7%)	330 (26.6%)	73 (59.3%)	419 (26.2%)	48 (46.2%)	360 (27.0%)
	No	179 (56.8%)	1054 (74.8%)	123 (60.3%)	912 (73.4%)	50 (40.7%)	1182 (73.8%)	56 (53.8%)	973 (73.0%)
Receiving Via ¹ T2	Yes	96 (36.5%)	246 (21.1%)	73 (36.5%)	269 (21.9%)	50 (47.6%)	292 (22.1%)	48 (48.0%)	294 (22.1%)
	No	167 (63.5%)	922 (78.9%)	127 (63.5%)	962 (78.1%)	55 (52.4%)	1031 (77.9%)	52 (52.0%)	1035 (77.9%)

NB. Across cells there are missing data ranging from 10 to 310.¹Receiving via an intermediary.

Table 2

Model results predicting Bullying and Cyberbullying at T2.

Predictor	Bullying T2			Cyberbullying T2		
	B (SE)	Sig.	Exp(B)	B (SE)	Sig.	Exp(B)
Age	0.02 (0.03)	.575	1.03	0.02 (0.04)	.606	1.04
Gender ¹	0.09 (0.08)	.230	1.08	0.14 (0.09)	.126	1.09
Bu T1	0.95 (0.08)	< .001	1.08	0.74 (0.09)	< .001	1.09
CB T1	0.53 (0.12)	< .001	1.13	0.66 (0.13)	< .001	1.14
SS T1	-0.08 (0.14)	.589	1.15	0.26 (0.13)	.048	1.14
SR T1	0.24 (0.10)	.016	1.11	0.16 (0.12)	.192	1.13
SF T1	0.10 (0.13)	.442	1.14	0.17 (0.14)	.227	1.15
SRVI T1	0.03 (0.09)	.755	1.09	0.08 (0.11)	.461	1.12

NB. Bu = Traditional Bullying; CB = Cyberbullying; SS = Sexting: Sending; SR = Sexting: Receiving; SF = Sexting: Forward; SRVI = Sexting: Receiving via an intermediary.

¹Gender coded 0 = Female, 1 = Male.

Table 3

Model results predicting Sexting (Sending, Receiving, Forwarding, and Receiving via an intermediary).

Predictor	SS T2			SR T2			SF T2			SRVI T2		
	B (SE)	Sig.	Exp(B)	B (SE)	Sig.	Exp(B)	B (SE)	Sig.	Exp(B)	B (SE)	Sig.	Exp(B)
Age	0.13 (0.04)	< .001	1.04	0.05 (0.03)	.059	1.03	0.11 (0.04)	< .01	1.04	0.10 (0.03)	< .001	1.03
Gender ¹	0.02 (0.08)	.816	1.08	0.21 (0.07)	.001	1.07	0.30 (0.09)	.001	1.09	0.09 (0.07)	.182	1.07
Bu T1	0.18 (0.10)	.055	1.11	0.08 (0.09)	.381	1.09	0.28 (0.10)	.004	1.11	0.19 (0.09)	.031	1.09
CB T1	0.10 (0.13)	.424	1.14	0.09 (0.13)	.490	1.14	0.16 (0.13)	.228	1.14	0.14 (0.13)	.292	1.14
SS T1	0.96 (0.11)	< .001	1.12	0.71 (0.12)	< .001	1.13	0.11 (0.14)	.470	1.15	0.32 (0.12)	.009	1.13
SR T1	0.59 (0.09)	< .001	1.09	0.66 (0.08)	< .001	1.08	0.17 (0.11)	.126	1.12	0.16 (0.09)	.085	1.09
SF T1	0.02 (0.13)	.863	1.14	-0.05 (0.13)	.673	1.14	0.58 (0.12)	< .001	1.13	0.14 (0.13)	.282	1.14
SRVI T1	0.07 (0.10)	.447	1.11	0.32 (0.08)	< .001	1.08	0.41 (0.09)	< .001	1.09	0.73 (0.07)	< .001	1.07

NB. Bu = Bullying; CB = Cyberbullying; SS = Sexting: Sending; SR = Sexting: Receiving; SF = Sexting: Forward; SRVI = Sexting: Receiving via an intermediary.

¹Gender coded 0 = Female, 1 = Male.