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## **Risk and protective factors associated with cyberbullying: Are relationships or rules more protective?**

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The aim of this paper is to investigate which adolescents are most and least at risk of experiencing online victimization. The results of logistic regression analyses using data on 2079 adolescents attending secondary school in Bermuda indicate that not all forms of media use place adolescents at risk of experiencing cyberbullying. Adolescents who spent more time using their cell phone were more likely to report having received an aggressive or threatening electronic communication and having had someone say nasty things about them online. There was no such relationship between time on the internet and either form of online victimization. The findings also suggest that strong parent relationships and positive experiences at school are generally more protective against cyberbullying than adults' restrictions on adolescents' media use. These findings contribute important insight into strategies that hold promise for decreasing cyberbullying among adolescents.

**Keywords:** cyberbullying; online harassment; adolescents; parents; schools

### **1. Introduction**

In September 2010, 18-year-old Tyler Clementi jumped off the George Washington Bridge in New York after his roommate used a webcam to record him kissing another man. In October 2012, 15-year-old Amanda Todd took her life after years of being tormented by strangers and peers over a topless photo of her that was circulating on the internet. In August 2013, 14-year-old Hannah Smith committed suicide after receiving harassing comments on Ask.fm, a question-and-answer social networking site where users can post anonymously.

These high-profile teen suicides represent the public face of a growing problem in this digital age. While traditional forms of bullying have been decreasing steadily over the last two decades (Molcho et al. 2009; Rigby and Smith 2011; Finkelhor 2013), cyberbullying appears to be on the rise.

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Cyberbullying rates are still lower than rates of traditional bullying (Hasebrink et al. 2011), but one study of 10–17-year-olds living in the USA found that rates of reported online harassment increased over the course of the preceding decade, from 6% in 2000 to 11% in 2010 (Jones, Mitchell, and Finkelhor 2012; Finkelhor 2013). The rates are higher when researchers look more broadly at meanness online (Levy et al. 2012). A US-based survey conducted in 2013 showed that nearly half (49%) of young people aged 14–24 years have experienced verbal abuse through social media (Tompson, Benz, and Agiesta 2013). These trends are concerning given the negative outcomes associated with cyberbullying, including depression, social anxiety, substance use, and lowered academic performance (Mitchell, Ybarra, and Finkelhor 2007; Katzer, Fetchenhauer, and Belschak 2009; Tokunaga 2010; Bonanno and Hymel 2013; Kowalski and Limber 2013).

As countries attempt to stem this growing problem, their efforts will be aided by an empirically based understanding of which teens are most likely to experience online harassment, as well as the key risk and protective factors involved in cyberbullying. This knowledge will allow educators, parents, and policy-makers to target their prevention and intervention efforts strategically and effectively. Though the research base is growing (e.g., Hasebrink et al. 2011; Slavtcheva-Petkova, Nash, and Bulger 2014), we still lack a comprehensive understanding of the people and processes involved in cyberbullying among adolescents (Levy et al. 2012; Navarro et al. 2012; Lazuras et al. 2013; Davis, Reich, and James 2014).

In this paper, we report findings from an empirical investigation involving 2079 adolescents attending Grades 8–12 in Bermuda who answered questions about their computer-mediated activities and experiences of cyberbullying, as well as the nature of their offline experiences with friends, parents, and at school. The results of our analyses provide new insight into online and offline predictors of cyberbullying victimization, including relationships to age, gender, and race; the offline social dynamics involved in online victimization; and the relative effectiveness of parental and school rules versus supportive relationships. Additionally, as the first study of cyberbullying to be conducted in Bermuda, this study provides new knowledge about the prevalence and predictors of cyberbullying among Bermudian adolescents. More broadly, the results add to our understanding of adolescents' experiences of cyberbullying across cultures and geographic regions.

## **2. Research context**

### **2.1. Demographic predictors of cyberbullying**

A number of studies have investigated the role of various demographic characteristics in cyberbullying. With respect to age, a meta-synthesis of quantitative studies on cyberbullying pointed to seventh and eighth grades as the period of

greatest risk (Tokunaga 2010). Consistent with this claim, one study of 3339 youth in Grades 5, 8, and 11 in Colorado found that both offline and online forms of bullying perpetration were highest among eighth graders (Williams and Guerra 2007). These findings are consistent with theory and research relating to early adolescence more generally, which shows that this transitional time between childhood and adolescence is marked by the emergence of cliques and an associated emphasis on peer group membership. Because adolescents use features of their peer group to define themselves, it is important to them that the group itself be clearly defined (Bukowski and Sippola 2001). Starting at ages 11 and 12, indirect aggression in the form of spreading rumors and group exclusion starts to replace the physical aggression seen among younger children (Craig et al. 2001; Rubin, Bukowski, and Parker 2006). This social form of aggression serves the purpose of defining who is in and out of the group, as well as the group's attitudes and beliefs. As children attempt to define the parameters of peer group membership, bullying and victimization become increasingly common (Rubin, Bukowski, and Parker 2006).

Social forms of aggression – often called relational aggression – are higher among adolescent girls than boys (Crick and Grotpeter 1995; Crick 1996; Moretti, Holland, and McKay 2001). As with physical aggression, the intent of relational aggression is to inflict harm on another person. Instead of physical damage, however, the damage caused by relational aggression is focused on peer relationships. For instance, one child's attempt to damage another child's reputation would be classified as relational aggression. Boys, by contrast, are more likely to be involved in physical forms of bullying (Finkelhor et al. 2009). Though evidence relating to gender's role in cyberbullying is inconsistent (Levy et al. 2012; Pedersen 2013), girls appear to be somewhat more likely than boys to report online victimization in both Europe and the USA (Snell and Englander 2010; Tokunaga 2010; Hasebrink et al. 2011; Holfeld and Grabe 2012; Tompson, Benz, and Agiesta 2013). This trend makes sense in light of the relational nature of cyberbullying.

The role of race in cyberbullying is even less clear. An early study of cyberbullying found no statistically significant differences in rates of cyberbullying across race, though the researchers noted that their sample was relatively homogeneous (Patchin and Hinduja 2006). A more recent study found that African-American adolescents were more likely to be involved in cyberbullying perpetration than Caucasian adolescents, and Hispanic adolescents were more likely to be cyberbully victims than Caucasian adolescents (Wang, Iannotti, and Nansel 2009).

In light of these findings, we hypothesize the following:

*Hypothesis 1:* Younger adolescents (ages 12–14 years) are more likely to experience cyberbullying victimization than older adolescents (ages 16–18 years).

*Hypothesis 2:* Girls are more likely to experience cyberbullying victimization than boys.

The sparse and inconclusive research related to race does not provide sufficient evidence to formulate a hypothesis regarding the role of race in cyberbullying.

## **2.2. Online activities and cyberbullying**

An early investigation into cyberbullying found that cyberbullying victims were more likely than non-victims to be intense internet users and to report using the internet most often for instant messaging (Ybarra and Mitchell 2004). Subsequent research suggests that it is not merely the intensity of internet use that places adolescents at risk but the specific activities they pursue online (Twyman et al. 2010; Bossler, Holt, and May 2012; Mishna et al. 2012). For instance, in a study comparing the cyberbullying experiences of 52 children aged 11–17 to 52 matched controls living in the USA, researchers found that cybervictims were more likely to engage in computer-based social activities and were more likely to have a *MySpace* profile, a personal website, and a personal email account not accessible by their parents (Twyman et al. 2010). In another study involving 434 middle and high school students in the southeastern USA, youth were more likely to experience online victimization if they maintained social network sites and posted sensitive information online (Bossler, Holt, and May 2012).

These studies suggest that youth who engage in social activities online are at increased risk of being victims of cyberbullying. Further evidence suggests that these online social activities tend to be grounded in offline interpersonal dynamics (Hasebrink et al. 2011). Vandebosch and van Cleemput (2009) found that online bullies are more likely to be offline bullies, and online victims are more likely to be offline victims. Moreover, cyberbullying victims often know their online bullies from offline contexts like school (Juvonen and Gross 2008; Ybarra, Mitchell, and Espelage 2012). In their review of existing research and their own in-depth interviews with Swedish adolescents, Slonje, Smith, and Frisen (2013) found that cyberbullying often starts with a face-to-face argument between peers and then moves online, or vice versa. This body of research suggests that cyberbullying among adolescents appears largely to be a function of bringing peer relationships online rather than online social activity more generally.

*Hypothesis 3:* Adolescents who engage frequently in online peer communication with peers they know offline are more likely to experience cyberbullying victimization than adolescents who engage less frequently in online peer communication.

## **2.3. Relationships versus rules at home and at school**

The role of parents shifts from one of unilateral authority during childhood to a mix of unilateral and cooperative authority during adolescence (Youniss and Smollar 1985). School work is still managed in a unilateral way, but social issues tend to be discussed in a more reciprocal way. This suggests that to protect their children from cyberbullying, conversations will be more effective

than unilateral rules about internet use. Indeed, in their study of US families, Williams and Merten (2011) found that parental monitoring of their adolescents protected against contact with strangers but not against cyberbullying victimization. The authors suggest that because cyberbullying is a relational phenomenon, parents should take a relational approach to mitigating their children's experience of it. Consistent with this conclusion, another US-based study of 6th–10th graders found that adolescents who experienced higher parental support were less likely to report being bullied online (Wang, Iannotti, and Nansel 2009). In contrast, a study of Greek high school students determined that adolescents whose parents exercised online security practices were less likely to report cybervictimization (Floros et al. 2013). Similarly, the EU Kids Online survey of 9–16-year-olds living in 25 European countries found that youth whose parents restricted their internet use were less likely to have harmful experiences online (Hasebrink et al. 2011). Taken together, these studies suggest the following hypotheses:

*Hypothesis 4:* Adolescents who experience higher quality parent relationships are less likely to experience cyberbullying than adolescents who report lower quality parent relationships.

*Hypothesis 5:* Adolescents whose parents have rules restricting their digital media use are less likely to experience cyberbullying than adolescents whose parents do not have such rules.

Research exploring the role of schools in adolescents' experience of cyberbullying is sparse. Among a sample of 12–14-year-olds in Israel, victims of online bullying were more likely to report feeling fear in school (Gofin and Avitzour 2012). In another study involving younger children (Grades 2–4), youth who reported low school satisfaction were more likely to experience online victimization (Arslan et al. 2012). With respect to bullying perpetration, a study of students in Grades 5, 8, and 11 living in Colorado found that students who reported experiencing a negative school climate were more likely to report they had bullied others online (Williams and Guerra 2007). These studies suggest that positive school experiences may play a protective factor against cyberbullying.

Though school-based efforts to reduce cyberbullying are still relatively few in number and lacking empirical evidence of success (Slonje, Smith, and Frisen 2013; Davis, Reich, and James 2014), programs that have produced positive results focus on promoting a positive school climate rather than specific rules around digital media use (Slonje, Smith, and Frisen 2013). The many years of research into the effectiveness of interventions aimed at traditional bullying are consistent with this emerging evidence. This body of research shows that successful strategies generally adopt a whole-school approach, target school climate and peer influences, and seek to change peer norms around bullying (Swearer et al. 2010).

*Hypothesis 6.* Adolescents who experience a positive school climate are less likely to experience cyberbullying than adolescents who experience a negative school climate.

*Hypothesis 7:* Adolescents who attend schools with rules around digital media use are no more or less likely to experience cyberbullying than adolescents who attend schools without such rules.

## **2.4. The current study**

The studies reviewed here provide a valuable foundation for understanding cyberbullying among adolescents. However, the picture is not yet complete and, in many cases, the evidence is mixed. In the current study, we analyzed survey responses from 2079 adolescents attending secondary school in Bermuda to identify the relationship between online victimization and four groups of variables: *demographic* (age, race, gender, and socioeconomic status), *parental/peer* (father/mother relationship and friendship quality, and parental rules about technology use), *school* (school climate and school technology rules), and *media use* (time using cell phone and internet, and motivations for going online, for example, entertainment, identity expression, information seeking, and peer communication). This study provides a comprehensive and nuanced view of the risk and protective factors associated with cyberbullying among adolescents living in Bermuda. Bermuda represents a particularly rich context for studying adolescents' experiences with cyberbullying due to the high levels of digital media use among the adolescent population (Davis 2013). Moreover, by broadening the focus of research on cyberbullying beyond North American, European, and Asian countries, the findings from the current study contribute to a more complete understanding of this phenomenon.

## **3. Method**

### **3.1. Research site**

Bermuda is a self-governing British-dependent territory located approximately 650 miles east of Cape Hatteras, North Carolina. Queen Elizabeth II of England is the nominal chief of state and is represented on the Island by her appointed governor. Bermuda has a parliamentary government, which is led by an elected premier. Bermuda's economy is driven by international business and tourism, and the World Bank ranks the Island among the world's most affluent countries. With a total area of 21 square miles divided into 9 parishes, and a population of roughly 68,000 people, Bermuda is one of the most densely populated regions in the world. Approximately 60% of the Island's population is Black, and the other 40% identifies as White or Other (Government of Bermuda 2010).



Bermuda's small population, island status, and strict immigration rules have engendered a unique sense of community and national identity. At the same time, Bermudian heritage draws from many cultural influences, including traditions from England, Canada, the USA, and the Caribbean. Bermuda's geographic proximity to the USA, including its easy accessibility by air and cruise ship, has made the Island a popular tourist destination for Americans for over a century. In turn, Bermudians are well acquainted with major urban centers in the USA, as many of them attend American universities and visit places such as Florida, Atlanta, New York, and Boston for their own vacations. Further, with the rise of international business in the 1990s, many Americans relocated to Bermuda to pursue their careers. Bermuda's proximity to the USA has also meant that most of its television and radio feeds are American. Thus, Bermudians – including Bermudian youth – are exposed on a daily basis to the same sources of information and popular culture that reach most Americans.

Due to these cultural ties, the findings from the current study may hold some relevance to the US context. At the same time, Bermuda's distinct cultural and socioeconomic characteristics and racial make-up prevent generalizing the results to the USA, Great Britain, or other countries.

### 3.2. *Participants*

Survey data were collected in March and April 2010 from a sample of 2079 students (57% female) between the ages of 11 and 19 years ( $M = 15.4$  years,  $SD = 1.41$ ) attending 1 of 7 secondary schools in Bermuda, a British-dependent territory located approximately 650 miles off the coast of North Carolina. Across the schools, survey response rates were high to excellent, and ranged from 75% to 94% (see [Appendix 1](#)). With approximately 2600 students attending senior school in Bermuda, overall, the sample contained roughly 80% of all senior school students on the Island. In total, 52% of the students identified as Black, 22% as White, and 16% as Other.<sup>1</sup> (See [Appendix 2](#) for a complete overview of the demographic characteristics for the survey sample.)

Private school students represented 52% of the sample, even though approximately 40% of Bermuda's students attend private school. This disparity is a consequence of the lower response rates in the public schools and the inclusion of eighth-grade students from the private schools. Reasons for the lower response rates in the public schools include difficulties accessing a computer or the internet, refusal to take the survey, and absence from school. We suspect that, had the students who fell into the latter two categories taken the survey, mean levels of mother and father relationship quality, friendship quality, and school climate would be lower in the sample. However, we have no reason to believe that mean levels of other constructs in the sample, or the relationships among any of the constructs, would be different. Moreover, because we are not aware of any systematic reason why certain students had



difficulties accessing a computer or the internet in school, we have no reason to believe that inclusion of these students would alter any of the results.

### 3.3. *Questionnaire and procedure*

Students completed an anonymous online survey that included questions about their online activities, experiences with cyberbullying, school satisfaction, parent relationships, and demographic characteristics. Paper versions of the survey were used by students who experienced a slow internet connection or technical difficulties with the school computers.

At least two weeks prior to survey administration, students' parents or guardians received a letter that provided them with details of the study. If parents did not want their child to participate in the survey, they were asked to sign and return the form. In each school, fewer than five forms were returned. Students from compliant families then completed the survey on a computer in school, though paper versions were used by students who experienced a slow internet connection or technical difficulties with the school computers. Upon completion of their survey, students were asked to complete a student information form. This form was used to keep track of the number of completed surveys and to enter students into a raffle drawing for a chance to win one of several \$25 gift certificates.

### 3.4. *Measures*

#### 3.4.1. *Outcome variables*

Two forms of online victimization served as outcome variables. Respondents were asked whether or not they had experienced: (1) 'someone saying nasty things about me online/cell phone' (*Nasty*) and (2) 'someone sending me an aggressive or threatening email, instant message or text message' (*Aggressive*). These questions mirror those used in previous cyberbullying research conducted by the *Pew Internet & American Life Project* (Lenhart 2007). For both cyberbullying indicators, the baseline 'No' response was coded as 0, and 'Yes' as 1.

#### 3.4.2. *Predictor variables*

To investigate the role of demographic characteristics in cyberbullying, age, gender, and race were included as predictor variables. Age was measured as a continuous variable (in years), while gender was dichotomized to male and female. Following the racial categories used by the Bermuda Government at the time of the study, race was dichotomized to White/Other and Black.

To investigate the role of online activities, digital media use scales (e.g., Leung 2007; Courtois et al. 2009) and relevant literature were used to create two scales, one measuring *online peer communication* (10 items) and the other measuring *online identity expression and exploration* (13 items). The

former scale assessed the degree to which respondents are motivated to go online to communicate and maintain their relationships with existing friends, for example, 'By going online, I feel more involved with what's going on with my friends.' The latter scale assessed the degree to which respondents are motivated to go online to express and explore different aspects of their identity, for example, 'I enjoy using the internet to try out different ways of expressing myself.' For each scale, respondents were asked to rate each statement on a seven-point scale that ranged from *completely untrue* to *completely true* (see [Appendix 3](#)). The estimated values for the Cronbach's alpha internal consistency reliability for the *online peer communication* and *online identity expression and exploration* scales were .87 and .88, respectively.

Two additional digital media use scales are the six-item *online entertainment/escape* scale and the six-item *online information seeking* scale. As with the other digital media use scales, the items are on a seven-point scale ranging from completely untrue to completely true (see [Appendix 3](#)). The estimated values for the Cronbach's alpha internal consistency reliability for the *online entertainment/escape* and *online information seeking* scales were .80 and .72, respectively.

To investigate the role of parent relationships, the 10-item *mother trust* scale from the revised version of Armsden and Greenberg's (1987) *Inventory of Parent and Peer Attachment* was used to measure *mother relationship quality*. Respondents were asked to rate each of the 10 statements on a seven-point scale from completely untrue to *completely true*, for example, 'My mother understands me.' An analogous scale for *father trust* consisting of 10 items was also used (see [Appendix 3](#)). The estimated values for the Cronbach's alpha internal consistency reliability for the *mother relationship quality* and *father relationship quality* scales were .91 and .92, respectively.

To investigate the role of school climate, the seven-item *school climate* scale was used to measure students' overall feelings toward school, both in terms of personal attitude and the school environment. Respondents were asked to rate each of the statements on a seven-point scale from *completely disagree* to *completely agree*, for example, 'Being a good student is important to me' and 'There is at least one teacher at school who understands me' (see [Appendix 3](#)). The estimated value for the Cronbach's alpha internal consistency reliability for the *school climate* scale was .73.

Additional variables relating to the hypotheses cover parental and school rules around the use of cell phones and laptops. Respondents were asked whether such rules were in place, and if so, did they follow them. As a further indicator of media use, students were asked how many hours per day they spent using their cell phone and the internet.

### 3.4.3. Control variables

Mother's education was included as a control variable and dichotomized to 'some college or less' and 'finished college or higher'.

### 3.5. Data analysis

Multiple imputation using R and the MICE algorithm was used to generate 25 imputed data sets, accounting for the maximum amount of missing data in any one variable (23% in mother's education) (Buuren and Groothuis-Oudshoorn 2011). Logistic regression models using the Logit link were fitted to predict whether a student has experienced the two forms of cyberbullying. Positive coefficients for independent variables mean that the 'Yes' outcome is more likely, while the opposite is true for negative coefficients. Both models produced a non-significant  $p$ -value for the combined chi-square goodness-of-fit statistic.

Multiple imputation requires the regression to be fit separately on each imputed data set and the results combined using Rubin's (1987) rules. The chi-square goodness-of-fit test statistics are combined using the equations derived from Li et al. to obtain an overall goodness-of-fit  $p$ -value (1991).

For each candidate variable, the level of association with each of the cyberbullying outcomes was examined using univariate regression models. This approach was selected because the framework is already in place to produce a correct  $p$ -value with the imputed data ( $p$ -values from  $t$ -tests or chi-squared tests cannot be easily combined from the imputed data). Variables with a  $p$ -value of less than .25 in the univariate analysis were included in the full model (see Bendel and Afifi 1977). Variables and their  $p$ -values are shown in Table 1.

The results of the univariate regression analyses suggest two slightly different models tailored for each of the two cyberbullying outcomes. Age, mother's education, and school rules about cell phones are dropped from the model for *Nasty*. The online information seeking scale was removed from the model for *Aggressive*.

## 4. Findings

### 4.1. Prevalence of cyberbullying among demographic groups

Overall, 40% of the 2079 students surveyed reported someone saying nasty things about them online or with a cell phone (*Nasty*), and just over one-quarter (27.9%) reported receiving an aggressive or threatening email, instant message, or text message (*Aggressive*). Within age groups, 17-year-olds were slightly more likely than 13-year-olds to report experiencing *Nasty* (44.8% versus 36%,  $\chi^2(1) = 3.3$ ,  $p = .07$ ) and considerably more likely to report experiencing *Aggressive* (35.2% versus 18%,  $\chi^2(1) = 15.6$ ,  $p < .001$ ).<sup>2</sup> Age was not included in the logistic regression model for *Nasty* (see Section 3.5), but the logistic regression model predicting *Aggressive* showed that older adolescents were more likely to experience *Aggressive* than younger adolescents ( $t(188) = 4.83$ ,  $p < .001$ ). This result is counter to *Hypothesis 1*, which predicted a higher prevalence of cyberbullying among early adolescents.

Table 1. Levels of statistical significance for each of the univariate regression models.

| Variables                         | Nasty      | Aggressive |
|-----------------------------------|------------|------------|
| Age                               | $p = .349$ | $p = .000$ |
| Gender                            |            |            |
| Boy                               | Reference  |            |
| Girl                              | $p = .000$ | $p = .000$ |
| Race                              |            |            |
| Black                             | Reference  |            |
| White/Other                       | $p = .016$ | $p = .171$ |
| Mother's education                |            |            |
| Some college or less              | Reference  |            |
| Finished college or higher        | $p = .432$ | $p = .045$ |
| Mother trust scale                | $p = .000$ | $p = .000$ |
| Father trust scale                | $p = .000$ | $p = .000$ |
| Parental rules, cell              |            |            |
| No                                | Reference  |            |
| Don't Know                        | $p = .701$ | $p = .751$ |
| Yes, and I follow                 | $p = .826$ | $p = .070$ |
| Yes, and I don't follow           | $p = .039$ | $p = .278$ |
| Parental rules, laptop            |            |            |
| No                                | Reference  |            |
| Don't know                        | $p = .063$ | $p = .012$ |
| Yes, and I follow                 | $p = .603$ | $p = .285$ |
| Yes, and I don't follow           | $p = .061$ | $p = .523$ |
| School climate                    | $p = .000$ | $p = .000$ |
| School rules, cell                |            |            |
| No or don't know                  | Reference  |            |
| Yes                               | $p = .358$ | $p = .016$ |
| School rules, laptop              |            |            |
| No                                | Reference  |            |
| Don't know                        | $p = .234$ | $p = .215$ |
| Yes                               | $p = .223$ | $p = .783$ |
| Time on the internet              | $p = .030$ | $p = .058$ |
| Time on cell                      | $p = .000$ | $p = .000$ |
| Online peer communication scale   | $p = .000$ | $p = .000$ |
| Online identity expression scale  | $p = .007$ | $p = .034$ |
| Online information seeking scale  | $p = .120$ | $p = .720$ |
| Online entertainment/escape scale | $p = .122$ | $p = .109$ |

Note: Bold  $p$ -values indicate that variable is eliminated from the logistic regression model because it does not meet the  $<.25$  threshold.

In support of *Hypothesis 2*, the raw data showed that girls were considerably more likely than boys to report that someone had said something nasty about them online (47.1% versus 30.2%,  $\chi^2(1) = 54.8, p < .001$ ), and that they had been the target of an aggressive electronic communication (31.7% versus 22.7%,  $\chi^2(1) = 18.4, p < .001$ ). The difference between girls and boys persisted when the logistic regression models were fitted (*Nasty*:  $t(263) = 6.3, p < .001$ ; *Aggressive*:  $t(138) = 3.3, p < .01$ ).

With respect to race, White and Other adolescents were more likely to report cyberbullying victimization than Black adolescents, with 43.1% versus 37.7% for *Nasty* ( $\chi^2(1) = 5.2, p = .02$ ), and 29.5% versus 26.8% for *Aggressive* ( $\chi^2(1) = 1.5, p = .22$ ). When the logistic regression models were fitted, White and Other adolescents continued to be more likely than Black adolescents to experience *Nasty* ( $t(138) = 2.9, p < .01$ ), but the differences between White and Other adolescents and Black adolescents only approached significance for *Aggressive* ( $t(146) = 1.7, p < .10$ ).

#### 4.2. Online activities and cyberbullying

The results of the logistic regression analyses showed that adolescents who reported spending more time on their cell phone and those who reported high levels of online peer communication were more likely to experience *Nasty* than adolescents who reported spending less time on their cell phone and those who reported lower levels of online peer communication ( $t(85) = 4.9, p < .001$ ;  $t(136) = 5.0, p < .001$ ) (Table 2). Paralleling the results for *Nasty*, increased time on one's cell phone and higher levels of online peer communication were associated with a greater risk of *Aggressive* when compared with spending less time on one's cell phone and engaging in less online peer communication ( $t(90) = 2.3, p < .05$ ;  $t(111) = 4.9, p < .001$ ) (Table 3). In contrast, there was no statistically significant effect of overall time spent on the internet, online identity expression, online information seeking, or online entertainment/escape for either *Nasty* or *Aggressive* (Tables 2 and 3). These results support *Hypothesis 3*, which predicted that adolescents who engage frequently in online peer communication with peers they know offline are more likely to experience cyberbullying victimization than adolescents who engage less frequently in online peer communication.

#### 4.3. Relationships versus rules at home and at school

Adolescents who reported high-quality parent relationships (both mother and father) were less likely to experience someone saying something nasty about them online than adolescents who reported low-quality parent relationships, though the difference only approached significance for father relationships (*Mother*:  $t(229) = -2.0, p < .05$ ; *Father*:  $t(242) = -1.9, p < .10$ ) (Table 2). For *Aggressive*, only mother relationship quality approached significance (*Mother*:  $t(236) = -1.8, p < .10$ ; *Father*:  $t(241) = -1.1, p > .10$ ) (Table 3).

Table 2. Logistic regression results using *Nasty* as the outcome variable ( $N = 2079$ ).

| Variables                  | Logistic coefficient | Standard error | $t$ (df)   | Odds ratio | 95% CI     |
|----------------------------|----------------------|----------------|------------|------------|------------|
| (Intercept)                | 1.423**              | 0.451          | 3.2 (135)  | 4.15       | 1.68–10.23 |
| Gender                     |                      |                |            |            |            |
| Boy                        | Reference            |                |            |            |            |
| Girl                       | 0.688***             | 0.109          | 6.3 (263)  | 1.99       | 1.60–2.47  |
| Race                       |                      |                |            |            |            |
| Black                      | Reference            |                |            |            |            |
| White/Other                | 0.308**              | 0.109          | 2.9 (138)  | 1.36       | 1.09–1.69  |
| Mother trust               | -0.087*              | 0.043          | -2.0 (229) | 0.92       | 0.84–1.00  |
| Father trust               | -0.069~              | 0.037          | -1.9 (242) | 0.93       | 0.87–1.01  |
| Parental rules, cell       |                      |                |            |            |            |
| No                         | Reference            |                |            |            |            |
| Don't know                 | 0.165                | 0.274          | 0.6 (62)   | 1.18       | 0.68–2.04  |
| Yes, and I follow          | 0.079                | 0.152          | 0.5 (222)  | 1.08       | 0.80–1.47  |
| Yes, and I don't follow    | 0.078                | 0.188          | 0.4 (193)  | 1.08       | 0.74–1.58  |
| Parental rules, laptop     |                      |                |            |            |            |
| No                         | Reference            |                |            |            |            |
| Don't know                 | -0.468~              | 0.280          | -1.7 (59)  | 0.63       | 0.36–1.10  |
| Yes, and I follow          | 0.086                | 0.160          | 0.5 (184)  | 1.09       | 0.79–1.50  |
| Yes, and I don't follow    | 0.081                | 0.195          | 0.4 (120)  | 1.08       | 0.73–1.60  |
| School climate             | -0.361***            | 0.062          | -5.8 (95)  | 0.70       | 0.62–0.79  |
| School rules, laptop       |                      |                |            |            |            |
| No                         | Reference            |                |            |            |            |
| Don't know                 | -0.213               | 0.172          | -1.2 (215) | 0.81       | 0.57–1.14  |
| Yes                        | 0.094                | 0.128          | 0.7 (186)  | 1.10       | 0.85–1.42  |
| Time on the internet       | -0.019               | 0.023          | -0.9 (149) | 0.98       | 0.94–1.03  |
| Time on cell               | 0.062***             | 0.013          | 4.9 (85)   | 1.06       | 1.04–1.09  |
| Online peer communication  | 0.3039***            | 0.060          | 5.0 (136)  | 1.35       | 1.20–1.53  |
| Online identity expression | -0.070               | 0.066          | -1.1 (153) | 0.93       | 0.82–1.06  |
| Online information seeking | -0.056               | 0.045          | -1.3 (295) | 0.95       | 0.86–1.03  |
| Online entertainment       | -0.037               | 0.058          | -0.6 (202) | 0.96       | 0.86–1.08  |

Note: Goodness of fit:  $F$ -statistic = 1.008 on 2058 and 1,156,666 degrees of freedom ( $p = .396$ ). Significance levels are: ~ $p < .10$ , \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

These results provide modest support for *Hypothesis 4*. The lack of a statistically significant effect of parent rules around either cell phone use or laptop use for both *Nasty* and *Aggressive* runs counter to *Hypothesis 5*, which predicted that adolescents whose parents have rules restricting their digital media use are less likely to experience cyberbullying than adolescents whose parents do not have such rules.

Table 3. Logistic regression results using *Aggressive* as the outcome variable ( $N = 2079$ ).

| Variables                  | Logistic coefficient | Standard error | $t$ (df)   | Odds ratio | 95% CI    |
|----------------------------|----------------------|----------------|------------|------------|-----------|
| (Intercept)                | -3.407***            | 0.855          | -4.0 (278) | 0.03       | 0.01–0.18 |
| Age                        | 0.204***             | 0.042          | 4.83 (188) | 1.23       | 1.13–1.33 |
| Gender                     |                      |                |            |            |           |
| Boy                        | Reference            |                |            |            |           |
| Girl                       | 0.398**              | 0.122          | 3.3 (138)  | 1.49       | 1.17–1.90 |
| Race                       |                      |                |            |            |           |
| Black                      | Reference            |                |            |            |           |
| White/Other                | 0.198~               | 0.115          | 1.7 (146)  | 1.22       | 0.97–1.53 |
| Mother's education         |                      |                |            |            |           |
| Some college or less       | Reference            |                |            |            |           |
| Finished college or higher | -0.177               | 0.123          | -1.4 (80)  | 0.84       | 0.66–1.07 |
| Mother trust               | -0.083~              | 0.045          | -1.8 (236) | 0.92       | 0.84–1.01 |
| Father trust               | -0.043               | 0.039          | -1.1 (241) | 0.96       | 0.89–1.04 |
| Parental rules, cell       |                      |                |            |            |           |
| No                         | Reference            |                |            |            |           |
| Don't know                 | 0.218                | 0.282          | 0.8 (69)   | 1.24       | 0.71–2.19 |
| Yes, and I follow          | -0.147               | 0.165          | -0.9 (237) | 0.86       | 0.62–1.20 |
| Yes, and I don't follow    | -0.013               | 0.197          | -0.1 (223) | 0.99       | 0.67–1.46 |
| Parental rules, laptop     |                      |                |            |            |           |
| No                         | Reference            |                |            |            |           |
| Don't know                 | -0.433               | 0.314          | -1.4 (55)  | 0.65       | 0.35–1.22 |
| Yes, and I follow          | 0.195                | 0.178          | 1.1 (131)  | 1.22       | 0.85–1.73 |
| Yes, and I don't follow    | 0.059                | 0.200          | 0.3 (182)  | 1.06       | 0.71–1.58 |
| School climate             | -0.426***            | 0.062          | -6.8 (150) | 0.65       | 0.58–0.74 |
| School rules, cell         |                      |                |            |            |           |
| No or don't know           | Reference            |                |            |            |           |
| Yes                        | 0.920**              | 0.347          | 2.7 (117)  | 2.51       | 1.25–5.02 |
| School rules, laptop       |                      |                |            |            |           |
| No                         | Reference            |                |            |            |           |
| Don't know                 | 0.101                | 0.184          | 0.5 (281)  | 1.11       | 0.77–1.60 |
| Yes                        | 0.186                | 0.143          | 1.3 (147)  | 1.20       | 0.90–1.60 |
| Time on the internet       | -0.018               | 0.024          | -0.7 (126) | 0.98       | 0.94–1.03 |
| Time on cell               | 0.030*               | 0.013          | 2.3 (90)   | 1.03       | 1.00–1.06 |
| Online peer communication  | 0.326***             | 0.066          | 4.9 (111)  | 1.39       | 1.21–1.58 |
| Online identity expression | -0.104               | 0.071          | -1.4 (133) | 0.90       | 0.78–1.04 |
| Online entertainment       | -0.025               | 0.065          | -0.4 (119) | 0.98       | 0.86–1.11 |

Note: Goodness of fit:  $F$ -statistic = 0.98 on 2059 and 118,467 degrees of freedom ( $p = .732$ ). Significance levels are ~ $p < 0.10$ , \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .



Providing support for *Hypothesis 6*, adolescents who said they experienced a positive school climate were less likely to report experiencing either *Nasty* or *Aggressive* than adolescents who said they experienced a negative school climate (*Nasty*:  $t(95) = -5.8$ ,  $p < .001$ ; *Aggressive*:  $t(150) = -6.8$ ,  $p < .001$ ) (Tables 2 and 3). With respect to school rules around digital media use (*Hypothesis 7*), there was only one instance in which school rules had a statistically significant effect: adolescents who said their school had rules around cell phone use were actually *more* likely to receive aggressive electronic communications compared to adolescents who said their school did not have such rules ( $t(11) = 2.7$ ;  $p < .01$ ) (Table 3).

## 5. Discussion

The current investigation uncovered several noteworthy findings related to cyberbullying that extend and add insight into previous research, particularly with respect to relationships to age, gender, and race; the offline social dynamics involved in online victimization; and the relative effectiveness of parental and school rules versus supportive relationships. Consistent with earlier studies (e.g., Jones, Mitchell, and Finkelhor 2012; Finkelhor 2013), our results show that the majority of adolescents have not been on the receiving end of hurtful online conduct. Nevertheless, over one-quarter of the sample has received an aggressive or threatening electronic communication, and 40% has had someone say nasty things about them online.

These rates are even higher for girls and – in the case of aggressive communications – older adolescents. Our finding that girls are more likely than boys to experience cyberbullying supports the conclusions drawn from earlier studies investigating gender differences in cyberbullying (Snell and Englander 2010; Tokunaga 2010; Holdfeld and Grabe 2012). With respect to the role of age, our results add complexity to existing evidence, as they point to different trends for different forms of cyberbullying. While there was no relationship between age and receiving nasty comments online, older adolescents were more likely than younger adolescents to have received aggressive or threatening electronic communications. This distinction suggests that certain forms of cyberbullying may be more or less likely at different ages. This claim merits further investigation, since such insight would help schools to tailor their anti-cyberbullying efforts for specific grade levels. Our study also indicates that White and Other adolescents are more likely to experience online bullying than Black adolescents, adding new data to the limited existing evidence relating to race and cyberbullying (Patchin and Hinduja 2006; Wang, Iannotti, and Nansel 2009). Further investigations involving adolescents from a variety of countries and cultures are needed before definitive conclusions can be reached about the role of race – and sociocultural experiences more broadly – in cyberbullying.

The results of our logistic regression analyses suggest that not all forms of media use place adolescents at risk of experiencing cyberbullying. For instance,

adolescents who spent more time using their cell phone were more likely to report online victimization, but there was no such relationship between time on the internet and cyberbullying. The difference between cell phone and internet use may be related to the fact that cell phones are typically used for interpersonal communication – of which cyberbullying is one form – whereas internet use encompasses a wide variety of activities.

Indeed, when we examined specific motivations for going online, we found that only the motivation to communicate with one's peers was positively related to both forms of cyberbullying (*Nasty* and *Aggressive*). The other motivations we examined – identity expression, information seeking, and entertainment – were not related to cyberbullying victimization. This finding is consistent with previous research showing a positive link between certain online social activities and cyberbullying experiences (Twyman et al. 2010). By measuring adolescents' motivations for going online rather than their specific online activities, the current investigation provides insight into cyberbullying that is not tied to particular online spaces, such as *MySpace*, that may no longer be popular destinations for today's adolescents. Our findings suggest that anti-cyberbullying interventions should take into account not just what adolescents do online, but their motivations for engaging in various online activities.

With respect to relationships versus rules, in general, strong parent relationships and positive experiences at school appear to be more protective against cyberbullying victimization than placing restrictions on adolescents' media use. Adolescents who reported stronger parent relationships and a positive school climate were less likely to report that someone had said nasty things about them online when compared with adolescents who reported low-quality parent relationships and a negative school climate. Rules put in place by their parents or school had no statistically significant relationship to this form of online bullying.

A slightly different pattern emerged for aggressive or threatening online communications, suggesting that cyberbullying is not a uniform experience and that different forms are associated with somewhat different risk and protective factors. School climate again emerged as a protective factor, but parent relationships did not play as strong a role, with only mother relationship quality approaching significance. It may be that receiving aggressive or threatening online communications is a more serious form of cyberbullying requiring more active intervention than simply the presence of strong, supportive parental relationships. Somewhat counter-intuitively, adolescents who reported experiencing aggressive online communications were actually *more* likely to report that their school enforced rules around cell phone use. One possible explanation for this finding is that students experience schools that enforce rules around cell phone use as punitive environments. This explanation is consistent with the view that a positive school climate is associated with lower incidents of cyberbullying victimization.

These findings contribute important insight into strategies that hold promise for decreasing cyberbullying among adolescents. First, because not all forms of

media use place adolescents at equal risk of experiencing online victimization, it is important to understand how they use media and with what purposes. Relatedly, cyberbullying itself comes in different forms, and the risk and protective factors may be somewhat different in each case. This nuanced understanding of adolescents' media use and cyberbullying experiences is necessary to create effective, targeted interventions.

Second, our results suggest that strong parent relationships and positive school experiences are more likely to serve as protective factors against cyberbullying than adults' rules around technology use, a finding that is supported by earlier studies (e.g., Wang, Iannotti, and Nansel 2009; Arslan et al. 2012; Gofin and Avitzour 2012). This finding is also consistent with empirically based approaches to traditional bullying, which emphasize the role of positive relationships and school climate (Swearer et al. 2010). Therefore, it is recommended that adults' efforts to stem cyberbullying place greater emphasis on promoting strong interpersonal relationships offline rather than placing restrictions on adolescents' media use. If parents and schools find it necessary to enforce technology-related rules, they will likely be more effective if implemented in the context of supportive adult relationships.

### **5.1. Limitations and future directions**

Because this study is cross-sectional, it is not possible to draw causal conclusions about the relationships between the predictor variables in the models and the two cyberbullying outcomes. It is recommended that future studies employ research designs that support causal conclusions, such as longitudinal studies and randomized experiments. The findings from the current investigation provide a strong foundation for the direction of such research. They suggest that future investigations should distinguish between different forms of media use and cyberbullying experiences. They should also seek to tease out the directions of the relationships between adolescents' media use, parent relationships, school climate, and online victimization.

As well, because many features of Bermuda distinguish it from the USA, Great Britain, and other countries, these findings are only generalizable to the population of Bermudian adolescents. Future research should investigate the predictors of cyberbullying for adolescents living in other geographic regions to determine whether the findings reported here hold true for other populations.

## **6. Conclusion**

Bullying has taken on new forms in this digital age of smartphones, apps, and social media. As schools take steps to address cyberbullying, their efforts are more likely to succeed if they are informed by an empirically based understanding of both online and offline risk and protective factors. By conducting the research in Bermuda, the current study adds new knowledge to the growing

research base on adolescents' cyberbullying experiences across cultures and geographic regions. The results provide insight into the specific computer-mediated activities that place Bermudian adolescents at risk of victimization, as well as the offline experiences that serve as protective factors. Importantly, the findings show that supportive relationships at home and positive experiences at school are associated with a decreased likelihood of experiencing cyberbullying victimization, whereas parent and school technology rules are generally unrelated to cyberbullying. These findings suggest that efforts to reduce incidents of cyberbullying should place emphasis on promoting positive relationships in school and at home rather than placing restrictions on adolescents' media use.

### Disclosure statement

No potential conflict of interest was reported by the authors.

### Notes

1. These racial categories are the same categories used by the Bermuda Government at the time of this study.
2. The *p*-values here are calculated using the raw data and exclude missing values. As a result, they are similar (but not identical) to those from the univariate regressions reported in the previous section, which use the imputed data.

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**Appendix 1. Survey response rates by school**

|                | Survey respondents ( <i>n</i> ) | Students enrolled in school ( <i>n</i> ) | Survey response rate (%) |
|----------------|---------------------------------|--|--------------------------|
| Private school |                                 |  |                          |
| School 1       | 228                             | 249                                      | 92                       |
| School 2       | 148                             | 162                                      | 91                       |
| School 3       | 155                             | 181                                      | 86                       |
| School 4       | 279                             | 326                                      | 86                       |
| School 5       | 268                             | 284                                      | 94                       |
| Public school  |                                 |  |                          |
| School 6       | 478                             | 635                                      | 75                       |
| School 7       | 523                             | 659                                      | 79                       |

**Appendix 2. Demographic characteristics of participants**

| Characteristic                   | Survey respondents ( <i>n</i> = 2079) |       |
|----------------------------------|---------------------------------------|-------|
|                                  | <i>n</i>                              | %     |
| Gender                           |                                       |       |
| Girls                            | 1180                                  | 57    |
| Boys                             | 895                                   | 43    |
| No answer                        | 4                                     | 0.002 |
| Race                             |                                       |       |
| Black                            | 1078                                  | 52    |
| White                            | 467                                   | 22    |
| Other                            | 323                                   | 16    |
| No answer                        | 211                                   | 10    |
| School type                      |                                       |       |
| Public                           | 1001                                  | 48    |
| Private                          | 1078                                  | 52    |
| School year                      |                                       |       |
| Grade 8 (Year 9)                 | 252                                   | 12    |
| Grade 9 (Year 10)                | 579                                   | 28    |
| Grade 10 (Year 11)               | 470                                   | 23    |
| Grade 11 (IB1)                   | 397                                   | 19    |
| Grade 12 (IB2)                   | 381                                   | 18    |
| Mother's highest education level |                                       |       |
| Some high school                 | 99                                    | 5     |
| Finished high school             | 468                                   | 23    |
| Some college                     | 228                                   | 11    |

## Appendix 2. (Continued.)

| Characteristic                   | Survey respondents ( $n = 2079$ ) |     |
|----------------------------------|-----------------------------------|-----|
|                                  | $n$                               | %   |
| Finished college                 | 586                               | 28  |
| School beyond college            | 218                               | 10  |
| Don't know                       | 250                               | 12  |
| No mother                        | 9                                 | 0.4 |
| No answer                        | 221                               | 11  |
| Father's highest education level |                                   |     |
| Some high school                 | 173                               | 8   |
| Finished high school             | 463                               | 22  |
| Some college                     | 175                               | 8   |
| Finished college                 | 437                               | 21  |
| School beyond college            | 211                               | 10  |
| Don't know                       | 348                               | 17  |
| No father                        | 48                                | 2   |
| No answer                        | 224                               | 11  |

**Appendix 3. Survey scales*****Online identity expression/exploration***

1. I enjoy using the Internet to try out different ways of expressing myself.
2. I feel that I'm able to express my personality online.
3. I can show a better version of myself online.
4. I feel I can express who I want to be online.
5. There are certain things I can express about myself more freely online than I can offline.
6. When I'm online, I can present myself how I want others to view me.
7. The way I act online is sometimes a bit different from the way I act offline.
8. There are certain things I don't share about myself online.
9. Sometimes I create or use a character (avatar) online that looks or acts quite differently from how I look or act offline.
10. Sometimes I act or say things very differently online from how I act or say things offline.
11. Sometimes I create or use a profile online that is very different from how I appear offline.
12. Sometimes I say things online that I might not say offline.
13. I sometimes feel like different parts of my personality come across when I'm online compared to when I'm offline.

***Online peer communication***

1. By going online, I feel more involved with what's going on with my friends.
2. By going online, my friends and I can maintain our relationship with each other.
3. By going online, I can improve my relationship with my friends.
4. I show friends encouragement online.
5. I go online to communicate with friends I see regularly.
6. Going online helps me to maintain my position with my group of friends.
7. When I'm online, I can tell friends things that are hard to say face-to-face.
8. When we're online, my friends and I sometimes talk to each other about personal issues.
9. When we're online, my friends and I sometimes share secrets with each other.
10. When I'm online, I like to share my personal feelings with my friends.

***Online entertainment/escape***

1. Going online is a good way to amuse myself
2. When I'm online I can escape reality.
3. I feel I'm able to relax online.
4. I enjoy being able to goof around online.
5. I have fun when I'm online (on the internet).
6. I feel less tense when I'm online (on the internet).

***Online information seeking***

1. I go online (use the internet) to find information for schoolwork.
2. I go online to keep track of the news.
3. I go online to find information related to health, exercise or nutrition.
4. I go online (use the internet) to find information about my hobbies and/or career interests.
5. I go online to look up information about things I might do (e.g. movie times/reviews, TV schedules).
6. I go online to find information about public figures, events, or places.

***Mother relationship quality\*\* (Armsden & Greenberg, 1987)***

1. My mother respects my feelings.
2. I feel my mother does a good job as my mother.
3. I wish I had a different mother.
4. My mother accepts me as I am.

5. My mother expects too much from me.\*
6. When we discuss things, my mother cares about my point of view.
7. My mother trusts my judgment.
8. My mother understands me.
9. When I am angry about something, my mother tries to be understanding.
10. I trust my mother.

### ***School climate***

1. I am satisfied with the friends I have at school.
2. Being a good student is important to me.
3. There is at least one teacher at school who understands me.
4. I have been happy at school this year.
5. I get into trouble a lot at school.
6. In general, I don't feel respected by most of my teachers at school.
7. I don't really feel involved at school.

\*Item removed after internal reliability analysis.

\*\*Father Relationship Quality scale mirrors Mother Relationship Quality scale.