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Recent years have witnessed a surge of research on cyberbullying. In this article, three studies examined prevalence rates of cyberbullying among college-age students, venues through which cyberbullying occurs, with a particular focus on social media, and perceptions of cyberbullying as a function of features of the target (e.g., peer, celebrity, groups). Study 1 found texting and social media to be the most commonly used venues for cyberbullying victimization. Study 2 determined that features of the target of cyber aggressive comments influenced perceptions of cyberbullying. Online aggressive comments directed toward peers were perceived most negatively whereas those targeted toward random people known only online were evaluated least negatively. Using an innovative methodology for examining cyberbullying, Study 3 found that venue (e.g., Facebook, comments, forum posts) and features of the target influenced the nature of online exchanges. Implications for prevention and intervention are discussed.

KEYWORDS cyberbullying, cyber aggression, peer aggression, school violence

The last decade has witnessed a surge of research on cyberbullying, bullying that occurs through the use of electronic communication technologies, such as e-mail, instant messaging, social media, online gaming, or through digital messages or images sent to a cellular phone (Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Kowalski, Limber, & Agatston, 2012; Patchin & Hinduja, 2012). Like traditional bullying, cyberbullying is an act of aggression intended to cause harm or distress, it has a repetitive quality (e.g., a single e-mail may be sent to hundreds of different individuals), and it occurs among individuals

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whose relationship is characterized by a power imbalance (Kowalski et al., 2012, 2014; Olweus, 1993; Patchin & Hinduja, 2012). Importantly, whereas with traditional bullying this power imbalance might reflect differences in physical strength or social status, with cyberbullying it might also reflect differences in technological expertise.

Reported prevalence rates of cyberbullying are variable across studies, depending on how cyberbullying is defined, the time parameter used to measure cyberbullying (e.g., has cyberbullying occurred in the last two months, last year, lifetime), the ages of the participants, the country of origin of the sample, and the response format used to classify involvement with cyberbullying (e.g., at least once, once or twice a week), to name a few (for a more complete discussion of conceptual and measurement issues related to cyberbullying, see Bauman, Cross, & Walker, 2012; Kowalski et al., 2014). Across most studies, prevalence rates range from 10% to 40% (e.g., Kowalski et al., 2014; Lenhart, 2010; O'Brennan, Bradshaw, & Sawyer, 2009).

One variable affecting prevalence rates is the nature of the items used to assess cyberbullying. In some instances, participants are asked single-item questions determining whether they have ever been the victim or the perpetrator of cyberbullying. In other cases, participants are asked a series of questions determining whether they have been cyberbullied via a number of different venues (e.g., instant messaging, text messaging, e-mail, online gaming). Typically, prevalence estimates for cyberbullying are lower when single-item measures are used as opposed to when more specific items inquire about cyberbullying that occurs through particular venues (Kowalski et al., 2014; Menesini, Nocentini, & Calussi, 2011; Vaillancourt et al., 2010). Multiple items measures provide a more detailed portrait of the means by which cyberbullying occurs. Knowing that 19% of respondents report being victims of cyberbullying is not as informative as knowing the venues by which that cyberbullying has been perpetrated.

These venues through which cyberbullying occurs reflect the technologies most in use at the time. Thus, they change rapidly, with implications for prevention and intervention efforts that must keep up with the changes in technology. For example, Kowalski and Limber (2007) found instant messaging to be the most frequently used venue for cyberbullying reported by both victims and perpetrators. Katzer, Fetchenhauer, and Belschak (2009) observed chat rooms to be a common method of both peer-to-peer communication and cyberbullying among middle and high school students. More recently, however, social media, such as Twitter and the like, appear to be emerging as popular sites for cyberbullying perpetration and victimization, in part a reflection of their increasing popularity. Focusing on the relation of social media to cyberbullying is an important goal in 2014. Thus, assessing the extent to which social media are emerging platforms for cyberbullying is one goal of the current series of studies.

The conceptual and methodological issues surrounding research on cyberbullying have pointed to another deficiency in the literature. Much of the attention devoted to cyberbullying has focused primarily on peer-to-peer cyberbullying occurring through text messages, Facebook, and instant messages (Pyzalski, 2011, 2012). However, the relation between victim and perpetrator might not, in fact, be peer-to-peer. Indeed, in some instances, the relationship is not known as the victim and the perpetrator are unknown to each other. Pyzalski (2012) created a taxonomy to examine victim–perpetrator relationships in regards to cyberbullying. This taxonomy includes six categories: cyber aggression against peers (i.e., the victim and perpetrator are from the same group); cyber aggression against the vulnerable (i.e., the victims are "weaker" people, such as the homeless, alcoholics, etc., who may be unaware of the victimization); random cyber aggression (i.e., the victim is anonymous to the perpetrator); cyber aggression against groups (i.e., a group of people is victimized, such as an ethnic or religious group); cyber aggression against celebrities (i.e., the victims are celebrities or otherwise famous); and cyber aggression against school staff (i.e., school staff/administrators are the targets of cyber aggression). Perceptions of the offensiveness of acts of cyber aggression and whether particular behaviors even constitute cyberbullying might be expected to vary as a function of the characteristics of the target, a second focus in the current series of studies.

Third, to date, the majority of the research on cyberbullying has focused on youth in middle and high school to the virtual exclusion of another important segment of the school-age population—college students. One study found, however, that as many students reported that their first experience with cyberbullying occurred during college as occurred during middle school (Kowalski, Giumetti, Schroeder, & Reese, 2013; see also Cowie et al., 2013; Rafferty & Vander Ven, 2014). Given that cyberbullying can occur with any demographic, and with the increased use of apps, such as Yik Yak, currently in vogue on college campuses, this is a sample that warrants our attention. Yik Yak allows users to post short comments anonymously for anyone in that user's vicinity (e.g., school) to view and vote on.

In the current manuscript, three studies examine the prevalence rates of cyberbullying among college-age students, the venues through which cyberbullying occurs, and perceptions of cyberbullying as a function of features of the target (e.g., peer, celebrity, the vulnerable, groups). More specifically, Study 1 provides an overview of cyberbullying prevalence rates and examines the correspondence between Internet tools and cyberbullying venues. Study 2 provides a novel conceptual approach to research cyberbullying using Pyzalski's (2012) typology to examine instances of cyberbullying as a function of the nature of features of the target. Important to Study 3 is an innovative methodology for examining cyberbullying using Salesforce's Radian6 program, which is detailed later in this article. This methodology identifies cyberbullying behavior as it occurs online.

STUDY 1

Study 1 was designed to explore prevalence rates of cyberbullying in addition to examining the correspondence between Internet use and cyberbullying venues. A specific focus was to determine the degree to which social media are popular platforms for cyberbullying perpetration and victimization among school-age youth. In addition, with an eye toward prevention and intervention, the study examined common responses to cyberbullying among targets and bystanders. Prevalence rates of cyberbullying were expected to mirror those observed with students in other age demographics. However, the venues through which cyberbullying occurs were expected to differ not only because of technological shifts but also because of the age of the participants. Participants were expected to not only spend more time on social media sites but also to report involvement in cyberbullying via these sites. Responses to cyberbullying were expected to be primarily indirect.

Method

PARTICIPANTS

A total of 169 female and 75 male undergraduate students enrolled in an introductory psychology course (four did not identify their sex) participated. Participants' ages ranged from 18 to 25 ($M = 18.8$, $SD = 1.2$). Eighty-four percent of the sample was White, with another 8.6% being African American.

PROCEDURE

After responding to demographic questions, participants completed an online survey examining their experiences with the Internet and with cyberbullying. Participants were asked how often they used the Internet on an average day (1 = *0 hours* to 7 = *>10 hours*); how safe they felt using the Internet (1 = *not at all safe* to 5 = *extremely safe*); and how often they used a provided list of 14 electronic communication technologies (e.g., texting, Facebook, Twitter; 1 = *never* to 5 = *frequently, at least once a day*).

In addition, questions adapted from the Olweus Bullying Questionnaire (Olweus, 1996/2004; see also Kowalski & Limber, 2007) were included to assess participants' experiences with cyberbullying. Participants were first provided with the following definition of cyberbullying:

> When we say cyberbullied, we mean bullied through email, instant messaging, social media, in a chat room, on a website, in an online game, or through a text message sent to a cell phone. For example someone who sends mean messages to another person in an email or posts negative comments or information about that person via social media, like Facebook, is cyberbullying.

Then, they were asked the following questions: "How often have you been cyberbullied in the past year?"; "How often have you cyberbullied someone else in the past year?"; and "How often have you witnessed some-one else being cyberbullied in the past year?" Each of these questions was answered using a 5-point response scale (1 = *I haven't* to 5 = *several times a week*).

To gather information regarding the venues by which cyberbullying is most likely to occur, participants used this same 5-point response format to indicate the extent to which they had been cyberbullied via the same 14 electronic communication technologies for which their overall use had been assessed earlier (e.g., texting, Facebook, Twitter). They were then asked to identify the perpetrator of the cyberbullying. Participants responded "yes" or "no" to each of the following choices: sibling, friend, another student at school, teacher, stranger/don't know, or someone else.

To gauge responses to cyberbullying victimization, participants gave yes/no responses to eight different possible responses that they offered in response to their own victimization (did nothing, reported the cyberbullying, asked the perpetrator to stop, cyberbullied back, made fun of the perpetrator to other people, saved the evidence, blocked them on social media, responded in another way). Similar response options were provided, with the addition of "provided support," for participants' perceptions of the responses of others who had witnessed the participant's victimization.

Results

Most participants reported using the Internet between 1 and 6 hours a day (1–2 hours: 18.9%; 3–4 hours: 45.1%; 5–6 hours: 25.8%). When using the Internet, over 77% reported that they felt moderately to very safe using the Internet. The average age at which participants began using social media was 13.3 (SD = 1.9).

The most common technological tools reported by participants reflected high use of social media. The majority of participants (99.6%) reported using texting often or frequently, followed by e-mail (98.4%), Facebook (86.5%), YouTube (75.1%), Instagram (70.9%), and Twitter (69.4%). Contrary to previous research, participants infrequently stated that they used instant messaging (14.5%) or chat rooms (0.8%) often or frequently. The most frequent venues by which participants indicated they had been victimized were texting (56.8%), Twitter (45.5%), Facebook (38.6%), Instagram (13.7%), and YouTube (11.4%). Instant messaging (2.3%) and chat rooms (2.3%) were infrequent sources of cyberbullying victimization.

Consistent with published research (e.g., Hinduja & Patchin, 2009; Kowalski & Limber, 2007), 18.2% of participants reported they had been a victim of cyberbullying at least once within the last year. Almost 12% indicated they had perpetrated cyberbullying at least once within the last

year. Being a victim of cyberbullying was significantly related to being a perpetrator of cyberbullying ($r = .54$, $p < .001$). Over 55% of participants stated they had witnessed cyberbullying at least once within the last year.

In most cases, the perpetrator was a friend (50%) or another student at school (54.3%), followed by a stranger (30.6%). A sibling was listed as the perpetrator in 7.9% of the cases and a teacher in 2.9%. Participants listed "someone else" in 9.1% of the cases.

Responses to cyberbullying victimization were varied and included doing nothing (25.0%), reporting the cyberbullying (31.8%), asking the person to stop (29.5%), cyberbullying back (13.6%), making fun of the perpetrator to other people (11.4%), saving the evidence (18.2%), and blocking them on social media (34.1%). An additional 6.9% indicated that they responded in another way, including threatening the perpetrator and letting the incident go because the perpetrator immediately regretted what they had done.

A related variable was participants' perceptions of others' responses to their victimization. Unfortunately, the largest percentage of respondents who had been cyberbullied perceived that others did nothing (25%), followed by asking the perpetrator to stop (15.9%), cyberbullying back (11.4%), making fun of the perpetrator to other people (9.1%), and reporting the cyberbullying (6.8%). An additional 13.6% indicated that the witness responded in another way but provided no specifics.

Discussion

Our focus in Study 1 was to determine the relations between technology use and cyberbullying, with a particular focus on social media. Noteworthy among the results is the finding that venues of cyberbullying reflect the technological tools most in use by the participants. Additionally, the technological tools reported by those involved in cyberbullying are different from those in the published literature. This likely reflects two trends. First, technology changes rapidly. As new modes of technology emerge, new means of cyberbullying appear. Additionally, the modes likely reflect age-related trends. The most often used technological tools among ninth graders may differ from seniors in college. The present results suggest that, while texting remains dominant, social networking sites are common locations for cyberbullying. Because communication on social networking sites differs from previously popular forms of electronic communication, this shift may have implications not only for how cyberbullying occurs but also for the effects and responses that cyberbullying produces. Online communication no longer has to be direct and somewhat private, as it was with instant messaging. It can now be indirect and very public.

These new, more indirect and public forms of cyberbullying may result in the use of different response strategies in regard to cyberbullying.

Specifically, Kowalski and Limber (2007) observed that the most common response among middle school students who had been cyberbullied was to do nothing. In the current study with college students, the most common response was to block the person from social media, followed by reporting them. These data not only reflect the current trend toward cyberbullying occurring via social media, but also reflect an increased awareness among young people regarding appropriate responses. Additionally, the data might reflect differences in responses between middle school students and college students.

However, the same cannot be said for participants' perceptions of the responses of bystanders. Over half of the sample reported that they had witnessed cyberbullying in the past year, yet their perception was that other bystanders typically do nothing. A key part of the bullying education program implemented by some colleges needs to focus on the active role of the bystander in both preventing and potentially perpetuating bullying depending on the response offered. Additional research on the role of the bystander in cyberbullying situations is clearly needed.

STUDY 2

Study 2 used a modified version of Pyzalski's (2012) typology to explore perceptions of cyberbullying directed toward different types of targets. Due to social distance and reduced identifiability online (Charness & Gneezy, 2008), it was expected that cyberbullying directed toward people known only online would be seen most frequently, and viewed as the least negative, whereas cyberbullying toward peers would be seen least frequently and viewed the most negatively.

Method

PARTICIPANTS

A total of 197 undergraduate introductory psychology students at a midsized university and 16 students recruited online through the website Reddit (143 females, 66 males; 4 did not report their sex) participated in this study. Ages ranged from 18 to 25 ($M = 18.8$; $SD = 1.3$). Participants were predominantly White (82.9%), followed by African American (10%) and Asian (4.8%).

PROCEDURE

As in Study 1, after completing demographic questions, participants indicated how often they used the Internet, how safe they felt using the Internet, and

the frequency with which they used several technological tools. The list of technological tools was modified slightly from Study 1. Because Study 1 demonstrated the salience of social media to participants and because we were interested in Study 2 in cyberbullying that occurs via social media, texting was omitted from the list. In addition, the response format for the technological tools was modified to reflect a 6-point scale (1 = *never* to 6 = *extremely often [at least once a day]*). Participants were also asked how often they had been cyberbullied in the past year, how often they had cyberbullied others in the past year, and how often they had been cyberbullied through the technological tools listed. The response format for these items mirrored that in Study 1.

To explore perceptions of cyber aggression directed toward different types of targets and the extent to which participants perceived these comments to be cyberbullying, participants were shown a series of five comments/posts that pertained to a particular category from Pyzalski's (2012) typology. These comments were generated by the authors but are representative of comments found on social media. Because we were using a college student sample and because cyber aggression against school staff represented a very small percentage of responses in Pyzalski's (2012) study, this category was omitted in the current study, leaving five instead of six categories. Categories of comments are provided in Table 1. All participants received the same five comments. In a repeated measures design, participants rated each comment/post on scales indicating how hurtful, malicious, acceptable, offensive, and humorous the comment was, as well as the extent to which they thought the comment constituted cyberbullying (bullying through the use of the Internet or related technologies). These variables were drawn from previous research by the second author on teasing and bullying. In addition, participants responded to the following two items: "How often do you see such comments/posts?" and "How often do you post such comments/posts?" All of these questions were answered using a 5-point scale (1 = *not at all* to 5 = *extremely*) with the exception of the item asking participants the extent to which the comment/post constituted cyberbullying (yes/no).

Results

Similar to Study 1, most participants spent between 1 and 5 hours daily using the Internet (1–2 hours: 18.3%; 3–4 hours: 38.0%; 5–6 hours: 33.7%). Eighty-one percent reported that they felt moderately to very safe using the Internet. Most participants responded that they often, very often, or extremely often spent their time on the Internet using Facebook (72.5%), Twitter (71.7%), and YouTube (79.3%). A very small percentage indicated that they often or more frequently used chatrooms (7.7%).

TABLE 1 Categories of Comments: Study 2

Categories of comments

The following comment is an example of a comment that may be made online about a disadvantaged group without their knowledge. Please treat this example as an example that would apply to any disadvantaged group: "Every homeless person is in their present situation because it is their own fault. They were either greedy and screwed up financially, got into drugs, or some other selfish reason."

The following comment is an example of a comment that may be made online. The comment is addressing a group that may not even be aware that this comment is made: "Women are pretty entitled. And why not, they are pandered to, even though they bring nothing especially useful to the table."

The following comment is an example of a comment that may be made online. The person who posted this comment and the person who received it do not know each other in real life, and have only communicated online using pseudonyms: "The truth hurts, doesn't it, douche bag?"

The following comment is an example of a comment that may be made online. The comment is referring to a celebrity, while the celebrity has no idea that this comment exists: "Bitches like Kim Kardashian should be lambasted into obscurity."

The following comment is an example of a comment that someone might make to someone they know personally in real life online. For the following questions, assume that the sender and receiver know each other in real life: "Stupid gap-toothed home-wrecking hoe. Y'all will get what's coming to you one day."

Twenty-two percent of the participants indicated they had been cyberbullied at least once within the last year. Fourteen percent stated they had cyberbullied others at least once within the past year. The most common social media venues by which people reported becoming victims of cyberbullying were Twitter (12.0%) and Facebook (11.4%). YouTube fell behind (4.7%) with chat rooms rarely being reported as a venue for cyberbullying victimization (2.1%).

Repeated measures analyses of covariance with type of comment as the repeated factor and cyberbullying victimization experience as the covariate revealed significant main effects of type of target (see Table 2). Cyberbullying victimization was centered before being entered as the covariate (Aligna, 1982; Delaney & Maxwell, 1982). Participants reported that, when they made aggressive comments online, these comments were most often directed toward random people known only online, whereas they were least often directed toward peers, $F(4, 740) = 6.22$, $p < .001$, $\eta^2 = .03$. In contrast, participants reported that the aggressive comments they saw online most frequently targeted celebrities, and least frequently targeted peers, $F(4, 740) = 27.79$, $p < .001$, $\eta^2 = .13$.

When rating each type of comment, comments directed toward peers stood out relative to other types of targets (see Table 2). Participants rated aggressive comments made toward peers as less humorous, $F(4, 736) = 29.65$, $p < .001$, $\eta^2 = .14$; less acceptable, $F(4, 740) = 21.22$, $p < .001$, $\eta^2 = .10$; more malicious, $F(4, 736) = 67.50$, $p < .001$, $\eta^2 = .27$; more

TABLE 2 Main Effects of Target Controlling for Cyberbullying Experience: Study 2

Variable	Vulnerable M (SD)	Groups M (SD)	Random M (SD)	Celebrities M (SD)	Peers M (SD)
Offensive	3.89[a,b] (1.05)	4.28[a,c,e] (1.02)	3.86[c,d] (1.02)	3.97[e,f] (1.05)	4.46[b,d,f] (0.99)
Acceptable	1.89[a] (0.95)	1.70[b,e] (0.99)	1.94[c,e] (1.00)	1.84[d] (0.96)	1.35[a,b,c,d] (0.73)
Intended to hurt	3.08[a,e] (0.96)	3.30[b,f] (1.07)	3.70[c,e,f,g] (1.02)	3.29[d,g] (1.27)	4.41[a,b,c,d] (0.89)
Humorous	1.98[a,e,f,g] (1.09)	2.28[b,e,h] (1.23)	2.25[c,f,i] (1.11)	2.73[d,g,h,i] (1.35)	1.70[a,b,c,d] (1.05)
Malicious	2.97[a,e] (1.06)	3.05[b,g] (1.07)	3.38[c,e,f,g] (1.14)	3.11[d,f] (1.12)	4.25[a,b,c,d] (0.96)
Constitute cyberbullying	1.60[a,e] (0.49)	1.60[b,f] (0.49)	1.79[c,e,f,g] (0.41)	1.66[d,g] (0.47)	1.91[a,b,c,d] (0.29)
Frequency of posts seen	2.57[a,b,g] (0.84)	2.42[c,d] (0.82)	2.75[a,d,e] (0.81)	2.90[b,c,f] (0.85)	2.35[e,f,g] (0.81)
Frequency of posts by participant	1.14 (0.43)	1.09[c] (0.36)	1.24[a,c] (0.55)	1.16[b] (0.48)	1.06[a,b] (0.27)

Note. Means in a single row that share a common superscript differ significantly, $p < .05$. Vulnerable = victims are "weaker" people, such as the homeless; Groups = a group is victimized, such as an ethnic or religious group; Random = the victim is anonymous to the perpetrator; Celebrities = victims are celebrities or otherwise famous; Peers = victim and perpetrator are from the same group.

offensive, $F(4, 748) = 20.87$, $p < .001$, $\eta^2 = .10$; and more hurtful, $F(4, 783) = 61.60$, $p < .001$, $\eta^2 = .25$, than comments directed at most other targets. In is important to note, however, that all comments, regardless of topic, were rated as low in acceptability. Comments that were most often seen as cyberbullying were those that were directed toward peers, $F(4, 748) = 25.98$, $p < .001$, $\eta^2 = .12$.

Discussion

Involvement in cyberbullying as victim or perpetrator mirrored the results of Study 1 and published findings (e.g., Kowalski & Limber, 2007). Given that the venues showcased social media, these results have implications for researchers as they inform prevention and intervention efforts aimed at curbing cyberbullying. These prevention and intervention efforts will not be entirely stagnant processes but rather continuously evolving to keep up with changes in technology. While some features may be consistent across social media platforms, other components will be unique to particular platforms, leading prevention/intervention specialists to have to maintain currency with social media platforms.

Second, the results of this study highlight a feature about cyberbullying already well known to researchers—the phenomenon is not easily categorized. Rather, it depends, at least in the present case, on the target of the cyberbullying. Perceptions of the intention of the perpetrator and the offensiveness of the behavior were influenced by the nature of the target of the behavior. Aggressive comments directed toward peers were evaluated as

less acceptable, as less humorous, as more offensive, and as reflecting more malicious intent by the perpetrator than comments directed toward members of other groups (e.g., random people or celebrities). Yet, in Study 1, the most often cited source for victimization was a friend or another student at the university. Additional research is needed to investigate what it is about cyberbullying of peers that makes perceptions of the behavior so much more negative. While one might speculate that the closeness of the relationship with peers relative to members of other target groups may account for some of the offensiveness, this same closeness also makes peers the most likely targets.

STUDY 3

The third study extended Studies 1 and 2 using an innovative methodology to examine cyberbullying. Researchers in Computer Science have recently developed cyberbullying detection tools. For example, several researchers have used natural language processors to interpret text from online posts that can be construed as cyberbullying. Yin et al. (2009) trained a computer system to detect and interpret cyberbullying in data taken from Kongregate, Slashdot, and MySpace. The system examined the posts based on content (e.g., local features of the post), context (e.g., the context in which the post occurred), and sentiment (e.g., whether or not the direct text had any markers of harassment). However, even having trained the program to take all of these features into account, only 61.9% of posts examined were correctly identified as harassment.

Bayzick, Kontostathis, and Edwards (2011) similarly developed a program called BullyTracer to detect cyberbullying in online conversation. The data included forum transcripts crawled from Myspace. The transcripts were reviewed by research assistants and rated as cyberbullying or not, and BullyTracer was tested against these assessments, much like the work of Yin et al. (2009). To test for the presence of cyberbullying, BullyTracer used a dictionary of words indicative of cyberbullying that fit into the categories of insult words, swear words, and second-person pronouns. Excessive capitalization (more than 50% of all words; Bayzick et al., 2011) was also an indicator of cyberbullying. BullyTracer was able to correctly identify posts containing cyberbullying 85.3% of the time and posts that did not contain cyberbullying 51.9% of the time. Overall, the accuracy was 58.6% (Bayzick et al., 2011).

Although these programs allow for the examination of real-world data, they are limited to studying datasets scraped from one or two websites, and the accuracy of these tools is also somewhat limited at this time. Cyberbullying is not a problem likely to be contained to a few websites, so

a broader methodology may be useful. Additionally, an examination of the real-world data found through the psychological lens may help the fields of psychology and computer science integrate their research on cyberbullying more completely.

Thus, in Study 3 an innovative methodology for examining cyberbullying used Salesforce's Radian6 (http://www.salesforcemarketing cloud.com) program to acquire and examine potential examples of real-world cyber bullying to assess trends regarding where cyber aggression occurs most frequently, and to whom the cyberbullying is most typically addressed. Radian6 has access to all public, non-password-protected social media, and extracts all data points from these public social media. It has agreements with social networking sites, and data that are aggregated/shared must comply with the user agreements of the social networking sites. Radian6 uses a list of keywords supplied by users to pull public posts containing these words from a variety of social media. Users can select from which social media they would like to pull (such as forums, Facebook, Twitter, YouTube comments, etc.), what country they would like to pull from, and what language they want the posts to be written in. After selecting the desired options, users give Radian6 a list of keywords. Radian6 then pulls any posts meeting the selected criteria that contain one of the words in this list. To make this list more specific, users have the option to select words that the post must contain in addition to the word on the original list of keywords ("and" modifiers). Radian6 will now only pull posts that contain one or more of the original keywords as well as one of the new moderator words. It is also possible to input a list of words that the user wishes to prevent Radian6 from finding ("not" modifiers). This allows posts to be pulled that contain an original keyword, but not this new modifier word. The not and the and modifier words can be used in conjunction so that a post must contain an original keyword, one of the and keywords, and none of the not keywords to be selected by Radian6.

After inputting a profile of original keywords, and modifiers, and not modifiers, Radian6 allows the user to download a stream of posts containing the desired words, and to break down the total stream of posts in accordance with their origin (Facebook, comments, forums, etc.).

Method

A profile including a large list of words indicative of cyberbullying was created. Drawing upon previous research, this list was comprised predominantly of a variety of insults and profanity. This list was then pruned to create a profile consistent with the estimated monthly volume allowances (EMV) of Radian6 (i.e., the cap on the number of posts the profile would pull in a month). The final list included "idiot," "fag," "slut," "dick," "bitch," and "asshole" as original keywords. Modifiers were used to help assure that the

posts pulled contained cyberbullying and not simply complaining, as profanity is common online in contexts other than cyberbullying. The and modifiers used include "such a," "what a," and "you're a," as they indicate that someone or something is being specifically referenced. These modifiers are also consistent with tools in computer science that use personal pronouns and second person pronouns as indicators of cyberbullying (Bayzick et al., 2011; Yin et al., 2009).

Posts were then downloaded from the past 90 days (April–June 2013), and broken up by media type. To achieve the desired EMV, researchers had to limit the search to Facebook, forum posts, forum replies, and website comments. In total, over the period of time the study was run, 180,215 posts were downloaded, 116,881 from Facebook, 2,343 from forum posts, 32,404 from forum replies, and 28,587 from comments. A random sample of 3,000 posts was then selected from these data, in proportion with the amount of posts downloaded from each venue. Because so few forum posts were in the final list ($n = 39$, 1.3%), forum posts were omitted from subsequent analyses.

To examine the prevalence of cyberbullying and the types of cyberbullying common in social media, this sample of 2,961 posts (excluding forum posts) was categorized along three dimensions. Importantly, because the posts were generally taken out of context creating some ambiguity regarding the meaning of the post, for each variable of interest, a category reflecting uncertainty was added. Sample comments for each of the three coding dimensions are provided in Table 3. First, the posts were categorized as either cyberbullying or not along a 3-point scale (1 = *not cyberbullying,* 2 = *maybe cyberbullying,* 3 = *cyberbullying*). Second, all posts were categorized based on who the target of the post was, based on the modified version of Pyzalski's (2012) typology used in Study 2, with the exception of adding a category labeled "difficult to determine" based on the lack of context provided. The school personnel category was again omitted because only 1 comment out of 3,000 reflected cyber aggression against school officials. Third, posts were rated as to whether they were made directly to their targets or not: (0 = *not applicable because the post did not relate to a person,* 1 = *post directed at the target,* 2 = *post directed at a third person,* 3 = difficult to determine given the lack of context).

Results

Two coders rated each post along the three primary variables of interest. Interrater reliability for whether the post was cyberbullying or not, the directness of the post, and the target of the post were all acceptable, exceeding .80 (Nunnally, 1978).

Layered crosstabs were used to analyze the results. This allowed us to determine, for example, what percentage of Facebook posts constituted cyber aggression and what percentage of these cyber-aggressive posts were directed to each of the target categories. A crosstabs with venue, category

TABLE 3 Sample Comments: Study 3

Types	Comment
Category	
It's not	As a non educated person, I look at this and think the "optimal" flight pattern would be to fly slowly upwards and backwards. It would lower the immediate risc, and make cutting the chute possible. No direct communication with the pilot makes this a bitch tho.
The vulnerable	How can you live being a bum going from one place to the other staying till your no longer allowed too smooch then on too the next idiot what a pathetic path too live?
Groups	West is far better than Arab where women are not even allowed to drive! What a fantastic nation! . . .
Random person	Guest_from_Grottoes sound more like an idiot_from_Grottoes. Who would think that would be hilarious? What a jerk!
Celebrity	I predict Odumbocare is going to be an Epic Fail! Just like his entire presidency. (If you can even call it that). I love the fact that with each passing day, this man is proving what a complete and utter evil, lying, vile, idiot, that he is to the entire world. His mask is coming off and all nations are . . .
Peers	You're a yeasty fucking whore and walked out. As planned she chased me out and yelled "oh don't you think u can just say that and walk out of here" then I turned around and yelled "I'm sorry I just can't have sex with you any more." Now all the cabins were really close so the entire camp then heard me scream . . .
Difficult to determine	He should be abused in jail . . . What a bitch!
Directness	
n/a	Insomnia you're a bitch
To the subject	Ha, you're a bitch. I hope you get Crocs for your birthday.
Third party	Rib Buster is a perfect example of what a coward is, this weakling has a problem with a certain race of people and has the nerve to make comments as if he really cared about fairness in this case. Sounds like his mind was made up before he knew any facts just like he is saying about that race. Hypocrite . . .
Not sure	defective idiot . . .
Cyberbullying ratings	
Not cyberbullying	LOL, I know that you are currently buried in messages and comments. i just forwarded you something that I hope you find interesting. I have tweeked it as much as I was able to, maybe you can take it a little further. If you can, it might be worth taking a listen to. If you do decide to tweek it, let me know . . .
Maybe cyberbullying	*Puts seashell up to ear* "The ocean tells me you're a little bitch." What a fucking fag all you do is boost. You're videos are shit & you sound like a pre pubescent jackass. Learn to play the game properly & take your shit K/D elsewhere. You have been reported numerous times so say bye bye to your account. Comment & subscribe . . . More like fuck off and get reset.

Note. Comments are replicated verbatim, including misspellings and grammatical errors.

of person, and cyberbullying rating showed that cyber aggression was most common in the comments section of websites, as 80.4% of such comments constituted cyber aggression, $\chi^2(10, n = 379) = 122.0, p < .001$, as compared

to 36.6% of Facebook posts, χ^2 (12, $n = 708$) $= 833.0$, $p < .001$, and 59.3% of forum replies, $\chi^2(10, n = 320) = 157.0$, $p < .001$.

This same analysis showed that people known only online were victimized most frequently on every venue with the notable exception of Facebook, where peers were most commonly victimized. Random people known only online accounted for 38.6% of targets of cyber aggression in comments, 58.8% of targets in forum replies, and 1.8% of targets on Facebook. In contrast, 32.7% of cyber aggressive comments on Facebook were directed toward peers, whereas only 0.8% were directed toward peers in comments and only 2.8% were directed toward peers in forum replies.

With regards to the directness of the post, a crosstabs analysis of venue, ratings of cyberbullying, and directness showed that 38.6% of posts that were rated as cyber aggression were made directly to the subject, compared to 46.1% of cyber-aggressive posts that were made indirectly, and 15.3% of cyber-aggressive posts that were ambiguously directed. This varied, however, with the venue. Among comments indicative of cyberbullying, those in the comments section (48.6%), χ^2 (6, $n = 185$) $= 157.0$, $p < .001$, and forum replies (51.2%), $\chi^2(6, n = 165) = 161.0$, $p < .001$, were more likely to be direct, compared to Facebook (27.7%), $\chi^2(6, n = 197) = 1023$, $p < .001$. Posts on Facebook (54.4%) were more indirect, followed by comments (44.1%) and forum replies (30.0%).

A layered crosstabs analysis with venue, category of person, and directness revealed that random people known only online were the most likely to be addressed directly in both comments (72.3%), $\chi^2(15, n = 160) = 745$, $p < .001$, and forum replies (88.0%), $\chi^2(15, n = 202) = 866.0$, $p < .001$. Peers were most likely to be addressed directly on Facebook (52.8%), $\chi^2(18, n = 144) = 2487.0$, $p < .001$, but, not surprisingly, very unlikely to be addressed directly in comments (0.5%) or forum replies (0.4%).

Discussion

Using real-world data, Study 3 builds on knowledge gained from Study 2. Study 2 found that perceptions of cyberbullying differ as the target of the cyberbullying changes. Study 3 examined where cyber aggression occurs, the frequency with which it occurs, and to whom it is most often directed.

Study 3 indicated that venue is relevant in discussions of cyberbullying, as a relation was found between venue, the frequency of cyber aggression, and the directness of posts. For example, on Facebook, people were more direct with their peers than they were with members of Pyzalski's other groups. However, even with that, the posts suggest that people are more indirect than direct on Facebook compared to comments and forum replies. Additionally, cyber aggression was more common in comments and forum replies than on Facebook. This highlights the fact that the nature of the relation between online individuals is important in influencing their online

exchanges. That cyber aggression occurred most frequently in comments and forum replies might indicate that anonymity is a factor conducive to cyberbullying, as these venues are typically either completely anonymous or make use of pseudonyms, whereas Facebook employs the most direct ties to identity, and exhibited the lowest rates of cyber aggression. As in Studies 1 and 2, this has implications for prevention and intervention efforts as perceived anonymity could open up the pool of individuals who might be willing to perpetrate cyberbullying (Kowalski et al., 2014). People will say and do things anonymously that they might be unwilling to say and do directly to someone's face (Diener, 1980; Postmes & Spears, 1998). To the degree that technological trends allow for increasing anonymity, prevalence rates of cyberbullying might be expected to increase.

GENERAL DISCUSSION

The findings of these three studies show that cyberbullying is not a monolithic practice and seems to occur in a variety of contexts with varying frequencies. Venue was shown to be important as certain venues seem to be more likely to contain or attract cyberbullying than others, or, at least, cyberbullying directed toward particular targets.

Study 1 indicated that common venues of cyberbullying have likely shifted to social media. Peers were still reported as the most common perpetrators of cyberbullying, and a positive relation was found between cyberbullying perpetration and victimization, consistent with the current literature.

Study 2 examined the perceptions of cyber aggression directed toward different targets, in accordance with Pyzalski's (2012) typology. It was found that cyber-aggressive comments directed toward random people known only online were seen the most frequently and seen as the most acceptable. Cyber aggressive comments directed toward peers were seen as the least acceptable and the most malicious and offensive, and the most likely to be labeled cyberbullying. These results indicate that the categorization of cyberbullying depends, in part, on the relationship between victim and perpetrator.

Study 3 further explored the categorization of cyber aggression using a methodology unexplored in the psychological literature but that interfaces well with the area of computer science. Specifically, using an analysis of cyberbullying behavior as it occurs on social media, Study 3 focused on how the targets of cyber aggression, as well as the frequency of the aggression, vary from venue to venue. Findings indicated that cyber aggression was most common in website comments and least common on Facebook. The victims of the cyber aggression differ with venue as well, and random people known only online are the most common targets on every venue except Facebook.

This emphasizes the role that ever-changing technology plays in shaping our online interactions, as well as the role that the victim–perpetrator relationship plays in facilitating cyber aggression. All of these relationships should be further explored in future research.

Study Limitations

The current research had several limitations. First, due to data constraints set by Salesforce, the profile created in Study 3 had to have an EMV of less than 100,000, meaning that the estimated number of posts the profile would pull in a month had to be less than 100,000. While still providing a wealth of information, a larger EMV would allow for even more expansive data searches using a wider range of key terms. Additionally, Radian6 pulls only individual posts, meaning that context is lost when examining data. This may lead to reduced accuracy of classification. Third, our study purposefully focused on a school-age population that has not received as much attention in the literature: college students. However, the nature of these studies would benefit from including elementary, middle, and high school students in the sample to examine developmental variations in the use of social media and perceptions of cyberbullying.

Conclusions

Understanding the fluid nature of cyberbullying behavior is at one time a blessing and a curse to parents and educators. On the one hand, knowledge is power, and the ever-changing nature of technology and, thus, cyberbullying behavior encourages researchers and educators from a variety of disciplines to work together in designing prevention and intervention efforts to curb the behavior. On the other hand, these same prevention and intervention efforts are hampered by a seeming inability to keep up with the technological demands imposed by the situation. Programs, such as Radian6, however, suggest that technology can be used to help us understand the technology and cyberbullying as it actually occurs and to observe directly the most common venues by which it is occurring and the most common targets for the behavior. For example, the ability to use programs, such as Radian6, to track cyberbullying has implications for the development of apps for reporting instances of cyberbullying as they occur.

COMPETING INTERESTS

The authors have no competing interests associated with these three studies.

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