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Social media as a vector for youth violence: A review of the literature

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ABSTRACT

Homicide is the second leading cause of death for young people, and exposure to violence has a negative impact on youth mental health, academic performance, and relationships. We demonstrate that youth violence, including bullying, gang violence, and self-directed violence, increasingly occurs in the online space. We review the literature on violence and online social media, and show that while some forms of online violence are limited to Internet-based interactions, others are directly related to face-to-face acts of violence. Central to our purpose is uncovering the real-world consequences of these online events, and using this information to design effective prevention and intervention strategies. We discuss several limitations of the existing literature, including inconsistent definitions for some forms of online violence, and an overreliance on descriptive data. Finally, we acknowledge the constantly evolving landscape of online social media, and discuss implications for the future of social media and youth violence research.

1. Introduction

According to the Centers for Disease Control and Prevention, homicide is the second leading cause of death for young people, oftentimes as the result of a conflict between peers. In 2010, an average of 13 young people were victims of homicide every day, and many more were victims of nonfatal violence. In recent years an increasing number of studies have investigated the ways in which the Internet and social media facilitate acts of violence against children and adolescents (e.g., King, Walpole, & Lamon, 2007; Perren et al., 2012; Tokunaga, 2010). Social media has become recognized as a vehicle through which youth perpetuate acts of violence against their peers, such as bullying, harassment, dating aggression, and gang-related crimes. In addition, social media has also been used as a vehicle for inflicting self-harm—most notably, cyber-suicide (Cash, Thelwall, Peck, Ferrell, & Bridge, 2013; Hinduja & Patchin, 2010; Ruder, Hatch, Ampanozi, Thali, & Fischer, 2011).

The overarching developmental task of adolescence, identity formation (Sales & Irwin, 2009), is inherently marked by adolescents' developing sexuality and interest in romantic attachments (Collins, 2003). Today's youth are avid users of social networking sites—e.g., Twitter. Approximately 90% of adolescents use the Internet regularly while 70% have a user profile on at least one social networking site (Subrahmanyam, Garcia, & Harsono, 2009). Research suggests that adolescents use the online environment to explore matters important to them in their off-line lives (Subrahmanyam et al., 2009).

Acts of face-to-face verbal and physical aggression are still more common than online attacks. Research suggests that most children and adolescents (65–91%) report little or no involvement in violence on social media sites (Kowalski & Limber, 2007; Williams & Guerra, 2007; Ybarra, West, & Leaf, 2007). Electronic forms of youth violence, do, however, represent a growing public health problem in need of additional research and prevention efforts (David-Ferdon & Hertz, 2007). To illustrate, according to Patchin and Hinduja's (2013) research, which consisted of a random sample of 4441 youth between the ages of 10 and 18 from 37 school districts, approximately 20% of youth in 2010 reported experiencing cyber-bullying victimization, and 20% reported bullying others through cyberspace at some point in their lifetimes. Social media sites such as Facebook, and Twitter and MySpace previously have provided unmonitored and uncensored environments, which can easily expose youth to illegal activities and/or violent behaviors (King et al., 2007). Online

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communications are characterized by a greater degree of anonymity, which research has linked to increased hostility in interpersonal interactions (McKenna & Bargh, 2000).

Despite the increasing concern with youth violence and social media, empirical data describing this relationship is limited. Existing research does suggest that frequent exposure to violent activities and behaviors through social media has a detrimental psychosocial effect on children and adolescents (Marcum, Higgins, & Ricketts, 2010; Ybarra, Espelage, & Mitchell, 2007; Ybarra, West, et al., 2007). Additionally, research indicates that youth who perpetrate aggression through social media are more likely to endorse a belief that violence against peers is a normative behavior (Hinduja & Patchin, 2013; Williams & Guerra, 2007). However, little is known about how the effects of youth experiences with violence via social media compare to the effects of traditional forms of violence.

Despite this limited knowledge, effective prevention and intervention strategies require a comprehensive understanding of the types of violence in social media that place children and adolescence at risk of engaging in such behaviors. The aim of this article is to review the existing research findings on the most common types of youth violence in social media: cyber-bullying/victimization, electronic dating aggression/cyber-stalking, gang violence, and cyber-suicide. We conclude by discussing implications for the future of social media and youth violence research.

2. Methods

2.1. Literature search

We performed the search for relevant studies using terms that related to violence or being a victim of violence and to the use of social media, and limited the focus to young people 12–21 years old. Violence-related terms included "sexual/child/partner abuse," "victims of crime," "homicide," "rape," "suicide," "gang violence," or "bullying." Terms for social media included the names of social networking sites, including "Facebook," "Twitter," "YouTube," "Myspace," and "Formspring," and using controlled vocabulary terms like "computer mediated communication" and "web 2.0 technologies" when database indexing made that possible. The age range was incorporated by either adding controlled vocabulary terms or keywords such as "youth," "adolescent," "teen," or "young adult" or by narrowing a completed search's results by age group if possible. Using all terms, we searched seven databases (ERIC, PsychINFO, Social Service Abstracts, PubMed, and Scopus), and searched Google for any gray literature or reports. When searching Google, we limited results to PDF reports from .edu or .gov sites. All searches were limited to articles published between 2001 and 2013.

2.2. Selection of literature

Of the 105 articles that were assessed during the initial search process, 56 articles were included for review. Per the inclusion criteria, we included a table which describes the articles reviewed for this manuscript which include analyzing the ways in which social media relates to peer-to-peer violence to include school shootings, electronic sexual violence, gang violence, and suicide (see Table 1).

3. Types of youth violence via social media

3.1. Cyber-bullying/victimization

The first major category of social media-involved youth violence is cyber-bullying, or electronic bullying. Cyber-bullying is generally defined as a type of bullying involving the use of online or computer-mediated communication, such as Twitter, Facebook, instant messaging, or text messaging (Menesini et al., 2012; Smith et al., 2008). Examples of cyber-bullying include sending insulting or threatening messages, spreading rumors, disclosing personal information, displaying embarrassing pictures, or excluding others during online communications (Perren et al., 2012). Although there appears to be a significant conceptual overlap between face-to-face bullying and cyber-bullying (Cross et al., 2009; Dooley, Pyzalski, & Cross, 2009), cyber-bullying differs from traditional bullying in that humiliating text or visual materials sent to social media can be permanent and available to the public (Heirman & Walrave, 2008). Moreover, whereas face-to-face bullying is generally characterized by physical dominance, a physical advantage is not necessary in cyber-bullying; perpetrators can instead dominate a victim through knowledge of social media usage, anonymity, and the victim's limited possibilities of defense and few options of escape (Perren et al., 2012).

Reports vary widely as to what percentage of adolescents have been exposed to cyber-bullying (between 5% and 40%), presumably because of a lack of consistency in the way the term is operationalized by researchers. Using a random sample of 4400 11-to-18-year-old students, Hinduja and Patchin (2012) found that approximately 20% had indicated being a victim of cyber-bullying at some point in their lives. Youth identified as lesbian, gay, bisexual, or transgender report an even higher rate of cyber-victimization. For example, a national study conducted by Blumenfeld and Cooper (2010) found that 54% of the sexual minority respondents reported cyber-victimization within the past three months.

Much of the empirical literature investigates the impact of cyber-bullying on youth outcomes and well-being (e.g., Goebert, Else, Matsu, Chung-Do, & Chang, 2011; Ortega, Elipe, Mora-Merchan, Calmaestra, & Vega, 2009; Spears, Slee, Owens, & Johnson, 2009). Other research examines specific technological tools or online activities that are commonly used in cyber-bullying/victimization. Cyber-bullying occurs in a variety of online settings: for instance, Kowalski and Limber (2007) found that 25% of the victims of cyber-bullying reported their victimization occurring in a chat room, while 23% reported it taking place on a website. Still, their study also determined that instant messaging was the most common form of cyber-bullying, with 56% of perpetrators and 67% of victims claiming the bullying they experienced or perpetrated was through instant message. A study by Mesch (2009), which included a nationally representative sample of American youth ($N = 935$), found that the risk of becoming either a perpetrator or a victim of cyber-bullying was the highest for adolescents with an active profile on social networking sites and those who participate in chat rooms. Brandtzæg, Staksrud, Hagen, and Wold's (2009) research also indicated that frequent users of the Internet were particularly at risk of exposure to cyber-bullying, but also found that cyber-bullying occurred most frequently via e-mail. In addition, the authors

Table 1
Reviewed articles

	Quasi-experiment	Survey	Review	Qualitative	Case study	Editorial	Total
Peer violence (e.g. school shootings, sexual violence, dating violence)	8	17	15	2	1	1	45
Suicide	1		2			1	4
Gang violence	1	1	2	2		1	7

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reported that sexually-related cyber-bullying was more likely to occur on social networking sites in communities in which the users remain anonymous.

On the other hand, Smith et al. (2008) reported from two surveys with students (ages 11–16) that cyber-bullying was most likely to involve phone calls and text messages, followed by instant messaging, with the lowest prevalence for mobile phone/video clip-based cyber-bullying. Menesini, Nocentini, and Calussi (2011) found in a sample of 1092 Italian youth that the less severe forms of cyber-bullying were silent/prank calls and insults posted on instant messaging, while the most severe forms consisted of posting embarrassing pictures/photos on websites, phone pictures/photos/videos of intimate scenes, and phone pictures/photos/videos of violent scenes. Further, offensive text and e-mail messages and insults on websites, chat rooms, and blogs ranged from moderate to high levels of severity.

Little is currently known as to whether certain types of cyber-bullying are more common than other forms. One study, which looked at cyber-victimization over a period of one year, found that the type of cyber-bullying most frequently reported by victims was rude or nasty comments (32%), followed by rumor spreading (13%), and then by threatening or aggressive comments (14%) (Ybarra, West, et al., 2007). One study (Hinduja & Patchin, 2010), which included 1,684 participants between the ages of 11 and 16 years from four public middle schools located in a Southern state, utilized the Revised Peer Experiences Questionnaire (RPEQ), a nine-item self-report measure that assesses overt and relational victimization within the previous 30 days. Four self-report items were added to each of the RPEQ victimization scales. The items were: "(1) A student sent me a text message or instant message that was mean or that threatened me; (2) A student posted a comment on my Web space wall that was mean or that threatened me; (3) A student sent me an e-mail that was mean or that threatened me; and (4) A student created a Web page about me that had mean or embarrassing information and/or photos (p. 211)." The study found that 14% ($n = 239$) of the students in the sample indicated that they had been victims of cyber-bullying at least one time in the past 30 days. On the other hand, an earlier study conducted by Juvonen and Gross (2008) reported that as many as 72% of youth had experienced cyber-bullying within the past year. Collectively, however, these studies highlight the fact that cyber-bullying occurs frequently among youth.

Electronic technology also enables adolescents to hide their identities by sending or posting messages anonymously, by using a false name, or by assuming someone else's on-screen identity. A UCLA Internet Study (Cole, 2001) noted that the Internet is increasingly a point of social contact for adolescents who may prefer the anonymity of cyber relationships. Unlike the aggression or bullying that occurs in the school yard, victims and perpetrators of cyber-bullying may not know the person with whom they are interacting. Between 13% and 46% of young people who were victims of cyber-bullying reported not knowing their harasser's identity. Similarly, 22% of young people who admitted they perpetrate electronic aggression reported they did not know the identity of their victim (Kowalski & Limber, 2007; Mitchell, Finkelhor, & Wolak, 2007).

The literature on cyber-bullying describes a type of behavior that does not directly cross over to face-to-face interactions. Missing from this body of work is a discussion of what type of online activities are predictive of real world violence or exploitation. School shootings are particularly tragic occurrences that often suggest a linkage between online threats or cyber-bullying and real world violence, when post-incident investigations uncover the perpetrators' troubling online communication patterns. Between November 2007 and June 2009, Lindberg, Oksanen, Sailas, and Kaltiala-Heino (2012) followed a group of seven 13-to-18-year-olds sent for adolescent psychiatric evaluations because they had threatened to carry out school massacres. Adolescents who had expressed school massacre threats online, as compared to those who made in-person threats, had more often issued the threat with clear intention and had more often made preparations to carry out the act (Lindberg et al., 2012). Half of the adolescents who expressed their massacre threats online had made preparations to carry out the threat, which is considered a crucial step in the process of becoming a school shooter (Lindberg et al., 2012). Due to a small sample size, the generalizability of these findings is unclear. But the research suggests that certain types of online threats, namely those related to school shootings, may imply greater intent than in-person threats.

As extremely shocking and rare events such as school shootings have become objects of fascination for some youth, social media has provided individuals with a forum to find others with similar radical and deviant opinions (Hawdon, 2012; Kiilakoski & Oksanen, 2011a,b). In Finland, two school shootings took place in November 2007 and September 2008. Both offenders were young males who used the Internet to document their thoughts and ideas about violence in general and to share videos and other statements about their specific future intentions (Kiilakoski & Oksanen, 2011b). While neither of the Finnish school shooters found any encouragement for their intentions from their off-line peer groups, their ideas were supported by both Finnish and international Internet communities. Both shooters were active in pro-school-shooting online groups that supported their violent revenge fantasies (Kiilakoski & Oksanen, 2011a). Other studies found that group pressures may be stronger in a computer-mediated setting than in face-to-face interactions (Spears, Postmes, Lea, & Wolbert, 2002). Deviant online communities, such as pro-school-shooting groups, may provide a platform for like-minded individuals to come together and thus reinforce their violent ideations.

3.2. Electronic dating aggression/cyber-stalking

Research has demonstrated that by providing individuals with a community of like-minded individuals, social media sites can also motivate them to engage in other at-risk behaviors. In a web-based study conducted in conjunction with *Seventeen Magazine* Online, CyberAngels, the College of Education at the University of South Florida, and the Department of Child and Family Studies at the Louis de la Parte Florida Mental Health Institute, an online survey was developed and placed on the *Seventeen Magazine* site from May through June 1999 to assess level of Internet use, involvement in varied at-risk behaviors online, incidents involving negative interactions in cyberspace, and perceived mechanisms to promote safety and well-being (Berson, Berson, & Ferron, 2002). The survey was intended to assess online risks to adolescents that might be associated with engagement in threatening behavior or exploitation. The survey results confirmed that a significant number of adolescent girls were engaging in sexual risk behaviors when online and continued this behavior off-line, which put them at a heightened risk of sexual violence (Berson et al., 2002). The data also confirmed that there was a lack of preventative intervention to create and maintain awareness and safety for adolescents at risk of sexual violence. Moreover, the research uncovered a preponderance of reported online experiences that challenged students to confront choices in conflict with the development of attitudes, values, and social functioning (Berson et al., 2002).

Another study selected and coded 752 publicly visible profiles of adolescents ages 14–18 years for the following five risks: violence, alcohol, cigarettes, drugs, and sex. The study found that 54% of older youth included references to such risky behavior in their MySpace profiles, while 28% did so in profiles on MyLOL, an online dating service (Pujazon-Zazik, Manasse, & Orrell-Valente,

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2011). Consistent with other studies (Moreno, Brockman, Rogers, & Christakis, 2010; Moreno, Parks, Zimmerman, et al., 2009), it found that females were more likely than males to mention their interest/participation in sexual risk behaviors. If adolescent females have internalized social norms that place a high value on female sexuality in attracting romantic partners, they may reflect this in their online profiles (Baumeister & Vohs, 2004). These findings highlight the discussion of risky behaviors on social media that may have implications for negative consequences, such as attracting the attention of cyber-bullies or sexual predators (Mitchell et al., 2007).

Given the brevity of profiles, when adolescents choose to characterize themselves in terms of their interest/involvement in risky behaviors, it suggests that they value such behaviors in themselves and are seeking companions with similar interests (Pujazon-Zazik et al., 2011). While stated interest/involvement in risky behaviors may not indicate participation in those behaviors, research strongly supports the connection between adolescents' online and off-line attitudes and behaviors (Subrahmanyam, Smahel, & Greenfield, 2006; Subrahmanyam et al., 2009). More specifically, behavior that happens online may have direct and indirect implications for behavior that happens off-line and vise-versa. Additionally, online mention of interests/involvement in risky behavior may have other negative consequences, including attracting the attention of cyber-bullies or sexual predators (Mitchell et al., 2007).

3.3. Gang violence

The presence of urban street gangs on social media is a relatively new area of research. In the last five years, criminologists have investigated how and why gang members use social media (Decker & Pyrooz, 2011, Pyrooz, 2012; Knox, 2011; Morselli & Decary-Hetu, 2013; Womer & Bunker, 2010). A gang presence on social media is described as a form of cyber-bullying, but the real-world violence precipitated by gang-related online threats or communications suggests this may be a different phenomenon entirely. While researchers have not settled on a term to describe this phenomenon, recent work uses phrases such as "cyber-banging" a term often used by the police and "Internet banging" (Patton, Eschmann, & Butler, 2013), to describe this unique form of computer-mediated communication. This section reviews empirical articles that examine how and why urban gang members use social media.

3.3.1. How often do gangs use social media?

Gangs spend a significant amount of time surfing the Internet, particularly social media sites (Decary-Hetu & Morselli, 2011; Decker & Pyrooz, 2011; King et al., 2007; Patton et al., 2013; Pelfrey & Weber, 2013; Sela-Shayovitz, 2012). Data from the National Assessment Center's survey of gang members (2007) purports that 25% of individuals in gangs use the Internet for at least 4 h per week and of those individuals 45% gained access to the Internet via a local community center. Gang members use of the internet use and access to the internet is slightly lower than overall U.S. youth internet usage which hovers around 95% (Pew Internet Research Survey, 2013). In a qualitative study of 177 purposively sampled current and former gang members in Fresno, California; Los Angeles, California; and St. Louis, Missouri, Decker and Pyrooz (2011) report that 82% of participants used the Internet and 71% of that group stated they use social networking sites like Facebook or MySpace.

Decary-Hetu & Morselli (2011) investigated the extent to which gang members in Montreal, Canada, use social media. In a systematic keyword search of over 25 street gangs identified in conjunction with the Montreal Police Department, the researchers found that the gangs primarily used Twitter, Facebook, and Myspace. More specifically, gang members were more likely to use MySpace, which is the oldest social networking site, followed by Facebook and Twitter. The researchers found that the gangs used social media sites primarily to promote gang and street culture but not necessarily to recruit gang members. The extent to which gang members move between different social media sites, and the decision-making progress involved in choosing a particular social media site to engage, is not described in the literature.

3.3.2. What do gangs do online?

Gangs engage in a number of online activities including but not limited to posting videos, watching videos, announcing activities, inciting dares, making fun of a recent homicide or victimization, displaying weapons, and discussing and displaying illegal and other substances (Decary-Hetu & Morselli, 2011; Decker & Pyrooz, 2011; Patton et al., 2013; Sela-Shayovitz, 2012;). Decker and Pyrooz (2011) found that current and former gang members predominately engaged in posting videos (55%) and watching gang-related videos on YouTube (58%).

According to a study of 30 gang members ages 16–20 in a large city in Israel, the degree to which gang members are engaged in social media activities may be impacted by their technical proficiency (Sela-Shayovitz, 2012). The study qualitatively assessed computer skills by asking participants to report on their completion of a basic computer course. Computer skills were grouped into three groups. Low-level computer skills included sending e-mails, using Facebook, and playing games. Mid-level skill included the ability to download movies and music. An individual with high technical skill indicated a broader knowledge of software and, in some case, hacking. Sela-Shayovitz (2012) found that gang members with low-level computer skills might engage in general Internet searching activities but were more likely to prefer face-to-face interactions. Gang members who possessed more advanced computer skills, however, were more likely to engage in cyber-crimes such as hacking, at times associated with a desire for social respect and or revenge against another gang or someone in the same gang.

3.3.3. Is social media a vector for urban gang violence and criminality?

Recent research has explored the ways urban gangs use social media to facilitate violence and crime (Decker & Pyrooz, 2011; Patton et al., 2013; Pelfrey & Weber, 2013; Pyrooz, Decker, & Moule, 2013; Sela-Shayovitz, 2012;). Examples of violence and crime on social media include but are not limited to: selling drugs; downloading illegal music and videos; harassing or threatening someone online; attacking someone on the street because of something said online; and posting videos of violence and threats online. Decker and Pyrooz (2011) argue that while gang members use social media in ways that are similar to the broader youth population (e.g., talking to girls, sharing videos and music, etc.) social media is also used to promote gang activity. For example, gang members in their qualitative sample reported that they used social media to brag about violence, make threats, and display gang symbols. The researchers also found that almost one-quarter of the participants reported gang-related cyber-victimization on social media sites. In a more recent study of 585 current and former gang members and violent offenders interviewed about their use of the Internet and gang involvement in five metropolitan areas, Pyrooz et al. (2013) found that 45% of the participants engaged in at least one form of online offending, which includes selling drugs or stolen property, harassing and threatening people, and uploading violent videos. The study also found that only 11% of their sample reported that their gang organized online and only 8% of the sample suggested that their gang recruited online.

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3.4. Cyber-suicide

Cyber-suicide is a self-directed form of youth violence. Definitions of cyber-suicide vary but generally refer to individuals using the Internet to communicate suicidal ideation (Alao, Soderberg, Pohl, & Alao, 2006). Few research studies have examined how frequently or why youth discuss suicide on social media sites. In a study that examined adolescent suicide statements on MySpace, Cash et al. (2013) reviewed 1038 MySpace posts that were collected from publicly available profiles. Profiles were downloaded using a search algorithm which downloaded over 40,000 profiled. Final comments were included/excluded based on the following criteria: "had a public profile; did not self-identify as a musician, comedian or movie maker; had received less than 4000 comments. Findings from this study revealed that youth communicated suicidal thoughts in direct response to negative experiences with personal relationships, substances use, a complicated mental health status which may include thoughts of various methods of suicide. The researchers theorize in this preliminary work that youth expressing suicidal thoughts online may be seeking resources and support as they cope with challenging experiences in their daily life. Researchers also express a concern that social media can create a space for youth to learn about ways of committing suicide and others who have done so, and that online engagement with a prior suicide may even motivate them to replicate the event, a phenomenon known as the *Werther effect*.

Ruder et al. (2011) use a case study to theorize about the ways in which youth use Facebook to discuss suicide. Ruder and colleagues found that youth indeed post suicide statements on Facebook, and in response, individuals with whom they network attempt to prevent the potential suicide attempt. The researchers point toward the opportunity to use Facebook as a suicide prevention tool. Additional research is needed to fully understand how and why youth communicate suicidal thoughts via social media.

4. Discussion

This review clearly demonstrates that youth violence—whether bullying, gang violence, or self-directed violence—increasingly occurs in the online space. Electronic youth violence deserves the attention of violence researchers in the criminal, sociologic, medical, and public health domain. However, major limitations with the existing studies constrain our ability to make recommendations about future interventions.

Most importantly, the reviewed studies illustrate a lack of rigorous definition of cyber-violence. Cyber-bullying, the best-studied category of online aggression, has a few standardized measures (CDC, 2011), yet the breadth and depth of such measures are poor compared to those for traditional bullying and other in-person forms of youth violence, and few of the papers reviewed above use these standard measures. We identified no validated measures for cyber-suicide, discussions of mass violence online, or electronic gang violence. The development of standard definitions and instruments is of critical importance to the field.

Relatedly, the vast majority of research described in this review is purely *descriptive*. The correlates, consequences, and causes of online aggression have rarely been examined (CDC, 2009), impairing our understanding of the phenomenon and our ability to place it in context with existing knowledge about youth violence. For instance, although some studies suggest that there may be a bidirectional relationship between online and in-person violence (in which physical violence spurs online relational violence, and vice versa), the direction of the relationship, the risks and protective factors for the intersection of in-person and electronic aggression, and the specific causes for one type of violence turning into another have yet to be explored. We would urge future researchers to refer to some of the seminal work in in-person violence and bullying as a basis for their own work.

There is also a notable lack of investigation into ways in which social media not only facilitates but also enhances traditional violence. For instance, cyber-suicide articles (Alao et al., 2006; Cash et al. 2013; Ruder et al., 2011) suggest that the use of online media increases the "spread" of suicidal ideation, but little empirical evidence of this effect exists. Future researchers should consider examining the degree to which messages in all categories of electronic aggression are spread (e.g., are "shared" or "retweeted"), and the nature of the disseminated messages (e.g., are they positive? negative? information sharing? rumor spreading? (Ranney & Daya, 2013).

One challenge, of course, is the difficulty in examining trends in electronic aggression over time. For instance, the "digital divide" is disappearing (Madden et al., 2013; Zickuhr & A. Smith 2012), and new forms of social media and online involvement are constantly developing. We suspect, based on our review that the format and impact of all forms of electronic aggression are changing over time. However, to our knowledge, no one has rigorously explored this trend. Similarly, the influence of baseline technology use and computer literacy (which has been shown to be important in determining mobile health acceptability, for instance (Ranney et al., 2012) has yet to be investigated.

Given the lack of standard definitions, qualitative research may be particularly valuable for researchers attempting to define the reasons for online violence, the forms in which it is perpetrated, and the relationship between social media use in general and electronic youth violence. We would urge future researchers employing qualitative techniques to provide a high level of description of their analytic techniques, to improve generalizability and validity. The qualitative studies in this review, although laudable, lack depth to their analytic processes.

Most importantly, there is a lack of information about the ways in which electronic media can be used not only to perpetrate but also to prevent aggression. For instance, if we change norms about in-person dating violence, will that reduce online dating aggression? If we reduce Internet banging, will it translate into a reduction in in-person gang violence?

References

Alao, A. O., Soderberg, M., Pohl, E. L., & Alao, A. L. (2006). Cybersuicide: Review of the role of the Internet on suicide. *CyberPsychology & Behavior, 9*, 489–493.

Baumeister, R. F., & Vohs, K. D. (2004). Sexual economics: Sex as female resource for social exchange in heterosexual interactions. *Personality and Social Psychology Review, 8*, 339–363.

Berson, I. R., Berson, M. J., & Ferron, J. M. (2002). Emerging risks of violence in the digital age: Lessons for educators from an online study of adolescent girls in the United States. *Journal of School Violence, 1*, 51–71.

Blumenfeld, W. J., & Cooper, R. M. (2010). LGBT and allied youth responses to cyberbullying: Policy implications. *International Journal of Critical Pedagogy, 3*, 114–133.

Brandtzæg, P. B., Staksrud, E., Hagen, I., & Wold, T. (2009). Norwegian children's experiences of cyberbullying when using different technological platforms. *Journal of Children and Media, 3*, 349–365.

Cash, S. J., Thelwall, M., Peck, S. N., Ferrell, J., & Bridge, J. A. (2013). Adolescent suicide statement on MySpace. *Cyberpsychology, Behavior and Social Networking, 16*(3), 166–174.

Centers for Disease Control and Prevention (2011). In M. Hamburger, K. C. Basile, & A. M. Vivolo (Eds.), *Measuring bullying, victimization, perpetration and bystander experiences: A compendium of assessment tools*. Atlanta: GA.

Centers for Disease Control and Prevention (2009). In C. David-Ferdon & M. F. Hertz (Eds.), *Electronic media and youth violence: A CDC issue brief for researchers*. Atlanta, GA.

Cole, J. I. et al. (2001). *UCLA Internet report 2001: Surveying the digital future year two*. Los Angeles, CA: UCLA Center for Communication Policy. <http://www.ccp.ucla.edu>.

Collins, W. A. (2003). More than a myth: The developmental significance of romantic relationships during adolescence. *Journal of Research on Adolescence, 13*, 1–24.

Cross, D., Shaw, T., Hearn, L., Epstein, M., Monks, H., Lester, L., et al. (2009). *Australian covert bullying prevalence study (ACBPS)*. Perth, Australia: Child Health Promotion Research Centre, Edith Cowan University.

David-Ferdon, C., & Hertz, M. F. (2007). Electronic media, violence, and adolescents: An emerging public health problem. *Journal of Adolescent Health, 41*, S1–S5.

Decker, S. H., & Pyrooz, D. C. (2011). *Leaving the gang: Logging off and moving on*. Council on Foreign Relations.

Decary-Hetu, D., & Morselli, C. (2011). Gang presence in social network sites. *International Journal of Cyber Criminology, 5*, 876–890.

Dooley, J. J., Pyzalski, J., & Cross, D. (2009). Cyberbullying versus face-to-face bullying: A theoretical and conceptual review. *Zeitschrift für Psychologie/Journal of Psychology, 217*, 182–188.

Goebert, D., Else, I., Matsu, C., Chung-Do, J., & Chang, J. Y. (2011). The impact of cyberbullying on substance use and mental health in a multiethnic sample. *Maternal and Child Health Journal, 15*, 1282–1286.

Hawdon, J. (2012). Applying differential association theory to online hate groups: A theoretical statement. *Research on Finnish Society, 5*, 39–47.

Heirman, W., & Walrave, M. (2008). Assessing concerns and issues about the mediation of technology in cyberbullying. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 2*(2). <http://cyberpsychology.eu/view.php?cisloclanku=2008111401&article=1>.

Hinduja, S., & Patchin, J. W. (2010). Bullying, cyberbullying, and suicide. *Archives of Suicide Research, 14*(3), 206–221. http://dx.doi.org/10.1080/13811118.2010.494133.

Hinduja, S., & Patchin, J. W (2012). *School climate 2.0: Preventing cyberbullying and sexting one classroom at a time*. Thousand Oaks, CA: Sage Publications.

Hinduja, S., & Patchin, J. W. (2013). Social influences on cyberbullying behaviors among middle and high school students. *Journal of Youth and Adolescence, 42*, 711–722.

Juvonen, J., & Gross, E. F. (2008). Extending the school grounds? Bullying experiences in cyberspace. *Journal of School Health, 78*, 496–505.

Kiilakoski, T., & Oksanen, A. (2011a). Soundtrack of the school shootings: Cultural script, music and male rage. *Young, 19*, 247–269.

Kiilakoski, T., & Oksanen, A. (2011b). Cultural and peer influences on homicidal violence: A Finnish perspective. *New Directions for Youth Development, 33*, 31–42.

King, J. E., Walpole, C. E., & Lamon, K. (2007). Surf and turf wars on line: Growing implications of Internet gang violence. *Journal of Adolescent Health, 41*, S66–S68.

Knox, G. (2011). *Gang members on Facebook: Should we look the other way?* <http://www.ngcrc.com/gangface.htm>.

Kowalski, R. M., & Limber, S. P. (2007). Electronic bullying among middle school students. *Journal of Adolescent Health, 41*, S22–S30.

Lindberg, N., Oksanen, A., Sailas, E., & Kaltiala-Heino, R. (2012). Adolescents expressing school massacre threats online: Something to be extremely worried about? *Child and Adolescent Psychiatry and Mental Health, 6*, 39.

Madden, M., Lenhart, A., Duggan, M., Cortesi, S, Gasser, U. (2013). Teens and Technology 2013. Report. Retrieved 1. 23. 2014 from http://www.pewinternet.org/files/old-media//Files/Reports/2013/PIP_TeensandTechnology2013.pdf.

Marcum, C. D., Higgins, G. E., & Ricketts, M. L. (2010). Potential factors of online victimization of youth: An examination of adolescent online behaviors utilizing Routine Activity Theory. *Deviant Behavior, 31*, 381–410.

McKenna, K. Y. A., & Bargh, J. A. (2000). Plan 9 from cyberspace: The implications of the Internet for personality and social psychology. *Personality and Social Psychology Review, 4*, 57–75.

Menesini, E., Nocentini, A., & Calussi, P. (2011). The measurement of cyberbullying: Dimensional structure and relative item severity and discrimination. *Cyberpsychology, Behavior, and Social Networking, 14*, 267–274.

Menesini, E., Nocentini, A., Schultze-Krumbholz, A., Scheitauer, H., Frisen, A., & Berne, S. (2012). Cyberbullying definition among adolescents: A comparison across six European countries. *Cyberpsychology, Behavior, and Social Networking, 15*(9), 455–463.

Mesch, G. S. (2009). Parental mediation, online activities, and cyberbullying. *CyberPsychology & Behavior, 12*, 387–393.

Mitchell, K. J., Finkelhor, D., & Wolak, J. (2007). Youth Internet users at risk for the most serious online sexual solicitations. *American Journal of Preventive Medicine, 32*, 532–537.

Moreno, M. A., Brockman, L., Rogers, C. B., & Christakis, D. A. (2010). An evaluation of distribution of sexual references among "top 8" MySpace friends. *Journal of Adolescent Health, 47*, 418–420.

Moreno, M. A., Parks, M. R., Zimmerman, F. J., et al. (2009). Display of health risk behaviors on MySpace by adolescents. *Archives of Pediatrics and Adolescent Medicine, 163*, 27–34.

Morselli, C., & Decary-Hetu, D. (2013). Crime facilitation purposes of social networking sites: A review and analysis of the " cyberbaning" phenonomenon. *Small Wars and Insurgencies, 24*(1), 152–170.

National Assessment Center (2007). Survey of gang members' online habits and participation. *Survey results reported at i-SAFE annual Internet safety education review meeting*, Carlsbad, CA.

Ortega, R., Elipe, P., Mora-Merchan, J., Calmaestra, J., & Vega, E. (2009). The emotional impact on victims of traditional bullying and cyberbullying: A study of Spanish adolescents. *Zeitschrift für Psychologie/Journal of Psychology, 217*, 197–204.

Patchin, J. W., & Hinduja, S. (2013). *Cyberbullying research in review*. <http://cyberbullying.us/Cyberbullying_Research_In_Review.pdf>.

Patton, D. U., Eschmann, R. D., & Butler, D. A. (2013). Internet banging: New trends in social media, gang violence, masculinity and hip hop. *Computers in Human Behavior, 29*(5), A54–A59.

Pelfrey, W. V., & Weber, N. L. (2013). Keyboard gangsters: Analysis of incidence and correlate of cyberbullying in a large urban student population. *Deviant Behavior, 34*(1), 68–84.

Perren, S., Corcoran, L., Cowie, H., Dehue, F., Garcia, D., & Mc Guckin, C. (2012). Tackling cyberbullying: Review of empirical evidence regarding successful responses by students, parents, and schools. *International Journal of Conflict and Violence, 6*, 283–293.

Pujazon-Zazik, M. A., Manasse, S. M., & Orrell-Valente, J. K. (2011). Adolescents' self-presentation on a teen dating website: A risk-content analysis. *Journal of Adolescent Health, 50*, 517–520.

Pyrooz, D. C., Decker, S. H., & Moule, R. K. (2013). Criminal and routine activities in online settings: Gangs, offenders, and the Internet. *Justice Quarterly*, 1–28.

Ranney, M. L., & Daya, M. (2013). Twitter and resuscitation education: is this the future? *Resuscitation, 84*(2), 147–148.

Ranney, M. L., Choo, E. K., Wang, Y., Baum, A., Clark, M. A., & Mello, M. J. (2012). Emergency department patients' preferences for technology-based behavioral interventions. *Annuals Emergency Medicine, 60*(2), 218–227 (e248).

Ruder, T., Hatch, G. M., Ampanozi, G., Thali, M., & Fischer, N. (2011). *Crisis, 32*(5), 280–282.

Sales, J. M., & Irwin, C. E. (2009). Theories of adolescent risk taking: The biopsychosocial model. In R. J. DiClemente, J. S. Santelli, & R. A. Crosby (Eds.), *Adolescent health: Understanding and preventing risk behaviors* (pp. 31–50). San Franscisco, CA: John Wiley and Sons.

Sela-Shayovitz, R. (2012). Gangs and the web: Gang members' online behavior. *Journal of Contemporary Criminal Justice, 28*(4), 389–405.

Smith, P. K., Mahdavi, J., Carvalho, M., Fisher, S., Russel, S., & Tippett, N. (2008). Cyberbullying: Its nature and impact in secondary school pupils. *Journal of Child Psychology and Psychiatry, 49*, 376–385.

Spears, B., Slee, P., Owens, L., & Johnson, B. (2009). Behind the scenes and screens: Insights into the human dimension of covert and cyberbullying. *Zeitschrift für Psychologie/Journal of Psychology, 217*, 189–196.

Spears, R., Postmes, T., Lea, M., & Wolbert, A. (2002). When are net effects gross products? The power of influence and the influence of power in computer-mediated communication. *Journal of Social Issues, 58*, 91–107.

Subrahmanyam, K., Garcia, E. C., & Harsono, L. S. (2009). In their words: Connecting online weblogs to developmental processes. *British Journal of Developmental Psychology, 27*, 219–245.

Subrahmanyam, K., Smahel, D., & Greenfield, P. (2006). Connecting developmental constructions to the Internet: Identity presentation and sexual exploration in online teen chat rooms. *Developmental Psychology, 42*, 395–406.

Tokunaga, R. S. (2010). Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers in Human Behavior, 26*, 277–287.

Williams, K. R., & Guerra, N. G. (2007). Prevalence and predictors of Internet bullying. *Journal of Adolescent Health, 41*, S14–S21.

Womer, S., & Bunker, R. (2010). Surenos gangs and Mexican cartel use of social networking sites. *Small Wars & Insurgencies, 21*(1), 81–94.

Ybarra, M., Espelage, D. L., & Mitchell, K. J. (2007). The co-occurrence of on-line verbal aggression and sexual solicitation victimization and perpetration: Association with psychosocial indicators. *Journal of Adolescent Health, 41*, S31–S41.

Ybarra, M., West, M. D., & Leaf, P. (2007). Examining the overlap in Internet harassment and school bullying: Implications for school intervention. *Journal of Adolescent Health, 41*, S42–S50.

Zickuhr, K., & Smith, A. (2012). Digital differences. <http://pewinternet.org/Reports/2012/Digital-differences.aspx> Retrieved 03.12.13.

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