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Abstract

Objective: This review focuses on the literature on cyberbullying among adolescents. Currently, there is no unified theoretical framework to move the field of cyberbullying forward. Due to some unique features of cyberbullying, researchers have generally assumed that it is distinct from aggression perpetrated in person. Many measures of cyberbullying have been developed based on this assumption rather than to test competing models and inform a theoretical framework for cyberbullying. Approach: We review current theory and research on cyberbullying within the context of the broader literature on aggression to explore the usefulness of the assumption that cyberbullying represents a distinct form of aggression. Associations between cyberbullying and general forms of aggression and psychosocial predictors of cyberbullying are discussed. Conclusions: Based on the empirical research, we suggest that the media through which aggression is perpetrated may be best conceptualized as a new dimension on which aggression can be classified, rather than cyberbullying as a distinct counterpart to existing forms of aggression. Research on cyberbullying should be considered within the context of theoretical and empirical knowledge of aggression in adolescence. Using this approach will create a theoretical framework for understanding cyberbullying, focus future research, and guide prevention efforts.

Keywords: cyberbullying, adolescence, electronic media, violence

Cyberbullying Among Adolescents: Measures in Search of a Construct

Adolescents' use of technology to inflict harm through bullying or harassment has received a great deal of attention in both the mainstream media and the empirical literature. Media outlets have referred to this phenomenon as "cyberbullying" and showcased the effects it is believed to have on youth, such as anxiety, depression, and, in extreme cases, suicide attempts. Within the scientific literature, cyberbullying, or electronic aggression, has been the focus of special issues published by the *Journal of Adolescent Health, Journal of Social Sciences*, *European Journal of Developmental Psychology*, and *Journal of Community and Applied Social Psychology*. However, the research literature on this topic is disorganized and lacks an empirically-supported theoretical framework that could provide a structure to guide future research (Hertz & David-Ferdon, 2008). Importantly, at present there is no clear evidence to support a very basic assumption: that cyberbullying represents a distinct form of aggression. The purpose of this review is to (1) evaluate theoretical assumptions regarding cyberbullying and propose an initial theoretical model; (2) critique measures used to assess cyberbullying; (3) discuss how empirical research on cyberbullying informs theory; and (4) identify future directions for cyberbullying measurement and research. Although there are many ways people can perpetrate harm online (e.g., sexual predator prowling), this review focuses solely on peer-targeted aggression among adolescents.

Definitions of Cyberbullying

Despite a growing body of research on cyberbullying, there is little consistency across studies in how it is defined or in the domain of behavior sampled by measures of cyberbullying. The lack of consistency across studies is reflected in the terms used to label this phenomenon. Bill Belsey, the founder of bullying.org, suggested the term *cyberbullying*. Terms others have used to refer to similar phenomena include online harassment, online bullying, internet bullying,

internet aggression, electronic aggression, cyber aggression, and electronic bullying (e.g., Raskauskas & Stoltz, 2007; Wade & Beran, 2011; Williams & Guerra, 2007; Ybarra & Mitchell, 2007). Cyberbullying is the most commonly used term in research and the media, although this construct encompasses a broad range of aggressive behaviors that do not meet a strict definition of bullying. Bullying has traditionally had a specific meaning within the research community, usually implying aggressive behavior "that involves an observed or perceived power imbalance and is repeated multiple times or is highly likely to be repeated" (Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014, p. 7). This definition excludes many acts of aggression perpetrated through technologies that may not reflect an imbalance of power (e.g., Wolak, Mitchell, & Finkelhor, 2007). Nonetheless, we use the term cyberbullying in this review due to its common use in the literature, with the understanding that it encompasses any peer-targeted aggressive behavior perpetrated via electronic communication technologies.

In addition to differences in how they label this phenomenon, researchers have also varied in their definitions of cyberbullying. For example, Belsey defined cyberbullying as the "use of information and communication technologies such as e-mail, cell phone and pager text messages, instant messaging, defamatory personal Web sites, and defamatory online personal polling Web sites, to support deliberate, repeated, and hostile behaviour by an individual or group, that is intended to harm others" (Belsey). Others have defined cyberbullying as bullying through the use of technologies (e.g., Kowalski & Limber, 2007). Other researchers have provided broader definitions, such as using technologies to be mean to or harass others (e.g., Bauman, 2009). The CDC's expert panel defined electronic aggression as "any type of harassment or bullying…that occurs through email, a chat room, instant messaging, a web site (including blogs), or text messaging" (Hertz & David-Ferdon, 2008, p. 3). In general, researchers agree that cyberbullying constitutes aggression that is perpetrated through the use of electronic

communication technologies, although the type of aggression (e.g., harassment, bullying, ill-intended behavior) and the electronic communication technologies they specify differ.

Despite the rapid increase in research on cyberbullying, researchers have not yet clarified how existing frameworks of aggression might be expanded to incorporate electronically-mediated aggressive behavior. A theoretical model that integrates cyberbullying into the larger framework of aggression will be useful for defining and creating measures of cyberbullying, guiding future research, and informing prevention programs. Prior to the emergence of cyberbullying, researchers have classified aggression along multiple dimensions, such as form, the motivation for aggression (reactive or proactive; e.g., Dodge & Coie, 1987), and the level of confrontation (direct or indirect; e.g., Card, Stucky, Sawalani, & Little, 2008). Forms of aggression that have been identified in the literature include physical, nonphysical or verbal, and relational or social aggression. Physical aggression involves physical threats, assault, and provocation. Verbal aggression involves teasing, mocking, and taunting (Martin & Huebner, 2007). Relational or social aggression targets social relationships, status, and reputation, through behaviors such as rumor spreading and manipulating friendships (Crick & Grotpeter, 1995; Galen & Underwood, 1997). Although these forms of aggression are correlated (Sullivan, Farrell, & Kliewer, 2006), there is evidence that they have different patterns of relations to adjustment (e.g., Putallaz et al., 2007). These classifications have empirical support and may help to create a useful framework for understanding cyberbullying.

Electronic Media as an Additional Dimension for Classifying Aggression

Current research on cyberbullying is largely based on the assumption that it is a new form of aggression, a counterpart to physical, verbal, and relational aggression (see Figure 1a). As such, researchers have generally not differentiated among physical, verbal, and relational aggression within their definitions and measurement of cyberbullying. This is based on the

assumption that the medium for inflicting aggression is more salient than the form. However, it is possible that media represents an additional dimension on which aggression can be classified.

We propose that a multidimensional model of aggression in which behavior is classified by both form and media will provide a useful theoretical framework to understand the existing literature and to guide future research (see Figure 1b), while acknowledging that motivation and level of confrontation are also meaningful classifications. Figure 1b indicates that, according to this model, aggressive behaviors are simultaneously classified by form (physical, verbal, or relational) as well as by media (in-person or cyber). In many cases, the same aggressive act can be perpetrated across media (e.g., rumors can be spread in person or through text messages). In other cases, aggression perpetrated via electronic communication technologies may present differently. For example, posting embarrassing photos targets adolescents' image, reputation, and relationships. Because of this, it is considered relational cyberbullying according to this model. Conversely, some aggressive acts, such as punching someone, can only be perpetrated in person. This model proposes that in-person aggression and cyberbullying tap into the same underlying construct. The model acknowledges the extensive similarities among aggressive behaviors perpetrated in-person and electronically while accommodating differences in the way aggression is perpetrated.

Unique Features of Cyberbullying

The assumption that cyberbullying represents a distinct form of aggression has not been empirically determined, but rather has been supported, in part, by significant qualitative differences in the circumstances that typically surround the perpetration of aggression electronically versus in person (e.g., Tokunaga, 2010). Most differences between cyberbullying and in-person aggression relate to differences in the characteristics of electronically-mediated versus in-person communications, and suggest that adolescents may be more disinhibited via

electronic communication technologies than in person.

Ease of access and unlimited audience. One unique feature of cyberbullying is the lack of space or time limitations. Adolescents typically perpetrate in-person aggression in public settings (e.g., schools, neighborhoods). In contrast, electronic communication enables adolescents to aggress in private from their homes at any time. There is the potential for an unlimited audience, as adolescents do not need to be physically present to witness aggression perpetrated electronically. However, it is unclear whether the ease of access to potential victims and the potential for an unlimited audience have meaningful effects on factors of interest, such as psychosocial predictors and consequences of perpetration.

Decreased inhibition. Other factors point more clearly to meaningful differences between in-person aggression and cyberbullying. In particular, there are more naturally occurring barriers to aggression perpetrated in person than online. For example, adolescents typically have greater inhibition in person than when communicating via electronic media. Suler (2004) explained that many factors that support inhibition in person do not exist in online interactions, such as one's sense of individuality and visibility and the presence of authority. Furthermore, he suggested that people are able to separate their "real life" selves from their online selves, especially because they have some degree of control over who the other person believes they are during online interactions. Suler (2004) identified two distortions in perception that lead to disinhibition: solipsistic interjection, in which the person with whom one interacts begins to feel like a character inside one's head; and dissociative imagination, in which the online world feels separate from the real world, like a game with different rules. Although these factors do not pertain specifically to aggression, they do cause reduced inhibition.

Potential for anonymity. Electronic communication technologies create a greater potential for anonymity, such that adolescents are able to perpetrate aggression without the

victim learning their identity. Several studies have shown that approximately half of electronic victims reported not knowing the identity of their aggressor (e.g., Bauman, 2009; Kowalski & Limber, 2007; Raskauskas & Stoltz, 2007). This is similar to indirect aggression, wherein adolescents may not know who was responsible for acts such as starting a rumor or destroying their property. It is, however, different in that no one, not just the victim, might know who perpetrated the cyberbullying. The potential for anonymity reduces the risk of negative repercussions, such as damage to one's social image and punishment from authority figures.

Decreased social control. There is less formal and informal social control for electronic interactions than for interactions in the physical world. Cyberbullying is unusual in that it does not occur in a physical space, raising the question of who is responsible for monitoring electronic interactions and enforcing consequences for those who perpetrate cyberbullying. Because of the potential for anonymity and the lack of clarity about how and whose responsibility it is to address cyberbullying, there is often a decreased risk of consequences for the perpetrator (Mishna, Saini, & Solomon, 2009). Moreover, it is possible that both adolescents and adults have more permissive beliefs about aggression perpetrated online than in person. Even if witnesses disapprove of an adolescents' aggressive behavior online, the perpetrator is unable to see nonverbal cues of disapproval. This limits the role of bystanders, whose reactions may discourage adolescents from aggressing in person. The decreased social control may increase the likelihood that adolescents will behave aggressively during electronic interactions.

Lack of nonverbal cues. Electronic communication technologies also lead to reduced coordination of communication. Kiesler and colleagues (1984) argued that nonverbal cues, such as eye contact, gestures, and facial expressions, are critical for the regulation of social exchanges. The lack of nonverbal cues increases the likelihood of misunderstandings, offenses, and miscommunications (Kiesler, Siegel, & McGuire, 1984). Encoding and interpreting situational

cues and intent attributions are integral processes in the decision to aggress (Crick & Dodge, 1994). It is possible that even adolescents without hostile attribution biases can mistake a well-intended behavior for a hostile one when interacting through electronic media. The lack of cues such as tone of voice and facial expression may increase the likelihood of misinterpretations and hostile attributions. What one adolescent intends as a joking, friendly interaction can quickly become a mutually aggressive interaction if the other person interprets the comment as an insult or a threat.

The lack of nonverbal cues may also reduce empathy, which serves as a natural check on adolescents' behavior. Developmental research has shown that children and early adolescents rely more heavily on facial expressions than on their understanding of the situation when making judgments about how people feel (e.g., Hoffner & Badzinski, 1989). A key component of empathy is absent in electronic communication, because it is not possible to see the victim's immediate emotional reaction (with the notable exception of video chatting technology). This is troubling because of the well-established inverse relation between empathy and aggression (e.g., Miller & Eisenberg, 1998). Furthermore, Milgram's (1965) study demonstrated that participants were more likely to shock people who were further away, suggesting that adolescents might be more willing to perpetrate aggression via electronic communication than in person.

Significance of Features Associated with Cyberbullying

Although some differences surrounding the circumstances of aggression have theoretical implications, there is little empirical evidence to support the assumption that these differences justify representing cyberbullying as a distinct form of aggression. Ease of access to victims and decreased inhibition, social control, and coordination of communication may make it easier to perpetrate aggression electronically, but differences in the likelihood that a given individual will commit specific acts of aggression are also evident within in-person aggression. For example,

some adolescents may engage in physical acts such as hitting, pushing or shoving other youths, but would not engage in more serious acts of aggression that involve the use of weapons. The unique features of cyberbullying suggest that there may be a lower threshold for perpetrating cyberbullying, but do not necessarily justify considering it a distinct form of aggression.

The unique features of cyberbullying do, however, suggest that researchers should consider the media through which aggression is perpetrated in addition to its form. A multidimensional model allows aggression to be classified by both media and form, which is important given the range of items included in measures of cyberbullying (see Figure 1b). Excluding physical harm, the ways that adolescents can harm their peers using electronic media are virtually limitless and will likely multiply as electronic technologies develop. Due to the wide range of aggressive behavior that can be perpetrated electronically and the dissimilarity of these behaviors to each other, it seems questionable to incorporate all such behaviors into a one-dimensional factor. Researchers have included physical (e.g., threatening someone via text message), verbal (e.g., calling someone names), and relational aggression (e.g., rumor spreading) in their measures of cyberbullying (e.g., Bauman, 2009), which emphasizes the need to classify aggression by form as well as media.

The development of a theoretical framework and empirical research should be an iterative process, in which the model guides empirical research, and the findings are used to refine the model. Specifically, different hypotheses can be drawn from the proposed model in which aggression is classified by both media and form. Firstly, if media represents an additional dimension of aggression, measures of cyberbullying would likely have factors parallel to those of in-person aggression (i.e., physical, verbal, and relational; see Figure 1b). A further empirical question is whether physical aggression can be perpetrated electronically. For example, sending physical threats electronically may be a physical form of cyberbullying, given that the World

Health Organization defined physical threats as violence (Dahlberg & Krug, 2002). Secondly, if media represents an additional dimension of aggression, cyberbullying will be closely related to broad measures of aggression and will share some psychosocial predictors with those measures. However, cyberbullying may have some unique predictors as well due to the unique circumstances surrounding the perpetration of aggression.

Improving Measures of Cyberbullying

The use of a systematic approach to measure development has not been a major focus of research on cyberbullying, perhaps because the field has grown so quickly. The measures created to assess cyberbullying reflect the common assumption that cyberbullying is a new form of aggression, distinct from physical, verbal, and relational aggression. In attempting to assess prevalence of, predictors of, and consequences for cyberbullying behavior, researchers have generally neglected the more basic goal of establishing gold standard measures for cyberbullying. This neglect has impeded the field's growth in terms of establishing a theoretical framework for understanding cyberbullying; specifically, it has limited researchers' abilities to test competing theoretical models of cyberbullying within the broader framework of adolescent aggression. Addressing key questions about cyberbullying requires carefully developed measures with empirical and theoretical support.

Our review of measures (or items) used to assess cyberbullying perpetration among adolescents revealed few carefully developed measures (see table provided as an online supplement). For example, many studies used single items to measure perpetration of cyberbullying, often defining the construct and asking adolescents how often they had cyberbullied others (e.g., Heirman & Walrave, 2012; Kowalski, Morgan, & Limber, 2012; Li, 2007). There are multiple problems with this approach. For example, the word "bullied" is non-specific and subject to social desirability and cultural differences in responding (Konishi et al.,

2009; Sontag, Clemens, Graber, & Lyndon, 2011). Furthermore, single items are not designed to assist researchers in exploring the factor structure of cyberbullying or how cyberbullying fits within a broader framework of aggression. In contrast, using multiple items allows researchers to sample more fully from the whole domain of behaviors represented by cyberbullying, to explore the factor structure of cyberbullying, and to test competing theoretical frameworks of aggression.

The Need to Use Aggression Literature to Define the Cyberbullying Domain

Testing competing models of aggression requires strong, empirically supported measures of cyberbullying with items that adequately sample the domain of interest. Unfortunately, the majority of researchers who have developed multiple-item measures have not described how they defined the domain or how they generated items (e.g., Bauman, 2009; Del Rey, Elipe, & Ortega-Ruiz, 2012; Perren, Dooley, Shaw, & Cross, 2010; Schoffstall & Cohen, 2011; Sticca, Ruggieri, Alsaker, & Perren, 2013; Ybarra & Mitchell, 2004a, 2007). For example, cyberbullying was assessed with two items on the Youth Internet Safety Survey, but the scope of the domain and the item generation process were not discussed (e.g., Jones, Mitchell, & Finkelhor, 2013).

In some cases, researchers were deliberate about defining the domain of interest. As would be expected from the inconsistency in definitions of cyberbullying, researchers varied in how they defined the domain of cyberbullying behaviors. There is a great deal of overlap in behaviors assessed across measures, particularly for items representing direct verbal aggression such as mocking, name-calling, and sending mean or nasty messages, and relational or social aggression such as rumor-spreading, posting or sending embarrassing photos, excluding, and ignoring. Despite these consistencies, there were several areas in which researchers differed sharply in their specification of the domain. The lack of a shared understanding of what constitutes cyberbullying behavior is a major failing in the field. For example, some researchers

included relatively mild behaviors that may not be aggressive, such as gossiping (e.g., DeHue, Bolman, & Vollink, 2008; Nicol & Fleming, 2010; Wright & Li, 2013), playing a joke (e.g., Werner, Bumpus, & Rock, 2010), or generally disinhibited behavior, such as saying something online that they would not say in person (e.g., Aricak et al., 2008). In contrast, some measures included more rare, illegal behavior that requires technological sophistication, such as hacking or sending viruses (e.g., Aricak et al., 2008; Calvete, Orue, Estevez, Villardón, & Padilla, 2010; Cetin, Yaman, & Perker, 2011; Patchin & Hinduja, 2006). Further diversifying the range of behaviors assessed, some measures included sexually aggressive behaviors (e.g., Cetin et al., 2011; DeHue et al., 2008; Patchin & Hinduja, 2006; Wade & Beran, 2011).

Defining the domain of cyberbullying can be guided by the proposed multidimensional model in which media and form are both considered classifications of aggression (Figure 1b). For example, mild behavior such as gossiping, playing a joke, and disinhibited behavior that does not harm or intend to harm generally does not fit within most definitions of aggression, and thus should not be considered cyberbullying or included in measures of cyberbullying. Sexual aggression, on the other hand, can be considered a form of peer-targeted aggression, distinct from physical, verbal, or relational aggression (McMaster, Connolly, Pepler, & Craig, 2002); thus, it may represent a subset of cyberbullying behaviors. It may therefore be more useful to represent sexual aggression perpetrated electronically as a subscale of cyberbullying behaviors. Similarly, hacking or sending viruses, insofar as they represent a destruction of property, may also be considered peer-targeted aggression, with interesting parallels to physical aggression perpetrated in person.

The Need to Use Both Empirical and Theoretical Approaches to Generate Items

As with establishing the domain of interest, the methods researchers have used to develop items have varied significantly in quality. Some researchers have taken a careful and thorough

approach to item development (e.g., Aricak et al., 2008; Menesini, Nocentini, & Calussi, 2011; Topcu & Erdur-Baker, 2010; Wade & Beran, 2011). In some cases, researchers have used empirically-driven approaches to item development. For example, Topcu and Erdur-Baker (2010) generated items based on interviews and focus groups with adolescents, and Cetin et al. (2011) created their measure based on observations, interviews with students and teachers, and a focus group. Other researchers have taken a more theoretical approach, such as basing items on their definition of the domain (Ang & Goh, 2010; Calvete et al., 2010), a review of the literature (e.g., Aricak et al., 2008; Menesini et al., 2011), or expert input (e.g., Aricak et al., 2008; Wade & Beran, 2011). One group of researchers (Werner et al., 2010) linked their measure to a broader framework of aggression, such that items were generated based on the idea that both verbal and relational aggression could be perpetrated electronically. An integrated approach, in which theory is used to define the domain and structure of the measure, and empirical evidence is used to generate and refine items, is clearly needed. Such an approach could lead to a gold standard measure, which would significantly benefit our theoretical understanding of cyberbullying and greatly improve the quality of empirical research.

Using Factor Structure to Validate Theoretical Frameworks

Once developed, measures of cyberbullying can be used to test competing theoretical models of aggression. Specifically, if both form and media represent dimensions of adolescent aggression as in the proposed model, then the factor structure of cyberbullying should parallel the structure of in-person aggression (see Figure 1b). Conversely, if cyberbullying constitutes a distinct form of adolescent aggression (see Figure 1a), support should be found for representing it as a separate factor. In general, however, researchers have not tested models informed by the broader adolescent aggression literature. Instead, many researchers have used exploratory analyses such as principal components or exploratory factor analyses to identify factor structure

(e.g., Ang & Goh, 2010; Cetin et al., 2011; Law, Shapka, & Olson, 2010; Law, Shapka, Domene, & Gagné, 2012a; Law, Shapka, Hymel, Olson, & Waterhouse, 2012b; Topcu & Erdur-Baker, 2010; Werner et al., 2010). In other cases, researchers tested *a priori* hypotheses about factor structure that were not guided by theoretical models of adolescent aggression. For example, Menesini and colleagues (2011) compared a unidimensional model to two competing models: one in which items loaded onto separate factors based on media (phone or computer), and one in which items loaded onto separate factors based on whether they were written, verbal (prank calls), or visual (pictures and videos). Although testing competing models strengthened the study, additional models based on form were not tested. For example, sending violent pictures may be considered physical aggression, and sending intimate pictures considered sexual aggression. The authors may have been able to find support for multiple factors guided by a theoretical model of aggression rather than media.

One study tested a factor structure based on a theoretical model that specified different forms of adolescent aggression. Wright and Li (2013) created a measure of cyberbullying that assessed cyber relational aggression (e.g., gossiping about peers, turning peers against other peers) and cyber verbal aggression (e.g., insulting others, threatening to hurt others physically). A confirmatory factor analysis yielded acceptable internal consistencies for both the cyber relational and cyber verbal aggression scales. This preliminary evidence suggests that a broader theoretical framework of adolescent aggression may be a useful structure to guide cyberbullying research. It also provides support for a theoretical model in which both media and form are important dimensions of adolescent aggression, as represented by Figure 1b.

Studies Examining Relations Between Cyberbullying and In-Person Aggression

The proposed framework in which aggression is classified by both media and form (Figure 1b) suggests that measures of cyberbullying should be closely related to measures of

aggression that do not specify the medium. In fact, the proposed framework indicates that both in-person and cyberbullying are subsets of the broader construct of aggression. It also suggests that cyberbullying and in-person aggression share psychosocial predictors. Research on cyberbullying can shed some light on these hypotheses, despite significant limitations of current measures of cyberbullying. The following sections review research on the relations between cyberbullying and broader measures of aggression. Empirical research on psychosocial predictors of cyberbullying is reviewed in the context of predictors of in-person aggression.

Relations Between Cyberbullying and Broader Measures of Aggression

Several studies have identified cross-sectional relations between cyberbullying and more general forms of aggression. Moderate to strong positive relations between concurrent measures of cyberbullying and general measures of bullying have been found for adolescents in Canada (Li, 2007), Italy (Menesini, Nocentini, & Camodeca, 2013), Spain (Casas, Del Rey, & Ortega-Ruiz, 2013), Turkey (Erdur-Baker, 2010), and the U.K. (Pornari & Wood, 2010). A major limitation of these studies is that measures not specifically designed to assess cyberbullying typically do not specify the media. With the exception of items referring to specific physically aggressive behaviors such as “punch,” many items on measures of aggression could be perpetrated either in person or electronically. For example, the in-person bullying scale used by Menesini et al. (2013) included items such as “spreading rumours” and “threatening,” but did not specify that these behaviors occurred during in-person interactions. Adolescents may thus endorse these items even if their behavior did not occur in person. Researchers should not assume that measures designed to assess forms of aggression such as physical, verbal, or relational aggression are only assessing in-person aggression. Correlations between these measures and measures specifically designed to assess cyberbullying may thus be inflated to the extent that they represent part-whole relations.

Several studies have examined the extent to which measures of various forms of aggression predict changes in cyberbullying. Low and Espelage (2013) found that nonphysical bullying (teasing, rumor-spreading, and threats) predicted changes in cyberbullying one year later among middle school students in the U.S. Similarly, Modecki, Barber, and Vernon (2013) found that changes in aggression from grades 8 through 10 predicted the frequency of cyberbullying in grade 11 among students in Western Australia. In a longitudinal study of adolescents in New Zealand, cyberbullying predicted changes in traditional bullying, and traditional bullying predicted changes in cyberbullying (José, Kljakovic, Scheib, & Notter, 2011).

Although most studies have focused on associations between broad measures of aggression and cyberbullying, a few studies have investigated whether this relation varies by form. Werner and colleagues (2010) created a measure of internet aggression that included verbal (e.g., making rude or nasty comments) and relational (e.g., encouraging others to block a certain person) items. They found support for the association between relational aggression and internet aggression but not for the relations between physical or verbal aggression and internet aggression. Results across studies may vary by the content of cyberbullying measures. In a study that used multiple scales to measure cyberbullying (cyber forgery, cyber verbal bullying, and hiding identity) and broader forms of aggression (physical, verbal, and indirect) among high school students in Turkey, all forms of cyberbullying were correlated with all broader forms of aggression (Cetin et al., 2011). However, variations in the strength of these relations were not tested, so it is unclear whether some associations (e.g., between cyber verbal bullying and verbal aggression) were stronger than others (e.g., hiding identity and physical aggression).

Support for a multidimensional model of aggression. The literature on cyberbullying has established consistent, moderate to strong relations between cyberbullying and more general

aggression (e.g., Li, 2007). However, few studies have tested hypotheses based on a theoretical framework. The proposed framework in which aggression can be classified by media as well as form has some empirical support. This framework contends that both cyberbullying and in-person aggression are subtypes of peer-targeted aggression. This argument is supported by several studies that found the majority of adolescents classified as "cyberbullies" were also classified as "traditional bullies" using broader measures of aggression (e.g., Raskauskas & Stoltz, 2007; Smith et al., 2008).

Wang, Iannotti, and Luk (2012) used latent class analysis to determine whether adolescents who engaged in cyberbullying were different from adolescents who engaged in more general forms of bullying. Although items representing physical, verbal, and relational bullying provided behavioral examples, the cyberbullying items focused on specific types of media by asking adolescents if they had bullied others using a computer, email, pictures, or cell phones. Their analysis suggested three classes of adolescents: one that engaged in all forms and media of bullying behaviors; one that engaged in predominantly verbal bullying and social exclusion; and one that had low involvement in all forms and media of bullying. These findings suggest that adolescents are not distinguishable by the media through which they perpetrate aggression. Though this study was an excellent first step toward exploring a theoretical model of aggression, the lack of specificity in the cyberbullying measure leaves unanswered questions about how forms of aggression perpetrated in person relate to forms of cyberbullying.

The proposed framework's position that cyberbullying may include the same forms of aggression as does in-person aggression also has some empirical support. For example, Law and colleagues (2012b) identified a factor structure that suggested a distinction between verbal cyberbullying and relational cyberbullying (Law et al., 2012b). In contrast, Werner and colleagues (2010) conducted a principal components analysis of an internet aggression measure

that included verbal and relational items, and found support for a single general factor. However, their measure had only four items, limiting their ability to identify multiple dimensions. Further work using a larger and broader sample of items is needed to provide a more adequate test of the structure of cyberbullying.

In summary, there is evidence that cyberbullying is related to broader measures of aggression. However, very little research has explored the underlying structure of aggression to provide a theoretical framework for how aggression perpetrated in person and electronically relate to each other. The research that has examined the structure of electronic and broader measures of aggression has generally been exploratory rather than grounded in a theoretical model. Despite this limitation, results of these studies provide some support for the idea that media represents an additional dimension on which aggressive behavior can be classified (Figure 1b) rather than cyberbullying representing a distinct form of aggression (Figure 1a).

Predictors of Electronic and In-Person Aggression

Another way to evaluate the model in which aggression is classified by both media and form is to determine the extent to which cyberbullying shares psychosocial predictors with in-person aggression. Support for the validity of a construct and its measure involves demonstrating a pattern of relations with other constructs that is consistent with theory (Cronbach & Meehl, 1955). If cyberbullying is a distinct form of aggression, it will likely have unique predictors. Conversely, if media is an additional dimension of adolescent aggression, cyberbullying will likely share many of the risk factors associated with perpetration of more general aggression. Researchers have identified a host of factors that increase adolescents' risk of involvement in aggression, including individual-level factors, family factors, school factors, peer factors, community and neighborhood factors, and situational factors (Hawkins et al., 1998). Far fewer studies have investigated factors that increase adolescents' risk for engaging in cyberbullying. In

general, these studies have focused on individual, family, and situational factors.

Individual characteristics. Several studies have established relations between cyberbullying and the following individual-level factors that have also been related to in-person aggression: empathy, moral disengagement, normative beliefs about aggression, impulsivity, depression, delinquency, and substance use. Moral disengagement and lower levels of empathy have been consistently linked with in-person aggressive behavior (e.g., Miller & Eisenberg, 1998), and emerging evidence suggests that they are also related to cyberbullying. Ang and Goh (2010), for example, found that cognitive empathy (identifying and understanding how the other person feels) did not explain a significant proportion of the variance in cyberbullying, but that affective empathy (i.e., sharing the emotional experience) did. Cognitive empathy may not be a deterrent for the commission of cyberbullying because of adolescents' dependence on facial cues to identify emotion. However, affective empathy may still serve as a self-sanction for cyberbullying, when adolescents consider how they would feel in a similar situation rather than rely on their knowledge of the other person's experience. Bauman (2009) found that moral disengagement was associated with perpetration of cyberbullying, although Perren and Gutzwiller (2012) did not. These findings suggest that empathy and moral engagement are important predictors for both in-person and cyberbullying, although there may be some variation in the nature of the relations due to circumstantial differences in the perpetration of cyberbullying.

Several studies have linked beliefs about aggression to perpetration of cyberbullying. In a study of adolescents in Spain, Calvete and colleagues (2010) found that adolescents who reported beliefs justifying aggression were more likely to engage in cyberbullying. Conversely, children and adolescents in Finland who endorsed higher pro-victim attitudes were less likely to engage in cyberbullying (Elledge et al., 2013). Normative beliefs about aggression were also

linked to cyberbullying in two studies of American adolescents (Werner et al., 2010; Williams & Guerra, 2007). Furthermore, attitudes toward cyberbullying and normative beliefs about cyberbullying have been shown to predict cyberbullying (Heirman & Walrave, 2012; Nicol & Fleming, 2010).

Cyberbullying and broader measures of aggression have both been linked to adolescents' psychosocial characteristics. For example, impulsivity and hyperactivity have been linked to cyberbullying (Sontag et al., 2011; Sourander et al., 2010). Wang, Nansel, and Iannotti (2011) found that both cyberbullying and broader measures of aggression were related to depression. Further, increases in a combined measure of delinquency, substance use, and aggression predicted subsequent cyberbullying among students in Western Australia (Modecki et al., 2013). Similarly, Ybarra and Mitchell (2004b) found that adolescents who engaged in cyberbullying used substances and behaved delinquently more frequently than adolescents who did not perpetrate cyberbullying.

Family, peer, and school factors. The few studies that have examined family risk factors for cyberbullying have found strong parallels to relations found for broader measures of aggression. For example, many studies have found that lower parental monitoring and poor parent-child relations predict aggressive behavior (e.g., Hawkins et al., 1998). Similarly, Law and colleagues (2010) found that child disclosure of online behavior to their parents was associated with lower cyberbullying. Parental monitoring predicted lower cyberbullying among adolescents in the Midwest (Low & Espelage, 2013). Furthermore, the quality of the parent-child relationship (e.g., parental support) is associated with lower levels of both in-person aggression and cyberbullying (Fanti, Demetriou, & Hawa, 2012; Wang, Iannotti, & Nansel, 2009; Ybarra & Mitchell, 2004b).

Researchers have also explored school and peer predictors of cyberbullying. Two

contextual factors, positive school climate and peer support, that have been linked to broad measures of aggression (e.g., McEvoy & Welker, 2000) have also been linked to cyberbullying. In a study of high school students in Spain, school climate and positive peer interactions predicted both a broad measure of aggression and cyberbullying (Casas et al., 2013). Casas and colleagues (2013) concluded that cyberbullying and broader measures of aggression were interrelated and may represent the same construct. Similarly, Williams and Guerra (2007) found that peer support and school climate predicted lower frequency of both cyberbullying and a broader measure of aggression, and that these relations were equally strong across both measures of aggression.

Situational predictors. In addition to sharing predictors with broad measures of aggression, it is also possible that some predictors may be specific to cyberbullying, which is an important test of discriminant validity. For example, cyberbullying has been associated with having a computer in one's bedroom (e.g., Law et al., 2010) and with risky and frequent use of electronic communication technologies (Erdur-Baker, 2010). These situational factors are theoretically unrelated to in-person aggression, but increase opportunities to engage in cyberbullying, just as having a weapon increases the ease with which an adolescent could engage in physical aggression.

Overall, there is some support that cyberbullying is related to the same risk factors as broader forms of aggression, with the exception of unique situational factors. In other cases, an underlying construct such as parental monitoring may present differently across media (e.g., parental monitoring of online activities versus activities outside the home). The high degree of overlap among risk factors, combined with the unique situational risk factors, provides some support for a theoretical model in which media represents an additional dimension of aggression (Figure 1b), rather than a model in which cyberbullying represents a distinct construct.

Limitations

This review has several limitations. First, the focus of the review was on perpetration of cyberbullying, so we did not discuss victimization even though these phenomena are closely related. Ideally, improvements in the study of cyberbullying perpetration will lead to corresponding improvements in the study of electronic victimization. For example, developing and testing a theoretical model of cyberbullying perpetration may also advance research on victimization. Further, creating strong measures of cyberbullying perpetration can lead to the development of parallel measures for victimization and guide work to identify the consequences of electronic victimization.

Second, we propose a framework for aggression based, in part, on the current literature on cyberbullying, which has significant limitations because the field is young and underdeveloped. In particular, much of the literature we reviewed on the structure of cyberbullying and its relations to other constructs was based on poorly developed measures that may not have adequately sampled this construct. As such, our proposed framework is intended as a working model to guide future research rather than a model strongly supported by empirical evidence. Despite the limitations of the current literature, it is important to take advantage of the work that has already been done by drawing tentative conclusions to inform a working theoretical framework of aggression. Future research will lead to either refinements in this framework or establish a new framework that explains how cyberbullying relates to in-person aggression.

A major limitation of this review is the speed at which technology is changing and the corresponding research is evolving. It is likely that in-person and electronic communications will become so intertwined that they will soon be impossible to disentangle. For example, it is both cyberbullying and in-person aggression when a rumor is started in the cafeteria at school and

then spread online and through text messages. Another example is that adolescents may exclude someone at school because that person had been victimized online in a way that damaged his or her image or reputation. Because interactions online are likely to transfer to the physical world and vice versa, adolescents may not be able to differentiate electronic interactions from in-person interactions. The distinctions researchers work so carefully to specify may not translate very well to adolescents' life experiences, so these distinctions may need continuous adaptation..

Research Implications

Our review of the current state of the literature on cyberbullying identified several issues that have hampered progress, with perhaps the greatest need being an empirically-supported theoretical model that explains the relation between cyberbullying and in-person aggression. This model will provide a framework to guide empirical research, which will further inform theory. Several deficits must be addressed in order to meet the overarching goal of establishing a theoretical model. First, because it is difficult to draw sound theoretical conclusions from research using poorly constructed measures, there is a need to establish gold standard measures of cyberbullying based on a clear working definition. Second, those measures should be used to inform theory by testing competing theoretical models of electronic and in-person aggression. Third, theory about cyberbullying and the larger body of literature on adolescent aggression should guide research about risk and protective factors and outcomes, and shared and unique risk factors and outcomes should inform theory about how cyberbullying fits into a larger framework of aggression.

Measure development. Further work is needed to create a gold standard measure for self-reported cyberbullying (David-Ferdon & Hertz, 2007). A critical first step in the development of any measure is to define the domain of the construct it is designed to measure. A working definition of cyberbullying is needed to guide the development of measures to assess

this phenomenon. As discussed previously, the CDC convened an expert group that, among other things, crafted a definition of electronic aggression as harassment or bullying perpetrated through specific identified electronic communication technologies. Behavioral examples of harassment or bullying were also included, specifically "teasing, telling lies, making fun of someone, making rude or mean comments, spreading rumors, or making threatening or aggressive comments" (Hertz & David-Ferdon, 2008, p. 3). We recommend an adoption of this definition, with a further explanation of harassment or bullying as an intentional act that damages or threatens to damage an adolescent's feeling of safety, sense of self, sense of agency, dignity, image and reputation, relationships, or privacy. Furthermore, because the CDC's list of specific electronic media may become outdated fairly quickly, it should be expanded to include any electronic communication technology. This definition encompasses bullying, but does not exclude other types of aggression. It is also inclusive of proactive and reactive aggression; physical, verbal, and relational aggression; and direct and indirect aggression.

In order to create a strong measure of aggression, items should be created using an empirical approach while taking theoretical considerations into account. Our proposed theoretical model, in which aggression is classified by media and form, can serve as a guide for measure development. Specifically, the model suggests that a cyberbullying measure should have items that adequately sample physical, verbal, and relational forms of aggression. Systematically sampling across these factors will greatly improve the content validity of cyberbullying measures (c.f., Cronbach & Meehl, 1955). After identifying the domain of interest, researchers should take an empirical approach to develop an item pool. A mixed methods strategy would begin by using qualitative methods such as interviews or focus groups with a range of samples to explore experiences of cyberbullying which adolescents have heard about, witnessed, or experienced as a victim or aggressor. Qualitative interviews and focus groups

could be supplemented by other methods such as direct observation and coding of aggressive interactions that occur in publicly accessible sites such as social networks. This could provide rich, nuanced information that the literature currently lacks. The themes that emerge could be further explored by quantitative research to determine their relevance for specific populations of adolescents. Researchers should further review these items in order to determine whether they fit within a working definition of cyberbullying and adequately sample across forms of aggression.

A qualitative approach is likely to yield a fuller understanding of cyberbullying by providing information about the range of behaviors youth experience. Few measures of cyberbullying have sought input or feedback from adolescents during the process of generating items. To develop measures without input from the population of interest is not a sound methodological practice. Mishna and colleagues (2009) pointed out that cyberbullying is a moving target, requiring researchers to constantly consult with and seek feedback from adolescents. One issue to consider is that with the rapid increase in technologies and evolving online culture, measures of cyberbullying may become outdated more quickly than other measures. Avoiding the mention of specific electronic media (e.g., chat rooms) and instead using more general terms (e.g., online or through cell phones) is one possible method to increase the likelihood that a measure will maintain its relevance over time. Even using such strategies, measures of cyberbullying will need to be adapted over time to accommodate the changing nature of electronic communication technologies and adolescents' use of those technologies.

Further work is also needed to develop and evaluate innovative approaches to obtaining collateral sources of data on the occurrence of cyberbullying. Researchers investigating broader forms of aggression often supplement self-report with ratings by peers, teachers, and parents. This strategy is designed to avoid problems associated with relying on a single method of assessment (e.g., Kazdin, 2003). It may be difficult to develop cyberbullying measures that

include multiple informants due to the context in which it occurs. Bauman (2009), for example, found that as many as half of electronically victimized adolescents were not aware of the identity of the perpetrator. Further, as many as 50% of victimized adolescents may not tell anyone about their experience, but friends were the most common confidants (Slonje & Smith, 2008). Peers may also directly observe cyberbullying because it is often perpetrated in groups (DeHue, Bolman, & Vollink, 2008). Because of this, peers may provide the most appropriate outside reporter about cyberbullying, even though they may still have incomplete information. An alternate approach to increasing the accuracy of cyberbullying measurement is to have adolescents fill out brief surveys frequently over short periods of time (for example, via smartphones) about their recent internet and cell phone use.

Empirical Testing of Theoretical Models. Once developed, items representing cyberbullying can be used to test competing theoretical models. Thus far, researchers have generally not taken full advantage of statistical analyses that can inform theory about aggression and its underlying framework. Empirical research can determine which theoretical model best explains relations among items that assess aggression. For example, it is possible that their relations are best explained by both media and form, which can be tested by multidimensional models (see Figure 1b). Another approach is latent class analysis, which can test whether adolescents who engage in cyberbullying are the same, different from, or a subset of adolescents who engage in in-person aggression. Item response theory analyses could test the theory that there is a lower threshold for engaging in cyberbullying than in in-person aggression, as suggested by the unique features of electronic communication technologies.

Clinical Implications

A remaining question is the extent to which risk and protective factors for aggression perpetrated in person also predict aggression perpetrated electronically versus the extent to which

cyberbullying has unique risk and protective factors. Addressing these questions is necessary to develop appropriate prevention programs and can inform theory. Researchers have begun to identify individual, family, peer, school, and situational factors that place adolescents at risk for perpetrating cyberbullying. The shared risk factors suggest that many aspects of violence prevention programs can effectively address cyberbullying. It is important to note, however, that some risk factors are slightly different, such as parental monitoring of internet use or having a computer in one's bedroom. Prevention programs may need to incorporate these unique factors (e.g., providing education to parents about monitoring computer use).

Research on shared and unique risk factors has yet to be conducted in the area of broader contextual factors, such as risk factors in the community. In the case of cyberbullying, it is likely that the culture of the internet and the interaction between the physical world and cyberspace play a significant role in the initiation and maintenance of adolescents' aggressive behavior. It is possible that the disorganization, reduced social control, and diffusion of responsibility that characterize the culture of electronically mediated communication place adolescents at considerable risk for involvement in aggression. If so, this suggests the possibility of developing innovative online interventions to address cyberbullying. More research needs to be done regarding descriptive and injunctive norms for adolescents' behavior through electronic communication technologies. Effective prevention programs will most likely need to increase social control for behaviors in cyberspace in order to reduce cyberbullying.

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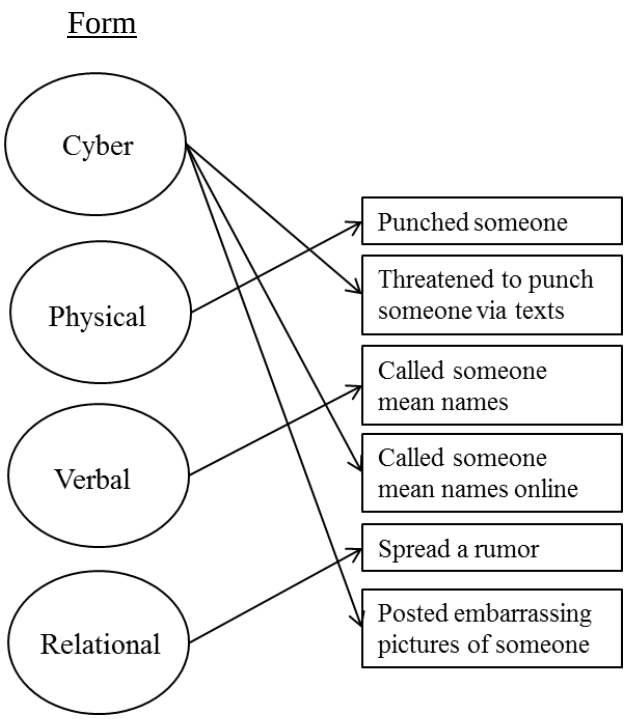
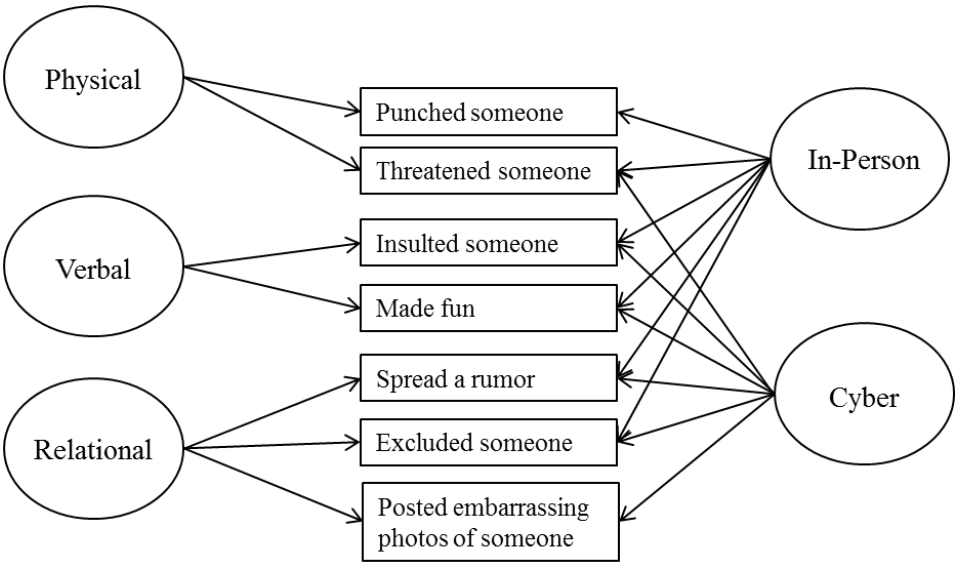


(a) Including cyberbullying as an additional form of aggression.



(b) Incorporating media as an additional dimension of aggression.

Figure 1. Competing theoretical models of cyberbullying. Figure 1a displays cyberbullying as a distinct construct; Figure 1b displays media as an additional dimension of aggression.