Investigation of the Cyberbullying Phenomenon as an Epidemic

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Abstract

Cyberbullying research began in the late 1990, and was largely in response to the growing use of technology among adolescents, as well as increased instances of cyber abuse among teenagers (Patchin & Hinduja, 2006; Yardi & Bruckman, 2011). Cyberbullying can have a long-lasting psychological impact on individuals; the result of which can include changes in self-efficacy, self-esteem and behavior. This study postulates that not only do these impacts have negative consequences on individuals, but that cyberbullying spreads through communities, societies, and the world similar to an epidemic. The general strain theory, the system dynamics SIR epidemic model, and prior cyberbullying research findings were used to develop a casual loop model to explain the underlying structure of the cyberbullying epidemic problem. Finally, directions for continued research are identified.

Keywords: Cyberbullying, Electronic Bullying, Online Harassment, Cyber bullying, Internet harassment, General Strain Theory, System Dynamics, SIR Epidemic Model

1.   Introduction

Cyberbullying is a relatively new phenomenon resulting from technological advancement and the widespread use and acceptance of technology among people. Yardi and Bruckman (2011) indicate that on any given day in the United States, 23 million teenagers will get online "hanging out in chat rooms and social networking sites, and 18 million teens have their own cell phone" (Yardi & Bruckman, 2011, p. 3237). Adolescents seem to have a natural inclination towards the use of electronic media but they do not always use technology in positive ways (Juvonen & Gross, 2008; Yardi & Bruckman, 2011; Ybarra, 2004).

In developing a functional definition of cyberbullying, Ybarra and Mitchell (2004) argue that cyberbullying is an intentional and overt act of aggression toward another person online. It involves the sending or posting of harmful or cruel text or images using the Internet or other digital communications devices (Willard, 2007), such as computers, cell phones and other electronic devices (Patchin & Hinduja, 2008). The common definition of cyberbullying includes

an intent by the cyberbully to hurt the victim, repeated actions, and a relationship of power imbalance between the bully and the victim (Vandebosch & Van Cleemput, 2008).

There has been a variety of research on the prevalence of cyberbullying among adolescent's (Lenhart, 2010; Yardi & Bruckman, 2011) and that the ubiquitous ownership and use of technology has led to an increased incidence of cyberbullying abuse and victimization (Beran & Li, 2005; Kowalski & Limber, 2007; Ortega, Elipe, Mora-Merchan, Calmaestra, & Vega, 2009; Patchin & Hinduja, 2006; Raskauskas & Stoltz, 2007; Ybarra, 2004). More recent research has also exposed cyberbullying prevalence among older adolescents in college (Aricak, 2009; Dilmac, 2009) as well as adults in the workplace (Keashly & Neuman, 2010; McKay, Arnold, Fratzl, & Thomas, 2008; Privitera & Campbell, 2009).

Cyberbullying research has focused primarily on the identification and examination of prevalence among victims within schools, colleges, and eventually within the workplace. As the phenomenon has grown, subsequent research began to identify and examine the overall psychological impact of victimization. Cyberbullying causes severe psychological, emotional, and social problems among many of its victims (Blair, 2003; Juvonen & Gross, 2008; Patchin & Hinduja, 2006). Cyberbullying can have a long-lasting psychological impact on individuals; the result of which can include changes in self-efficacy, self-esteem and behavior. This study postulates that not only do these impacts have negative consequences on individuals, but that cyberbullying spreads through communities, societies, and the world similar to an epidemic. The general strain theory, the system dynamics SIR epidemic model, and prior cyberbullying research findings were used to develop a casual loop model to explain the underlying structure of the cyberbullying epidemic problem.

2. Literature Review

2.1. Psychological Impact of Cyberbullying

The impact of cyberbullying among victims finds that the construct is a repeated behavior that offends, causes embarrassment, lowers self-esteem, sabotages, intimidates, and negatively affects an individual's academic, professional, personal and social life (Mesch, 2009). Dempsey, Sulkowski, Nicols, and Storch (2009) argue that there is a significant relationship between cyber victimization and problems with psychosocial adjustment.

One contributing factor relating to the sharp increase in cyberbullying activity among adolescents and young adults has to do with the number of people engaged in social network use. The more time adolescents and young adults spend on the Internet or using social networking sites, the greater the possibility to cyberbullying activity to occur (Mesch, 2009). The consequences of cyberbullying may be more severe than those of traditional bullying because verbal and psychological bullying may have more negative long-term effects (Campbell, 2005). Campbell (2005) further argues that the basis for this severity seems to be related to the potential for a wide-scale audience that may have access to incidences of cyberbullying and the power of the written word. Because negative comments, threats, and accusations written on web sites, emails, chat rooms, and other forms of media are permanent and visible to many, they may

be looked at repeatedly by the victim and their peers causing victims to feel that there is no escape from the abuse.

Strom and Strom (2005) lend support to the findings of Campbell in terms of the uniqueness of cyberbullying and its impact upon victims. They argue that cyberbullies often hide behind a cloak of anonymity inherently provided by the Internet. Using fake screen names cyberbullies are able to post hurtful and harmful messages intended to embarrass the victim and undermine their reputation by making the matter public and viewable by many. Consequently, such actions create a great deal of anxiety among victims and negatively impact their psychological state (Beale & Hall, 2007; DeHue, Bolman, & Vollink, 2008; Spear, Slee, Owens, & Johnson, 2009; Strom & Strom, 2005).

Patchin and Hinduja (2006) also support the finding that anonymity is one of the important elements that makes cyberbullying attractive to cyberbullies. Because they do not have to face their victims, cyberbullying has a great appeal as a mechanism to harass others. Moreover, their 2006 study identified specific psychological effects experienced by victims from online bullying. For example, the negative impact was manifested in feelings of frustration, anger, and sadness that had a detrimental impact on the victim's psychological wellbeing (Patchin & Hinduja, 2006). Among adolescents taking part in this study, about one third of them indicated having been harassed by online bullying and as a result they had experienced being ignored by friends, disrespected, called names, threatened, pick on, and have had rumors spread about them (Patchin & Hinduja, 2006).

Ybarra (2004) and Ybarra and Mitchell (2004) suggest that victims of cyber abuse experience depressive symptoms, behavior problems, drug use, and negative attitudes toward school. Mason (2008) also suggests that adolescents who have experienced incidents of cyberbullying are likely to report behavioral issues, drinking alcohol, smoking, and depressive symptoms. Experiences involving online harassment are directly related to increased levels of distress among victims (Juvonen & Gross, 2008).

Ortega et al.(2009) found the most common emotional response to be anger by victims. In addition, others symptoms reported as a result of cyberbully victimization include stress, being upset, depression, and loneliness. Sourander et al. (2010) found that adolescents reported fear for their safety to be a primary emotional symptom associated with cyberbullying. In addition, they reported other psychosomatic issues such as sleeping problems, bed-wetting, headaches, and stomachaches.

Contemporary research pertaining to the victimization of cyberbullying has found that this construct has a detrimental impact on the self-esteem of its victims (Peterson, 1993). A study conducted by Salmivalli, Kaukiainen, Kaistaniemi, and Lagerspetz (1999) examined adolescents seeking to identify how traditional bullying impacts self-esteem. Findings from this study indicated that victims of traditional bullying had low levels of self-esteem, while individuals with higher levels of self-esteem were better able to deal with the effects of traditional bullying. Patchin and Hinduja (2007b), found a direct correlation between cyberbullying victimization and self-esteem and between cyber offending and victimization. Specifically, this study identified that both cyberbullies and victims of cyberbullying have lower levels of self-esteem compared to

those who have not been either offenders or victims. Interestingly, these levels remained the same even though the researchers controlled for age, gender, and race (Patchin & Hinduja, 2007b).

A horrific element associated with cyberbullying victimization is suicide ideation. Kim, Koh, and Leventhal (2005) conducted a study among Korean middle school students specifically aimed at identifying the prevalence of suicidal ideation as a result of bullying among victims, bullies, and victim-bullies. Students involved with bullying, as a victim, as a bully, or victim-bully, were compared against other students who were not involved in bullying. Findings from this study indicate that suicide ideation is higher among respondents involved in bullying in some way. The incidence of suicide ideation was highest among the victim-bully category used in this study. Researchers have found that individuals who had experienced bullying or cyberbullying, as a victim or as a perpetrator, had higher rates of suicidal thoughts and were more likely to attempt suicide than those that peers that did not experience such bullying (Klomek, Sourander, & Gould, 2010; Patchin & Hinduja, 2007b).

Older adolescents and adults are often victims of cyberbullying in college and throughout the workplace (Bond, Tuckey, & Dollard, 2010; Chapell et al., 2004; De Cuyper, Baillien, & De Witte, 2009; Keashly & Neuman, 2010; Lester, 2009; Privitera & Campbell, 2009). Privitera and Campbell (2009) argue that workplace bullying of all types is defined similarly to bullying in the academic domain. Workplace bullying may concern personal issues, work related issues or social exclusion (Cowie, Naylor, Smith, Rivers, & Pereira, 2002). However, scientific research on bullying and cyberbullying among older adolescents and adults within both college and the workplace is in its infancy with less than significant literature on the topic (Lester, 2009).

According to Privitera and Campbell (2009), workplace bullying is defined as "repeated behavior that offends, causes humiliation, sabotages, intimidates, or negatively affects someone's when there is an imbalance of power" (p. 395). In addition, they further suggest that the negative consequences of college and workplace bullying are similar to those experienced by youngsters and younger adolescents within schools. Privitera and Campbell (2009) argue that the experiences of workplace bullying have a negative direct impact upon a victim's physical health and emotional wellbeing, and such consequences can extend into the victim's family and social relationships.

Baillien, Neyens, Witte, & De Cuyper (2009) support the premise that the negative acts associated with workplace bullying are mainly psychological in nature, but they also indicate that some cases of physical and sexual abuse have been reported. In addition, they also suggest that bullying in this environment develops as a result of multiple causes associated with both the victim personality and coping mechanism, as well as work related aspects of the organization. Bond, Tuckey, and Dollard (2010)argue that workplace bullying negatively affects both the individual and the organization. In addition, they add to the conversation by suggesting that workplace bullying can result in "adverse psychological and psychosomatic effects such as depression, anxiety, irritability, symptoms of trauma, impaired interpersonal functioning, and diminished productivity and work quality" (Bond et al., 2010, p. 37) .

Recent research on bullying in the workplace has found that victims of this abuse may actually suffer from posttraumatic stress and suffer symptoms such as distressing intrusive thoughts, dreams, and flashbacks, hyper-arousal, and shattered core beliefs (Bond et al., 2010; Leymann & Gustafsson, 1996; Wilson, 1991). Mikkelsen and Einarsen (2002) indicate that the psychological impact from bullying of all types in the workplace can be so severe among victims that the posttraumatic stress symptoms experienced can be statistically equivalent to the posttraumatic stress symptoms experienced by victims of rape. Hoobler, Rospenda, Lemmon, and Rosa (2010) argue that negative experiences such as those experienced by victims of workplace bullying can undermine mental health and lower self-esteem. In addition, they further argue that negative events experienced in the workplace generate intense emotional, physiological, and psychological reactions among victims of such abuse. Thus, these experiences impose a type of "sickness" on the individuals involved.

2.2. General Strain Theory

Introduced into the pool of psychological theory in 1938 by Robert Merton, the original strain theory proposed only one source of strain: the failure to achieve a desired goal. Merton's original theory focused on monetary gain as a source of strain. He further theorized that there exists a discrepancy between valued goals and the legitimate means to achieve those goals, and that the legitimate means to achieve such goals creates strain. As a means to alleviate such strain, Merton theorized that people in turn adapt in a variety of ways to achieve desired goals by circumventing legitimate ways to achieve them (Akins, Smith, & Mosher, 2010). Traditional strain theories, such as Merton's, claim that some people are drawn to crime when they are prevented from achieving cultural goals such as monetary success through legitimate channels.

Scholarly and empirical research on the general strain theory in recent times has had the effect of refocusing the sources for strain. Agnew (1992) considers alternative sources of strain. As a result of different sources of strain, the individual's response is different and guided by their focused attempt to prevent a loss, retrieve what was lost, or in the case of bullying/cyberbullying, seek revenge on those who have removed the positive stimuli (Agnew, 1992; Froggio, 2007). Agnew (2000) further argues that strain makes people feel angry, frustrated, depressed, anxious, and essentially creates pressure for corrective action on the part of the victim. In response to this pressure, victims react by wanting to take a corrective action as a means to alleviate the bad feelings. Consequently for some victims, cyberbullying is one corrective action that adolescents might take to mitigate the bad feelings (Patchin & Hinduja, 2010).

Hay, Meldrum, and Mann (2010) argue that empirical testing of the general strain theory has found that research using this theoretical framework often finds individual reaction to strain manifested in acts and crimes committed against other people or their property. Contemporary research on cyberbullying indicates that such activity generates negatively valued stimuli in victims causing them strain that correspondingly leads to negative emotions within the victim (Hay et al., 2010; Patchin & Hinduja, 2007b). In an almost self-preservative manner, victim responses are aimed at confronting the negative stimuli by attempting to alleviate the strain, in some instances this is accomplished in an anti-normative manner such as cyberbullying others (Patchin & Hinduja, 2007b). Franek (2005) too argues that students who have been bullied online are more likely to turn into cyberbullies themselves.

Privitera and Campbell (2009) argue that an imbalance of power exists between the victim and the bully/cyberbully, and that the negative psychological impact of such abuse among workers is similar to that of students. Moreover they argue that the imbalance of power significantly impairs the victimized workers' ability to cope with the negative acts of bullying because they may perceive themselves to be in a position to ineffectively protect themselves or unable to remove themselves from the negative situation (Privitera & Campbell, 2009). Consequently, stress and strain develop and in some instances victims lash out in retaliation against the perpetrators causing stress.

Baillien, Neyens, De Witte, and De Cuyper (2009) suggest that workplace bullying, including acts of cyberbullying, strains victims mainly in a psychological manner. Baillien et al. (2009) also argue that other workplace strains such as tension and frustration among employees as a result of abusive circumstances in the workplace may set the stage for workplace bullying. The increased stress and strain within some adolescents and young adults may cause bullying and cyberbullying through a process individuals use to vent off negative emotions on others (Baillien et al., 2009). Hoobler, Rospenda, Lemmon, and Rosa (2010) suggest that many workplace experiences, such as negative actions from supervisors and coworkers, can lead to workplace related stress and strain. These types of actions can impact some victims in a manner which leads them to retaliate against the perpetrator. This is particularly the case when bullying activity is the result of a coworker. In some instances, retaliation might be in the form of cyberbullying (Hoobler et al., 2010).

The literature shows that there are a variety of negative psychological and even physical effects of being cyberbullied. These impacts are possibly manifestations of the strain as a result of victimization and support the premise of the association of cyberbully victimization to the general strain theory. This study theorizes that this negative strain can damage individuals, making them "sick" as though they were infected with a disease. The general strain theory supports the notion of cyberbullying as a disease that infects individuals exposed to negative strain (i.e. cyberbullied) and that those infected often respond to this strain by acting out in negative ways (i.e. becoming a cyberbully), passing the infection to others. The literature discussed in this section lends support to the use of the system dynamics SIR epidemic model for studying cyberbullying, which will be discussed in the next section.

3.   Methodology

System dynamics allows us to analyze complex problems in business, economic, natural, and social systems by studying dynamic cause and effect over time (Maani & Cavana, 2007, p. 7). Through system dynamics modeling we can better understand the structure of a system, the interconnections of its components, and how changes affect the entire system over time (Maani & Cavana, 2007, p. 8). System dynamics is ideal for studying the cyberbully phenomenon because it involves a complex problem within a social system with interconnected parts. The system dynamics approach offers to ability to take a holistic view of the problem and analyze how the parts of the system interact.

The purpose of this study is it to develop a preliminary system dynamics model as a baseline to investigate the psychological impact of cyberbullying from an epidemic point of view. The

resulting model focuses on the relationship between bullies, potential victims ("healthy" population), and victims ("infected" population). The model developed from this research can be translated into a formal model for validation, extension, and analyze potential mitigation strategies.

The epidemic model is well-established in the system dynamics domain and has been used to study the dynamics of the spread of disease (Sterman, 2000). In addition, researchers have extended the epidemic model to study other dynamic problems such as computer viruses (Abdel-Azim & Wahba, 2002) and identity theft (Bourne & Deaton, 2005). This research explores epidemics modeling as it relates to the spread of cyberbullying as an infectious disease. A cyberbullying epidemic model was developed by identifying structure from literature on cyberbullying research. The sections below describe the structure identified from the literature and the final proposed model.

3.1. Model Conceptualization

3.1.1. The SIR Model

The basis of this study's model is grounded in a model developed by Kermack and McKendrick (1927). This model (see Figure 1), known as the SIR model, contains three stocks: Susceptible population (S), Infectious population (I), and Recovered population (R). In the SIR version of the epidemic model those that become infected eventually recover and develop an immunity (Sterman, 2000). This study used the SIR model as its basis because cyberbullying acts as a disease in that a consequence on victims is a lower self-esteem versus non-victims (Patchin & Hinduja, 2007b; Salmivalli et al., 1999). Stress and depression are also common by-products of cyber abuse among young student victims (Ortega et al., 2009; Ybarra, 2004; Ybarra & Mitchell, 2004). Stress, depression, and embarrassment can be such powerful negative influences in a cyber-abuse victim's life that in extreme cases some victims turn to thoughts of suicide, or to committing the actual act. Suicidal thoughts have been found to be higher in individuals impacted by cyberbullying in some way; whether they were the bully, the victim or both (W. Kim, Jeong, & Lee, 2010).
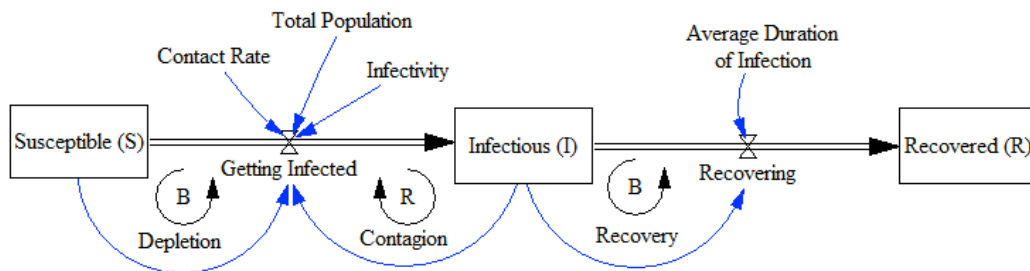

Figure 1. SIR Epidemic Model (adapted from Sterman, 2000)

As discussed earlier, general strain theory suggests that negative events in a persons' life generates strain. In response to such strain, some people resort to socially unacceptable responses for dealing with that strain. This study hypothesizes that cyberbullying is one such response to

the strain associated with traditional and electronic bullying. Empirical studies on cyberbullying seem to support this framework in that many cyberbullies were also cyber victims (Katzer, 2009; Ybarra, 2004). Berthold and Hoover (2000) identified that cyber abused U.S. middle school students were more than three times as likely to report bullying others when compared to students who had not been bullied. Therefore, similarly to the SIR model in Figure 1, the infected cyberbullied population can spread the infection. We have modeled this in a coflow structure (see Figure 2) whereby a certain percentage of the individuals getting cyberbullied will become cyberbullies themselves and move into the "Bullies" stock. In this model "Healthy" refers to the susceptible population that has never been victimized by cyberbullying.
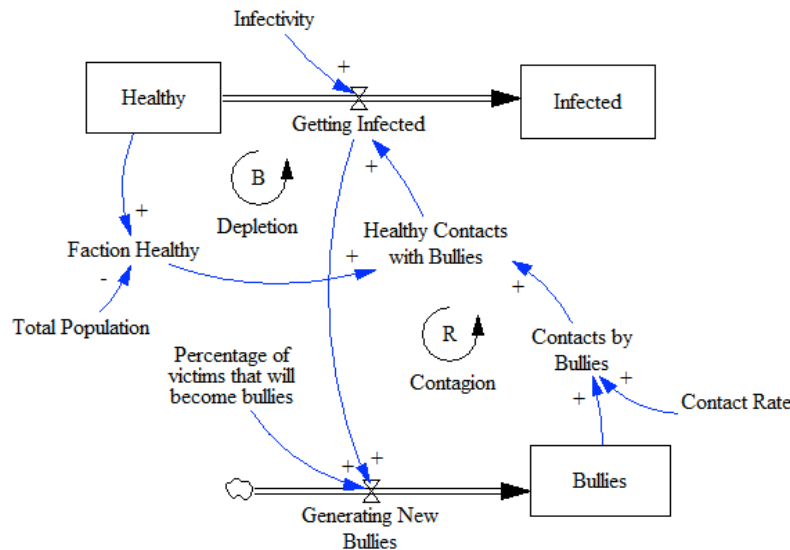

Figure 2. Bullies Coflow

In addition to a certain percentage of infected individuals infecting others, there are bullies that come from the "healthy" population. These bullies have not been cyberbullied themselves but have some other strain in their lives that causes them to act out in negative ways. Characteristics such as an abrasive or authoritarian personality may, in conjunction with other factors such as stress, may cause strain that provokes aggressive behavior (Baillien et al., 2009; De Cuyper et al., 2009). For simplicity, this version of the model does not include additional inflows of new bullies as a consequence of alternate types of strain. However, future extensions should include these.

While the impact of cyberbullying can be long-lasting, this study assumes that as in the standard SIR model individuals can "recover" from cyberbullying over time. However, an individual that has "recovered" from cyberbullying is susceptible to "reinfection" (see Figure 3). When individuals recover from cyberbullying they are not immune to reinfection but they are also not moved back to the healthy stock as they are never really considered healthy again. The purpose of this structure is to allow for a difference in initial infection rate and reinfection rate. One possibility for this difference could be that individuals who have been bullied develop a distrust of technology and, therefore, are less likely engage in activities involving a computer, such as interacting with peers on social networking sites (Dempsey et al., 2009; Mesch, 2009). This model also assumes that bullies rehabilitate over time and eventually become non-bullies (e.g.

maturity). In this preliminary version of the model, there is no prevision for a recovered bully to become a bully again, but that certainly should be considered in future versions. In addition, other intervention strategies to reduce the infection duration of victims and increase the rehabilitate rate of bullies should be investigated.
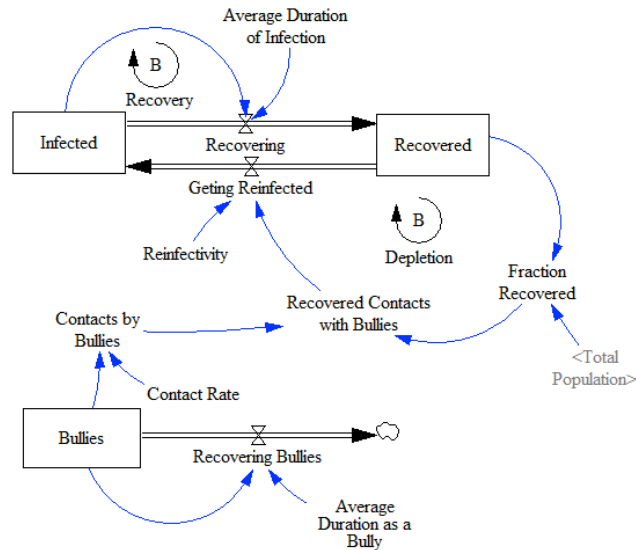

Figure 3. Recovering Victims and Bullies

The general strain theory purports that strain is a by-product resulting from an individual's confrontation with a negative stimuli (Agnew, 1992; Akins et al., 2010; Patchin & Hinduja, 2007a). However, individual reactions to such strain vary among victims. A significant portion of the extant literature on self-control in response to cyberbullying at the middle and high school levels has found that many students who experience cyberbullying in turn cyberbully others in response to their victimization (Berthold & Hoover, 2000; Katzer, 2009; Ybarra & Mitchell, 2004). In fact, Berthold and Hoover (2000) found that bullied middle school students were more than three times as likely to report bullying others when compared to students who had not been bullied.

This point suggests a lack of self-control on the part of the victim in response to this behavior. Existing empirical literature among younger adolescents finds that most cyberbullies were also victims of cyber abuse themselves (Ybarra & Mitchell, 2004). However, in contrast, research among adult victims of cyberbullying indicates that a considerable number of adults victimized did nothing in response to their cyber abuse (Akbulut & Çuhadar, 2011). Instead of responding to their abuse by in turn cyberbullying another person, they simply waited for the instances of abuse to stop. Therefore, the level of social maturity is a factor in determining the rate of infection and reinfection.
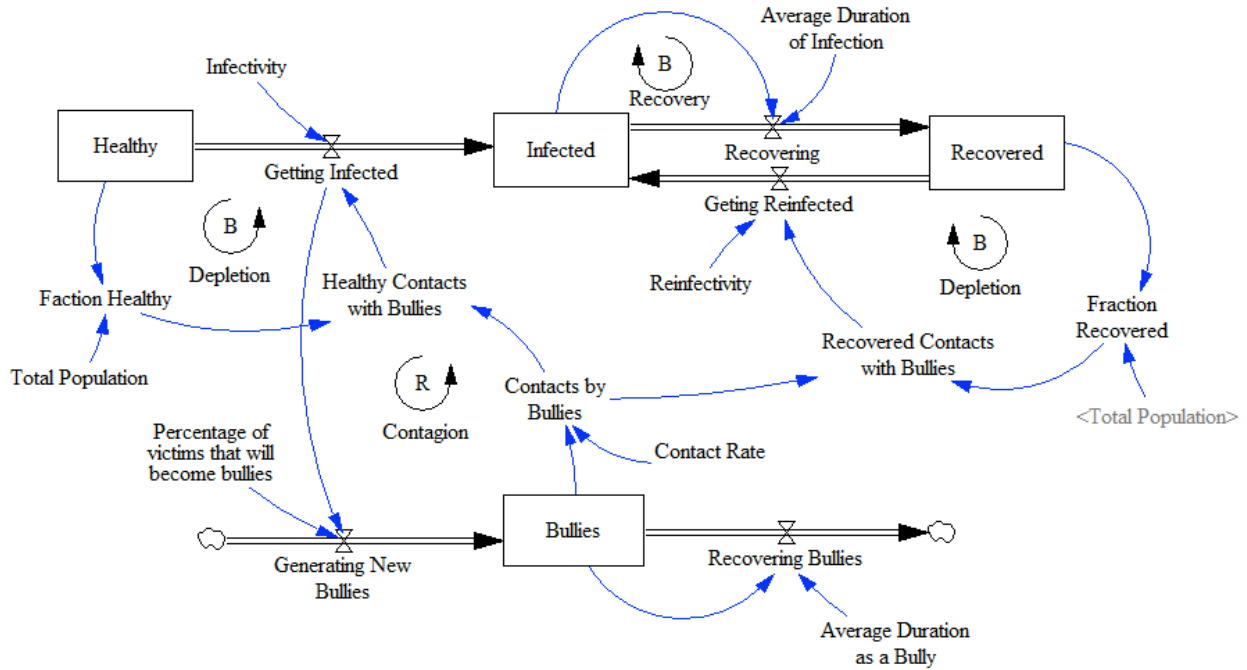
Figure 4. Preliminary Cyberbullying Epidemic Model

For simplicity, the model (see Figure 4) assumes a constant total population and that no new bullies come into the system from sources of strain other than being a victim of cyberbullying. This model also does not take into account a victim that does not become a bully when they are first infected, rather become a bully on a subsequent reinfection, which is certainly possible.

4. Discussion

The product of this research includes a preliminary framework for studying cyberbullying as an epidemic. The model was developed by combining and extending the system dynamics SIR epidemic model and the general strain theory with research findings in cyberbullying literature.

While research on cyberbullying is growing, new directions are warranted, including research focused upon the impact of victimization. As a result of repeated cyber abuse, victims often experience feelings related to fear, stress, depression, embarrassment, frustration, lowered self-esteem, and suicidal thoughts. These psychological impacts not only "infect" the individual being abused but the effects of such abuse often push the victim to victimize others; thus, spreading the infection more rapidly. Epidemics occur when the contagion feedback loop dominates the recovery and depletion loops (Sterman, 2000). To prevent an epidemic, mitigation strategies are needed to reduce the infection rate and increase the recovery rate; thus, preventing the system from reaching its tipping point and thereby infecting the entire population with the negative psychological consequences.

An extended epidemic model seems to be a viable framework to study the spread of the negative psychological impacts of cyberbullying. System dynamics modeling of the cyberbullying phenomenon from an epidemic point of view offers a new way to analyze the problem as well as develop and test mitigation strategies. The information gained from such modeling and simulation may aid school administrators and human resource departments in developing appropriate prevention and mitigation policies. Certainly additional research is warranted, including full development of a formal simulation model, review of the model structure and behavior by cyberbullies, victims, and cyberbullying experts, and extension of the model to include additional constructs.

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