Cyber-Bullying Among University Students: An Empirical Investigation from the Social Cognitive Perspective

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ABSTRACT
Rising incidents of, and tragedies from, cyber-bullying have alerted researchers, educators, government officials, and parents to the severe consequences of this new form of bullying. Existing research on cyber-bullying is mostly conducted without sound theoretical foundation. In addition, previous studies focus on children and adolescents; there is a paucity of empirical examination of cyber-bullying behavior among university students. Drawing from social cognitive theory and focusing on university students, this study hypothesizes about, and empirically tests the effects of, personal and environmental factors on the likelihood for university students to perform cyber-bullying behavior. The results from a survey of university students in Hong Kong reveal that social norms, as well as personal factors such as Internet self-efficacy, motivations, and cyber-victimization experience, are strong predictors of university students’ cyber-bullying behavior. This study not only enriches our understanding of determinants of cyber-bullying behavior by university students but also provides valuable insights to educators, government officials, and parents.

Keywords: Cyber-bullying, bullying, social cognitive theory, motivation, aggression

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1. INTRODUCTION

With more than two thousand millions Internet users worldwide [Internet World Stats, 2011], the Internet plays an increasingly important role in people’s daily activities. Nowadays, people, and especially youths, live with the Internet. For instance, teenagers have been found to spend more than 30 hours a week online [The Telegraph of London, 2011]. The Internet, however, has proved to be a double edged sword: although it brings unprecedented convenience to everyday life, it also provides a breeding ground for various types of undesirable behaviors, such as cyber-bullying, a type of bullying that occurs via electronic media [Li, 2006]. Traditional bullying is often caused by physical, verbal, or psychological attack or intimidation [Farrington, 1993], with the victims being repeatedly hurt in an imbalanced-power situation [Olweus, Limber, and Mahalic, 1999].

Although cyber-bullying is a relatively recent phenomenon, the prevalence and adverse consequences of such behavior have been documented by researchers in many parts of the world [Li, 2008; Menesini and Spiel, 2012; Navarro and Jasinski, 2012; Smith, et al., 2008; Vandebosch and Van Cleemput, 2009; Wang, Iannotti, and Nansel, 2009]. For instance, Raskauskas and Stoltz [2007] showed that nearly half of the adolescents surveyed were victims and about one fourth were cyber-bullies. Victims of cyber-bullying were often found to suffer high distress, emotional instability, and social anxiety. Demspey and colleagues [2009] also showed a positive relationship between online bullying and the symptoms of social anxiety. In the most extreme cases, cyber-bullying can also lead to suicide or physical harm. The widely publicized suicides of Megan Taylor Meier, Phoebe Prince, and Tyler Clementi have truly underscored the serious consequences of cyber-bullying and called attention to this new form of bullying behavior.

Cyber-bullying is clearly an important concern for government agencies, educational administrators, and parents. To take actions against cyber-bullies,
government agencies worldwide have passed or proposed legislation to reprimand cyber-bullying behavior. For instance, a number of states in the United States passed laws [e.g., the Megan Meier Cyber-Bullying Prevention Act] against electronic harassment ["Megan Meier Cyberbullying Prevention Act," 2009]. In Hong Kong, members of the legislative council have also proposed legislation to deter cyber-bullying behavior [Lee, 2010].

In addition to legislation, education on what is appropriate or inappropriate online behavior can be an important preventive measure. For instance, the U.S. Health Resources and Services Administration has set up an educational website to illustrate the consequences of cyber-bullying and to introduce strategies for preventing and coping with such behavior [Epstein and Kazmierczak, 2007]. The Hong Kong government has also established a website to provide general information about the best practices for preventing different types of cyber-crimes, including cyber-bullying [InfoSec, 2012].

Moreover, education and social welfare institutions in different countries have launched a series of surveys to better understand cyber-bullying behavior and its impact. Findings of the surveys are shared with parents and youngsters to help them tackle this issue more effectively [Hong Kong Federation of Youth Groups, 2010].

In recent years, there has an increased interest among academic researchers regarding the phenomenon of cyber-bullying. Most of the studies focus on comparing and contrasting traditional bullying and cyber-bullying behaviors [Beran and Li, 2007; Dehue, Bolman, and Vollink, 2008; Hinduja and Patchin, 2010; Law, Shapka, Hymel, Olson, and Waterhouse, 2011]; examining the prevalence of cyber-bullying [Li, 2006; Yilmaz, 2011]; and investigating the characteristics [or profiles] of cyber-bullies and cyber-victims [Katzer, Fetchenhauer, and Belschak, 2009; Navarro and Jasinski, 2012; Raskauskas and Stoltz, 2007].
Existing research on cyber-bullying is generally atheoretical, and this absence of a theoretic foundation in most of the empirical studies conducted so far [a notable exception being Zhang, Land, and Dick, 2010] hinders the scientific analysis of the cyber-bullying phenomenon [Tokunaga, 2010]. Given this apparent gap in the existing literature, the primary objective of our study is to conduct a rigorous, theory-based investigation into factors determining the likelihood of cyber-bullying behavior from the perspective of social cognitive theory.

An additional objective of our study is to examine the current state of cyber-bullying behavior among university students. The majority of prior studies on cyber-bullying focused on children and adolescents, aged from 9 to 18 years old [e.g., Dooley, Shaw, and Cross, 2012; Hinduja and Patchin, 2008; Juvonen and Gross, 2008; Raskauskas and Stoltz, 2007; Smith, et al., 2008]. There has been a scarcity of research investigating cyber-bullying behavior among university students. A recent Internet use survey revealed that 95% of young adults [18-29 years old] were active users of the Internet, representing the highest use among all the age groups [Pew Internet and American Life Project, 2010]. Since the frequency of using the computer and the Internet has been found to be an indicator of exposure to risks, young adults are likely to be exposed to cyber-bullying behavior, a known risk online [Huang and Chou, 2010; Li, 2007a, 2007b], which lends importance and relevance to our study.

Moreover, the limited number of cyber-bullying studies on university students was all conducted in non-Asian countries, such as the U.S. and Turkey. For instance, in the United States, Finn [2004] found that about 10% to 15% of 339 students at the University of New Hampshire had received threatening or harassing e-mails or instant messages and more than 50% had received unwanted pornography. Another study of 439 students in a Midwestern university in the United States revealed that 8.6% of the students had cyber-bullied others and 21.9% had been cyber-bullied [MacDonald and Roberts-Pittman, 2010].
In the Turkish context, Dilmac [2009] found that 22.5% of 666 students at Selcuk University had performed cyber-bullying and 55.3% of the students surveyed were online victims. A more recent survey of bullying via electronic media showed that 59.8% of the 579 university students recruited for the study had been cyber-bullied [Turan, Polat, Karapirli, Uysal, and Turan, 2011].

Given the prevalence of cyber-bullying behavior among university students in Western countries (as revealed from prior research), it is worthwhile to examine such behavior among university students in an Asian society, such as Hong Kong, to enhance our understanding of the cyber-bullying phenomenon.

The remainder of this paper is organized as follows. In Section 2, we introduce the theoretical foundation for this study and present the research model and related hypotheses. In Section 3, we discuss the research methodology and present the results of our data analysis. In Section 4, we conclude with a discussion of our findings, the limitations of this study, and implications for both researchers and practitioners.

2. THEORETICAL FOUNDATION AND HYPOTHESES DEVELOPMENT

Social cognitive theory, which provides a framework for understanding, predicting, and changing human behavior [Bandura, 1977, 1986], identifies human functioning as an interaction of personal, behavioral, and environmental influences. The theory posits that both personal factors (in the form of cognitive, affective, and biological events) and environmental factors (such as peer support and stressful environment) can affect the development of an individual’s behavior [Bandura, 1978]. Social cognitive theory has been widely applied to research in health [e.g., Resnicow, et al., 1997], education [e.g., McWhirter, Crothers, and Rasheed, 2000; Miltiadou and Savenye, 2003], and communication [e.g., LaRose and Eastin, 2004]. It has also been adopted to explain and predict traditional bullying behavior [e.g., Hymel, Rocke-Henderson, and Bonanno, 2005; Mouttapa,
Valente, Gallaher, Rohrbach, and Unger, 2004; Toblin, Schwartz, Hopmeyer Gorman, and Abou-ezzeddine, 2005] and aggression [e.g., Anderson and Huesmann, 2003; Schwartz, et al., 1998].

Drawing from social cognitive theory and a comprehensive review of prior research on bullying and cyber-bullying, we focus on cyber-victimization experience, Internet self-efficacy, motivations, and demographics [age and gender] as the personal factors, and social norm as the environmental factor determining university students’ likelihood to engage in cyber-bullying behavior. Figure 1 depicts the research model.

![Figure 1. Research Model](image-url)
2.1. Personal Factors

In this section, we advance hypotheses about the important role that personal factors play in influencing cyber-bullying behavior.

2.1.1. Internet Self-Efficacy

Self-efficacy refers to “people’s judgment of their capabilities to organize and execute courses of action required to attain designated types of performance” [Bandura, 1986, p. 391]. It has been confirmed extensively that the stronger the perceived self-efficacy, the more likely that an individual will take on a task [e.g., Hsu and Chiu, 2004; Olivier and Shapiro, 1993]. Whereas individuals generally shy away from tasks where their self-efficacy is low, they will engage in tasks where they are more optimistic about their capabilities. For instance, prior research reveals that health behaviors such as quitting smoking, physical exercise, dental hygiene, and breast self-examination are dependent on one’s perception of self-efficacy [Conner and Norman, 2005]. Andrew [1998] found that high levels of self-efficacy boosted students’ academic performance. In traditional bullying studies, researchers also showed that students with higher self-efficacy were more likely to perform bullying behaviors [Bulach, Fulbright, and Williams, 2003; Natvig, Albrektsen, and Qvarnstrom, 2001].

In this study, Internet self-efficacy is adopted to measure an individual’s perception or judgment of his or her ability to accomplish tasks across the Internet application domains [Hsu and Chiu, 2004]. Compared with self-efficacy, it is a more specific construct emphasizing the effective establishment, maintainability, and utilization of general Internet use [Eastin and LaRose, 2000]. Prior research on cyber-bullying [Vandebosch and Van Cleemput, 2009] has revealed that most cyber-bullies considered themselves as Internet experts [Ybarra and Mitchell, 2004b], suggesting that individuals with a higher level of perceived Internet self-efficacy are more likely to engage in cyber-bullying behavior. Therefore, we hypothesize:
Hypothesis 1: Internet self-efficacy will positively affect the likelihood of committing cyber-bullying.

2.1.2. Motivation

In a nutshell, motivation studies why people think and behave as they do [Hofstede, 1980]. It has been widely recognized as an indispensable cause of human behavior [Bullock, Wong-Lo, and Gable, 2011], such as bullying [Skues, Cunningham, and Pokharel, 2005], aggression [Collins, 1973; Kornadt, 1984], violence [Hamberger, Lohr, Bonge, and Tolin, 1997], sexual abuse [Burk and Burkhart, 2003], and addiction [Saunders and Wilkinson, 1990]. In this study, we draw from literature on aggression [e.g., Edwards, 1999] to understand the effect of motivation on cyber-bullying behavior (a form of online aggressive behavior).

Motivation is goal-driven [Fontaine, 2007; Geen and Green, 2001]. In this study, we focus on power, attention, and acceptance [Reiss, 2004] as the instrumental drivers of cyber-bullying behavior. Power is the desire to control or influence others [Reiss, 2004]. Since the role of authority and power is generally emphasized in societies and organizations alike, people would attempt aggressive acts, such as cyber-bullying, to establish authority and demonstrate coercive power over others [Felson, 1984] as well as to build self-worth that ultimately leads to self-development [Tedeschi and Felson, 1994].

The craving for attention is intrinsic to human nature and is the motive for most of our actions [Ganesh, 2011]. Scholer and colleagues [2008] found that children often engaged in harmful behaviors to draw attention from others, rather than to intentionally hurt others. Attention-getting has also been confirmed as a motivator for traditional bullying [Cunningham, Cunningham, Ratcliffe, and Vaillancourt, 2010; Francis, 2011].

Acceptance is the desire for social or peer approval [Reiss, 2004]. Prior research has shown that bullies may perpetrate bullying or cyber-bullying behavior to seek peer approval; e.g., to impress their friends [Varjas, Talley,
Meyers, Parris, and Cutts, 2010]. Individuals, especially youngsters, are found to derive self-benefits in the form of enhanced self-esteem when they gain social approval from their peers [Benson and Spilka, 1973; Twenge and Campbell, 2001].

In sum, individuals with a high desire for power, attention, or acceptance will be more likely to perform cyber-bullying behavior. Thus, we hypothesize:

Hypothesis 2: Motivations (i.e., the desire for power, attention, or acceptance) will positively affect the likelihood of committing cyber-bullying.

2.1.3. Cyber-Victimization Experience

Behavioral acquisition or adoption always comes from learning and observation [Latham and Saari, 1979; Manz and Sims, 1986; Schunk, 1981]. Social cognitive theory [Bandura, 1978] asserts that individuals can observe behaviors of others and then reproduce the same actions. The cycle of violence hypothesis also postulates that individuals learn violent behaviors by being the victims of the aggressive behavior [Burgess, Hartman, and McCormack, 1987; McCord, 1988].

Empirical evidence is largely supportive of both theories. For instance, Ryan [1989] has noted the relationship between the victims and victimizers in sexual aggression and found that youths’ sexual aggression often stemmed from their own victimization experience. Victimization has also been shown to increase children’s likelihood of committing violent criminal behavior, such as robbery, burglary, and assault [Widom, 1989; Widom, Maxfield, and Justice, 2001].

In addition, previous research on cyber-bullying has revealed the positive impact of cyber-victimization experience on cyber-bullying behavior [Espelage and Swearer, 2003; Li, 2007b; Walrave, 2009; Ybarra and Mitchell, 2004a]. Individuals who have been victims of cyber-bullying are more likely
to commit cyber-bullying in the future, via the process of learning from and reproducing other bullies’ behavior. We thus hypothesize:

*Hypothesis 3: Cyber-victimization experience will positively influence the likelihood of committing cyber-bullying.*

### 2.1.4. Demographics

*Demographics* includes age and gender.

**Age.** Early bullying studies suggested a positive relationship between age and bullying, because growing up implies better physical strength and power [Olweus, 1993]. More recent research, however, has reported distinct relationships between age and different types of bullying behaviors. Whereas younger adolescents (most of whom lack social skills such as emotional control and social expressivity) were more likely to engage in physical bullying [Brame, Nagin, and Tremblay, 2001], older individuals (who are more socially competent) were more likely to commit verbal attacks and relational aggression [Espelage, Mebane, and Swearer, 2004; Rys and Bear, 1997]. In the online context, empirical evidence has also been mixed. Some researchers found that cyber-bullying behavior increased with age [e.g., Hinduja and Patchin, 2008; Kowalski and Limber, 2007; Raskauskas and Stoltz, 2007; Ybarra, Mitchell, Finkielhor, and Wolak, 2007; Ybarra, Mitchell, Wolak, and Finkielhor, 2006]. Others reported a negative relationship between age and incidents of cyber-bullying [e.g., Dehue, et al., 2008; Sevcikova and Smahel, 2009].

In this study, we hypothesize a negative relationship between age and cyber-bullying behavior for two reasons. First, prior research on antisocial behavior has shown that the rates of offending appear highest during adolescence, peaking at about age 17 and dropping precipitously in young adulthood [Moffitt, 1993]. Most people are only temporarily involved in antisocial behaviors (when they are teenagers); they become more pro-social when they grow up, as a result of learning, mental development, and emotional maturity [Moffitt, 1993]. For
instance, a survey conducted by the U.S. Federal Bureau of Investigation [2003] revealed that the majority of criminal offenders were young adolescents (at 17 to 18 years old), with arrest rates decreasing and continuing to slow down in adulthood. Since our study focuses on university students (who are generally over 18 years old), we expect the incidents of cyber-bullying behavior to drop with the increase in age of the students. Second, anonymity on the Internet, as well as the elimination of physical strength as a necessary condition to perform aggressive behavior online, allows those who are younger and physically weaker to engage in cyber-bullying activities. Thus, we hypothesize:

*Hypothesis 4: Age will negatively influence the likelihood of committing cyber-bullying.*

**Gender.** Males have been found in many previous studies to be more aggressive than females [Eagly and Steffen, 1986; White, 1983]. This gender difference in performing aggressive acts may be due to biological predisposition [Eagly and Steffen, 1986; Frodi, 1978; Frodi, Macaulay, and Thome, 1977]. For instance, the size of the amygdala has been found to be positively associated with aggressive behavior, and in general the size of the male amygdala is larger than that of the female amygdala [Vochteloo and Koolhaas, 1987].

The gender difference in aggressive behavior may also be explained by traditional gender roles and cultural norms [Bandura, 1973; Berkowitz, 1989]. Traditionally, braveness, independence, and aggressiveness are valued characteristics for males, whereas females are expected to be benevolent and tolerant [Maccoby, 1998]. In every culture, males have assumed a dominant role for protecting their families and countries [Aldous, 1969; Bielby and Bielby, 1992].

In the online context, prior research has revealed that more than half of the males surveyed had committed cyber-bullying, compared with a much lower percentage for females [Li, 2007b; Wang, et al., 2009; Ybarra, et al., 2006].
suggesting that the gender stereotype may still sustain in the cyber-bullying context [Huang and Chou, 2010; Slonje and Smith, 2008]. Therefore, we hypothesize:

\textit{Hypothesis 5: Males will more be likely to commit cyber-bullying than females.}

2.2. \textbf{Environmental Factor: Social Norm}

According to social cognitive theory, social influence as an environmental factor can shape individuals’ behavior [Bandura, 1977, 1986]. Social influence is an important source of “verbal persuasion” [Bandura, 1986]; it is similar to the concept of \textit{social norm}, which refers to an individual’s perception that people who are important to him or her think that he or she should or should not perform certain behavior [Fishbein and Ajzen, 1975]. Huesmann and Guerra [1997] found that youngsters who held normative beliefs about aggressive behaviors were more likely to perpetrate such behavior. Similar findings have been reported by studies on traditional bullying [Bentley and Li, 1995; Espelage and Swearer, 2003]. Likewise, in the online context, individuals will be more likely to engage in cyber-bullying behavior if important parties approve of such behavior. Thus, we hypothesize:

\textit{Hypothesis 6: Social norm will positively influence the likelihood of committing cyber-bullying.}

3. \textbf{RESEARCH METHODOLOGY}

The target respondents in this study were current university students in Hong Kong. A total of 288 usable questionnaires were collected in June 2011, via invitations posted both off-line and online. Participation was on a voluntary basis. The questionnaire consisted of three parts designed to (1) collect respondents’ demographic and background information, (2) probe their knowledge of, and
their experience with, cyber-bullying and cyber-victimization, and (3) explore factors contributing to cyber-bullying behavior.

The measurement items for potential predictors of cyber-bullying behavior were borrowed from prior research with modifications of question wording to fit the specific context of cyber-bullying. Multi-item measures were used for each construct to ensure construct validity and reliability. Internet self-efficacy was measured by four items, adapted from Hsu and Chiu [2004]. Social norm was measured by three items borrowed from Venkatesh and colleagues [2003]. The measurements for the three types of motivations (i.e., power, acceptance, and attention) were borrowed from Reiss [2004]. All the above-mentioned measurements (see Appendix) were phrased as questions on 7-point Likert scales, from strongly disagree (1) to strongly agree (7). Age was ranged from 18 to more than 30 years old. Gender was indicated by a dummy variable [Male = 1, Female = 0].

Prior to the study, we identified six types of cyber-bullying behavior (summarized in Table 2 in the next section) from a comprehensive review of prior literature. In the questionnaire, both cyber-bullying and cyber-victimization were measured on 5-point scales, ranging from Never (1) to 11 or more (5), reflecting the frequency in performing cyber-bullying behavior or suffering from cyber-victimization.

4. DATA ANALYSIS AND RESULTS

This section presents information on descriptive statistics and assessment of measurement and structural models.

4.1. Descriptive Statistics

In this section, we present the descriptive statistics about the respondents’ demographic data and their experience with cyber-bullying and cyber-victimization.
4.1.1. Demographic Data

As indicated in Table 1, our respondents consisted of 100 males (34.7% of total) and 188 females (65.3%). More than 94% of the respondents were between the ages of 18 and 25 years. A vast majority spent at least three hours each day on the computer (87.2%) and on the Internet (79.2%).

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Demographic Profile of the Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Respondents</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>188</td>
</tr>
<tr>
<td>Male</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>18-21 years</td>
<td>119</td>
</tr>
<tr>
<td>22-25 years</td>
<td>152</td>
</tr>
<tr>
<td>26-30 years</td>
<td>11</td>
</tr>
<tr>
<td>&gt;30 years</td>
<td>6</td>
</tr>
<tr>
<td>Hours on Computer per Day</td>
<td>Less than 1 hour</td>
</tr>
<tr>
<td></td>
<td>1-2 hours</td>
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<td></td>
<td>3-4 hours</td>
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<td></td>
<td>5-6 hours</td>
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<tr>
<td></td>
<td>7 hours or more</td>
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<tr>
<td>Hours on the Internet per Day</td>
<td>Less than 1 hour</td>
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<td></td>
<td>1-2 hours</td>
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<td>3-4 hours</td>
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<td></td>
<td>5-6 hours</td>
</tr>
<tr>
<td></td>
<td>7 hours or more</td>
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</table>
4.1.2. Cyber-Bullying and Cyber-Victimization Experience

As shown in Table 2, the results of our data analysis reveal that, among the six types of cyber-bullying behavior, “deliberately ignoring or excluding someone from an online activity” was the one of the most frequently perpetrated behaviors by respondents (47.9%). Among cyber-victims, 43.8% reported that they had been victims of the behavior “disseminating private information/messages or posting images/videos without permission.”

<table>
<thead>
<tr>
<th>Types of Cyber-Bullying Behavior</th>
<th>Cyber-Victims</th>
<th>Cyber-Bullies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sending threatening, harassing, humiliating, insulting and teasing messages, images, or videos</td>
<td>122 [42.4]</td>
<td>23 [8.0]</td>
</tr>
<tr>
<td>Disseminating private information/messages or posting images/videos without permission</td>
<td>126 [43.8]</td>
<td>71 [24.7]</td>
</tr>
<tr>
<td>Spreading rumors or gossips</td>
<td>41 [14.2]</td>
<td>20 [6.9]</td>
</tr>
<tr>
<td>Deliberately ignoring or excluding someone from an online activity</td>
<td>86 [29.9]</td>
<td>138 [47.9]</td>
</tr>
<tr>
<td>Pretending to be someone to send or post messages in someone’s name</td>
<td>34 [11.8]</td>
<td>21 [7.3]</td>
</tr>
<tr>
<td>Attacking online accounts or modifying others’ profile</td>
<td>69 [24.0]</td>
<td>8 [2.8]</td>
</tr>
</tbody>
</table>

Consistent with prior research on bullying and cyber-bullying, our results (see Table 3) show that more than half (51.7%) of the respondents were both
bullies and victims in cyberspace, with 60.4% having engaged in cyber-bullying behavior and 71.9% having been cyber-victims.

<table>
<thead>
<tr>
<th>Roles</th>
<th># of Respondents [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyber-Bully</td>
<td>174 [60.4]</td>
</tr>
<tr>
<td>Cyber-Victim</td>
<td>207 [71.9]</td>
</tr>
<tr>
<td>Cyber-Bully and Cyber-Victim</td>
<td>149 [51.7]</td>
</tr>
</tbody>
</table>

4.2. Assessment of Measurement and Structural Models

The partial least squares (PLS, as implemented in SmartPLS 2.0.M3) was used in this study to assess both the measurement model and the structural model [Hair, Anderson, Tatham, and Black, 1998].

4.2.1. Measurement Model

All the constructs, except for cyber-victimization experience and cyber-bullying, were modeled as reflective ones. We will first present the validation of the two formative constructs and then assess the reliability and validity of the reflective constructs in accordance with established guidelines [Gefen and Straub, 2005].

Validation of Formative Constructs. In this study, cyber-victimization experience and cyber-bullying were modeled as formative constructs. Unlike in the case of reflective constructs (where the indicators are caused by the constructs), the indicators of formative constructs cause the constructs [Diamantopoulos and Siguaw, 2006]. Since the indicators are not expected to correlate highly with one another (and are thus not interchangeable), dropping one of the indicators may result in a change of the meaning of the construct [Diamantopoulos and Siguaw, 2006; Petter, Straub, and Rai, 2008].
From an exhaustive literature review, we identified six distinct types of cyber-bullying behavior (shown earlier in Table 2). Because (1) each of the six types of behavior is not substitutable by any other behavior and (2) the presence of one behavior does not necessitate the presence of another behavior, the six types of cyber-bullying behavior were modeled as formative indicators of both cyber-victimization and cyber-bullying, from the perspective of victims or perpetrators.

We assessed the validity of cyber-victimization experience and cyber-bullying in accordance with established guidelines [Cenfetelli and Bassellier, 2009; Petter, et al., 2008]. First, we tested multi-collinearity among the indicators by computing the variance inflation factor (VIF) of each indicator. As shown in Table 4, the results indicate that all the VIFs ranged from 1.089 to 1.276 for cyber-victimization experience and 1.056 to 1.194 for cyber-bullying, both below the 3.33 threshold, thus indicating that multi-collinearity was not present [Diamantopoulos and Siguaw, 2006; Petter, et al., 2008].

<table>
<thead>
<tr>
<th>Formative Items</th>
<th>Cyber-Victimization</th>
<th>Cyber-Bullying</th>
</tr>
</thead>
<tbody>
<tr>
<td>Send insulting and teasing messages, images, or videos</td>
<td>1.196</td>
<td>1.170</td>
</tr>
<tr>
<td>Disseminating private information/messages or posting images/videos without permission</td>
<td>1.276</td>
<td>1.168</td>
</tr>
<tr>
<td>Spreading rumors or gossips</td>
<td>1.193</td>
<td>1.194</td>
</tr>
<tr>
<td>Deliberately ignoring or excluding someone from an online activity</td>
<td>1.089</td>
<td>1.075</td>
</tr>
<tr>
<td>Pretending to be someone to send or post messages in someone’s name</td>
<td>1.139</td>
<td>1.103</td>
</tr>
<tr>
<td>Attacking online accounts or modifying other’s profile</td>
<td>1.171</td>
<td>1.056</td>
</tr>
</tbody>
</table>
Second, we assessed the weight of the indicators (see Table 5, next page) and found that the weights of all paths (i.e., the relative contribution) toward cyber-victimization (except that of spreading rumors and attacking online accounts) were significant. For cyber-bullying, the weights of all the indicators were significant. Although two indicators (spreading rumors and attacking online accounts) had a relatively small contribution to constructs, their absolute contribution (i.e., zero-order bivariate loadings) was quite strong. For instance, spreading rumors had a strong absolute contribution to cyber-victimization at 0.551. Although the absolute contribution of attacking online accounts or modifying other’s profile was only 0.287 to cyber-victimization, it had an important absolute contribution to cyber-bullying. Since we wanted to explore the potential relationship between the likelihood of performing cyber-bullying and the different types of cyber-victimization experience, we decided to keep both indicators in our study, following the suggestion of Cenfetelli and Bassellier [2009].

**Validation of Reflective Constructs.** For reflective constructs, individual item reliability, internal consistency, and discriminant validity were examined following the approaches to testing measurement models in PLS suggested by Barclay et al. [1995] and Gefen and Straub [2005]. Individual item reliability was examined by the loadings of measures with their corresponding construct (see Table 6). All of the loadings exceeded 0.7, indicating good item reliability.

Internal consistency was assessed by examining the composite reliability index developed by Fornell and Larcker [1981], a measure of reliability similar to Cronbach’s alpha. The benchmark for acceptable reliability is 0.7. All constructs met this criterion (see Table 7), indicating that the measures had good internal consistency.
## Table 5
T-Value, Item Weights, and Loadings of Formative Measures

<table>
<thead>
<tr>
<th>Formative Items</th>
<th>Cyber-Victimization</th>
<th></th>
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<th>Cyber-Bullying</th>
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<tbody>
<tr>
<td></td>
<td>T-Statistic</td>
<td>Weight</td>
<td>Loading</td>
<td>T-Statistic</td>
<td>Weight</td>
<td>Loading</td>
</tr>
<tr>
<td>Sending threatening, harassing, humiliating, insulting and teasing messages, images, or videos</td>
<td>3.140***</td>
<td>0.271</td>
<td>0.603</td>
<td>4.938***</td>
<td>0.398</td>
<td>0.672</td>
</tr>
<tr>
<td>Disseminating private information/messages or posting images or videos without permission</td>
<td>3.362***</td>
<td>0.457</td>
<td>0.744</td>
<td>3.031***</td>
<td>0.273</td>
<td>0.632</td>
</tr>
<tr>
<td>Spreading rumors or gossips</td>
<td>1.240</td>
<td>0.176</td>
<td>0.551</td>
<td>4.478***</td>
<td>0.330</td>
<td>0.550</td>
</tr>
<tr>
<td>Deliberately ignoring or excluding someone from an online activity</td>
<td>3.997***</td>
<td>0.455</td>
<td>0.734</td>
<td>4.207***</td>
<td>0.271</td>
<td>0.639</td>
</tr>
<tr>
<td>Pretending to be someone to send or post messages in someone’s name</td>
<td>1.728*</td>
<td>0.174</td>
<td>0.388</td>
<td>4.046***</td>
<td>0.254</td>
<td>0.464</td>
</tr>
<tr>
<td>Attacking online accounts or modifying other’s profile</td>
<td>0.044</td>
<td>-0.004</td>
<td>0.287</td>
<td>3.011***</td>
<td>0.286</td>
<td>0.308</td>
</tr>
</tbody>
</table>

Note:
* *p<0.100
** *p<0.050
*** *p<0.010
Table 6

Loading and Cross-Loading of Measures

<table>
<thead>
<tr>
<th></th>
<th>Motivation</th>
<th>Internet Self-Efficacy</th>
<th>Social Norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motivation 1</td>
<td>0.973</td>
<td>0.004</td>
<td>0.294</td>
</tr>
<tr>
<td>Motivation 2</td>
<td>0.981</td>
<td>0.001</td>
<td>0.278</td>
</tr>
<tr>
<td>Motivation 3</td>
<td>0.973</td>
<td>0.067</td>
<td>0.291</td>
</tr>
<tr>
<td>Internet Self-Efficacy 1</td>
<td>-0.017</td>
<td>0.687</td>
<td>-0.204</td>
</tr>
<tr>
<td>Internet Self-Efficacy 2</td>
<td>0.002</td>
<td>0.808</td>
<td>-0.118</td>
</tr>
<tr>
<td>Internet Self-Efficacy 3</td>
<td>0.081</td>
<td>0.822</td>
<td>0.045</td>
</tr>
<tr>
<td>Internet Self-Efficacy 4</td>
<td>-0.042</td>
<td>0.710</td>
<td>-0.054</td>
</tr>
<tr>
<td>Social Norm 1</td>
<td>0.290</td>
<td>-0.017</td>
<td>0.927</td>
</tr>
<tr>
<td>Social Norm 2</td>
<td>0.247</td>
<td>-0.110</td>
<td>0.911</td>
</tr>
<tr>
<td>Social Norm 3</td>
<td>0.230</td>
<td>-0.073</td>
<td>0.788</td>
</tr>
</tbody>
</table>

Table 7

Internal Consistency and Discriminant Validity of Constructs

<table>
<thead>
<tr>
<th></th>
<th>Composite Reliability</th>
<th>Cronbach’s Alpha</th>
<th>Average Variance Extracted</th>
<th>M</th>
<th>ISE</th>
<th>SN</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>0.98</td>
<td>0.98</td>
<td>0.95</td>
<td>0.976</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISE</td>
<td>0.85</td>
<td>0.77</td>
<td>0.58</td>
<td>0.025</td>
<td>0.759</td>
<td></td>
</tr>
<tr>
<td>SN</td>
<td>0.91</td>
<td>0.85</td>
<td>0.77</td>
<td>0.295</td>
<td>-0.069</td>
<td>0.877</td>
</tr>
</tbody>
</table>

Note 1: Bolded diagonal elements are the square root of AVE for each construct. Off-diagonal elements are the correlations between constructs.

Note 2:
M = Motivation
ISE = Internet Self-Efficacy
SN = Social Norm
Barclay et al. [1995] suggest two criteria for discriminant validity. First, the square root of AVE of a construct should be greater than the correlations of the construct with other constructs, thus indicating that the construct shares more variance with its own measures than it shares with other constructs in a model. This criterion was satisfied by the current data, as shown in Table 7. Second, no item should load higher on a construct than on the one it intends to measure. An examination of the loadings and cross-loadings of measures shown in Table 6 reveals that all items satisfied this criterion.

4.2.2. Assessment of Structural Model

The results of the structural model from PLS, including path coefficients, explained variances, and significance levels, are illustrated in Figure 2. The results show that cyber-victimization experience ($\beta=0.338; p<0.01$), Internet self-efficacy ($\beta=0.092; p<0.01$), social norm ($\beta=0.069; p<0.05$), and motivation ($\beta=0.530; p<0.01$) had significant positive effect on the likelihood of performing cyber-bullying behavior. In addition, age ($\beta=-0.088; p<0.01$) and gender ($\beta=-0.072; p<0.01$) were found to exert a significant negative impact on cyber-bullying, suggesting that older students and male students were less likely to engage in cyber-bullying behavior.

In sum, all the hypotheses [except H5] were supported by our data.
5. CONCLUSION AND DISCUSSION

This section presents the conclusions of our study, discusses the implications for research and practice, and explains the limitations and opportunities for future research.

5.1. Conclusions of the Study

The primary objective of this study was to investigate factors determining the cyber-bullying behavior of university students. The results of a survey of university students in Hong Kong reveal that both personal and environmental factors are important predictors of cyber-bullying behavior.
Consistent with social cognitive theory and prior research on traditional bullying, Internet self-efficacy was found to have a significant positive influence on cyber-bullying behavior. University students who had more expertise in operating the Internet and using Internet applications were more likely to perform different types of online bullying behavior (e.g., sending harassing messages, modifying images, or posting videos) without others’ technical support and assistance.

In addition, consistent with social cognitive theory, the cycle of violence hypothesis, and prior cyber-bullying research [Beran and Li, 2007; Varjas, Henrich, and Meyers, 2009], cyber-victimization experience was found to exert a strong positive impact on the likelihood to perform cyber-bullying behavior. University students may have learned such behavior from their experience being victims of cyber-bullying [Burgess, et al., 1987; McCord, 1988]. Exposure to violence from different channels may have also lessened their perception of the negative consequences of aggressive behavior [Baldry, 2003], and thus lowered their inhibition in performing such behaviors.

Social norm was also found to have a significant impact on the likelihood of cyber-bullying. Consistent with the predication of social cognitive theory [Bandura, 1986], university students had a greater tendency to engage in cyber-bullying behavior when they held positive normative beliefs about such behavior (i.e., when they believed that people who were important to them approved of such behavior).

Motivation was revealed to be the strongest predictor of cyber-bullying. University students who desired power, attention, and/or peer approval were significantly more likely to perpetrate cyber-bullying behavior. This finding is consistent with that of Campbell [1982], who has identified self-worth, the need for acceptance, and social approval as core factors contributing to aggressive acts. The finding is also consistent with Workman’s [2010] research, which reveals
that people were more inclined to perform cyber-harassment when they needed social acceptance or approval.

Both age and gender were found to be significant predictors of cyber-bullying behavior. University students who were older (an indicator of cognitive and emotional maturity) were less likely to engage in cyber-bullying behavior, a finding that is consistent with that of previous studies and confirmative of our expectations. However, contrary to our expectations, female students were found to have a greater tendency to perform cyber-bullying behavior compared with males. Although this finding is different from that of most bullying and cyber-bullying studies conducted previously, it does have some empirical support in prior research [e.g., Kowalski, Limber, and Agatston, 2008]. For instance, research on traditional bullying and aggression shows that females prefer relational and verbal aggression to physical aggression [Athanasiades and Deliyanni Kouimtzis, 2010; Chisholm, 2006]. The Internet (which confers anonymity in communication) has provided an ideal platform for females to perpetrate such relational/verbal aggression [Crick, Casas, and Nelson, 2002] as spreading rumors, excluding someone from their social network, and sending harassing messages. Future research can further explore gender effect on different types of cyber-bullying behavior.

5.2. Implications for Research and Practice

This study makes several contributions to cyber-bullying research. First, it is one of the first attempts to study cyber-bullying in a rigorous, theory-driven manner. Drawing from social cognitive theory, this study identifies potential predictors of cyber-bullying and empirically tests their effects on individuals’ likelihood to engage in cyber-bullying behavior. This study enhances our understanding of the personal and environmental factors affecting cyber-bullying behavior and thus contributes to theory building in this area of research.
Second, by examining the cyber-bullying behavior of university students in Hong Kong, this study addresses an additional gap in prior literature – the paucity of cyber-bullying research on university students, particularly university students in Asia. The study thus enriches our knowledge of the prevalence and the predictors of cyber-bullying behavior in a demographic sector and geographical area not studied extensively in prior literature.

This study also has significant implications for practice. The results of the study can alert government agencies, university administrators, and parents to the prevalence of cyber-bullying behavior among university students, and particularly university students in Hong Kong. Appropriate legislation, policies, and education/training programs aimed to prevent and deter acts of cyber-bullying among university students can then be devised and implemented. For instance, as social norm is found to exert significant impact on the likelihood to perform cyber-bullying behavior, parents, teachers, siblings, and peers can take an active role in dissuading their children, students, brothers and sisters, and fellow students from engaging in cyber-bullying.

5.3. Limitations and Future Research

This study has a number of limitations. First, the results of the study show that only 67.6% of the variance of cyber-bullying has been explained by personal and environmental factors. Future research may explore the impact of other factors (e.g., traditional bullying experience, self-control, emotional regulation) on cyber-bullying behavior. Second, since this study is based on self-reports, respondents may have over- or under-reported their cyber-bullying behavior and cyber-victimization experience. Future research may supplement self-reports with data collected from educators and parents. Third, this study gathered data from 288 Hong Kong students. The generalization of the findings of this study to a different context needs caution.
APPENDIX: MEASUREMENT ITEMS

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item</th>
<th>Measures</th>
<th>Adapted from</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet Self-Efficacy</td>
<td>ISE1</td>
<td>I know how to find information by using a search engine.</td>
<td>Hsu and Chiu [2004]</td>
</tr>
<tr>
<td></td>
<td>ISE2</td>
<td>I know how to download or upload files.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISE3</td>
<td>I know how to install an application or software.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ISE4</td>
<td>I know how to exchange messages or chat with other users online.</td>
<td></td>
</tr>
<tr>
<td>Social Norm</td>
<td>SN1</td>
<td>People who are important to me think that it is acceptable to harass or act aggressively toward others on the Internet.</td>
<td>Venkatesh et al. [2003]</td>
</tr>
<tr>
<td></td>
<td>SN2</td>
<td>People in my life whose opinions I value think that it is all right to harass or act aggressively toward others on the Internet.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SN3</td>
<td>People who influence my behavior think that it is cool to harass or act aggressively toward others on the Internet.</td>
<td></td>
</tr>
<tr>
<td>Motivation</td>
<td>M1</td>
<td>Power</td>
<td>Reiss [2004]</td>
</tr>
<tr>
<td></td>
<td>M2</td>
<td>Acceptance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M3</td>
<td>Attention</td>
<td></td>
</tr>
</tbody>
</table>

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