THE INSTIGATING, IMPELLING, AND INHIBITING FORCES IN CYBERBULLYING PERPETRATION ACROSS GENDER

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Abstract

Internet provides youths with a new breeding ground for misbehavior. Cyberbullying is one of the most prevalent online misbehavior that has recently received public attention due to its potentially devastating consequences. Drawing on I^3 theory, we develop a research model to investigate the driving and mitigating forces of cyberbullying perpetration. We further examine the moderating role of gender on the effect of forces on cyberbullying perpetration. An online survey of 211 university students was conducted to empirically validate the research model. Results show that both cyberbullying victimization and perceived online disinhibition can increase individual's tendency to perpetrate cyberbullying, whereas subjective norm as the inhibiting force represses the propensity to cyberbully others. Furthermore, the power of the factors influencing cyberbullying perpetration is different between male and female students. The effects of instigating and inhibiting forces are stronger for female students than for male students, while the effect of impelling force is stronger for male students than for female students. We expect that this study will not only provide a theoretical explanation of cyberbullying perpetration but also offer valuable insights to related parties in their effort to tackle cyberbullying perpetration among university students.

Keywords: Cyberbullying perpetration, cyberbullying victimization, gender, I^3 theory, instigating, impelling, inhibiting

1   INTRODUCTION

Individuals, especially youths and young adults, live with the Internet and have shifted their mode of communication from face-to-face to online (Nixon 2014). One unfortunate development with the use of information communication technologies (ICT) in online communication is the emergence of cyberbullying behaviors. Cyberbullying is an aggressive act that is performed through ICT to inflict harm or discomfort on others (Kowalski et al. 2014). A worldwide cyberbullying survey conducted by Microsoft Corporation (Microsoft Corporation 2013) has highlighted the magnitude of cyberbullying and called attention to the devastating situation of cyberbullying in Asia. The study showed that, among the twenty-five countries surveyed, the prevalence of cyberbullying was particularly high in Asia. For example, 70% of respondents in China has experienced cyberbullying. Furthermore, 54% of youths felt worried about cyberbullying, especially among senior students who had better knowledge about cyberbullying incidents.

The prevalence and adverse consequences of cyberbullying have also captured researchers' attention in many parts of the world (Görzig & Ólafsson 2013; Menesini et al. 2012; Navarro & Jasinski 2012; Smith et al. 2008). Kowalski et al. (2014) reviewed the previous studies and found that the prevalent rate of cyberbullying victimization (ranged from 10-40%) and cyberbullying perpetration (ranged from 3-36%) were considerably high in general. Other studies have documented the significant psychological and social impacts for both victims and perpetrators resulted from cyberbullying (Moore et al. 2012). Victims of cyberbullying are often found to suffer from psychological problems, such as anxiety, depression, emotional problems, and low self-esteem (Schultze-Krumbholz et al. 2012), and psychosocial problems, such as poor social relationships, delinquency and suicide. On the other hand, perpetrators of cyberbullying are frequently associated with various internalizing problems, such as suicidal ideation and negative emotions (Patchin & Hinduja 2011), as well as externalizing problems, such as poor social relationship, illegal behaviors, and delinquent behaviors (Ybarra & Mitchell 2004a). Instead of simply causing a temporarily negative feeling, cyberbullying can have a profound devastating impact on individuals' daily and social lives, and thus is an issue we cannot afford to overlook.

The limited number of studies on cyberbullying perpetration are exploratory in nature, characterized by a focus on investigating demographic, perceptual, and motivational factors associated with online aggressive behavior (Hinduja & Patchin 2008) as well as a lack of theoretical guidance. In addition, cyberbullying research has thus far received scant attention from IS researchers, and thus is still in its infancy in the field. As a form of bullying enabled by ICT, cyberbullying and its impact are IS-related problems worthy of serious scholarly investigation in the IS academic community. As much of the scholarly attention on cyberbullying has been directed to adolescents (Dehue et al. 2008; Dredge et al. 2014; Heirman & Walrave 2012), this study has as its first objective to advance the theoretical understanding of cyberbullying perpetration among university students in the IS literature. Particularly, we draw on I^3 theory to explain the development of cyberbullying perpetration.

Studies on traditional bullying have consistently shown that males are more likely than females to be involved in bullying behavior, and that the aggression by males is more often of a direct nature (Olweus & Limber 2010). However, unlike traditional bullying, cyberbullying does not involve physical contact between the bully and the victim, and is often viewed as a special form of relational or indirect aggression. To date, research has shown mixed results regarding gender-related effects in cyberbullying (Heiman & Olenik-Shemesh 2013; Hinduja & Patchin 2008). Furthermore, most studies only focused on gender differences in the prevalence of cyberbullying (Beckman et al. 2013; Li 2007); there is a lack of theoretical insight into gender differences with respect to the underlying motives of cyberbullying. Thus, the second objective of this study is to explore gender differences in cyberbullying perpetration among university students.

To address the research gaps discussed above, this study aims to answer the following research questions.

1. *What are the factors driving university students to engage in cyberbullying perpetration?*

2. *How does gender difference influence the development of cyberbullying perpetration?*

We expect that the results of the study will advance the theoretical understanding of cyberbullying perpetration, and will help policy makers, educators, and parents identify risk factors associated with cyberbullying perpetration. The remainder of paper is organized as follows. In the next section, we introduce the theoretical foundation of this study and present the research model and related hypotheses. Then, we discuss the research methodology and present the results of data analysis. Finally, we conclude with discussion and implications for both research and practice.

2 THEORETICAL FOUNDATION AND HYPOTHESES DEVELOPMENT

In this study, we attempt to explain the development of cyberbullying perpetration based on I^3 theory. I^3 theory (pronounced as I-cubed theory), a relatively new meta-theory developed by Finkel and colleagues (Finkel 2014; Slotter & Finkel 2011), provides a comprehensive framework for categorizing risk factors promoting, aggravating, or mitigating aggressive behaviors. There are three major forces associated with aggressive behavior:

▪ Instigating Force: The situational events or circumstances that may normatively incite or arouse individuals toward aggression

▪ Impelling Force: The dispositional or situational factors that increase individuals' likelihood to act aggressively

▪ Inhibiting Force: The dispositional or situational factors that increase individuals' likelihood to override their urge to aggress, which in turn attenuates their aggressive acts

Cyberbullying perpetration represents an aggressive act carried out through electronic means (Smith et al. 2008). Since research on cyberbullying attempts to identify the risk factors leading to its victimization and perpetration, I^3 theory is a well-suited research framework for studying this phenomenon. Through the theoretical lens of I^3 Theory, we attempt to understand the factors instigating, impelling and inhibiting cyberbullying perpetration. More specifically, based on a comprehensive review of prior research on traditional bullying and cyberbullying, we identify cyberbullying victimization and perceived online disinhibition as instigating and impelling forces of cyberbullying perpetration respectively. We also propose subjective norm as an inhibiting force that suppresses cyberbullying perpetration.

The I^3 Theory also emphasizes the analysis of male and female discrepancies in aggressive acts with regard to instigating triggers, impelling forces, and/or inhibiting forces (Finkel & Slotter 2009). As noted by Patchin and Hinduja (2010), findings in gender differences on cyberbullying have been largely inconsistent. Thus, in this study, we aim to explore the moderating role of gender in the proposed research model. Figure 1 depicts the proposed research model.
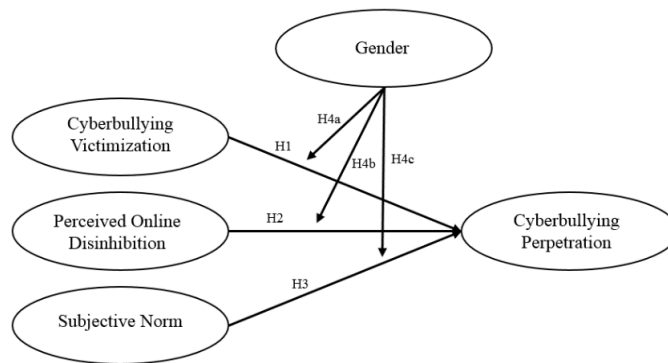
Figure 1.   Research Model.

2.1   The Instigating Force: Cyberbullying Victimization

I[3] Theory suggests individuals can be instigated or aroused towards aggression as a response to aversive events (Finkel 2014). Prior research also found that people tend to unfold their aggression instinct and perform aggressive acts when they are being provoked, rejected or insulted (Buss & Shackelford 1997). This study adopts cyberbullying victimization (i.e., an individual's prior experience being a victim of cyberbullying) as the trigger that instigates the individual to perpetrate cyberbullying behavior. The relationship between cyberbullying victimization and cyberbullying behavior has been empirically supported in previous studies (Li 2007; Walrave & Heirman 2011). Researchers tend to believe that aggressive behaviors can be learnt through observational learning and enactive learning (Bandura 1978). Victims of cyberbullying may observe perpetrators' behaviors and reproduce the same actions, and thus continuing the cycle of violence (Anderson et al. 2008). Thus, we hypothesize that individuals who are victims of cyberbullying are more likely to engage in cyberbullying behavior.

H1: Cyberbullying victimization will positively influence the likelihood of cyberbullying perpetration

2.2   The Impelling Force: Perceived Online Disinhibition

Cyberbullying is a bullying via electronic communication tools (Li 2008). The major impetus of cyberbullying perpetration is the unique characteristics of online environment. Many risk factors found in prior studies on cyberbullying perpetration (Sticca et al. 2013) are derived from the online disinhibition effect (Suler 2004). *"People behave online in ways that appear quite uninhibited as compared with their usual offline behavior"* (Suler 2004). Much of the aggressive behavior witnessed in cyberspace, including violence, flaming, verbal attacks, and incitement, can be attributed to online disinhibition. Some researchers have also argued that online disinhibition is closely related to cyberbullying and could induce deviant behavior online (Barlett & Gentile 2012; Kowalski et al. 2008). Thus, we believe that perceived online disinhibition is a strong impelling factor for cyberbullying behavior.

H2: Perceived online disinhibition will positively influence the likelihood of cyberbullying perpetration

2.3   The Inhibiting Force: Subjective Norm

Inhibition is a behavioral restraint for individuals to override their urge to aggress, which in turn attenuates their aggressive acts (Finkel 2014). A potential mitigating force on cyberbullying perpetration

is subjective norm, which refers to the influence of expectations from significant others (Fishbein & Ajzen 1975). Bagozzi (2007) argued that *"much of human behavior is not best characterized by an individual acting in isolation (p. 247)"*. In other words, individuals are easily affected by others, especially those they consider important. Prior cyberbullying studies have found that friends, parents school teachers, and peers are the important parties to the youths, whose negative attitudes towards bullying (i.e., their disapproval of cyberbullying) significantly reduce young adults' involvement in cyberbullying (Hinduja & Patchin 2013). Therefore, people may be less likely to engage in cyberbullying behavior if influential parties strongly discourage them from participating in online aggressive behavior. We thus believe that subjective norm is a strong inhibiting factor for cyberbullying behavior.

H3: Subjective norm will negatively influence the likelihood of cyberbullying perpetration

2.4 The Moderating Effect: Gender Differences

Prior studies have explored the role gender plays in the experience with and perceptions of cyberbullying (Erdur-Baker & Erdur-Baker 2010; Gradinger et al. 2010; Tokunaga 2010). For instance, Erdur-Baker and Erdur-Baker (2010) found that males were more likely to engage in cyberbullying compared to females. Görzig and Ólafsson (2013), however, showed that females were more active in cyberbullying behaviors. There are also studies that revealed no difference between males and females in cyberbullying behavior (e.g., Hinduja & Patchin 2008; Perren et al. 2010). It is apparent that findings regarding gender differences in cyberbullying context are mixed in prior research, suggesting the need for further investigation. In this study, we explore the role of gender in moderating the effects instigating, impelling and inhibiting factors on cyberbullying perpetration.

Prior research reveals that males and females react differently to cyberbullying victimization. Berne et al. (2013) found that the responses of female victims were more introverted than male victims. Mahalik et al. (Mahalik et al. 2005a; Mahalik et al. 2005b) noted that females were more mindful of their feminine norm and image. They tended to conceal their negative feelings, and were more reluctant to get even with cyberbullies (Wong et al. 2014). Previous studies also found that female victims reported more internalizing symptoms (including depression, anxiety, withdrawal, committing suicide, eating disorders), whereas male victims reported more externalizing symptoms (including violence, retaliation, aggression and oppositional disorders) (Leadbeater et al. 1999). Biological theory also suggests that gender differences in response to victimization stem from hormonal variations, with males having higher level of testosterone and thus more likely to be involved in crime or violence when incited (Peterson & Harmon-Jones 2012). These results are consistent with Wong et al. (2014) findings that males were more likely to bully others online than females when they experienced cyberbullying victimization. Thus, we expect that, compared to males, females with prior cyberbullying victimization experience are more likely to take advantage of the disinhibited nature of the Internet and engage in cyberbullying perpetration.

H4a: The impact of cyberbullying victimization on cyberbullying perpetration is stronger for males than for females

Internet provides a platform on which individuals can act anonymously, and express their inner feelings without fear of public awareness (Christopherson 2007). According to the Reduced Social Cues (RSC) model, when individuals (particularly those who lack self-confidence or physical strength) perceive that their online communication is unidentifiable, they are likely to exhibit disinhibited or deregulated behaviors online, especially. Prior research shows that, while often submissive in face-to-face settings, females became less constrained in the online communication (Herring 2003; Ybarra & Mitchell 2004b). The absence of face-to-face contact and the anonymous nature of cyberspace may motivate females to perpetrate cyberbullying, the online counterpart of traditional bullying (Simmons 2002). Indeed, Görzig and Ólafsson (2013) found females were more active in cyberbullying behaviors. Thus, we expect that,

compared to males, females with high perceived online disinhibition are more likely to take advantage of the disinhibited nature of the Internet and engage in cyberbullying perpetration.

H4b: The impact of perceived online disinhibition on cyberbullying perpetration is stronger for females than for males

Males and females process social cues differently. Females are more responsive to the significant others' feedback or evaluations, while males are more self-oriented and defensive of their own actions (Roberts 1991). Research shows that it is in the feminine nature (i.e., tolerance and sensitivity) to treasure relationships with others (Maccoby 1998) and value the social harmony of their communities. Compared with males, females are more likely to perform behaviors approved by significant others in their social group (Venkatesh & Morris 2000), even when those behaviors are against their personal rules or principles (Karson 1989). Prior cyberbullying studies have found that social pressure from others' persuasion/behavior had significant impact on females' decision to join in cyberbullying perpetration (Festl & Quandt 2013; Heirman & Walrave 2012). Thus, we expect that, compared to males, females perceiving high subjective norm of cyberbullying approval (disapproval) are more (less) likely to cyberbullying others online.

H4c: The impact of subjective norm on cyberbullying perpetration is stronger for females than for males

3 RESEARCH METHODOLOGY

3.1 Data Collection

We tested the proposed research model with university students in Hong Kong. We believe that university students are appropriate respondents in this study as they have a high prevalence of cyberbullying perpetration (Hinduja & Patchin 2010), and at a high risk of exposure to cyberbullying (Huang & Chou 2010). The participants were recruited through recruitment posters on university campus. They were informed that their participation was voluntary and anonymous, and could refuse or discontinue the study at any time. An online questionnaire was used to collect data from university students. In order to minimize the response bias and negative impact aroused by the questionnaire, we followed the general principles (i.e., autonomy, beneficence, justices, privacy, and confidentiality) for ethical research practices on human subjects in our data collection procedures (Mishna et al. 2012).

3.2 Measures

Appendix A presents the measures of this study. The measures of *perceived online disinhibition and subjective norm* were adapted from prior literature (i.e., Ledbetter (2009) and Venkatesh et al. (2003)) with minor modification to fit the context of cyberbullying. Measures for *cyberbullying perpetration* and *cyberbullying victimization* were developed through a synthesis of extant literature. The newly developed measures were subjected to the validation procedures described in the literature (Moore & Benbasat 1991). We modeled *perceived online disinhibition and subjective norm* as reflective constructs (where the indicators are caused by the constructs) as in prior literature, while we operationalized *cyberbullying victimization* and *cyberbullying perpetration* as formative constructs (where the indicators cause the constructs) (Jarvis et al. 2012).

3.3 Sample Profile

A total of 211 usable questionnaires were collected. A majority of the participants are between 18 and 25 years old (95.3%), and 120 (56.9%) of them are females. Most participants are heavy computer and Internet users, who are using computer (86.7%) and online (80.6%) for more than three hours a day.

4   DATA ANALYSIS AND RESULTS

We adopted the Partial Least Squares (PLS, as implemented in SmartPLS 2.0.M3) to assess both the measurement model and the structural model of the proposed research model (Hair et al. 2014).

4.1   Assessment of Measurement Model

Assessments of the measurement model of formative and reflective constructs follow different approaches and guidelines (Cenfetelli & Bassellier 2009). To assess the formative constructs, we followed an established procedure (Petter et al. 2007). First, the reliability of formative constructs was assessed by computing the Variance Inflation Factor (VIF) of each indicator. The results showed that all the VIFs range from 1.09 to 1.29 for cyberbullying victimization and 1.13 to 1.29 for cyberbullying perpetration, both are found below the threshold value, 3.33, and thus indicating the absence of multicollinearity (Diamantopoulos & Siguaw 2006). Second, the construct validity of formative constructs was assessed by examining the weights (representing the relative contribution) and the loadings (representing the absolute contribution) of the formative items (Cenfetelli & Bassellier 2009). We found that the weights of most paths towards cyberbullying victimization are significant (see Table 1). Though some indicators (i.e., CV4, CV5, CB5) have a relatively small contribution to the constructs, their absolute contributions (i.e., zero-order bivariate loadings) are fairly strong (i.e., >0.50). In addition, these items are associated with five major types of cyberbullying with strong theoretical foundation, thus, these indicators are retained in the model.

Formative Construct	Formative Indicators	Outer Weights (Outer Loadings)	t-value	Sig. level	p-value	Confidence Interval
Cyberbullying Perpetration	CB1	0.34 (0.70)	2.83	***	0.00	[0.14, 0.53]
	CB2	0.38 (0.67)	1.81	*	0.07	[0.03, 0.72]
	CB3	0.35 (0.61)	3.95	***	0.00	[0.20, 0.49]
	CB4	0.38 (0.59)	2.72	***	0.00	[0.15, 0.61]
	CB5	0.10 (0.57)	0.96	n.s.	0.34	[-0.07, 0.28]
Cyberbullying Victimization	CV1	0.25 (0.63)	2.50	**	0.01	[0.09, 0.42]
	CV2	0.48 (0.66)	2.23	**	0.03	[0.13, 0.84]
	CV3	0.48 (0.61)	4.33	***	0.00	[0.30, 0.67]
	CV4	0.17 (0.72)	1.03	n.s.	0.30	[-0.10, 0.45]
	CV5	0.14 (0.50)	1.16	n.s.	0.25	[-0.06, 0.33]

Note: ***p <0.01, **p <0.05, *p <0.10, *n.s.* = not significant

Table 1.   Outer Weights Significance Testing Results

To assess reliability and validity of reflective construct, we followed the established approaches in PLS (Gefen & Straub 2005). The reliability was assessed using composite reliability. The composite reliability of the reflective constructs are 0.88 and 0.90 (> 0.7 benchmark), indicating that a good internal consistency of the measures (see Table 2). Convergent validity was assessed by examining the item loadings of the constructs, and the square root of average variance extracted (AVE) for the reflective construct. Loadings of all reflective items are greater than the recommended 0.5 cutoff (Carmines & Zeller 1979), and the items are loaded well on their respective constructs (see Table 3). The square root of AVE for the reflective constructs is greater than the recommended level 0.5 (see Table 2) (Fornell & Larcker 1981). Discriminant validity was assessed by the two criteria suggested by Barclay et al. (1995).

The square root of AVE of each reflective construct is greater than the correlations of the construct with other constructs, and no item is loaded higher on a construct than on the one it intends to measure (see Table 2). The results showed that our reflective construct demonstrates good convergent and discriminant validity. In short, all reflective and formative constructs fulfill the requirements of the established guidelines.

	Composite Reliability	Cronbach alpha	AVE	POD	SN
Perceived Online Disinhibition (POD)	0.88	0.84	0.51	**0.72**	
Subjective Norm (SN)	0.90	0.84	0.76	-0.25	**0.87**

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

Table 2.   Correlation matrix and psychometric properties of key constructs

	POD	SN
POD1	**0.61**	-0.24
POD2	**0.79**	-0.13
POD3	**0.74**	-0.12
POD4	**0.78**	-0.17
POD5	**0.72**	-0.14
POD6	**0.80**	-0.23
POD7	**0.54**	-0.22
SN1	-0.23	**0.93**
SN2	-0.22	**0.92**
SN3	-0.22	**0.75**

Note: POD=Perceived Online Disinhibition; SN=Subjective Norm

Table 3.   Loading and Cross-Loading of Measures of Reflective Constructs

4.2   Assessment of Structural Model

In testing the hypothesized effects of the research model, we first presented the results of the proposed research model. We then reported the gender effects on the relationships between instigating, impelling, and inhibiting factors, and cyberbullying perpetration. Figure 2 presents the results of the structural model.

The model accounts for 49% of the variance in cyberbullying perpetration. Both cyberbullying victimization ($\beta = 0.58$; $\rho < 0.01$) and perceived online disinhibition ($\beta = 0.14$; $\rho < 0.01$) exhibit significant effects on the likelihood of performing cyberbullying perpetration, providing support to H1 and H2, whereas subjective norm ($\beta = -0.17$; $\rho < 0.01$) exerts a significant inhibiting effect on cyberbullying perpetration, providing support to H3.
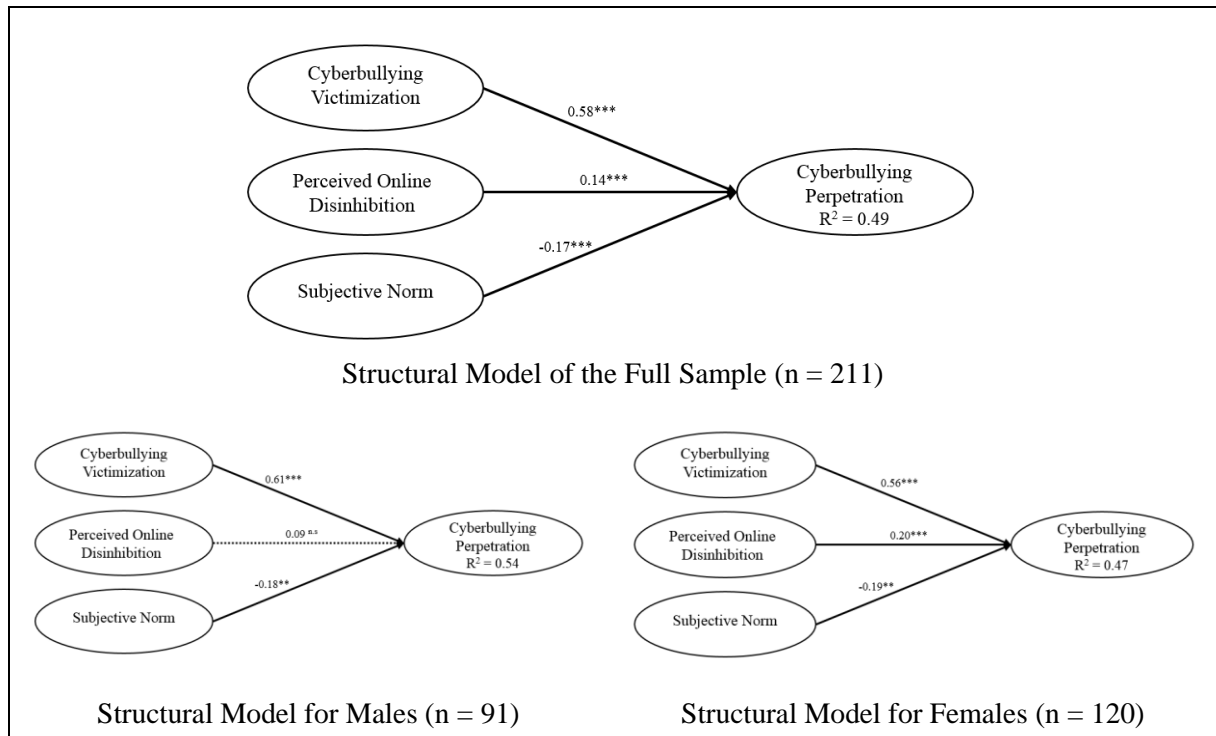
Figure 2.   *PLS results of the research model (Note: *p < 0.10, **p < 0.05, ***p < 0.01).*

To examine the role of gender in cyberbullying perpetration, we conducted a subgroup analysis. First, we followed the guideline offered by Ahuja and Thatcher (2005) and split the sample into male subgroup (91 cases) and female subgroup (120 cases). We then conducted a multi-group PLS analysis (Chin et al. 2003) and followed Keil et al. (2000) procedure (See Appendix B) to test the moderating effect of gender in the research model. As shown in Table 4, there are significant differences between male and female students in cyberbullying perpetration. First, the variance explained (R^2) for cyberbullying perpetration is higher for male students (54%) than female students (47%). Second, the impacts of the three key factors on cyberbullying perpetration are different between male and female students. The instigating effect of cyberbullying victimization on cyberbullying perpetration is stronger for male students (β = 0.61; p < 0.01) than female students (β = 0.56; p < 0.01), while the impelling effect of perceived online disinhibition on cyberbullying perpetration is stronger for female students (β = 0.20; p < 0.01) than male students (β = 0.09; p > 0.01), and the inhibiting effect of subjective norm is stronger for female students (β = -0.19; p < 0.05) than male students (β = -0.18; p< 0.05) towards cyberbullying perpetration . The results provide support to H4a, H4b and H4c.

	Male (n = 91) $R^2 = 0.538$		Female (n = 120) $R^2 = 0.472$		Statistical comparison of paths
	Standardized path coefficient	t-value	Standardized path coefficient	t-value	t-value
Cyberbullying Victimization	0.61	7.63***	0.56	7.77***	-16.98***
Perceived Online Disinhibition	0.09	1.29	0.20	3.32***	46.77***
Subjective Norm	-0.18	2.14**	-0.19	2.31**	-3.41***

Note 1: Dependent variable: Cyberbullying Perpetration

Note 2: ***p <0.01, **p <0.05, *p <0.10

Table 4.   *Model Summary - Statistical Comparison of Paths.*

5 DISCUSSION AND CONCLUSION

5.1 General Discussion

This study aims to answer the two key research questions presented in the Introduction of the paper. First, we propose a theory-guided research model explaining the development of cyberbullying perpetration among university students. Drawing on the I^3 theory, we identify three key factors predicting cyberbullying perpetration: cyberbullying victimization (instigation), perceived online disinhibition (impellence), and subjective norm (inhibition). The research model is empirically tested with 211 university students, and the findings of the study reveal that all the three forces exhibit significant effects on cyberbullying perpetration, consistent with the predictions of I^3 theory and results from prior cyberbullying research (Barlett 2015; Hemphill & Heerde 2014; Pabian & Vandebosch 2014). Individuals who have experienced cyberbullying victimization and those who perceive high level of online disinhibition will be more likely to be instigated and impelled to perform cyberbullying perpetration. In contrast, if individuals believe that people who are important to them would disapprove of cyberbullying behavior, they will be less likely to engage in cyberbullying perpetration.

Second, we explore the moderating role of gender in cyberbullying perpetration. Consistent with the findings of previous research on the role of gender in bullying and violence (Beckman et al. 2013; Giordano et al. 2002), the result of our study shows that the power of the driving and the mitigating forces of cyberbullying perpetration is different for males and females. More specifically, males are more likely to be instigated by cyberbullying victimization, whereas females are more likely to be impelled and inhibited by perceived online disinhibition and subjective norm respectively, providing strong evidence that gender differences do exist in cyberbullying perpetration.

5.2 Implications for Research and Practice

This study contributes to the advancement of knowledge in the cyberbullying literature. First, extant research in cyberbullying suffers from a general lack of theoretical guidance. This study is one of the first attempts to examine cyberbullying perpetration in a rigorous, theory-driven manner. Second, I^3 theory has been widely used to explain aggressive behaviors. With all the hypotheses supported by data, this study validates the theory in the cyberbullying perpetration context. Finally, the findings of this study provide insights into the impact of gender differences on the occurrence of cyberbullying perpetration. Male and female students who are involved in cyberbullying perpetration are influenced to different extent by the three driving factors.

Besides the theoretical contributions, the results of this study also provide insights to practitioners, particularly school counselors, parents, and government agencies. First, school counselors and parents should take the first step to identify students who have experienced cyberbullying victimization. More attention should be paid to male victims, as they have higher tendency to cyberbullying others as a revenge. Second, peer pressure and perceived online disinhibition are important drivers associated with cyberbullying perpetration among students (particularly females). Educational campaigns that raise awareness among general public of Internet etiquette, acceptable online behavior, and cyberspace offenses should be introduced and reinforced through peer groups among university students. Further, to discourage potential offenders from taking advantage of the anonymous and invisible nature of the cyberspace, online service providers should require users to use real identity during online service registration. This may help reduce the online disinhibition effect.

5.3 Limitations and Future Research Directions

This study also has a number of limitations. First, to keep the model parsimonious, this study focuses on the impact of three most relevant factors (cyberbullying victimization, perceived online disinhibition, and subjective norm) on cyberbullying perpetration. Although the research model explains about 48% of the variance, which is considered as high in social sciences studies, future studies should continue to

enrich the research model by exploring other potential factors driving cyberbullying perpetration. Second, the sample of this study consists of only university students in Hong Kong. Care must be taken when extrapolating the findings to other samples. Third, because of the cross-sectional nature of the study, spurious cause-effect inferences may be present. A longitudinal design is needed in the future.

To conclude, cyberbullying is an emergent global societal issue. We believe that this study is timely and the proposed research model can serve as a foundation for future research on cyberbullying.

ACKNOWLEDGMENT

Appendix A   Survey Instrument

Construct	Item	Description
Subjective Norm (Venkatesh et al. 2003)	SN1	People who are important to me think that it is not acceptable to harass or act aggressively toward others on the Internet
	SN2	People in my life whose opinions I value think that it is all right to harass or act aggressively toward others on the Internet (r)
	SN3	People who influence my behavior think that it is bad to harass or act aggressively toward others on the Internet
Perceived Online Disinhibition (Ledbetter 2009)	POD1	I feel less nervous when sharing personal information online.
	POD2	I feel like I can be more open when I am communicating online.
	POD3	I feel like I can sometimes be more personal during Internet conversations.
	POD4	When online, I feel more comfortable disclosing personal information to a member of the opposite sex.
	POD5	I feel less shy when I am communicating online.
	POD6	I feel less embarrassed sharing personal information with another person online.
	POD7	It is easier to disclose personal information online.
Cyberbullying Victimization (Xiao & Wong 2013)		In the last 12 months, how often …
	CV1	have you received threatening, harassing, humiliating, insulting and teasing messages, images, or videos on the Internet?
	CV2	did someone disseminate your private information/messages or posting your images/videos without your permission on the Internet?
	CV3	did someone spread rumors or gossips about you to sabotage your reputation on the Internet?
	CV4	did someone deliberately ignore or exclude you from an online activity?
	CV5	did someone pretend to be you to send/post messages in your name?
Cyberbullying (Xiao & Wong 2013)		In the last 12 months, how often…
	CB1	have you sent threatening, harassing, humiliating, insulting and teasing messages, images, or videos to someone on the internet?
	CB2	did you disseminate someone's private information/messages or post someone's images/videos without his/her permission on the Internet?
	CB3	did you spread rumors or gossips about someone to sabotage his/her reputation on the Internet
	CB4	did you deliberately ignore or exclude someone from an online activity
	CB5	did you pretend to be someone else to send/post messages in his/her name?

Appendix B Procedure for the comparison of Path Coefficients

t = (PC1 - PC2) / [Spooled * sqrt (1/N1 + 1/N2)] where
Spooled = sqrt {[(N1 -1) / (N1 + N2 - 2)] * SE1 square + [(N2 - 1) / (N1 + N2 - 2)] * SE2 square}
Where t = t-value with N1 + N2 - 2 degrees of freedom
    Spooled = pooled estimator for the variance
    N_i = sample size of dataset for culture i
    SE_i = standard error of path in structural model of culture i
    PC_i = path coefficient in structural model of culture i

References

Ahuja, M. K. and Thatcher, J. B. (2005). Moving beyond intention and toward the theory of trying: Effects of work environment and gender on post-adoption information technology use. MIS Quarterly, 29(3), 427-459.

Anderson, C. A., Buckley, K. E. and Carnagey, N. L. (2008). Creating your own hostile environment: A laboratory examination of trait aggressiveness and the violence escalation cycle. Personality and Social Psychology Bulletin, 34(4), 462-473.

Bagozzi, R. P. (2007). The Legacy of the Technology Acceptance Model and a Proposal for a Paradigm Shift. Journal of the association for information systems, 8(4), 244-254.

Bandura, A. (1978). Social learning theory of aggression. Journal of communication, 28(3), 12-29.

Barclay, D., Higginsm, C. and Thompson, R. (1995). The Partial Least Square (PLS) Approach to Causal Modeling: Personal Computer Adoption and Use as an Illustration (with Commentaries). Technology Studies, 2, 285-323.

Barlett, C. P. (2015). Predicting adolescent's cyberbullying behavior: A longitudinal risk analysis. Journal of adolescence, 41, 86-95.

Barlett, C. P. and Gentile, D. A. (2012). Attacking others online: The formation of cyberbullying in late adolescence. Psychology of Popular Media Culture, 1(2), 123-135.

Beckman, L., Hagquist, C. and Hellström, L. (2013). Discrepant gender patterns for cyberbullying and traditional bullying - An analysis of Swedish adolescent data. Computers in Human Behavior, 29(5), 1896-1903.

Berne, S., Frisén, a., Schultze-Krumbholz, a., Scheithauer, H., Naruskov, K., Luik, P., Katzer, C., Erentaite, R. and Zukauskiene, R. (2013). Cyberbullying assessment instruments: A systematic review. Aggression and Violent Behavior, 18(2), 320-334.

Buss, D. M. and Shackelford, T. K. (1997). Human aggression in evolutionary psychological perspective. Clinical Psychology Review, 17(6), 605-619.

Carmines, E. G. and Zeller, R. A. (1979). Reliability and validity assessment (Vol. 17): Sage publications.

Cenfetelli, R. T. and Bassellier, G. (2009). Interpretation of formative measurement in information systems research. MIS Quarterly, 33(4), 689-707.

Chin, W. W., Marcolin, B. L. and Newsted, P. R. (2003). A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. Information Systems Research, 14(2), 189-217.

Christopherson, K. M. (2007). The positive and negative implications of anonymity in Internet social interactions: "On the Internet, nobody knows you're a dog". Computers in Human Behavior, 23(6), 3038-3056.

Dehue, F., Bolman, C. and Völlink, T. (2008). Cyberbullying: Youngsters' experiences and parental perception. CyberPsychology & Behavior, 11(2), 217-223.

Diamantopoulos, A. and Siguaw, J. A. (2006). Formative versus reflective indicators in organizational measure development: A comparison and empirical illustration. British Journal of Management, 17(4), 263-282.

Dredge, R., Gleeson, J. and de la Piedad Garcia, X. (2014). Cyberbullying in social networking sites: An adolescent victim's perspective. Computers in Human Behavior, 36, 13-20.

Erdur-Baker, Ö. and Erdur-Baker, O. (2010). Cyberbullying and its correlation to traditional bullying, gender and frequent and risky usage of internet-mediated communication tools. New Media & Society, 12(1), 109-125.

Festl, R. and Quandt, T. (2013). Social relations and cyberbullying: The influence of individual and structural attributes on victimization and perpetration via the Internet. Human Communication Research, 39(1), 101-126.

Finkel, E. J. (2014). The I3 Model: Metatheory, theory, and evidence. In J. M. Olson & M. P. Zanna (Eds.), Advances in experimental social psychology (Vol. 49). San Diego: Academic Press.

Finkel, E. J. and Slotter, E. B. (2009). An I3 Theory analysis of human sex differences in aggression. Behavioral and Brain Sciences, 32(3-4), 279-279.

Fishbein, M. and Ajzen, I. (1975). Belief, attitude, intention and behavior: An introduction to theory and research.

Fornell, C. and Larcker, D. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(3), 39-50.

Gefen, D. and Straub, D. (2005). A practical guide to factorial validity using PLS-graph: Tutorial and annotated example. Communications of the Association for Information Systems, 16(1), 91-109.

Giordano, P. C., Cernkovich, S. A. and Rudolph, J. L. (2002). Gender, Crime, and Desistance: Toward a Theory of Cognitive Transformation1. American Journal of Sociology, 107(4), 990-1064.

Görzig, A. and Ólafsson, K. (2013). What makes a bully a cyberbully? Unravelling the characteristics of cyberbullies across twenty-five European countries. Journal of Children and Media, 7(1), 9-27.

Gradinger, P., Strohmeier, D. and Spiel, C. (2010). Definition and Measurement of Cyberbullying. Cyberpsychology, 4(2), 1-13.

Hair, J. F., Hult, G. T. M., Ringle, C. and Sarstedt, M. (2014). A primer on partial least squares structural equation modeling (PLS-SEM). Thousand Oaks, Calif: SAGE Publications.

Heiman, T. and Olenik-Shemesh, D. (2013). Cyberbullying Experience and Gender Differences Among Adolescents in Different Educational Settings. Journal of Learning Disabilities, 48(2), 146-155.

Heirman, W. and Walrave, M. (2012). Predicting adolescent perpetration in cyberbullying: An application of the theory of planned behavior. Psicothema, 24(4), 614-620.

Hemphill, S. A. and Heerde, J. A. (2014). Adolescent predictors of young adult cyberbullying perpetration and victimization among Australian youth. Journal of Adolescent Health, 55(4), 580-587.

Herring, S. C. (2003). Gender and Power in On-line Communication. In J. Holmes & M. Meyerhoff (Eds.), The handbook of language and gender (Vol. 25, pp. 202-228). Oxford, UK: Blackwell Publishing Ltd.

Hinduja, S. and Patchin, J. W. (2008). Cyberbullying: An exploratory analysis of factors related to offending and victimization. Deviant Behavior, 29(2), 129-156.

Hinduja, S. and Patchin, J. W. (2010). Bullying, Cyberbullying, and Suicide. Archives of Suicide Research, 14(3), 206-221.

Hinduja, S. and Patchin, J. W. (2013). Social Influences on Cyberbullying Behaviors among Middle and High School Students. Journal of Youth and Adolescence, 42(5), 711-722.

Huang, Y.-y. and Chou, C. (2010). An analysis of multiple factors of cyberbullying among junior high school students in Taiwan. Computers in Human Behavior, 26(6), 1581-1590.

Jarvis, C. B., MacKenzie, S. B. and Podsakoff, P. M. (2012). THE NEGATIVE CONSEQUENCES OF MEASUREMENT MODEL MISSPECIFICATION: A RESPONSE TO AGUIRRE-URRETA AND MARAKAS. MIS Quarterly, 36(1), 139.

Keil, M., Tan, B. C., Wei, K.-K., Saarinen, T., Tuunainen, V. and Wassenaar, A. (2000). A cross-cultural study on escalation of commitment behavior in software projects. MIS Quarterly, 24(2), 299-325.

Kowalski, R. M., Giumetti, G. W., Schroeder, A. N. and Lattanner, M. R. (2014). Bullying in the digital age: A critical review and meta-analysis of cyberbullying research among youth. Psychological Bulletin, 140(4), 1073-1137.

Kowalski, R. M., Limber, S. P. and Agatston, P. W. (2008). Cyber bullying: Bullying in the digital age. Oxford: Blackwell Publishing.

Leadbeater, B. J., Kuperminc, G. P., Blatt, S. J. and Hertzog, C. (1999). A multivariate model of gender differences in adolescents' internalizing and externalizing problems. Developmental psychology, 35(5), 1268.

Ledbetter, A. M. (2009). Measuring online communication attitude: Instrument development and validation. Communication Monographs, 76(4), 463-486.

Li, Q. (2007). New bottle but old wine: A research of cyberbullying in schools. Computers in Human Behavior, 23(4), 1777-1791.

Li, Q. (2008). A cross-cultural comparison of adolescents' experience related to cyberbullying. Educational Research, 50(3), 223-234.

Maccoby, E. E. (Ed.). (1998). The two sexes: Growing up apart, coming together. Cambridge, MA: Belknap Press of Harvard University Press.

Mahalik, J. R., Aldarondo, E., Gilbert-Gokhale, S. and Shore, E. (2005a). The role of insecure attachment and gender role stress in predicting controlling behaviors in men who batter. Journal of Interpersonal Violence, 20(5), 617-631.

Mahalik, J. R., Morray, E. B., Coonerty-Femiano, A., Ludlow, L. H., Slattery, S. M. and Smiler, A. (2005b). Development of the conformity to feminine norms inventory. Sex Roles, 52(7-8), 417-435.

Menesini, E., Nocentini, A. and Palladino, B. E. (2012). Empowering Students Against Bullying and Cyberbullying: Evaluation of an Italian Peer-led Model. International Journal of Conflict and Violence, 6(2), 313-320.

Microsoft Corporation. (2013). Safety & Security Center: Microsoft Safety & Security Center.

Mishna, F., Khoury-Kassabri, M., Gadalla, T. and Daciuk, J. (2012). Risk factors for involvement in cyber bullying: Victims, bullies and bully–victims. Children and Youth Services Review, 34(1), 63-70.

Moore, G. C. and Benbasat, I. (1991). Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation. Information Systems Research, 2(3), 192-222.

Moore, P. M., Huebner, E. S. and Hills, K. J. (2012). Electronic bullying and victimization and life satisfaction in middle school students. Social Indicators Research, 107(3), 429-447.

Navarro, J. N. and Jasinski, J. L. (2012). Going cyber: Using routine activities theory to predict cyberbullying experiences. Sociological Spectrum, 32(1), 81-94.

Nixon, C. L. (2014). Current perspectives: the impact of cyberbullying on adolescent health. Adolescent health, medicine and therapeutics, 5, 143-158.

Olweus, D. and Limber, S. P. (2010). Bullying in school: Evaluation and dissemination of the Olweus Bullying Prevention Program. American Journal of Orthopsychiatry, 80(1), 124-134.

Pabian, S. and Vandebosch, H. (2014). Using the theory of planned behaviour to understand cyberbullying: The importance of beliefs for developing interventions. European Journal of Developmental Psychology, 11(4), 463-477.

Patchin, J. W. and Hinduja, S. (2010). Cyberbullying and Self-Esteem. Journal of School Health, 80(12), 614-621.

Patchin, J. W. and Hinduja, S. (2011). Traditional and Nontraditional Bullying Among Youth: A Test of General Strain Theory. Youth and Society, 43(2), 727-751.

Perren, S., Dooley, J., Shaw, T. and Cross, D. (2010). Bullying in school and cyberspace: Associations with depressive symptoms in Swiss and Australian adolescents. Child and Adolescent Psychiatry and Mental Health, 4(1), 1-10.

Peterson, C. K. and Harmon-Jones, E. (2012). Anger and testosterone: Evidence that situationally-induced anger relates to situationally-induced testosterone. Emotion, 12(5), 899-902.

Petter, S., Straub, D. and Rai, A. (2007). Specifying Formative Constructs in Information Systems Research. MIS Quarterly, 31(4), 623-656.

Roberts, T. (1991). Gender and the influence of evaluations in self assessments in achievement settings. Psychological Bulletin, 109, 297-308.

Schultze-Krumbholz, A., Jäkel, A., Schultze, M. and Scheithauer, H. (2012). Emotional and behavioural problems in the context of cyberbullying: A longitudinal study among German adolescents. Emotional & Behavioural Difficulties, 17(3-4), 329-345.

Simmons, R. (2002). Odd girl out: The hidden culture of aggression in girls: Houghton Mifflin Harcourt.

Slotter, E. B. and Finkel, E. J. (2011). I³ theory: Instigating, impelling, and inhibiting factors in aggression. In M. Mikulincer & P. R. Shaver (Eds.), Human aggression and violence: Causes, manifestations, and consequences. Washington: American Psychological Association.

Smith, P. K., Mahdavi, J., Carvalho, M., Fisher, S., Russell, S. and Tippett, N. (2008). Cyberbullying: its nature and impact in secondary school pupils. Journal of Child Psychology and Psychiatry, 49(4), 376-385.

Sticca, F., Ruggieri, S., Alsaker, F. and Perren, S. (2013). Longitudinal risk factors for cyberbullying in adolescence. Journal of Community & Applied Social Psychology, 23(1), 52-67.

Suler, J. (2004). The Online Disinhibition Effect. CyberPsychology & Behavior, 7(3), 321-326.

Tokunaga, R. S. (2010). Following you home from school: A critical review and synthesis of research on cyberbullying victimization. Computers in Human Behavior, 26(3), 277-287.

Venkatesh, V. and Morris, M. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. MIS Quarterly, 24(1), 115-139.

Venkatesh, V., Morris, M. G., Davis, G. B. and Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425-478.

Walrave, M. and Heirman, W. (2011). Cyberbullying: Predicting Victimisation and Perpetration. Children & Society, 25(1), 59-72.

Wong, D. S. W., Chan, H. C. and Cheng, C. H. K. (2014). Cyberbullying perpetration and victimization among adolescents in Hong Kong. Children and Youth Services Review, 36, 133-140.

Xiao, B. and Wong, Y. M. (2013). Cyber-Bullying Among University Students: An Empirical Investigation from the Social Cognitive Perspective. International Journal of Business and Information, 8(1), 34-69.

Ybarra, M. L. and Mitchell, K. J. (2004a). Online aggressor/targets, aggressors, and targets: A comparison of associated youth characteristics. Journal of Child Psychology and Psychiatry, 45(7), 1308-1316.

Ybarra, M. L. and Mitchell, K. J. (2004b). Youth engaging in online harassment: Associations with caregiver-child relationships, Internet use, and personal characteristics. Journal of Adolescence, 27(3), 319-336.