Fear of Cyber Crime among College Students in the United States: An Exploratory Study

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Abstract

A literature review on fear of crime suggests perceived crime seriousness, perceived risk of victimization, and victimization experience as the three major predictors for fear of crime. In the present study I test these factors on cyber crimes as their relationships with fear of cyber crime are generally unexplored in the literature. Precisely, four cyber crimes are chosen, including online scam, cyber bullying, digital piracy, and computer virus. This study is the first study that takes into account of four types of cyber crime concurrently while addressing the relationship between fear of crime and the three major predictors. The findings suggest that fear of cyber crime does not always share the same predictors, depending on the crime. Internet use also plays a role in the fear of cyber crime.

Keywords: Fear, Cyber crime, Crime Seriousness, Perceived Risk, Victimization.

Introduction

Research on fear of crime has been abundant (Fox, Nobles, & Piquero, 2009; Hale, 1996; Keane, 1995; Mohammed, Saridakis, & Sookran, 2009; Russo & Roccato, 2010; Skogan, 1987; Smith & Hill, 1991; Rountree, 1998). Research on fear of cyber crime, however, still needs more attention. While some studies have been conducted (Alshalan, 2008), the literature remains thin as far as fear of cyber crime is concerned. Few efforts, if any, have been directed to address the distinction among cyber crimes with regard to fear of victimization (Alshalan, 2008). In the present study, I intend to address two main questions. First, can we predict fear of cyber crime in the same way we predict fear of crime? Second, do all cyber crimes share the same predictors?

Surely causality is beyond the scope of this study and I do not claim my findings will render definite answers to the above questions. Nonetheless, the findings should shed light on how fear of cyber crime may be related to the major factors indicated in the fear of crime literature. The present study is aimed to test the three common predictors for fear of crime on four different cyber crimes. The three common predictors are *perceived risk of victimization, perceived crime seriousness,* and *victimization experience*. The four cyber crimes include digital piracy, online scam, cyber bullying, and computer virus. These four cyber crimes were chosen because they respectively represent a different type of victimization.

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Computer viruses mostly target machines and rarely result in physical threats. It is mostly technical and often indiscriminate. Cyber bullying is likely to entail both emotional and physical harms and it is generally personal. Online scam mostly is financially motivated, and it requires interaction with the victim for the crime to be successful. Digital piracy is a unique cyber crime, because most people are actually more likely to be a perpetrator than a victim in this regard. Through these four types of cyber crime, I illustrate how people's perceptions and experiences are correlated with fear of cyber crime differently. Further, since cyber crime victimization has much to do with using the Internet, Internet use is also included to understand whether fear of cyber crime is affected by what people do on the Internet.

Literature Review

Currently very few studies focused on multiple individual crimes when measuring fear of crime (Fox et al., 2009). Usually crime was being measured as an aggregate construct (e.g., property crime or violent crime). An aggregate measure of fear is subject to possible shadowing effects (Ferraro, 1996), meaning it is possible there is only one particular crime that people are fearful of but the aggregate measurement fails to identify it and thus mistakenly concludes people are worried about crime in general. Even when individual crimes were measured, rarely did research include cyber crimes in the discussion. Cyber crime may not be totally distant from conventional crime. In a mixed method study, Yu (2012) found that some people tend to equate a cyber crime with a conventional crime. For example, hacking at times was seen as analogous to burglary and digital piracy is equivalent to theft. However, this does not necessarily mean the people who are afraid of theft would be afraid of digital piracy as well. Hence, it is not clear whether the patterns associated with the fear of crime literature will still hold true in cyber crime (Henson, Reyns, & Fisher, 2013). For instance, males are more likely to become a victim but fear of crime is generally more prevalent among females (May, Rader, & Gooddrum, 2010; Hale, 1996; Fisher, 1995; Warr, 2000; Jennings, Gover, & Pudrzynska, 2007). Age, education, and race also have been suggested to be related to fear of crime (Ortega & Myles, 1987; Liska, Sanchirico, & Reed, 1988; Braungart, Braungart, & Hoyer, 1980; Covington & Taylor, 2005). Elderly people, racial minorities, and undereducated people are generally found to have a higher level of fear of crime. Can these findings suggested in the literature apply to fear of cyber crime? A survey conducted by the Social Science Research Center at Mississippi State University (Alshalan, 2008) indicates some similar findings related to fear of cyber crime. Older people and females reported a higher level of fear of cyber crime; prior victimization heightens fear; perceived crime seriousness predicts more fear. It is important to note, however, cyber crime was measured as an aggregate construct instead of individual cyber crimes in this survey. Failing to distinguish different cyber crimes could be problematic in the study of fear of cyber crime because research has found that cyber crimes might be associated with different factors. For instance, using social media predicts online harassment but not hacking victimization (Wilsem, 2013). Hence, aggregating all cyber crimes together can lead to misleading conclusions.

Accordingly, in the present study I adopted crime-specific measures to explore fear of cyber crime. The four crimes chosen include digital piracy, online scam, cyber bullying, and computer virus. Every year, digital piracy accounts for worldwide financial losses in billions (Yu, 2012). Therefore, even though no study has addressed fear of digital piracy, it is worth exploring, especially in comparison with other cyber crimes. Likewise, no

criminological study to date has addressed fear of computer virus, but the existence of fear related to computer virus seems to be well documented in the literature (Bissett & Shipton, 2000; Murray, 1988; Hovav & D-Arcy, 2004). More research is needed to understand such fear's relationship with victimization experience, perceived crime seriousness, and perceived risk. In terms of fear of online scam, Roberts and her colleagues (2013) found that Internet exposure predicts fear of online identity theft but their study did not include any of the major predictors, namely "perceived risk", "perceived seriousness", and "victimization experience". Besides, identity theft is only one aspect of online scam, which means more work is certainly needed to understand fear of online scam.

In relation to fear of cyber bullying, Henson and colleagues (2013) studied fear of online interpersonal victimization, which includes harassment, sexual solicitations, stalking, intimidation, and threats of violence. They found "perceived risk" is a strong and positive predictor for fear of cyber crime, and so is "victimization experience". They did not find participating in online activities related to fear. However, Moreover, Randa (2013) found cyber bullying victimization experiences are positively correlated with fear of victimization, and fear of online victimization was found to be correlated with perceived risk in a study about college students' use of Facebook (Higgins, Ricketts, & Vegh, 2008).

Evidently, when it comes to fear of cyber crime the literature is sparse and the findings are far from conclusive. To contribute to the knowledge base, the present study is the first of its kind to take into account four types of cyber crime at the same time while exploring the relationships between fear of crime and the three major predictors suggested in the fear of crime literature (i.e., perceived risk, perceived crime seriousness, and victimization experience). Moreover, different Internet activities are measured as potential predictors.

Methods
Sampling
From an urban university in Midwest USA, college students enrolled in general education courses were recruited. These courses are open to all majors. The sample by no means is representative, but for the exploratory purpose it should be adequate as research has found fear of crime among college students shares similar patterns as the general population (Jennings et al., 2007; Cubbage & Smith, 2009; King, 2009; Barberet & Fisher, 2009).

Participation was voluntary and the survey was conducted anonymously by an online survey. Invitations were sent via email to 519 students and eventually 270 valid responses were recorded for analysis. The sample is composed of 148 females (54.8%) and 122 males (45.2%). The youngest age of the respondent is 17 and the oldest is 50. The average age of the respondent is 21.56 (medium: 20; mode: 18). As for race, 65.2% of the respondents identified themselves as White / Caucasian, 10% as Black / African American, 12.6% as Hispanic / Latino, 8.9% as Asian, and 3.3% as Other.

Measurement
The dependent variable is fear of cyber crime. As mentioned earlier, a total of 4 cyber crimes are included in this study: online scam, cyber bullying, computer virus, and digital piracy. The three main independent variables are *perceived risk of victimization*, *perceived crime seriousness*, and *victimization experience*. They are all measured in a crime-specific manner. Race, gender (0: female; 1: male), and age are included as control variables. Race was

recoded into a dichotomous variable that distinguishes only white and minority (0: white; 1: minority) due to the small sample sizes in each of the racial minority categories. Education level is not included because there was not much variation expected since the respondents were all college students. Internet use was measured into four separate online activities, including *online downloading*, *online shopping*, *online publishing*, and *online interaction*.

Hypotheses

The following hypotheses are proposed:
1. Perceived risk of victimization is positively correlated with fear of cyber crime (for all four cyber crimes).
2. Perceived crime seriousness is positively correlated with fear of cyber crime (for all four cyber crimes).
3. Victimization experience is positively correlated with fear of cyber crime (for all four cyber crimes).
4. Participating in online publishing is positively correlated with fear of digital piracy.
5. Participating in online shopping is positively correlated with fear of online scam.
6. Participating in online downloading is positively correlated with fear of computer viruses.
7. Participating in online interactions is positively correlated with fear of cyber bullying.

Analysis

Multivariate linear regression was used for analysis. The assumptions of independent samples and continuous dependent variables were met. No nonlinear patterns were found between the independent variables and the dependent variables. Homoscedasticity was found in a visual inspection of the plot of the standardized residuals by the regression standardized predicted value (Osborne & Waters, 2002). The variance inflation factor (VIF) (between 1 and 1.22) indicates no multicollinearity among any variables (O'Brien, 2007).

Results
Scores

Table 1 shows the average scores on the major variables. Computer virus is the most feared cyber crime, followed by online scam and cyber bullying. Computer virus also has the highest perceived risk, followed by online scam and cyber bullying. Computer virus entails the most victimization experience, followed by cyber bullying and online scam. Cyber bullying is perceived as the most serious cyber crime, followed by online scam and computer virus.

Digital piracy has the lowest score on all four variables. Based on the average scores shown in Table 1, it seems these four cyber crimes do not generate much fear, perceived risk, or victimization experience. Only perceived crime seriousness is relatively higher.

Table 1. Average Scores on Major Variables

Crimes (N=270)	Fear of Crime	Perceived Risk	Perceived Seriousness	Victimization experience
Online Scam	2.83	2.19	3.30	1.55
Cyber bullying	2.46	1.96	3.83	1.85
Computer Virus	2.96	2.80	3.19	2.62
Digital piracy	1.56	1.47	2.40	1.20

Internet use as measured in four activities has the following average scores: online shopping (2.26), online downloading (3.24), online interaction (3.37), and online publishing (1.59). Online interaction entails most participation, followed by online downloading and online shopping. As expected, most people do not engage in online publishing.

Hypothesis Testing

1. Online Scam

Fear of online scam serves as the dependent variable. Ten independent variables are included as shown in Table 2. This model can account for more than 40% of variation in fear of online scam (R Square: 0.408). *Perceived risk* and *perceived seriousness* are significant predictors for fear of online scam. Another significant predictor that renders the largest effect size is *online shopping* (Beta=0.478). All three significant predictors are positively correlated with fear of online scam. As hypothesized, people who participate in online shopping more frequently would have more fear for online scam, especially when they believe they are facing a higher risk of becoming a victim. When online scam is perceived as a serious crime, more fear will ensue as well. Our hypotheses thus are mostly supported, except for victimization experience. It does not appear that being victimized in online scam would lead to more fear.

Table 2. Multiple Linear Regression (Online Scam)

R Square: 0.408	b	SE	Beta	t	Sig.
Download	–0.105	0.062	–0.082	–1.702	0.090
Interaction	–0.052	0.046	–0.056	–1.146	0.253
Publishing	0.025	0.089	0.014	0.282	0.778
Shopping	0.499	0.053	0.478	9.421	0.000★★
Gender	–0.011	0.160	–0.004	–0.068	0.946
Race	–0.134	0.159	–0.042	–0.838	0.403
Age	0.016	0.014	0.055	1.113	0.267
Perceived Risk	0.393	0.065	0.309	6.008	0.000★★
Perceived Seriousness	0.121	0.057	0.107	2.127	0.034★
Victimization	–0.034	0.070	–0.024	–0.489	0.625

★$p<0.05$; ★★$p<0.01$

2. Cyber bullying

When fear of cyber bullying is the dependent variable, five independent variables are significant predictors at the 5% significance level, as shown in Table 3. This model explains 32% of the variation in fear of cyber bullying. *Online interaction* and *perceived risk* are positively correlated with fear of cyber bullying. As hypothesized, higher perceived risk and frequent participation in online interaction both predict a higher level of fear. Frequent interactions people have online with others could result in more opportunities for them to be bullied online. When they perceive that risk, they feel more fear.

In contrast, *victimization experience* is negatively correlated with fear of cyber bullying. This hypothesis is rejected and this also contradicts the literature where a positive correlation is usually reported between victimization experience and fear of cyber bullying or harassment (Henson et al., 2013; Randa, 2013). Although more research certainly is needed in this area, I posit a possible explanation for my finding is that college students with victimization experiences may have grown to realize how to cope with the situation and hence reduce unnecessary fear.

Perceived seriousness is not statistically significant, which renders our hypothesis rejected. *Gender* is significant in the direction that males are less fearful of cyber bullying, which is consistent with the literature. *Online publishing* unexpectedly is also positively correlated with fear of cyber bullying, which suggests publishing one's creative works online is accompanied by the fear that someone will harshly comment on the work or the author, to the extent of cyber bullying.

Table 3. Multiple Linear Regression (Cyber bullying)

R Square: 0.320	b	SE	Beta	t	Sig.
Download	0.009	0.066	0.007	0.143	0.886
Interaction	0.246	0.050	0.261	4.933	0.000★★
Publishing	0.285	0.097	0.153	2.930	0.004★★
Shopping	0.030	0.057	0.028	0.522	0.602
Gender	–0.385	0.174	–0.125	–2.213	0.028★
Race	–0.231	0.172	–0.072	–1.339	0.182
Age	0.010	0.016	0.035	0.666	0.506
Perceived Risk	0.444	0.071	0.346	6.283	0.000★★
Perceived Seriousness	0.049	0.067	0.041	0.726	0.468
Victimization	–0.151	0.060	–0.130	–2.517	0.012★

★$p<0.05$; ★★$p<0.01$

3. Computer Viruses

When fear of computer virus is the dependent variable, four significant predictors ($p<0.05$) are identified, as shown in Table 4. All four of them are positively correlated with fear of computer virus. This model accounts for 18.5% of variation in fear of computer virus (R Square: 0.185). Consistent with the hypotheses, *perceived seriousness* and *victimization experience* both predict fear. Also as hypothesized, people who engage in *online downloading* more frequently are more fearful of computer virus. *Online shopping* is an unexpected predictor. More online shopping also predicts more fear of computer virus. Perceived risk is not statistically significant, which rejects the hypothesis.

Table 4. Multiple Linear Regression (Computer Virus)

R Square: 0.185	b	SE	Beta	t	Sig.
Download	0.260	0.082	0.180	3.156	0.002★★
Interaction	0.027	0.062	0.026	0.445	0.657
Publishing	0.014	0.122	0.007	0.114	0.909
Shopping	0.145	0.070	0.122	2.068	0.040★
Gender	0.162	0.211	0.047	0.768	0.443
Race	0.028	0.214	0.008	0.132	0.895
Age	0.018	0.020	0.055	0.938	0.349
Perceived Risk	0.119	0.071	0.102	1.670	0.096
Perceived Seriousness	0.301	0.066	0.264	4.529	0.000★★
Victimization	0.266	0.078	0.102	1.670	0.001★★

★p<0.05; ★★p<0.01

4. Digital Piracy

In terms of fear of digital piracy, Tables 5 shows the regression results. Only two independent variables are identified as significant predictors. The only hypothesis supported is with regard to *online publishing*. Participating in online publishing predicts more fear of digital piracy. Perceived risk, perceived seriousness, and victimization experience are all insignificant, contrary to the hypotheses. This model explains more than 43% of variation in fear of digital piracy (R Square: 0.433). Aside from *online publishing*, *race* appears to be the only significant predictor in that racial minorities are more fearful of digital piracy than White / Caucasian; however, this result is not clear. A one-way ANOVA on the original measure of race found Asians appear to have a significantly higher level of fear than other racial groups. Although it is untested in the present study, it is suspected that this has something to do with the fact that studies have found Asians tend to have a more favorable attitude toward digital piracy (Swinyard et al., 1990; Yu, 2013). Perhaps this favorable attitude somehow contributes to more fear of victimization. This could imply that when it comes to digital piracy, the offenders might be among those who are worried the most about victimization because they know how easy and prevalent it is. This proposition certainly remains a conjecture and requires empirical testing.

Table 5. Multiple Linear Regression (Digital Piracy)

R Square: 0.433	b	SE	Beta	t	Sig.
Download	0.020	0.034	0.027	0.577	0.565
Interaction	–0.024	0.026	–0.045	–0.940	0.348
Publishing	0.659	0.051	0.624	12.855	0.000★★
Shopping	–0.006	0.029	–0.011	–0.221	0.825
Gender	0.147	0.089	0.084	1.653	0.100
Race	0.187	0.090	0.102	2.070	0.039★
Age	–0.002	0.008	–0.014	–0.284	0.777
Perceived Risk	0.002	0.044	0.003	0.053	0.958
Perceived Seriousness	0.059	0.033	0.087	1.773	0.077
Victimization	0.059	0.075	0.040	0.780	0.436

★p<0.05; ★★p<0.01

Discussion and Conclusion

The four cyber crimes tested in the present study do not appear to share the same predictors. For fear of online scam, the significant predictors include online shopping, perceived risk, and perceived seriousness. For fear of cyber bullying, the significant predictors include online interaction, online publishing, gender, perceived risk, and victimization experience. For fear of computer virus, the significant predictors include online downloading, online shopping, perceived seriousness, and victimization experience. As for fear of digital piracy, the significant predictors include online publishing and race.

Evidently, no one predictor can predict fear of all four cyber crimes. Age does not seem to have any impact on fear of cyber crime. Gender only affects fear of cyber bullying while race only matters in fear of digital piracy. Different online activities are associated different types of fear respectively. Perceived risk affects fear of online scam and cyber bullying, but not the other two cyber crimes. Perceived seriousness affects only fear of computer virus and online scam, whereas victimization experience is only related to fear of computer virus and cyber bullying. Thus, this analysis indicates that when discussing fear of cyber crime, it is imperative to be crime-specific. One of the strengths of the present study is that because of the crime-specific approach, the shadowing effect is avoided, that is, I do not falsely conclude a certain predictor is important for all fear of cyber crime when in fact it is only significant for some cyber crimes. Moreover, the analysis reveals that victimization experience is correlated with different cyber crimes in different directions in that it is positively correlated with fear of computer virus but the correlation with fear of cyber bullying is actually negative. This finding could have easily been overlooked in the absence of crime-specific measures.

Although they do not apply to all cyber crimes, the findings suggest that the traditional fear of crime predictors (i.e., perceived risk, perceived seriousness, and victimization experience) should at least be included in the discussion on fear of cyber crime, as suggested in the literature (Higgins et al., 2008; Henson et al., 2013; Randa, 2013). I have confirmed that these traditional predictors may play an important role in fear of cyber crimes. Even when they are not all significant, it has merit to study why they are influential in some cyber crimes but not others. Compared to other studies on fear of cyber crime, the present study is the first one to address all three of them together. Hence, although the findings are not completely consistent with the literature, the present study should be seen as contributive to more insight into fear of cyber crime. For example, Randa (2013) found victimization experience is positively correlated with fear of cyber bullying whereas the findings of the present study indicate a negative correlation. Despite the discrepancy, together it is found that victimization experience plays an important role in fear of cyber bullying, but the relationship needs more research to ascertain while considering what variables are being controlled for.

In addition to the three traditional predictors, Internet activities are included in the measurement. Unlike previous studies in which Internet exposure or Internet use was often measured without specifying the specific activity (Roberts et al., 2013), in the present study Internet use is distinguished into four types of activity, viz., online shopping, online publishing, online interaction, and online downloading. As expected, these four activities are respectively correlated with different types of fear of cyber crime (i.e., computer virus with online downloading and online shopping; digital piracy with online publishing; cyber bullying with online interaction and online publishing; online scam with

online shopping). The findings suggest fear of cyber crime has something to do with people's Internet habits and different habits are likely to lead to different types of fear.

It is recommended that future research on fear of crime to take into account more than one cyber crime in their measurement. Future research can also make a direct comparison between cyber crimes and conventional crimes. More research is needed to address how victimization experience may impact fear of cyber crime, especially cyber bullying. Could victimization experience actually make people more fearless? Is there an unidentified factor that determines how victimization experience impacts fear of cyber crime? Aside from victimization experience, why does perceived risk or perceived seriousness only matter in some cyber crimes but not others? What makes those cyber crimes differentially immune to perceptions? Furthermore, more research needs to address the relationship between fear of cyber crime and awareness. Although the literature generally suggests fear of crime is exaggerated (Jackson, 2004), can we say the same about fear of cyber crime? Could a low level of fear indicate insufficient awareness? These questions, among others, require more research to offer an answer.

In terms of policy, no policy should be hastily enacted when the literature in this area remains scant in depth and breadth. Nevertheless, based on the findings of this study, it is suggested that schools should better educate students about how to engage in online activities without increasing victimization opportunities. For instance, this study found that participating in online downloading increases fear of computer virus. So to reduce unnecessary fear students should learn how to carefully choose the source of downloads as well as how to properly scan downloaded files for viruses before activating them on a computer. Commercial websites should ensure consumer safety by showcasing the mechanisms in place to protect online shoppers from scams. Social media, such as Twitter and Facebook ought to make a better effort to discourage malicious commenting that could amount to cyber bullying. Online publishers, such as Amazon Kindle and YouTube need to protect intellectual property more effectively.

The present study illustrates the importance to address fear of cyber crime by specifying which crime is in question. It also points out the close relationship between online activities and fear of cyber crime. Although more research is definitely needed in this area, this study contributes to the literature on fear of crime by taking into consideration the three major traditional predictors at the same time, which is rarely seen in the literature. It is not only confirmed they are not the same construct but also proved their applicability to fear of cyber crime.

Limitations

The strength of the present study resides in the crime-specific measurement that addresses multiple cyber crimes, while previous studies tended to focus on only one type of cyber crimes when studying fear of cyber crime. Moreover, the present models are succinct and yet inclusive of relevant predictors (as reflected on R Squares). On the other hand, some limitations are notable. First, the sample is based on a convenient sample. The lack of representativeness is always an issue associated with convenient samples. In this regard, future replication of the current study using different samples is proposed. This is the best way to ensure external validity. Second, since the findings suggest the importance of using crime-specific measurement, it can be a limitation that we only included four cyber crimes in the discussion. Third, this study did not address prevalence. Most people scored generally low on fear of cyber crime, which implies a low level of fear among the

public. Since the sample does not represent the general public, it is not intended to make in-depth inferences about the prevalence of fear. Therefore, it is beyond the scope of this study to discuss what ramifications fear of cyber crime could result in. Without more information about prevalence, it is hard to determine whether fear of cyber crime is undesirable or perhaps it actually serves as a safeguard against online victimization. Finally, the interpretation of the quantitative findings requires more qualitative empirical support, especially with regard to why victimization experience has a negative impact on fear of cyber bullying and why racial minorities are more fearful of digital piracy.

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