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## Examining the Role of Peer Influence and Self-Control on Downloading Behavior

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### ABSTRACT

The purpose of the present study is two-fold. First, the present study is designed to provide additional information about the link between off-line and virtual peers and music piracy. Second, the present study provides information about how off-line and virtual peers interact with self-control to understand music piracy. The results of this study show that low self-control has a link with digital piracy. This means that individuals who cannot resist temptation and do not see the consequences of their action have an increased likelihood to perform digital piracy, which is consistent with a growing literature in this area (Higgins et al. 2006; Higgins and Makin 2004a, 2004b; Higgins and Wilson 2006).

The development of the personal computer has led to the widespread use of the Internet, allowing for an increased exchange of information and for the production of behaviors that include crime. One form of crime on the Internet is digital piracy. Digital piracy is the act of copying digital goods that include software, documents, audio (including music and voice), and video for any reason other than to back up without explicit permission with intent to deny compensation to the copyright holder. Piracy involves the use computer technology, and primarily refers to downloading behavior (Gopal et al. 2004; Higgins et al. 2006). The Internet provides a unique opportunity for individuals to participate in this form of criminal activity. Wall (2005) argues that the Internet provides a place for individuals to maintain anonymous domestic and transnational communication that is easy to perform. Further, Wall (2005) suggests that the Internet provides an opportunity for digital piracy to take place away from the copyright holder.

To date, a number of researchers have shown that subforms of digital piracy (e.g., music piracy) have become more pervasive (Gopal et al. 2004). To clarify music piracy, Higgins et al. (2006) considered it part of audio piracy that is the illegal uploading and downloading of digital sound or video without the explicit consent of the copyright holder. Technological advances have inadvertently helped promote this behavior by making the ability to upload and download music easier and faster. Thus, the technological advances have resulted in a substantial amount of music being uploaded and downloaded. For instance, the International Federation of Phonographic Industries (2006) has estimated that a third of all CDs are pirated. This has resulted in the music industry losing billions of dollars. Further, these are taxable dollars that the music industry has lost suggesting that society has suffered a substantial loss in tax revenue. Piracy is responsible for the loss of tax revenue, and it does produce stagnation in creativity or the desire to develop new music for consumption (Higgins and Makin 2004a, 2004b).

Music piracy is not a social science exercise, but a legal issue. The Copyright Act of 1976 made violations of any copyright that included music a criminal act (Koen and Im 1997). However, the framers of the 1976 Copyright Act could not have predicted the technological changes that were to take place after its passage. Thus, the No Electronic Theft Act (NETA) was developed to provide an update of the Copyright Act to include using the Internet. The language in the NETA made burning extra copies of music CDs, downloading music from the Internet without paying, or using a peer-to-peer network to upload or download music an illegal action. NETA provided for several different forms of technological use that include: CD burning, peer-to-peer networks, local area network (LAN) file sharing, digital stream ripping, and mobile piracy. The legislation concerning copyrighted material provides for penalties that may be civil (i.e., monetary damages) or criminal (i.e., jail or prison sentences).

To date, researchers have shown that criminological theory (i.e., self-control and social learning theory) may be used to explain digital piracy (Hinduja 2003; Hinduja and Ingram 2009; Higgins 2005; Higgins et al. 2006; Higgins and Makin, 2004a,b; Morris and Higgins 2009). Each of these studies has considered the role of digital pirating peer association, but only one study has considered the role of virtual peers (Hinduja and Ingram 2009). Hinduja and Ingram (2009) showed the virtual peer association should be considered in studies of digital piracy. Unfortunately, their study did not include a measure of self-control. Thus, the literature is not

clear on the role of virtual peers in the context of digital piracy, while including a measure of self-control.

The purpose of the present study is to contribute to multiple empirical literatures by explaining digital piracy behaviors through the use of two prominent theories in criminology. First, this study contributes to the self-control theory literature by understanding its connection with a criminal behavior while including a measure of virtual peers. Second, this study contributes to the social learning theory literature by understanding the connection of virtual peers with a criminal behavior. Third, this study contributes to the digital piracy literature by simultaneously assessing the measures, which has previously been ignored by criminologists to our knowledge.

In order to make this contribution, the present study outlines self-control theory that ends with a review of the empirical literature on self-control, peers, and digital piracy. Social learning theory also is presented that ends with a clarification of the role of virtual peers and a review of the empirical literature of social learning theory and digital piracy. Next, the methods section includes sampling, measures, and analysis plan. Lastly, the results are presented and discussed.

## **SELF-CONTROL THEORY**

Gottfredson and Hirschi's (1990) version of self-control theory is the latest installment of self-control theories (see Nye 1958, for other versions of the theory). Their theory is a parsimonious explanation of how parenting practices, self-control, and opportunity come together to account for criminal behavior. For instance, rational individuals (i.e., those that weigh the pleasure of an act against the pain of an act) are likely to choose criminal behavior when they perceive it as more pleasurable than painful. Crimes may be perceived as more pleasurable than painful because the characteristics of the acts are simple, easy, immediately gratifying and risky. The characteristics of the acts are attractive to individuals that have deficits in self-control. Gottfredson and Hirschi (1990) argue that individuals with deficits in self-control might be characterized as being insensitive, impulsive, risk-takers who are attracted to physical and simple tasks. These characteristics of low self-control influence an individuals' ability to calculate the consequences of their actions. Specifically, individuals with low self-control are classified by the following:

The dimensions of self-control are...factors affecting the calculation of the consequences of one's acts. The impulsive or short-sighted person fails to consider the negative or painful consequences of his acts; the insensitive person has fewer negative consequences to consider; the less intelligent person also has fewer consequences to consider. (he has less to lose) (Gottfredson and Hirschi 1990:95)

Individuals with low self-control are products of poor or ineffective parenting practices that can occur from several deficits in these practices. According to Gottfredson and Hirschi (1990), parents are to form an emotional bond with their child. Then, parents are to monitor their child to gather behavioral information. Next, parents are to analyze the child's behavior to determine if

the behavior is criminal. Finally, if the behavior is criminal, parents are to apply non-corporal punishment.

Gottfredson and Hirschi's (1990) theory has enjoyed a substantial amount of empirical support and development. Pratt and Cullen (2000) provided a meta-analysis of more than 20 studies that showed that self-control has a moderate link with crime and deviance, but that self-control is not able to remove the effect that peer association has with crime and deviance. Evans et al. (1997) argued that studies of self-control must include measure of peer association or run the risk of studying misspecified models. Others have shown that low self-control has a link with digital piracy. For instance, Higgins (2005) showed that low self-control and digital pirating peers have a link with piracy. Others have found similar results (Higgins and Makin 2004a, b; Higgins et al. 2006). Importantly, these studies show that associating with peers that participate in digital piracy is important as well. Unfortunately, these studies only consider the role of off-line peers rather than on-line peers. Thus, a gap in the literature exists, but to understand the potential role of off-line peers, social learning theory must be consulted.

## **SOCIAL LEARNING THEORY**

Social learning theory comes from several different disciplines (Bandura 1986; Skinner 1953). In the criminological literature, Akers' (1998) version of social learning theory is the predominant theory. This version of social learning theory is the result of a modification of Sutherland's (1947) version of differential association theory.

Within social learning theory, four measures are central—differential association, definitions, imitation, and reinforcement. Differential association refers to the amount of time and duration that an individual is exposed to criminal models (Akers 1998). Definitions refer to positive or negative evaluations (i.e., attitudes) toward a behavior (Akers 1998). When there is an excess of definitions that are favorable to the violation of the law, the individual is likely to perform the criminal behavior. Imitation refers to the emulation of a behavior that the individual has recently seen performed. Finally, differential reinforcement refers to the tangible or intangible rewards that are given to an individual from peers based on their performance of a behavior.

Social learning theory is very complex and can take many forms. One form of the theory asserts that individuals socialize differently and acquire the definitions from individuals that they associate. Then, the individual is likely to imitate the behavior that they have witnessed that will subsequently be reinforced. This form of the theory is very basic and does not take into account the possible direct, indirect, and reciprocal links between the measures. Thus, Akers (1998) argued that support for one concept will be enough to support the theory. The theory has been successfully applied to a multitude of behaviors (Akers 1998; Sellers et al. 2000). Under this perspective, the most supported component of the theory is differential association (Krohn 1999). The strength of this connection has led some to believe that it is possible that the entire learning process takes place within differential association (Krohn 1999). Furthermore, researchers have shown the peer association has a link with digital piracy (Gunter 2009;

Higgins et al. 2006; Higgins and Makin 2004; Higgins and Wilson 2006; Skinner and Fream 1997).

Given the importance of differential association and the development of the Internet, Warr (2002) argued that virtual peers may be important for criminal and deviant behavior. Virtual peers provide real or imagined others that individuals may identify with socially or psychologically. These peers provide a medium from which some individuals may learn behaviors and norms (Warr 2002). More importantly, virtual peers are available all of the time via the Internet. Hinduja and Ingram (2009) argued that virtual peers were important to consider when investigating music piracy, but their results showed that off-line peer association had a stronger link with music piracy. While Hinduja and Ingram (2009) advanced our understanding in this area, more research is necessary to understand how different forms of peers link to digital piracy through self-control.

## **THE PRESENT STUDY**

The purpose of the present study is twofold. First, the present study is designed to provide additional information about the link between off-line and virtual peers and music piracy. Second, the present study provides information about how off-line and virtual peers interact with self-control to understand music piracy. This study is important because it provides a richer understanding of the role of virtual peers. In addition, this study is important because it provides unearthed information about the role of peers (i.e., off-line and virtual) and self-control.

## **METHODS**

### **Sample and Procedures**

The data for the present study were collected during the spring 2010 semester. E-mails with a link to an on-line survey were sent to undergraduate students enrolled in criminal justice/criminology programs at four large universities in the United States (one in the Midwest, one in the Northeast, and two in the Southeast). Respondents were questioned on their own Internet use and behaviors on-line, as well as some of the behaviors their friends performed while using the Internet. They were also questioned on self-control, parental attachment, and school attachment measures. The students were informed that their participation was anonymous, confidential, voluntary, and that they had right to stop participating in the study if they wished to do so.

A total of 287 students responded to the on-line survey, which equated to a 19.6% response rate. The majority of respondents were seniors (40.1%), closely followed by a large junior response rate (30.7%). The sample contained 50.5% males (n = 142). The average age of the students was 22.5. The sample is 80.5% white (n = 227), 10.6% African American (n = 30), and 9.9% other (n = 23).

## **Measures**

### **Dependent Measure**

Following previous research in the area, our dependent measure is a direct measure of the number of times that they had downloaded music in the past 6 months. Specifically, we asked, "Please indicate the number of times you have illegally downloaded music in the past 6 months." The respondents indicated the number of times using a three-point scale: 0 times (0), 1–2 times (1), and 3 or more times (2). Preliminary analysis of this measure indicated that the responses were skewed making the data non-normal. To alleviate the skew, we dichotomized the measure to reflect 0 times (0) and at least one time (1).

### **Independent Measures**

In this study, we used a number of independent measures that include: self-control, parental closeness, school commitment, on-line and off-line friends, and demographics.

#### **Self-control**

We used a personality measure of self-control. Consistent with Schreck (1999), our measure of self-control consisted of eight measures. The eight measures were, "I act on the spur of the moment," "I do what brings me pleasure," "I am more concerned with the short run," "I test myself by doing something a little risky," "I take risk for fun," "I believe it is exciting to do things that can possibly get me in trouble," "I believe that excitement is more important than security," and "I spend no effort preparing for the future." The respondents marked their responses to these items using a five-point Likert-type scale: Strongly disagree (1), disagree (2), neither agree or disagree (3), agree (4), and strongly agree (5). Higher scores on the scale reflect lower levels of self-control. The measure had acceptable reliability (i.e., internal consistency) via Cronbach's alpha (.83) (Nunnally and Bernstein 1994). The measure had a mean of 18.74 and a standard deviation of 5.48.

#### **Parental closeness**

Parental closeness is an important independent measure for this study. Following Higgins and colleagues (2008), we used this measure to capture the social bonding that an individual feels toward their parents. The items that we used were, "I can talk about anything with my parents," "My parents always trust me," and "My parents always praise me when I do well." The respondents marked their responses to the items using a five-point Likert-type scale: None of the time (1), occasionally (2), some of the time (3), most of the time (4), and all of the time (5). Higher scores on the scale indicate more parental closeness. Following Nunnally and Bernstein's (1994) standards, the measure had acceptable internal consistency—reliability—(Cronbach's alpha =.67). The mean of the measure was 11.91 and the standard deviation was 2.28.

## **School commitment**

We used three items to capture school commitment. The items were, "I try hard in school," "Education is important to me," and "I complete my assignments on time." The respondents marked their responses to these items using a five-point Likert-type scale: Strongly disagree (1), disagree (2), neither agree or disagree (3), agree (4), and strongly agree (5). Higher scores on the scale indicate more school commitment. The measure had acceptable reliability (i.e., internal consistency via Cronbach's alpha =.73) (Nunnally & Bernstein, 1994). The measure had a mean of 13.46 and a standard deviation of 1.56.

## **Peer association**

Similar to Hinduja and Ingram (2009), we used a measure of on-line and off-line association with downloading peers. We used single items for each of the measures. The items were, "Please indicate how many of your friends you have met offline have illegally downloaded music in the past 6 months," "Please indicate how many of your friends you have met on-line have illegally downloaded music in the past 6 months." The answer choices for both items is: None of the time (1), occasionally (2), some of the time (3), most of the time (4), and all of the time (5). Higher scores on these items indicate illegal downloading by peers.

## **Demographics**

The demographics of the study were the individual's biological sex (1) for male and (2) for female. Next, the individuals indicated their age. Race was indicated by (1) for white, (0) non-whites. Finally, the individual's grades were measured by (1) mostly A's, (2) mostly A's and B's, (3) mostly B's, and so forth.

## **ANALYSIS PLAN**

The analysis plan takes place in a series of steps. The first step is a presentation of the descriptive statistics. This takes place to provide an indication of the distribution of the measures. The second step is a series of regression analyses that compare the links that low self-control and peers (i.e., virtual and off-line) have with illegal downloading. In cross-sectional data, regression analysis (i.e., Ordinary Least Squares Regression [OLS]) is a statistical technique that indicates the change in a dependent measure based on a series of independent measures. One important assumption in regression analysis is multicollinearity. Multicollinearity occurs when multiple independent measures are highly correlated to a point where they are indicating the same concept. Freund and Wilson (1998) argued that tolerance levels of 0.20 and below are indication of multicollinearity. 1 Another assumption of OLS is that the dependent measure is continuous. In situations when the dependent measure is not continuous, logistic regression is often used (Menard 2002). The third step allows us to determine if peer association (i.e., virtual and off-line) interacts with low self-control. This is consistent with the analysis techniques of previous research (Higgins et al. 2006; Higgins and Makin 2004a, 2004b; Higgins and Wilson 2006; Skinner and Fream 1997). To accomplish this analysis, we followed

the interaction procedure described by Aiken and West (1991) by mean centering the measures and multiplying them.

## RESULTS

### Step 1

Table 1 presents the descriptive statistics for these data. Forty-seven percent of the sample has illegally downloaded music from the Internet. The average self-control score is 18.74, while the average scores for parental attachment is 11.91 and school commitment is 13.46. The average respondent in the sample was a sophomore. Seventy-nine percent of the sample associates with peers that have downloaded music from the Internet, and 51 percent of the sample associates with virtual peers that have downloaded music from the Internet. Fifty-one percent of the sample is male and the average age of the sample is 22 years old. The sample is mostly white and the students have a “C” average.

TABLE 1  
Descriptive Statistics for the Measures in the Present Study

<i>Measure</i>	<i>Mean</i>	<i>Standard deviation</i>	<i>Skew</i>	<i>Kurtosis</i>	<i>Min</i>	<i>Max</i>
Music Piracy	0.47	—	0.14	-1.99	0.00	1.00
Low Self-Control	18.74	5.48	0.19	-0.35	8.00	33.00
Parental Attachment	11.91	2.28	-0.88	0.80	4.00	15.00
School Commitment	13.46	1.56	-0.69	-0.28	8.00	15.00
Class Standing	2.97	1.05	-0.66	-0.81	1.00	4.00
Offline Peer Association	0.79	—	-1.40	-0.04	0.00	1.00
Virtual Peers	0.51	—	-0.04	-2.01	0.00	1.00
Sex	0.51	—	-0.02	-2.01	0.00	1.00
Age	22.48	5.27	3.54	17.60	18.00	64.00
Race	0.79	—	1.58	0.40	0.00	1.00
Grades	2.69	1.14	0.76	0.17	1.00	7.00

*N* = 285.

### Step 2

Table 2 presents two logistic regression analyses. The first logistic regression analysis examines the links between the independent measures and illegally downloading music from the Internet—primarily between low self-control and off-line peer association. As self-control continues to decrease, these individuals are 1.07 times more likely to download music illegally from the Internet. Those that associate with peers off-line who download music illegally are 11.55 times more likely to download music illegally from the Internet than those that do not associate with this sort of peer. These were the only significant independent measures in this model. In addition, the tolerance measures do not show that multicollinearity was a problem with



these data. These results are consistent with results from other studies (Higgins, Fell and Wilson 2006; Higgins and Makin 2004; Higgins and Wilson 2006; Skinner and Fream 1997).

TABLE 2  
Regression Analysis for Digital Piracy

Measure	Off-line peers association				Virtual peer association			
	<i>b</i>	<i>S.E.</i>	<i>Exp(b)</i>	<i>Tolerance</i>	<i>b</i>	<i>S.E.</i>	<i>Exp(b)</i>	<i>Tolerance</i>
Low Self-Control	0.07**	0.03	1.07	0.87	0.05**	0.03	1.05	0.84
Parental Attachment	0.05	0.06	1.05	0.92	0.04	0.06	1.04	0.92
School Commitment	0.02	0.10	1.02	0.77	-0.08	0.10	0.93	0.79
Class Standing	0.08	0.14	1.09	0.85	0.12	0.14	1.13	0.85
Offline Peer Association	2.48**	0.48	11.55	0.93	—	—	—	—
Virtual Peers Association	—	—	—	—	0.99**	0.27	2.69	0.97
Sex	0.20	0.29	1.21	0.90	0.03	0.28	1.03	0.91
Age	-0.03	0.04	0.98	0.79	-0.05	0.04	0.95	0.81
Race	0.05	0.11	1.05	0.97	0.03	0.10	1.03	0.99
Grades	0.23	0.14	1.26	0.81	0.18	0.13	1.20	0.82

Chi-Square = 51.54\*\*\*  
 -2 Log Likelihood = 306.64  
 Cox & Snell R-Square = 0.18  
 Nagelkerke R-Square = 0.24

Chi-Square = 29.43\*\*\*  
 -2 Log Likelihood = 320.83  
 Cox & Snell R-Square = 0.11  
 Nagelkerke R-Square = 0.15

\*\* $p < .01$ , \*\*\* $p < .001$ .

The second logistic regression analysis examines the links between the independent measures and illegally downloading music from the Internet—including low self-control and virtual peer association. The results show that as self-control gets lower, individuals are more likely (i.e., 1.05 times more likely) to download music illegally from the Internet. Further, individuals that associate with virtual peers that download music from the Internet are 2.69 times more likely to download music from the Internet than those that do not associate with virtual peers. In this analysis, no other measures were significant and it appears that multicollinearity is not a problem in these data. The results from this analysis are consistent with previous research (Hinduja and Ingram 2009).

### Step 3

Table 3 shows the logistic regression analysis that includes the interaction effects for both of the peer association measures. The first model is for the off-line peer association measure. In this model, the results mirror those found in Table 2—low self-control ( $b = 0.08$ ,  $Exp(b) = 1.08$ ) and off-line peer association ( $b = 2.70$ ,  $Exp(b) = 14.86$ ). However, this model includes an interaction measure between low self-control and off-line peer association. We mean centered the measures as described by Aiken and West (1994). This process was used so that the multicollinearity would not be a problem in these data. The result of the interaction effect is insignificant. This is consistent with previous digital piracy research that used split models and

found no coefficient difference with low self-control and digital piracy (Higgins and Makin 2004a, 2004b; Higgins and Wilson 2006).

TABLE 3  
Regression Analysis for Digital Piracy

<i>Measure</i>	<i>Off-line peers association</i>				<i>Virtual peer association</i>					
	<i>b</i>	<i>S.E.</i>	<i>Exp(b)</i>	<i>Tolerance</i>	<i>b</i>	<i>S.E.</i>	<i>Exp(b)</i>	<i>Tolerance</i>		
Low Self-Control	0.08**	0.03	1.08	0.87	0.05**	0.03	1.05	0.84		
Parental Attachment	0.05	0.06	1.05	0.92	0.04	0.06	1.04	0.92		
School Commitment	0.01	0.10	1.01	0.77	-0.08	0.10	0.93	0.79		
Class Standing	0.09	0.14	1.09	0.85	0.10	0.14	1.13	0.85		
Offline Peer Association	2.70**	0.59	14.86	0.93	—	—	—	—		
Virtual Peers Association	—	—	—	—	0.98**	0.27	2.69	0.97		
Sex	0.22	0.29	1.25	0.90	-0.04	0.28	1.03	0.91		
Age	-0.02	0.04	0.98	0.79	-0.05	0.04	0.95	0.81		
Race	0.05	0.12	1.05	0.97	0.02	0.10	1.03	0.99		
Grades	0.23	0.14	1.26	0.81	0.16	0.13	1.20	0.82		
Low Self-Control×Offline Peer Association	-0.09	0.10	1.91	0.96	0.09	0.05	1.09	0.95		
		Chi-Square = 52.61*** -2 Log Likelihood = 305.57 Cox & Snell R-Square = 0.18 Nagelkerke R-Square = 0.25					Chi-Square = 32.31*** -2 Log Likelihood = 317.95 Cox & Snell R-Square = 0.12 Nagelkerke R-Square = 0.16			

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

Table 3 also shows the logistic regression analysis for virtual peer association. The results show that low self-control ( $b = 0.05$ ,  $Exp(b) = 1.05$ ) and associating with virtual peers that download music illegally ( $b = 0.98$ ,  $Exp(b) = 2.69$ ) increase the likelihood of downloading music from the Internet illegally. Following the previous logistic regression analysis that used an interaction measure, we constructed an interaction measure that included low self-control and associating with virtual peers that downloaded music from the Internet. The result from this analysis shows that an interaction is not present in these data. The result is consistent with Hinduja and Ingram (2009).

## DISCUSSION

The purpose of the present study was to contribute to the digital piracy, self-control, and social learning theory literatures. Specifically, the links between self-control and peer association (i.e., off-line and virtual) were examined in connection with downloading music from the Internet illegally. The results are instructive. 2

The results of this study show that low self-control has a link with digital piracy. This means that individuals that cannot resist a temptation and do not see the consequences of their action are more likely to perform digital piracy, which is consistent with a growing literature in this area (Higgins et al. 2006; Higgins and Makin 2004a, 2004b; Higgins and Wilson 2006). Overall, the result supports self-control theory.

The result that peer association has a link with digital piracy contributes to the literature in a few ways. The finding that associating with off-line peers who download music illegally resulted in an increased likelihood in one engaging in the same behavior is consistent with previous research in this area (Higgins et al. 2006; Higgins and Makin 2004a, 2004b; Higgins and Wilson 2006; Skinner and Fream 1997). Furthermore, this finding indicates that during the time spent with peers some form of learning is taking place, which is also consistent with previous research (Krohn 1999). Another way this study contributes to the literature is that it unearths the result that associating with virtual peers is important for understanding the downloading of music. This is consistent with Hinduja and Ingram (2009) and helps lament the view that peer association is important for the production of downloading music illegally from the Internet.

Importantly, our results reveal the type of analysis that is necessary to understand the effect of low self-control and peer association, regardless of the medium. To be clear, our analysis shows that the effect of these measures is additive and not interactive. That is, low self-control and peer association are not contingent on one another for this behavior to be performed. This has important theoretical implications. For instance, this would suggest that the premise from Gottfredson and Hirschi's (1990) and subsequent revisions (Hirschi 2004; Gottfredson 2006) that self-control is the only reason why criminal behavior occurs is not completely correct.

Given that the effect size for peer association, no matter the medium, is so much larger than low self-control, it would suggest that this measure is most important. Some may be tempted to suggest that Akers' (1998) version of social learning theory would be victorious when considering the effects of the measure. This would only be partly true. We agree with Krohn (1999) and Akers (1998) that support for one measure is support for learning theory, but Akers (1998) argued that individuals that are poorly socialized will form a level of behavioral control. The behavioral control will come from peer associations. This would imply that an interaction between low self-control and peer association would take place. In these data, using these measures, this does not occur. This would suggest that more research is necessary in this area. Overall, the results suggest that a measure of peer association (i.e., off-line or virtual) is necessary in a study with low self-control to understand digital piracy.

While the results have theoretical implications, the present study does have some limits. First, the study is unable to untangle whether the off-line peers are also the virtual peers. This suggests that some measurement contamination is possible. However, the measurement is consistent with Hinduja and Ingram (2009). Second, the study uses self-reports of peer association. Gottfredson and Hirschi (1990) have argued that this really is a reporting of the individual's behavior and not a true reporting of peer behavior. However, our measurement is consistent with previous research in this area (Higgins et al. 2006; Higgins and Makin 2004; Higgins and Wilson 2006; Skinner and Fream, 1997). Third, the present study only uses a

personality based measure of self-control. However, Gottfredson (2006) argued that measures of self-control may differ given the age of the respondents. Fourth, the study used cross-sectional data, making correlation and causation difficult to imply compared to the use of longitudinal data.

Despite the limits of the study, the results are instructive as to the importance of low self-control, off-line peer association, and virtual peer association for digital piracy. Specifically, the results indicate that while low self-control has a link with digital piracy, peer association (off-line and virtual peer association) has larger effects in regard to digital piracy. While research that uses different measures of peer association with longitudinal data may be more indicative of the extent of its effect, for now, we can see that self-control and peers are important for performing digital piracy.

## NOTES

1. Our focus is not to directly compare the differences in the coefficients between the years. Thus, we refrained from using a coefficient difference test ala Paternoster and colleagues (1998).

N = 285.

\*\*p < .01, \*\*\*p < .001.

\*p < .05, \*\*p < .01, \*\*\*p < .001.

2. We acknowledge that some may interpret these results differently. As one reviewer pointed out, some may interpret these results as support for Glaser's differential identity theory.

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