Piracy on the High Speeds: A Test of Social Learning Theory on Digital Piracy among College Students

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Abstract

This study assesses factors that affect Internet piracy among college students. Specifically, the study asks the question: Are social learning theories predictive of piracy behaviors? Data used in this study were collected from 587 undergraduate college students enrolled in two higher education institutions. Path analysis as part of structural equation modeling (SEM) is used to test several models for different types of Internet piracy. The results show that variables from social learning theories, such as peer involvement and parental support, are strongly related to Internet piracy. Using three differing types of Internet-based digital piracy, the differences and similarities in findings will be compared. Implications for future research and potentially more effective prevention strategies are also discussed.

Key Words: Differential association; Social learning; Digital piracy; Computer crime; Differential reinforcement

Introduction

When one thinks of crime, violent street crime typically comes to mind. In more recent years, white collar crimes, environmental crimes, identity theft, and other crimes previously considered less important have at least shared the spotlight of America's interest with violent crime. Yet, the growing threat of digital piracy is still often overlooked by the general population. Though digital piracy is resulting in billions of dollars in losses each year, it is given little more consideration than jaywalking by most people. The effectiveness of efforts to combat this crime could be greatly enhanced if we simply knew which factors cause individuals to engage in electronic copyright piracy.

This study assesses factors that potentially affect digital piracy among college students. Specifically, this study asks the question: Are social learning theories predictive of piracy behaviors? The importance of studying piracy has often been ignored in empirical studies. In 2005, copyright piracy in the United States software industry alone accounted for $6.8 billion in revenue lost (Business Software Alliance, 2006). Estimated losses in wages and tax revenue reflect similar importance. The music industry faces dire piracy problems as well. In 2004, the total amount of estimated sales for pirated music worldwide was $4.6 billion (International Federation of the Phonographic Industry, 2005). Moreover, this

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figure does not include the vast number of illegal files exchanged over the Internet without cost via peer-to-peer (P2P) file sharing programs. The total number of media files transferred through these programs has reached approximately 27.6 billion annually (House of Representatives, 2004a). Though the legality of such files cannot be ascertained due to the private nature of the exchanges, a large portion of the transfers is nonetheless illegitimate.

The violation of law and loss of potential revenue to "big business" are not, in and of themselves, considered harmful by the average citizen. The impact of digital piracy, however, still has a severe impact. First, governments worldwide are already spending millions of dollars to combat copyright piracy. These attempts often specifically outline goals consistent with deterrence-based law enforcement (e.g., House of Representatives, 2004a). Empirical evidence of the antecedents of digital piracy would undoubtedly assist in these efforts. Furthermore, tax revenue would increase if sales and the industry's taxable profits likewise increase. One study indicated that a ten percent decrease in the piracy rate would increase tax revenue by an estimated $21 billion in the United States alone (IDC, 2005).

Though using the word piracy to describe certain copyright violations has existed for over centuries, it is a relatively new concept as a widespread phenomenon. With the digital revolution came a new form of theft, digital piracy, which is unauthorized and illegal digital reproduction of intellectual property. Given its recent conception, few studies have addressed the causes of digital piracy and fewer still explicitly use a criminological theory as a foundation for research. The recent advancement of fast, easily accessible forms of electronic piracy has quickly outdated many of the few studies that have addressed this topic. More specifically, the rapid increase in popularity of P2P file sharing software since 1999 has dramatically increased the accessibility of music and video files. Presently, the average individual with minimal experience and broadband Internet access, which is common on virtually all college campuses, can download a music file in under a minute (Cooper & Harrison, 2001).

In light of this recent, rapid increase in accessibility, piracy has become more widespread than it ever has been. The technological access provided to college students and prevalence of piracy at universities is well documented and often the target of government actions (Cooper & Harrison, 2001; House of Representatives, 2004b). Using survey data from college students from two mid-Atlantic higher learning institutions, this study will empirically test whether variables derived from social learning theories affect digital Internet-based piracy among college students. More effective prevention strategies or the elimination of actions not consistent with the theoretical findings are some of the potential implications.

Social Learning Theories of Digital Piracy

Differential association (Sutherland & Cressey, 1960), one of the first social learning theories specifically developed to explain crime, views crime as a product of social interaction. Crime, according to this theory, is learned and criminal actions are the end result of an individual's exposure to an excess of definitions favorable to the violation of law. Definitions include the motives, attitudes (rationalizations), and techniques (ability) that permit an individual to commit a crime, all of which are learned through association with others. According to the theory, the most powerful definitions come from intimate primary groups, such as family members and friends/peers. Secondary groups, such as

government officials, entertainment industry representatives, university policies, and campaigns against piracy, generate less powerful definitions.

Modern social learning theories (Akers, 1985; Akers, 1998; Akers et al, 1979; Burgess & Akers, 1966) describe the social learning process in greater detail. Specifically, the social learning process is described as containing multiple concepts. The principle concepts of social learning include differential association, definitions, and differential reinforcement (Akers, 1985; Akers, 1998). The concept of differential association has remained quite similar to Sutherland's (Sutherland & Cressey, 1960) original description. Accordingly, differential association is the process by which people are exposed to normative definitions favorable or unfavorable to the violation of law. More specifically, this process usually involves direct contact with individuals engaging in deviant or criminal behaviors. Normative aspects such as moral approval or the absence of disapproval of deviant or criminal behavior, however, is also part of this process. Thus, the concept of differential association comprises both behavioral and attitudinal support for deviant or criminal acts.

In empirical studies of digital piracy, differential association has found some support relating to software piracy. Skinner and Fream (1997) tested differential association and found family and peer involvement to be predictive of piracy. These results, however, are quite dated and limited to only one distinct type of piracy. One other study from the pre-P2P era concluded that "social factors," which was defined as "norms, roles, and values at the societal level that influences an individual's intentions to pirate software" (Limayem, Khalifa, & Chin, 1999, p. 125), were similarly related software piracy. The exact measure for this variable is unspecified, but implied to be peer activity and support of piracy. This study, however, was limited to business undergraduates at a Canadian university, so its generalizablility to the U.S., where piracy rates are significantly lower (Business Software Alliance, 2006), is questionable.

More recently, several studies by Higgins and colleagues have found additional support for differential association. Four of these studies (Higgins & Makin, 2004a; Higgins & Makin, 2004b; Higgins, 2005; Higgins & Wilson, 2006) included peer activity, measured using a six-item scale, and found statistical significance. In these studies, the behavior of study was again strictly limited to illegally copied software. All of these studies utilized various scenarios from a previous study (Shore, et al., 2001) to describe the behavior to participants. One of the studies (Higgins & Makin, 2004b), however, used a shareware-based scenario in which an individual is asked to send a registration fee to the author, but is not explicitly required to do so by law. Though scenarios about computer ethics are not uninteresting, they do not necessarily measure actual engagement in illegal activities rather than a more abstract willingness to do so. Despite this limitation, these studies indicated that differential association may be an antecedent of digital piracy.

The second concept of social learning theory is that of definitions. According to the theories (Akers, 1985; Akers, 1998; Akers et al, 1979; Burgess & Akers, 1966; Sutherland & Cressey, 1960), definitions represent a variety of attitudes or meanings by an individual toward a specific behavior. These can include rationalizations for deviant or criminal acts, a general orientation toward the behavior, or an overarching moral evaluation of the behavior. In other words, definitions form the general moral belief that one has or that pertains to a specific act. Definitions, not being an innate part of an individual, are learned through the differential association process. Thus, definitions are both an outcome of differential association and an influence over behavior.

Similar to differential association, definitions have also received empirical support as being relating to digital piracy. Moreover, studies have shown such a relationship holds true when definitions are operationalized as general moral beliefs toward piracy (Higgins, 2005; Higgins et al, 2005; Higgins & Wilson, 2006; Limayem et al, 1999), specific rationalizations for pirating behaviors (Higgins & Wilson, 2006; Skinner & Fream, 1997), and specific beliefs about crimes unrelated to piracy (Gopal, Sanders, Bhattacharjee, Agrawal, & Wagner, 2004). The relationship between differential association and definitions in the area of digital piracy, however, remains untested.

Another key concept of social learning theory is differential reinforcement. According to the theories (Akers, 1985; Akers, 1998; Akers et al, 1979; Burgess & Akers, 1966; Sutherland & Cressey, 1960), differential reinforcement refers to the anticipated rewards or punishments for a specific act or behavior. These hypothetical consequences serve to encourage or inhibit the likelihood of an individual engaging in deviant behavior. This concept is actually quite similar to that of deterrence (Beccaria, 1764/1985), especially when more recent rational choice theories (e.g., Cornish & Clarke, 1986) are considered. These views similarly predict that perceived certain and severe punishment is likely to prevent a person from engaging in a criminal behavior. Differential reinforcement can include informal rewards and punishments beyond the criminal justice system, such as a negative reaction by friends or family. In the case of piracy, however, such informal reactions seem unlikely given the low severity ascribed to the crime of piracy and the overall prevalence of digital piracy. It is unlikely that there is much variation in positive reinforcement, as pirating for personal use does not involve rewards beyond getting the sought item without cost.

Differential reinforcement has not often been tested in relation to digital piracy. In fact, the Skinner and Fream (1997) study was the only criminological test to explicitly relate the concept to a form of piracy. The results of the study noted only non-significant relationships between differential reinforcement variables and software piracy. This finding, however, is not entirely applicable to modern piracy. First, the vast changes in technology and subsequent increase in piracy over the last ten years would in and of themselves demand additional consideration before rejecting deterrence altogether. Second, the study defined the act being investigated as "knowingly used, made, or gave to another person a 'pirated' copy of commercially sold commercially sold computer software" (p. 504). Thus, piracy in this study was strictly limited to the sharing or copying of software among peers. This variation of piracy occurs in a setting even more private than Internet-based digital piracy and could easily result in different perceptions of punishment. Additionally, it was unclear whether "pirated" was defined to the participants.

Though theories of general deterrence and differential reinforcement are clearly different in many vital aspects, the operationalization process in studies of digital piracy has resulted in both theories being tested through measures of punishment severity and certainty. Thus, while deterrence is not interchangeable with differential reinforcement, the research applying these concepts to piracy is not unrelated. Unfortunately, despite an interest in applying deterrence to digital piracy (Sherizan, 1995), only one such study exists. In a test of software piracy (Higgins, Wilson, & Fell, 2005), empirical support for a link between deterrence and piracy was found for punishment certainty, but not severity. Similar to the Skinner and Fream (1997) study, Higgins and colleagues measured punishment and likelihood of pirating in terms of sharing a physical copy of software. As

before, the private setting of in-person sharing radically changes the "chances of being caught" and will likely alter the potential offender's perceptions as well (Higgins, Wilson, & Fell, 2005, p. 173).

The Present Study

Using social learning theory, this study will investigate three hypotheses. First, given that social learning theory predicts that imitation is the result of differential association, belief, and differential reinforcement (Akers, 1985; Akers, 1998; Akers et al, 1979; Burgess & Akers, 1966), it is expected that (H_1) individuals with differential association, belief and differential reinforcement supportive of piracy will be more likely to engage in piracy. More specifically, Sutherland and Cressey (1960) predict that primary groups, including family and peers, generate more powerful messages than do secondary groups, such as government officials. Thus, it is expected that differential association, which primarily involves family and peers, will have a greater impact than would differential reinforcement, which involves societal forces.

Second, Sutherland and Cressey (1960) postulate that the differential association process includes the transmission of definitions, motives, and abilities. Therefore, it is expected that (H2) the effects of differential association will partially be mediated through belief and technical ability. Third, primary groups may have influence over an individual's perceptions of rewards and punishments through the differential association process. Essentially, pirating friends may downplay the likelihood of getting caught and, therefore, (H3) differential association favorable to piracy will decrease perceptions of punishment.

Methodology

Data Collection and Sample

Data used in this research were collected through student surveys from two mid-Atlantic higher-education institutions, one of which is a small, private, liberal-arts College and the other a moderately sized, public university. Prior research has postulated that perceptions of punishment and belief can best be ascertained through vignettes describing the criminal act being studied (Klepper & Nagin, 1989; Bachman, Paternoster, & Ward, 1992; Shore, et al., 2001; Higgins & Makin, 2004a). Therefore, participants were presented with several vignettes each describing an individual committing a specific act of piracy. These vignettes were intentionally kept brief to minimize the introduction of mitigating circumstances in the hopes that the participant would respond to the crime, not specific events surrounding the particular scenario. Questions following each vignette addressed the morality of the act, likelihood of punishment, severity of punishment, similarity to peer behavior, technical ability to engage in the act, and parental approval of the behavior (see Appendix). To minimize confusion between piracy and legal downloading, participants were explicitly told prior to responding that the scenarios and questions in the questionnaire are not instances of legal downloading (e.g., iTunes, shareware, demos, etc.). Participants were reminded of this on the questionnaire itself as well.

The sample for this study was a non-random sample of undergraduate college students enrolled in various classes during the spring 2006 semester. Thirteen classes were selected for the sample primarily based on their large enrollment figures, but also for diverse topics

and varying levels. From the 594 students asked to participate, seven students opted to not participate, resulting in a total response rate of about 98%.

The demographics of the sample are displayed in Table 1. Also displayed are the institution demographics from the larger public university. Unfortunately, enrollment statistics from the private college were unavailable. The gender, race, and class year demographics are roughly representative of the institutions from which the sample was drawn. The participants' majors, however, were over representative of the social sciences and under representative of the computer sciences, despite the fact that three introductory computer sciences classes were included in the sample.

Table 1: Sample Demographics

Variables	Percent (N)	Population Percent
Gender		
Male	44.3 (260)	42.2
Female	55.7 (327)	57.8
Race/Ethnicity		
White	86.7 (509)	83.1
Black	5.3 (31)	5.3
Hispanic	4.1 (24)	4.4
Asian	2.2 (13)	3.8
Other/Mixed	1.7 (10)	3.3
Class Year		
Freshman	30.7 (180)	28.8
Sophomore	28.1 (165)	25.1
Junior	19.9 (117)	23.0
Senior	21.1 (124)	23.2
Other	0.2 (1)	
Major		
Business-related	12.4 (73)	
Computer Sciences	0.9 (5)	
Criminal Justice	27.4 (161)	
Natural Sciences	8.0 (47)	
Psychology	8.7 (51)	
Sociology	5.8 (34)	
Other Social Science	9.4 (55)	
Other	26.6 (156)	

Variables

The dependent variables for this study were measured using objective questions about the monthly average of piracy violations for three types of piracy: music, software, and

movie. The available responses were ordinal, ranged from one to four and varied in description for each type of piracy. For music piracy, responses included: (1) Never, (2) 1-5 songs per month, (3) 6-15 songs per month, or (4) more than 15 songs per month. Movie piracy responses were: (1) Never, (2) 1-3 movies per month, (3) 4-6 movies per month, or (4) More than 7 movies per month. Finally, the software piracy questions contained the following categories: (1) Never, (2) 1-3 programs per year, (3) 4-6 programs per year, or (4) More than 7 programs per year.

The analysis will include six independent variables, each with three variations for each type of piracy in the vignette. The first independent variable, peer involvement, was measured similarly to previous studies (Skinner & Fream, 1997) by asking how many of the respondent's friends would do the described act (e.g., download music without paying for it). The possible responses were (1) none, (2) few, (3) about half, or (4) most or all. The second independent variable, parental approval, was measured with a Likert-like scale in response to asking if the respondent's parents would approve if they did the described act. The responses ranged from (1) strongly disapprove to (4) strongly approve. These first two measures comprise the differential association concept. Though a scale could theoretically be complied from the two measures, the reliability of such a scale would be unacceptably low (<.50) and comparing peer and parent variables' independent effects will yield more interesting results.

Two variables were derived from concepts associated with differential reinforcement. Reinforcement certainty was measured by asking how likely it was that the described act would result in individual being "caught and punished." Responses ranged from (1) extremely unlikely to (4) extremely likely. Reinforcement severity, on the other hand, asked what the punishment would be if the fictional individual in the vignette were "caught." Responses included: nothing, small fine, loss of Internet access, heavy fines/lawsuit, or jail/prison. These responses were later dichotomized to mild (0) for responses of nothing, small fine, or loss of Internet access and severe (1) for heavy fines/lawsuit or jail/prison.[2]

The measure for technical ability is a straightforward question about the respondent's ability (yes or no) to do the described act. The belief variable was measured using a question similar to Higgins's (2005) morality measure; "How morally wrong is this behavior?" with responses of (1) not wrong, (2) slightly wrong, (3) moderately wrong, and (4) very wrong. The descriptive statistics for the main independent and dependent variables are displayed in Table 2. The correlation matrices for each of the three types of piracy indicate that none of the correlation coefficients for the seven variables used in the analyses exceed .52, so collinearity is not expected to be problematic.[3] Additionally, the variance inflation factors (VIFs) and tolerances also indicated no multicollinearity issues.

[2] Multiple methods of coding the severity variable were attempted, including using it as an ordinal variable as originally collected. Severity's effect in the models remained similar regardless of the coding method. The dichotomous version was chosen because it seemed most consistent with general deterrence theory, which indicates that severity's effect should not increase once the severity becomes more severe than the crime, and because "nothing," "small fine" and "loss of Internet access" all appear to be considered insignificant punishments based on prior research of piracy (e.g., Cooper & Harrison, 2001).

[3] Correlation matrices are not shown, but are available from the author upon request

Table 2: Descriptive Statistics

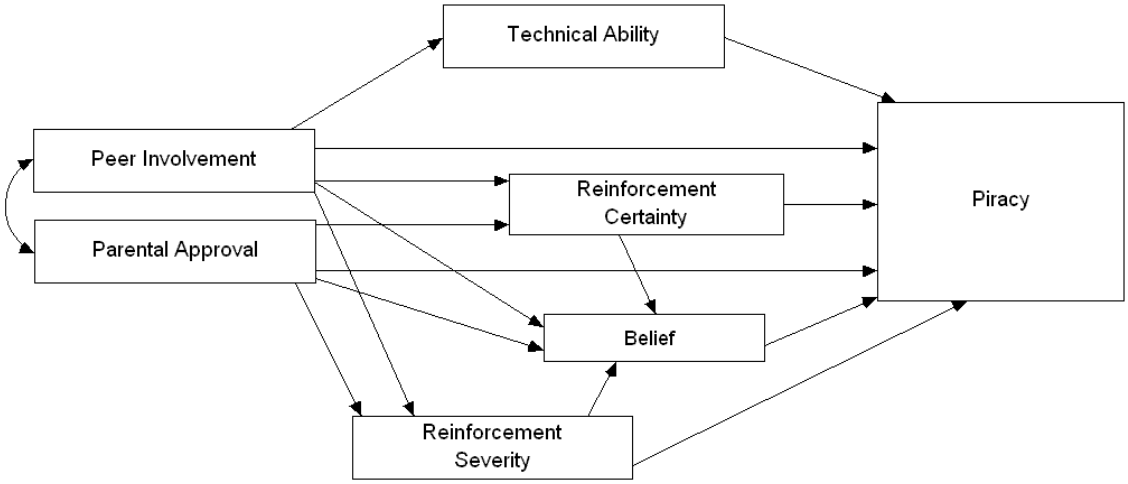
Variable		Mean	SD	Min	Max
Peer Involvement	(Music)	3.65	.640	1.00	4.00
	(Software)	2.69	.961	1.00	4.00
	(Movie)	2.80	.900	1.00	4.00
Parental Approval		2.54	.699	1.00	4.00
		2.38	.749	1.00	4.00
		2.36	.740	1.00	4.00
Reinforcement Certainty		1.90	.633	1.00	4.00
		2.10	.706	1.00	4.00
		2.11	.697	1.00	4.00
Reinforcement Severity		0.57	.496	0.00	1.00
		0.64	.481	0.00	1.00
		0.66	.475	0.00	1.00
Belief		2.01	.775	1.00	4.00
		2.26	.829	1.00	4.00
		2.19	.787	1.00	4.00
Technical Ability		0.94	.234	0.00	1.00
		0.73	.444	0.00	1.00
		0.81	.391	0.00	1.00
Piracy Involvement		2.46	1.174	1.00	4.00
		1.41	.686	1.00	4.00
		1.22	.584	1.00	4.00

Analysis

Several of the hypotheses in the present study address mediating effects within the causal model. Though several techniques allow for the testing of such effects, path analyses as a part of structural equation modeling (SEM) are most appropriate in this instance. This will allow the direct, indirect, and total effects of exogenous and intervening variables to be analyzed and discussed. The initial model for the analysis is presented in Figure 1. Maximum Likelihood (ML) is typically used for such analyses. This analysis, however, will use Weighted Least Squares Mean and Variance Adjusted (WLSMV) to account for the ordinal nature of the dependent variables. The significance of a chi-square statistic has often been used to determine the strength of the model overall, yet this statistic is often problematic when using large samples. Therefore, this analysis will also consult the comparative fit index (CFI) and root mean square error of approximation (RMSEA) to determine the overall fit of the model. The analysis will be performed separately for each type of Internet piracy included in this study and subsequent results will be compared for any noteworthy differences.[4]

[4] Each of the variables was measured with three observations, which is the minimum number of observations required for forming a latent construct and using true SEM. A bivariate analysis of the data, however, indicates that the different types of piracy measured in this study do not correlation sufficiently for such an analysis. The

Figure 1: Theoretical Model



Results

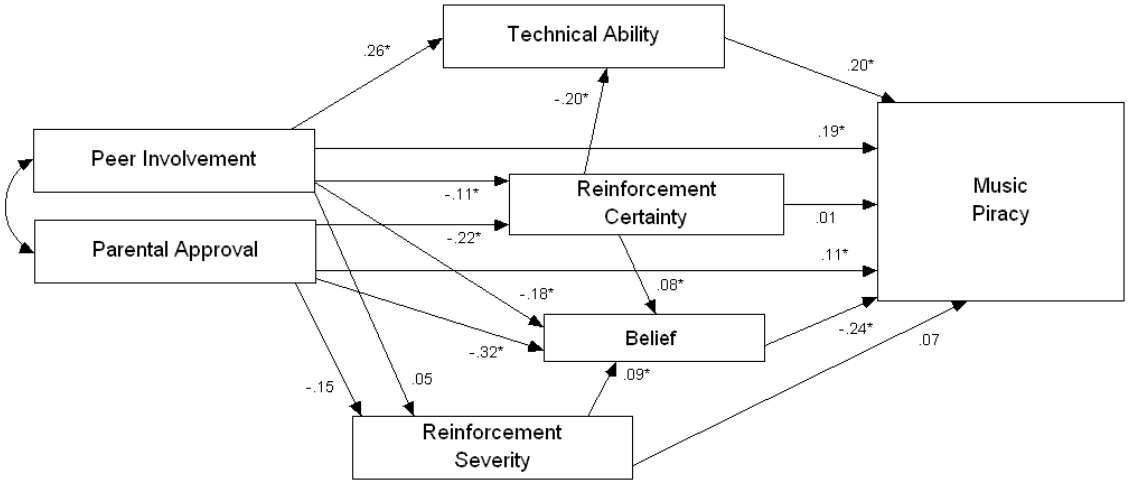
The results of the path analyses, including the direct, indirect and total effects on the dependent variables, are presented in Table 3. The results for all direct paths in the analysis are displayed in figures 2, 3, and 4. Looking first at the direct effects on digital piracy, measures of differential association from primary groups were powerful predictors of digital piracy of all types (standardized effects ranging from .11 to .23). Similarly, technical ability also displayed strong influence over the three forms of digital piracy (.20 to .33). Interestingly, the effect of belief appears to change depending on the specific type of piracy. For music piracy, belief has a substantively strong relationship (-.24) with piracy that rivals that of differential association measures (.19 and .11). With regard to software piracy, technical ability is no longer as influential (-.11) as differential association (.23 and .14), but still statistically significant. Conversely, belief has no significant impact on movie piracy. This is especially surprising considering that downloading movies requires more expertise than downloading music. The differential reinforcement variables, on the other hand, hold the weakest impact on piracy with no significant influence over the crime when controlling for the other social learning variables. Therefore, the hypothesis that social learning variables (differential association, technical ability, belief and differential reinforcement) have a direct effect on digital piracy is supported. Differential reinforcement itself, however, is not empirically supported as a predictor of digital piracy.

Table 3: Standardized Regression Coefficients for Final Path Analysis Models

	Music Piracy			Software Piracy			Movie Piracy		
	Direct,	Indirect,	Total	Direct,	Indirect,	Total	Direct,	Indirect,	Total
Peer Involvement	.19*	.10*	.30*	.23*	.15*	.38*	.21*	.09*	.30*
Parental Approval	.11*	.08*	.19*	.14*	.10*	.24*	.23*	.01	.25*
Reinforcement Severity	.07	-.02*	.04	.05	-.02	.03	.05	-.01	.04
Reinforcement Certainty	.01	-.06*	-.05	-.10	-.11*	-.21*	.05	-.04*	.01
Belief	-.24*	---	-.24*	-.11*	---	-.11*	-.07	---	-.07
Technical Ability	.20*	---	.20*	.33*	---	.33*	.33*	---	.33*
R^2		.242			.413			.312	
χ^2/df		1.252			1.212			1.302	
CFI		.995			.997			.995	
RMSEA		.021			.019			.023	

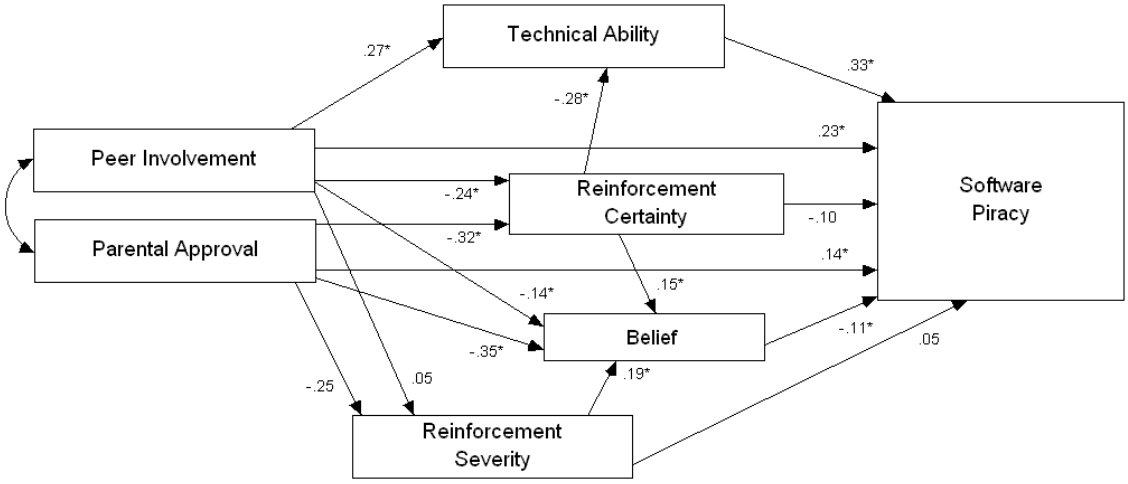
Cronbach's Alpha for such a construct would be a mere .59. Therefore, forming a latent construct for a single SEM model would be unwarranted.

Figure 2: Final Model for Music Piracy



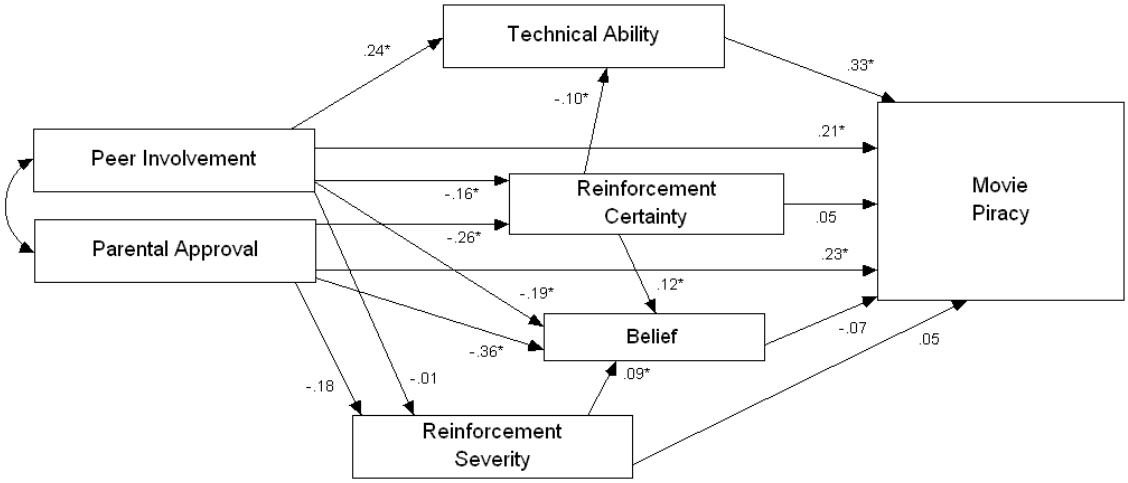
*** p < .05**

Figure 3: Final Model for Software Piracy



*** p < .05**

Figure 4: Final Model for Movie Piracy



*** p < .05**

The second hypothesis is that the effects of differential association are partially mediated through belief and technical abilities. Supporting this assertion, the indirect effects of differential association variables are found to be moderately strong. For music and software piracy, the indirect effects of parental approval (.08 and .10) rivalled that of the direct effects (.11 and .14) and were statistically significant. Similarly, peer involvement's indirect effects on music, software and movie piracy (.10, .15 and .09) also significantly contributed to the total effect of peer involvement on the three forms of piracy. Of the effects of differential association on digital piracy, only the indirect effect of parental approval on movie piracy was insignificant. Therefore, it seems that these indirect effects are powerful enough to lend some credibility to the notion that differential association's effect is mediated through belief and ability.

The third hypothesis of this study is that differential association favourable to piracy will decrease perceptions of punishment. The results indicate that parental approval has significant direct effects on perceptions of reinforcement certainty (-.22 to -.32), as does peer involvement (-.11 to -.24). Interestingly, the effects of peer involvement and parental support on reinforcement severity are relatively weak and non-significant. Though this evidence gives support to this hypothesis in general, it is clear that such a relationship gravitates toward punishment certainty rather than severity.

Overall, the models explain 24.2% of the variation in movie piracy, 41.3% of software piracy, and 31.2% of movie piracy. Despite the large sample size, the chi-square statistics, ranging from 1.21 to 1.30, are all too low to reject the null hypothesis that the data fit the models perfectly. Similarly, the CFI statistics (.995 to .997) are well above the required .95, indicating a significant improvement over a baseline comparison. The RMSEA statistics (.019 to .023) are also well within acceptable values.[5]

[5] As is common with many SEM-based models, minor modifications to the theoretically derived model were made to improve its fit. The paths from reinforcement certainty to technical ability were freed as recommended by the modification indices. While not initially predicted in this study's model, such a relationship is consistent with literature on piracy and the theory used. Depending on the direction of the relationship, an individual

Discussion and Conclusion

This study investigated the empirical validity of differential association and deterrence as applied to multiple forms of digital piracy. As predicted by social learning theory (Akers, 1985; Akers, 1998; Akers et al, 1979; Burgess & Akers, 1966), differential association predicted digital piracy in that college students with peers engaging in piracy and parents supportive of piracy were more likely to engage in piracy themselves. This finding is consistent with several prior studies have noted a strong relationship between peers and piracy (e.g., Higgins & Makin, 2004a; Higgins & Wilson, 2006; Limayem, Khalifa, & Chin, 1999; Skinner & Fream, 1997). However, this study has shown such an effect is not limited solely to peers and extends to parents as well. Furthermore, differential association theory (Sutherland & Cressey, 1960) also predicts the effects to be mediated through motives, beliefs, and ability. Though motives were beyond the scope of this study, significant indirect effects were observed through belief and ability. Additionally, it was hypothesized that perceptions of punishment would be influenced by differential association with pirating peers and parents supportive of piracy. The empirical evidence examined here is supportive of this postulation.

Conversely, the effects of differential reinforcement were statistically and substantively weak. The effects of perceptions of severity and certainty of punishment only rarely were statistically significant and were consistently weak; a finding consistent with prior studies of deterrence and differential reinforcement (Higgins, Wilson, & Fell, 2005; Skinner & Fream, 1997). These mixed results are obviously not enough to conclude there is an effect by reinforcement, but they are also not weak enough to definitively reject the notion that reinforcement may have some effect. With the simplicity of the measurement and analysis of this study, it is entirely possible that the poor relationships are the result of oversimplification in operationalizing severity and certainty.

Another noteworthy finding is the discrepancy between types of piracy. While the overall conclusion that differential association is a strong predictor of piracy and differential reinforcement variables are weak or non-predictors remains the same for all three types of piracy in this study, several differences were observed. Thus, different forms of piracy likely have similar causes and correlates. However, it would be erroneous to assume that such findings are identical without empirical verification.

The largest policy implication that can be derived from this study is the importance of social learning and belief. Obviously, the social learning process cannot be stopped altogether, but what is being learned can be altered if the environment changes. Attempting to sway the moral beliefs of college student to anti-piracy stances could result in exponentially growing anti-piracy beliefs. The effectiveness of programs designed to sway opinions is not guaranteed, but the data at least show that pro-social beliefs may prevent piracy.

Conversely, the deterrence factor so often discussed by government officials and the victimized industries did not receive much support. This is not necessarily a definitive conclusion though. The number of individuals who reported punishment being unlikely

might not seek the ability to commit a crime he or she considers not worthy of the risk involved or an individual with the technical ability to pirate may have an increased awareness of the anonymity involved and therefore knows detection is unlikely. The direction for the path in this model was arbitrary, but could theoretically flow in either direction or reciprocally.

or extremely unlikely was consistently higher than the number of people engaged in the activity. If everyone believes punishment is unlikely, then the variance must be explained by other concepts. This data cannot predict what would happen should punishment become more certain. Rather, the data show that perceptions are presently so far removed from certain that a deterrent effect is not present even among most non-pirating students. In other words, deterrence theory cannot find empirical support, even if it is applicable to piracy, if the vast majority of respondents have correctly assessed the certainty and severity of punishment is be minuscule. Therefore, the policy implication for deterrence is that *if* a deterrence effect is possible, it will take a radical change in tactics to become powerful enough to actually deter.

There are several limitations to this study that must also be addressed. First, peer activity and parental support were measured using data reported by only the respondent. Given the number of cases involved and anonymity guaranteed, it was unfeasible to contact parents and peers to confirm the validity of the reported support and activity. While it is unlikely participants intentionally lied in their responses, it is entirely possible that their responses were inaccurate perceptions of parental support and peer activity. For parental support, students may be unaware of their parents' stance on what is typically considered to be a minor crime. Thus, they may have selected (guessed) an answer representative of their own philosophy. The same concern exists for peer activity, but at least here it would appear that popular answers for peer activity coincide with popular answers for self-involvement in piracy activities.

Second, the data used in this study were cross-sectional. Therefore, the results here cannot truly claim to explain causality without establishing time-order. While it seems unlikely one would select peers based on a relatively minor and typically considered secretive part of one's life, this data do not disprove such a notion. Time-order would be a greater concern had punishment certainty and severity been significant predictors of piracy, as experimenting with piracy could increase awareness of the anonymity involved and become a reciprocal relationship. Finally, the items used to measure the variables were quite simplistic. Because a one-item measure is rarely as valid or reliable as a multiple-item measure, it may be more accurate to use scales or indices for more abstract concepts, such as belief.

Future research should attempt to overcome these limitations. In additional to using longitudinal data, assessing the validity of peer/parent measures, and importing more complex constructs, the theory should be expanded to go beyond the limited model used in this study. Modern and complete versions of social learning theory would be especially interesting to apply to Internet piracy and the learning process. Furthermore, research must distinguish between differing types of piracy. What may be true and well established for peers copying software may very well be undocumented and different for illegal, anonymous music downloads. Additionally, while P2P programs appear to be becoming a permanent part of technology, the Internet is ever changing and must be studied as such. The high number of individuals reporting having high-speed access and the technical ability to download music illegally are evidence of how theory can be impacted through technological evolution in even a relatively short period of time.

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