

Deterrence Effect of Four Legal and Extralegal Factors on Online Copyright Infringement

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A survey of online file sharers found that both legal and extralegal factors had a deterrence effect on online copyright infringement. Perceived certainty of punishment, perceived stigma of label, awareness of the laws and consensus with the laws were found to be negatively correlated with both current and likely future file-sharing activities. The regression analyses revealed that both current and future file-sharing activities were best predicted by the legal factor perceived certainty of punishment. The extralegal factors, perceived stigma of label and consensus with the laws, played important roles in deterring both current and likely future file-sharing activities, while awareness of the laws played a weak role in deterring likelihood of future file-sharing. The findings provide an empirical basis for developing alternative strategies to deter online file-sharing that involves massive users.

Key words: file-sharing, online copyright infringement, deterrence effect, punishment certainty, social stigma, extralegal factors, awareness of laws, consensus with law.

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Introduction

The development of computing and communication technologies has drastically changed the nature of how people communicate and exchange information. At the same time, illegal activities emerge as communication technologies advance (Grabosky & Smith, 1998, 2001; Grabosky, Smith, & Dempsey, 2001). One type of illegal activities is cyberpiracy, which is “the appropriation of new forms of intellectual property that have been created or popularized within cyberspace” (Wall, 2001, p. 5). These “virtual products” were created in digital format, including images, music, office aids, and interactive experience. The appropriation of these “virtual products” does not deprive owners of their use (Smith & Hogan, 2002). However, the threat to

owners comes from the dilution of their control over intellectual property. The term “dilution” is used in intellectual property laws to describe the reduction in value caused by unrestricted use (Wall, 2001). The common targets of cyberpiracy include movies, computer games, computer programs, and music encoded in MP3 format.

File-sharing has become a big concern of the music industry since 1999. According to the RIAA, the sales of CDs continued to decline in the U.S., from 940 million in 2000 to 615 million in 2006 (Anonymous, 2007). Each year, the industry loses about \$4.2 billion to piracy worldwide (RIAA, 2006). The music industry attributed this decline to file-sharing, and has brought legal actions to the networks that facilitated file-sharing, the Internet service providers, and the people that participated in file-sharing. The legal battles continue as file-sharing remains an unsolved issue.

While several studies explored relationship between file downloading and music sale (Day, Li, & Nelson, 2004; Fine, 2000; Liebowitz, 2003; Zentner, 2003), few studies looked at how file-sharing could be reduced by means beside the threat of law suits (LaRose, Lai, Lange, Love, & Wu, 2005). Law suits against file sharers seem to be ineffective due to the large scale of file-sharing, and it is impossible to bring legal actions against a large number of file-sharers. Are there any factors beyond legal means that play a role in deterring copyright infringement such as file-sharing? To what degree do these factors affect file-sharing activities? This study examines four legal and extralegal factors, perceived certainty of punishment, perceived stigma of label, awareness of the laws, and consensus with the laws, and tests whether these factors produce a deterrence effect on online copyright infringement.

This study is U.S.-based due to the fact that the United States was the country that had the largest number of file-sharers (Oberholzer & Strumpf, 2004). On OpenNap, a centralized P2P network, nearly one third (30.9%) of the users of file-sharing were in the United States. The country with the next largest number of users was Germany (13.5%). Italy was the third (11.1%). United States also had the largest shares of downloads (35%), compared to Germany (14.1%) and Italy (9.9%). Users from 10 European countries comprised of 44.8% of the file-sharers worldwide, who shared 44.6% of the downloads worldwide.

The MP3 (full name MPEG-1 Audio Layer 3) is an audio compression format that makes digital audio recordings easier to share on the Internet (Thomas, 1999). A song in MP3 format is about 10% of the size of the same song on a compact disc. The smaller file size is essential in environments like the Internet, where bandwidth is limited (Carey & Wall, 2001). The music can be downloaded from the Internet and be played through a computer's sound system or a portable MP3 player. The controversy started after MP3 was distributed through the Internet (Afzali, 1999, March 30). There are Internet music providers such as Apple's iTunes that carry only licensed files. Of much greater concern to the major record labels are the pirate providers, which post unlicensed recordings of copyrighted material in MP3 (Carey & Wall, 2001). One of the popular approaches to supply and obtain unauthorized material on the Internet is through the peer-to-peer file-sharing technology. Users

install file-sharing software in their own computers and gain access to the peer-to-peer file-sharing system. They can make MP3 music files stored on their own computers available for others to copy, search for MP3 music files stored on other users' computers and transfer exact copies of MP3 files from one computer to another via the Internet (Landau, 2002). In March 2006, Big Champagne, which had been conducting deep packet inspections in an attempt to estimate the general growth and volume of P2P traffic, found over 10 million simultaneous users on nine different file-sharing networks (Mennecke, 2006).

Data gathered from surveys conducted during March - May of 2003 showed that a striking 67% of the Internet users who downloaded music said they did not care about whether the music they downloaded was copyrighted. Some 27% of these music downloaders said they did care, and 42% shared files. File-sharers were 21% of the Internet user population—or about 26 million people. They are more likely to be younger, with 31% of the youngest adults aged 18 to 29 sharing files (Pew Internet & American Life Project, 2003).

Cyberpiracy, together with other methods of unauthorized use of a copyrighted work, are covered by copyright law. In 1998 the U.S. Congress updated copyright law for the digital age in preparation for ratification of the World Intellectual Property Organization (WIPO) treaties and passed the Digital Millennium Copyright Act (DMCA), which addressed several significant copyright-related issues. The European Union also passed various European Union directives on copyright law which member states are obliged to implement. An additional directive, the Directive on the enforcement of intellectual property rights of April 29, 2004, requires EU member states to criminalize all violations of any intellectual property right that can be tied to any commercial purpose, with penalties to include imprisonment.

Previous studies examined the effect of file-sharing on music sales with inconclusive findings (Day et al., 2004; Fine, 2000; Liebowitz, 2003; Zentner, 2003). These studies used different methods and looked at different aspects of online activities and other factors to investigate the effect of file-sharing. For example, Oberholzer and Strumpf (2004) observed 1.75 million file downloads, of which a significant majority of the downloads were music files, and U.S. users accounted for about one third of the downloads. They matched the data to U.S. album sales data and concluded that “downloads have an effect on sales which is statistically indistinguishable from zero.” Zentner (2003) found people who regularly download music online are more likely to buy music. The study also found that peer-to-peer usages reduced the probability of buying music by 30%. Liebowitz (2003) looked at the effect of a variety of possible factors including the macroeconomy, demographics, changes in recording format and listening equipment, prices of albums and other entertainment substitutes, and changes in music distribution on music sale. He found the decline in sales from 1999–2002 could not be fully explained by those factors. By gauging the effects of other possible factors, he concluded that file-sharing had reduced aggregate sales. Using household-level data from the Consumer Expenditure Survey, Michel (2006) found support for the claim that file-sharing had decreased sales. The

industry studies also had mixed conclusions about the effect of file-sharing on music purchase (Edison Media Research, 2003; Forrester, 2002; Jupiter Media Metrix, 2002; Nielsen//NetRatings, 2003; Pew Internet & American Life Project, 2000).

Whereas the effects of file-sharing on music sale were found mixed by both academic and industry studies, the music industry continues its hard line against those who infringe copyrights by trading songs illegally. Various copyright conglomerates, have aggressively pursued legal remedies on the Internet with various successes (Jacover, 2002). Although the history of online copyright infringement is not long, there seems to be a shift in tactics of the copyright conglomerates from suing technology providers (Napster) and squeezing conduits (Verizon) to suing individuals. The copyright conglomerates' hope is based on the deterrence effect of lawsuits (RIAA, 2007). How successful would it be? It will be necessary to look at deterrence as a complex and measurable phenomenon. The literature on the deterrence theory offers insight into the possible effect and provides the foundation for this study.

Literature Review

Deterrence refers specifically to the prevention of future crime by an individual or the overall population (Silver, 2002). The deterrence theory was first conceived by the members of the Classical School of thought and was based on the concepts of hedonism and rational choice. Bonesana and Beccaria (1764) and other Classicists argued that people are hedonistic, they seek pleasure and avoid pain and that they make choices when evaluating the costs and benefits of their actions before committing a crime. Certainty, celerity, and sufficient severity are the three main principles that make up the foundation of the deterrence theory (Silver, 2002). There are two types of deterrence, general and specific. General deterrence is directed at all of society, thus when others are punished for a particular behavior, the public observes and learns from this and in turn refrains from committing deviant acts. Conversely, specific deterrence is aimed at individuals. When they are punished for a criminal act, they are discouraged from committing future crimes (Brown, Esbensen, & Geis, 2001).

Deterrence model states that the deterrent effect of the criminal law varies considerably under different conditions, and the potential for more effective crime control within the deterrence model is limited by reasonably well known parameters. Although the deterrence model is not self-sufficient as a crime-control policy, it does offer the variables that greatly affect compliance with the law (Andenaes, 1974; Henshel, 1978; Meier & Johnson, 1977; Zimring & Hawkins, 1973).

Deterrence studies focusing on certainty and severity of sanctions have been a staple of criminological research for more than 30 years (Nagin & Pogarsky, 2001; Scheider, 2001). Two prominent findings emerged from this literature: 1) punishment certainty is far more consistently found to deter crime than punishment severity, and 2) extralegal consequences of crime seem at least as great a deterrent

as the legal consequences (Meier & Johnson, 1977; Nagin, 1998; Nagin & Pogarsky, 2001; Williams & Hawkins, 1992). Going back to Beccaria, punishment swiftness (“*celerity*”) has been accorded coequal status with certainty and severity in theory, yet empirical tests of the celerity effect are scant.

Evidence for severity (Decker, Wright, & Logie, 1993; Klepper & Nagin, 1989; Nagin & Paternoster, 1994; Piquero & Rengert, 1999) and celerity (Howe & Loftus, 1996; Legge & Park, 1994; Yu, 1994) effects is inconclusive. Severity is often found to be of little consequence for deterrence theory. After considering the results from deterrence studies from the 1970s, Witte (1983, p. 3) noted that “changes in the probabilities of conviction and imprisonment have a greater effect on crime rates than do changes in expected sentence length.” There is little evidence that severity of penalties is inversely related to the level of offenses (Decker & Kohfeld, 1990). Deterrent effects of severity are still disputed (Mendes & McDonald, 2001).

Celerity as deterrence prediction is grounded in psychological investigations of “Pavlovian conditioning” (Nagin & Pogarsky, 2001). In such studies, experimenters effectively suppressed animal behaviors with negative reinforcements occurring within 6 seconds following the targeted behavior. Criminology has adopted this finding as the basis for a celerity effect—that is, in similar fashion, delay should diminish the deterrent efficacy of a legal sanction. This analogy, however, neglects the fact that humans possess a far greater cognitive capacity than animals for connecting acts with temporally remote consequences (Nagin & Pogarsky, 2001). It is difficult to see how such experimental findings support the assumption that difference among jurisdictions or types of crime can be attributed even in part to contrasts in the celerity of punishment (Gibbs, 1975).

While no conclusive evidence has been discovered on punishment severity and celerity, certainty of punishment has been consistently found to deter criminal behavior (Horney & Marshall, 1992; Parker & Grasmick, 1979; Paternoster, Saltzman, Waldo, & Chiricos, 1985). Beliefs that lawbreakers are caught and punished are negatively correlated with official and self reported delinquency (Crother, 1969). There is convincing evidence that motorists can be deterred from alcohol-impaired driving, and increasing certainty of punishment is an effective intervention (Shepherd, 2001). There can be substantial changes in the amount of crime from changes in the certainty of punishment. The most direct evidence comes from the public reaction to police strikes in Liverpool in 1919 (Andenaes, 1952) and Montreal in 1967, which were followed by widespread looting (Andenaes, 1974).

Deterrence effects, however, are not limited to legal sanctions. Extralegal sanctions play an equally important role in securing compliance (Cochran, Chamlin, Wood, & Sellers, 1999; Grasmick, Blackwell, Bursik, & Mitchell, 1993; Meier & Johnson, 1977). In addition to formal punishments imposed by the state, actors contemplating law violation also take into account the likely magnitude of stigma—socially imposed embarrassment or self-imposed shame that they are doing something unacceptable (Grasmick & Kobayashi, 2002). Shame and embarrassment are emotions that cause pain (Scheff, 1988), just like state-imposed legal sanctions. This type of punishment

represents one of the potential costs that rational decision-makers take into account in deciding whether to break the law (Grasmick & Bursik, 1990). Researchers consistently found that the threat of stigma has one of the strongest inverse effects on involvement in illegal behaviors. (Cochran et al., 1999; Hollinger & Clark, 1982; Tittle & Rowe, 1973).

Public knowledge of the law also is important. Knowledge of the laws was found to have a deterrent effect on would-be offenders (Chiricos & Waldo, 1970; Van Den Haag, 1969; Wilkins, 1969). People are deterred by what they think is the certainty of capture and stigma, not what the certainty of capture and stigma is eventually (Henshel & Carey, 1975). Evidence suggests that the general public is quite unaware of specific legal penalties or changes in them (Biddle, 1969). Moreover, many users of file-sharing networks do not perceive that they are breaking the law by sharing copyrighted material. Some users who know or think they know the copyright law, perceive it as outdated and not fit for the digital era (Wall, 2001).

At the same time, consensus with the law could also play a role in deterring illegal activities. Andenaes (1974) suggested that knowledge of the laws is more effective if it is followed with the agreement with the laws. Consensus with the law refers to the standpoint resulted from unambiguous, credible, and persuasive information that avoids hostile reactions and achieves contact with the target reactions at the appropriate time and place. It is the consequence facilitated by effective communication with the targeted audience, not the changes in the law to reflect what the targeted audience agrees upon.

The deterrence theory and previous research suggest that legal and extralegal factors have a deterrence effect on criminal behaviors. But to what degree the deterrence theory applies to online file sharing remains a question. Online copyright infringement is different from common criminal behaviors. Many online file-sharers do not see it as a punishable illegal behavior. Because there are many Internet users who share files, the punishment is difficult to enforce. With difficult enforcement against copyright infringement, it is speculated that the deterrence effect of punishment on copyright infringement in file-sharing is relatively weak. On the other hand, whereas file-sharing may not be punished as severely as criminal convictions, financial penalties and stigma of label could imply significant loss to file-sharers and thus could impose noticeable deterrence effect on file-sharing. Therefore, the deterrence theory concerning criminal behaviors could still apply to file-sharing, the online copyright infringement.

Studies examine Internet file-sharing from different perspectives, but no studies have been done to test the deterrence effect of legal and extra legal factors on Internet file-sharing. Through an empirical approach, this study attempts to answer the question, do legal and extralegal factors have a deterrence effect on online file-sharing? In light of the general deterrence model and previous studies on the deterrence effect of legal and extralegal factors, four legal and extralegal factors were identified to have deterrence effects on illegal activities: perceived certainty of punishment, perceived stigma of label, awareness of the laws, and consensus with

the laws. Therefore, this study will test the following four hypotheses regarding the deterrence effect of the four legal and extra-legal factors. The findings of this study will shed light on the degree to which these factors deter online copyright infringement, and will have important implications on enforcement of copyright law regarding online copyright infringement.

H1a: Perceived certainty of punishment will be negatively associated with users' current file-sharing activities.

H1b: Perceived certainty of punishment will be negatively associated with users' likelihood of future file-sharing activities.

Certainty of punishment has been consistently found to deter criminal behavior (Parker & Grasmick, 1979). As the music industry aggressively pursues cases of copyright infringement, perceived certainty of punishment may rise and demonstrates a deterrence effect on file-sharing. It is expected that those who have higher perceived certainty of punishment would more likely be deterred than those who think the risk is low.

H2a: Perceived stigma of label will be negatively associated with users' current file-sharing activities.

H2b: Perceived stigma of label will be negatively associated with users' likelihood of future file-sharing activities.

One of the most consistent factors that affects compliance with the law is the threat of stigma. Socially imposed embarrassment or self-imposed shame has a strong deterrence effect on committing crimes, regardless of the character of criminal sanctions (Andenaes, 1974). If file-sharing is perceived as a threat of stigma, the perception is likely to deter file-sharing activities.

H3a: Awareness of the copyright laws will be negatively associated with users' current file-sharing activities.

H3b: Awareness of the copyright laws will be negatively associated with users' likelihood of future file-sharing activities.

H4a: Consensus with the laws will be negatively associated with current file-sharing activities.

H4b: Consensus with the laws will be negatively associated with likelihood of future file-sharing activities.

Ignorance of the law is technically not an excuse in a court, but deterrent effects may be facilitated by unambiguous and persuasive information. Communication that shows a law is reasonable and certain not only aids direct deterrence but

also encourages public participation in its enforcement. This study followed the assumption of Andenaes (1974) and Henshel (1978) that the higher level of awareness of the laws and consensus with the laws will have a deterrent effect on users' current or future file-sharing activities.

Method

This study employed a survey to test the factors that deter online copyright infringement. The population of the study is college students, who are the most frequent file-sharers. This study was conducted at a large university in the southern United States with a convenience sample. Students visiting the Union were asked to fill in a questionnaire regarding their online file-sharing activities. The Union is the largest setting for students at the university and students around campus gather at the Union for a variety of activities. Students who agreed to fill in the questionnaire were briefed about the anonymity of the study.

While use of a convenience sample negates external validity, with a carefully designed questionnaire, it could still produce meaningful data and offer some insight to understand the online file-sharing of college students. Having the questionnaire filled in on site could reduce errors in communication and ensure that the questionnaire was filled out by the appropriate respondents, the college students with access to the Internet. The data collection could also be completed in a relatively short time.

It is ideal to conduct a survey with a representative sample so that the results could be generalized to the population. However, a representative sample is essential only if the study estimates the univariate values in the population. When a study explores relationships between the variables informed by theories, a random sample of general population is not a must because the goal of the study is not to estimate the univariate values in the population. The findings of a study applying different methodologies suggest that a student sample could reveal multivariate relationships as well as a random sample from the general population (Basil, Brown, & Bocarnea, 2002). If a theory is true in the population, it should also apply to a student sample and stand the test with the sample.

The one-page questionnaire contained 20 questions about student file-sharing activities and the deterrence factors. The independent variables include perceived certainty of punishment, perceived stigma of label, awareness of the laws, and consensus with the laws. The dependent variables include current file-sharing frequency and quantity and likelihood of future file-sharing activities.

Operational Definitions and Measures

The measures of the key variables were constructed based on the literature of criminology and the specific situation regarding online file-sharing. The aspects and activities of all key variables were carefully taken into account to make sure that the measures cover the full range of the concepts' meaning and contain measurement validity.

Independent variables

Perceived certainty of punishment is defined as the degree to which a respondent believes that file-sharers will be caught and punished. The measure was adapted from an earlier study on deterrence effects of certainty of punishment in workplace (Hollinger & Clark, 1983) to suit the online file-sharing situation. Perceived certainty of punishment was measured with three aspects of certainty of being caught and punished including: 1) It is easy for law enforcement agencies to catch file-sharers online (easiness to detect); 2) There is a big chance of being caught if I share copyrighted files online (chance of being caught); and 3) Many users, who share copyrighted files on file-sharing applications, are punished (number of people punished).

Perceived stigma of label refers to the embarrassment and shame that a file-sharing application user will feel if others find out that he/she is sharing file online. The measure was adapted from earlier studies on deterrence effects of social stigma (Grasmick et al., 1993; Grasmick & Bursik, 1990). Perceived stigma of label was measured with the following statement: "I will feel embarrassed and shameful if my friends find out I was sharing copyrighted files online." The measure gauges level of embarrassment and shame associated with the three most important social connections of college students including: 1) friends; 2) parents; and 3) professors.

Awareness of the laws was defined as how informed a file-sharing application user is about the copyright laws. The measure of awareness of the law contains three aspects that specifically concern the copyright law about file-sharing online including: 1) I am aware of what the copyright laws said about online file-sharing; 2) I am aware of what has been discussed about the copyright laws through traditional media (newspaper and TV); and 3) I am aware of what has been discussed about the copyright laws through the Internet.

Consensus with the laws was defined as the degree to which a file-sharing application user agrees that the copyright laws concerning online file-sharing are reasonable and in line with current technology. Consensus with the laws was measured based on the two major arguments of the online file-sharers against copyright law concerning online file-sharing (Wall, 2001) and Andenaes' (1974) notion on reasonableness of a law contributing to consensus and ultimately to compliance. Consensus with the laws was measured with two aspects: whether a file-sharing application user agrees 1) the laws are reasonable; and 2) the laws are up-to-date.

The items for each independent variable were measured with a 5-point Likert scale with responses from strongly disagree to strongly agree. A mean score was calculated for each independent variable by adding up the values of all items measuring that variable and divided by the number of the items.

Dependent variables

Current file-sharing activities include logging on to the peer-to-peer networks and sharing digital material with others. Current file-sharing activities were measured with two aspects: 1) frequency of using file-sharing applications measured through a

5-point verbal frequency scale with responses from never to every day; and 2) quantity of shared files, measured at ordinal level with five categories including 1) 0; 2) 1–100; 3) 101–1000; 4) 1001–5000; 5) > 5000.

Likelihood of future file-sharing activities was defined as the intent to start or continue sharing files. Likelihood of future file-sharing activities was measured with the following statement: “I am likely to start/continue using file sharing applications.” It was measured with a 5-point Likert scale with responses from strongly disagree to strongly agree.

A total of 306 students completed the survey. The data were entered into a computer and SPSS was used to analyze the data. Reliability tests were run for the four independent variables, *Perceived certainty of punishment* ($\alpha = .93$), *Perceived stigma of label* ($\alpha = .85$), *Awareness of the laws* ($\alpha = .83$), and *Consensus with the laws* ($\alpha = .85$) with acceptable results. Pearson’s correlation was used to examine the relationship between the deterrence factors and file-sharing activities. Multiple regression was used to examine to what degree the deterrence factors predict current and likelihood of future file-sharing activities.

Findings

Of 306 respondents, 58% were males, 42% were female. Twelve percent of the students were freshmen, 19% sophomores, 49% juniors, 17% seniors and about 3% were graduate students. Half of the respondents reported good computer skills and 30% reported excellent computer skills. Forty-five percent of the respondents had access to high speed Internet in their dormitory or at home.

About half (46%) reported they participated in online file-sharing at least sometimes; among them 35% shared file every day or quite often. About one-third of the respondents (31%) shared one to five thousand files during the past month. One-fourth (25%) said they had increased their file-sharing during the last 6 months, and 60% said they would start or continue file-sharing. Although 55% said they were aware of what the laws said about online file-sharing, 39% disagreed; 56% said the laws were reasonable while 35% disagreed; and 46% did not consider the laws up-to-date.

H1a, that perceived certainty of punishment will be negatively associated with users’ current file-sharing activities was strongly supported. The hypothesis was

Table 1 Relationship between deterrence factors and current and likelihood of future file-sharing ($N = 306$)

Variables	Certainty of Punishment	Stigma of Label	Awareness of Law	Consensus with Law
Current Frequency	–.84	–.80	–.64	–.84
Current Quantity	–.87	–.87	–.62	–.84
Likely Future Sharing	–.85	–.80	–.70	–.82

All correlation coefficients, $p < .01$.

tested by examining the relationship between the independent variable, perceived certainty of punishment and the two dependent variables, frequency and quantity of file-sharing. Pearson's correlation showed a strong negative relationship between perceived certainty of punishment and frequency of sharing files ($r = -.84, p < .01$). There was also a strong correlation between perceived certainty of punishment and quantity of shared files ($r = -.87, p < .01$).

H1b, that perceived certainty of punishment will be negatively associated with users' likelihood of future file-sharing activities, was strongly supported. Pearson's correlation showed a strong negative relationship between perceived certainty of punishment and likelihood of future file-sharing activities ($r = -.85, p < .01$).

H2a, that perceived stigma of label will be negatively associated with users' current file-sharing activities, was strongly supported. The hypothesis was tested by examining the relationship between the independent variable, perceived stigma of label and the two dependent variables, frequency and quantity of file-sharing. Pearson's correlation showed a strong negative relationship between perceived stigma of label and frequency of sharing files ($r = -.80, p < .01$). There was also a strong negative correlation between perceived stigma of label and quantity of shared files ($r = -.88, p < .01$).

H2b, that perceived stigma of label will be negatively associated with users' likelihood of file-sharing activities, was strongly supported. Pearson's correlation showed a strong negative relationship between perceived stigma of label and users' likelihood of future file-sharing activities ($r = -.80, p < .01$).

H3a, that awareness of copyright laws will be negatively associated with users' current file-sharing activities, was supported. The hypothesis was tested by examining the relationship between the independent variable awareness of the laws and the two dependent variables, frequency and quantity of file-sharing. Pearson's correlation showed a negative relationship between awareness of the laws and frequency of sharing files ($r = -.64, p < .01$). There was also a negative correlation between awareness of the laws and quantity of shared files ($r = -.62, p < .01$).

H3b, that awareness of copyright laws will be negatively associated with users' likelihood of future file-sharing activities, was strongly supported. Pearson's correlation showed a strong negative relationship between awareness of the laws and users' likelihood of future file-sharing activities ($r = -.70, p < .01$).

H4a, that consensus with the laws will be negatively associated with users' current file-sharing activities, was supported. The hypothesis was tested by examining the relationship between the independent variable consensus with the laws and the two dependent variables, frequency and quantity of file-sharing. Pearson's correlation showed a strong negative relationship between consensus with the laws and frequency of sharing files ($r = -.84, p < .01$). There was also a strong negative correlation between consensus with the laws and quantity of shared files ($r = -.84, p < .01$).

H4b, that consensus with the laws will be negatively associated with users' likelihood of future file-sharing activities, was strongly supported. Pearson's

correlation showed a strong negative relationship between consensus with the laws and users' likelihood of future file-sharing activities ($r = -.82, p < .01$).

Multiple Regression Model

Multiple regression analyses were conducted with four independent variables entered in the equation to predict frequency, quantity of current file-sharing and likelihood of future file-sharing. Because of the relatively high correlations between some of the independent variables, which may indicate collinearity in the measures, the collinearity statistics in the output of the regression analyses were consulted. The common cut-off criteria for deciding when a given independent variable displays "too much" multicollinearity are if *Tolerance* is less than .20, and the *Variance-inflation factor* (VIF) is higher than 4.0 (O'Brien, 2007). The independent variable perceived certainty of punishment showed a *Tolerance* level around 17.7 and *Variance-inflation factor* (VIF) 5.78 for the three models with the three dependent variables. All other three independent variables had a *Tolerance* above .20 and VIF below 4.0 and did not seem to have serious collinearity problems. Because perceived certainty of punishment is a variable that plays an important role in the study and cannot be dropped from the models, and it is a concept that was measured independently from other independent variables, the following diagnostics were further conducted to determine if perceived certainty of punishment caused a serious collinearity problem in the models (Belsley, Kuh, & Welsch, 2004). a) Regression analysis based on a random sample of the data set. The results from a 50% random sample of the original data set did not differ drastically from the original results, nor did the results change the sign of the effects; b) Regression analysis with and without perceived certainty of punishment. Large changes in the estimated regression coefficients were not observed when perceived certainty of punishment was added or deleted; 3) Collinearity diagnostics. A condition index over 15 indicates possible collinearity problems. If a factor (component) has a high condition index, one looks in the variance proportions. The most common criterion is if two or more variables have a variance proportion of .50 or higher on a factor with a high condition index, these variables have high linear dependence and multicollinearity is a problem. In the output of regression analyses of the three models with the three dependent variables, factors 1 to 4 all had a condition index below 15 while factor 5 had a condition index ranging from 25.16 to 25.43 in all three models. However, no two or more variables of factor 5 had a variance proportions of .50 or higher. Therefore, the regression analysis results of the three models were still considered acceptable after the collinearity analysis and diagnostics.

The four predictors in the model accounted for high variance in frequency of file-sharing ($R^2 = .79, F = 280.84, p < .01$). Consensus with the law ($\beta = -.42, p < .01$) and perceived certainty of punishment ($\beta = -.37, p < .01$) were strong predictors. Perceived stigma of label was a moderate predictor ($\beta = -.20, p < .01$). Awareness of the law was not a significant predictor of frequency of file-sharing ($\beta = .05, p > .05$).

The four predictors in the model were also responsible for high variance in quantity of file-sharing ($R^2 = .86$, $F = 462.04$, $p < .01$). Perceived certainty of punishment ($\beta = -.42$, $p < .01$) and perceived stigma of label ($\beta = -.38$, $p < .01$) were strong predictors. Consensus with the law was a moderate predictor ($\beta = -.27$, $p < .01$). Awareness of the laws did not predict quantity of file-sharing in the right direction ($\beta = .12$, $p < .05$).

Finally, the four predictors in the model were also responsible for high variance in likelihood of future file-sharing activities ($R^2 = .78$, $F = 271.80$, $p < .01$). Perceived certainty of punishment ($\beta = -.38$, $p < .01$) was a strong predictors. Perceived stigma of label ($\beta = -.22$, $p < .01$) and consensus with the law ($\beta = -.27$, $p < .01$) were moderate predictors. Awareness of the law was ($\beta = -.10$, $p < .05$) a weak predictors of likelihood of future file-sharing.

Table 2 Regression analyses predicting current and likelihood of future file-sharing ($N = 306$)

Predictors/File-sharing Activities	Current Frequency	Current Quantity	Likely Future Sharing
Certainty of punishment	-.37**	-.42**	-.38**
Stigma of label	-.20**	-.38**	-.22**
Awareness of the laws	.05	.12**	-.10*
Consensus with the laws	-.42**	-.27**	-.27**
<i>R</i> square	.79	.86	.78
Adjusted <i>R</i> square	.79	.86	.78
Significance	.01	.01	.01

* $p < .05$; ** $p < .01$.

Note: Regression analyses were employed with four predictors entered as one block for each of the three dependent variables.

Discussion

The results of data analysis indicated that all four independent variables, perceived certainty of punishment, perceived stigma of label, awareness of the laws and consensus with the laws, negatively correlated with both current and likely future file-sharing activities. The findings showed that both legal and extra-egal factors had a deterrence effect on online copyright infringement and the relationships between the independent variables and current and likely future file-sharing were strong with all four independent variables.

The regression analyses provided some insight into predicting current and likely future file-sharing activities by the four independent variables. For frequency of file-sharing, consensus with the laws played the most important role, followed by perceived certainty of punishment. For quantity of file-sharing, perceived certainty of punishment played a dominant role, followed by perceived stigma of label. It is

clear that current file-sharing activity was best predicted by perceived certainty of punishment. The extralegal factors perceived stigma of label and consensus with the laws also played important roles in deterring current file-sharing activities, but not as consistent as perceived certainty of punishment.

For likelihood of future file-sharing, perceived certainty of punishment played a dominant role followed by consensus with the laws and perceived stigma of label. The findings of the deterrence effect on likelihood of future file-sharing from this study are consistent with the classic deterrence theory that states that people are hedonistic, and they make choices when evaluating the costs and benefits of their actions before committing a crime (Silver, 2002). The results suggest that perceived certainty of punishment as a major cost factor overweighs the benefit of file-sharing, and therefore will deter file-sharing. Stigma of label was also a noticeable cost factor that deterred future file-sharing. Consensus with the laws played an important role in deterring future file-sharing while awareness of the laws, although a significant predictor of likely future file-sharing, had a weak effect on likely future file-sharing activities.

While the deterrence effect of these legal and extralegal factors was strong, this study showed that 46% of the respondents were sharing files, 31% of the respondents shared a large quantity of files, and 60% of them would start or continue online file-sharing. Awareness of the laws was not deterring current file-sharing and had a weak effect on future file-sharing. Clearly, the majority of the students surveyed were not deterred by the threat of copyright conglomerates like the RIAA. Overall skepticism was observed concerning the certainty of punishment. It seemed that majority of the students did not believe that file-sharing would have negative consequences to them. There is a long way to go to enforce the copyright laws among the online file sharers.

The findings of this study suggest that while the deterrence effect of the legal and extra-legal factors on online copyright infringement is evident, it is not equal to effective control over copyright infringement by a large number of people. Because online file-sharing is an activity involving a large number of users, enforcement of the laws is difficult and is not likely to achieve full deterrent effect. The findings of this study provide an empirical basis for alternative strategies that may work more effectively to increase compliance with the laws.

This study showed that consensus with the laws was deterring both current and likely future file-sharing activities. At the same time students were ambiguous about what the laws said about online file-sharing. The students were almost equally divided in their perception about the reasonableness of the copyright law on online file-sharing and how up-to-date the law is. The more viable way to increase deterrence on online file-sharing would be to work on increasing awareness of the laws and consensus with the laws. Communication that shows a law is reasonable would aid direct deterrence. It would bring other benefits such as encouraging public participation in the enforcement of the laws. As Andenaes (1974) pointed out, the reasonableness of a law, its intensive dissemination and, above all, its effective

communication to the target audience contribute to consensus and ultimately to compliance.

The findings showed that one of the most effective deterrents was the extralegal factor stigma of label. Fear of embarrassment and shame was as strong a deterrent factor as certainty of punishment in some ways. Previous studies showed that effect of the stigma of label was usually weaker with younger people. However, this study found that stigma did have a deterrent effect on file-sharing by the students. The study also found that stigma of label worked in concert with other factors in deterring current online file-sharing. With consensus with the laws, the two extralegal factors accounted for about 40% of the variance of current file-sharing. It may also be logical to hypothesize that the higher level of consensus with the laws would in turn increase stigma of label, and result in a higher level of deterrence of file-sharing.

One surprising finding is that awareness of the laws was not a significant predictor of current file-sharing, while consensus with the law was a relatively strong predictor. The findings suggest that peoples' agreement with the laws about file-sharing is more important than whether they know about the laws governing file-sharing. If the copyright laws about online file-sharing were perceived as unreasonable and outdated, it would decrease the deterrence effect. Consensus with the laws also played a more important role than awareness of the laws in predicting likelihood of future file-sharing. This could be attributed to the attitude of the students towards the copyright laws regarding online file-sharing. Students may not be very clear about what the laws actually are. They do have their own judgment on whether laws are reasonable and up-to-date. The findings of this study suggest that it is important to communicate to the public on what the copyright laws are, and it is even more important to inform the public on reasonableness and updatedness of the related laws.

This study contributed to the understanding of online file-sharing and its deterrence factors in several ways. First, it identified four legal and extralegal factors that had strong deterrence effect on current and likely future online file-sharing. Second, the study examined the predictive power of the four independent variables in deterring current and likely future file-sharing and identified the factors that played the most important role in deterring online file-sharing. Third, it separated the deterrence effect on and effective control over online file-sharing and offered an empirical basis for developing alternative strategies to deter online file-sharing that involves massive users.

The study has its limitations while making its contribution. It used a convenience sample with a relatively small number of respondents. The initial goal of the study was not to infer the results of the study to the broader population, but to examine the multivariate relationships between the legal and extralegal factors and online file-sharing of college students, and test the applicability of deterrence theory as the theoretical framework. When a study explores relationships between the variables informed by theories, a representative sample is not as essential as in a study estimating the univariate values in the population. The findings of this study

regarding the relationship between the legal and extralegal factors and online file-sharing, although cannot be generalized to the broader population, provide strong support to the application of the deterrence theory in studying online file-sharing behaviors. The applicability of a theory in a convenience sample calls for verification of usefulness of the theory in the population. The deterrence effects found in this study could be used as the foundation for further research in light of the theoretical framework, which may help produce a more coherent body of research.

Although the findings could shed some light on students' file-sharing activities and the deterrence effect of the four legal and extralegal factors, they should be referred to its context when they are used to address college students' online copyright infringement. This study only looked at four legal and extralegal factors, while other factors also play a role in deterring or encouraging online file-sharing. Future studies could use a random sample, extending respondents' age groups to explore whether age is a covariant of the deterrence factors, or use qualitative methods to discern why there is such an apparent contradiction between the deterring effect and existing file-sharing activities. Other factors that are worth exploring may include how long a person has been involved in online file-sharing and how easy a person perceives online file-sharing to be. It could be hypothesized that 1) the longer a person engages in nonlegal activity without being punished, the less fear of being caught, hence the lower deterrence effect; 2) the easier a person perceives online file-sharing to be, the less barrier for him/her to participate and more likely he/she will engage in it, hence the lower deterrence effect. It would also be plausible to examine the relationship between the deterrence variables, and find to what degree they work together and influence each other in deterring online file-sharing activities.

Conclusions

Online copyright infringement is difficult to deter effectively. As the legal actions brought by music industry against the file-sharers increase, the actual file-sharing activities worldwide do not necessarily decrease. The deterrence effect of law suites against file-sharers is limited so far. This study found perceived certainty of punishment had a strong deterrence effect on current and future file-sharing. However, with the massive file-sharers worldwide, and the unknown chance that any given file-sharer may be caught and punished, the deterrence effect of perceived certainty of punishment may not transfer to the actual control of online copyright infringement. By looking beyond legal factors, this study found extralegal factors perceived stigma of label and consensus with the laws played important roles in deterring current and file-sharing activities, while perceived stigma of label, consensus with the laws and awareness of the laws were found to have a deterrence effect on likelihood of future file-sharing. Stigma of label, socially imposed embarrassment or self-imposed shame for doing something unacceptable, was found to have a consistent deterrence effect on both current and future file-sharing. The implication of the findings is that enforcement against online copyright infringement through

civil law has to work with extralegal means, which could have similar or more deterrence effect under certain circumstances. Certainty of punishment may work more effectively if extralegal means is also considered. When looking at the cost involved in taking legal actions against file-sharers, extralegal means seems to have even more advantage over legal means. Whereas the actual effect of file-sharing on music sale still needs further investigation, the findings of this study provide an empirical basis for developing alternative strategies to deter online file-sharing that involves massive users.

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