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Abstract

Software piracy has been studied by academics, software firms, law enforcement agents and policy makers for many years. Previous research in software piracy either did not differentiate between unauthorized copying and unauthorized sharing, or focused only on unauthorized copying. We believe the motivating factors behind the two behaviors are quite different because beneficiaries of the behaviors are different. In this paper, we consider unauthorized sharing as a kind of helping behavior and draw on relevant literature to see if the motivations behind unauthorized sharing can be better appreciated from an affective perspective. We tested the affective model of unauthorized sharing based on empirical data obtained from a large-scale survey. We found from the survey that both perceived affordability and perceived convenience could arouse sympathy or annoyance with the unauthorized copier, and their effects were mediated by perceived controllability of the need of unauthorized copying. Our results support the strong effects of affective factors on the moral obligation of unauthorized sharing.

Keywords: Software Piracy, Unauthorized Sharing, Affective Model, Morality.

1 INTRODUCTION

Software piracy refers to the unauthorized acquisition, use, or dissemination of licensed software. The Business Software Alliance estimated that 41% of all software installed in 2008 was actually pirated, resulting in a global business loss of $50.2 billion in 2008, 5% up from that in 2007 (Business Software Alliance, 2009). Because of its huge economic and social impact, software piracy has been studied by academics, software firms, law enforcement agents and policy makers for many years. Besides illegal merchants, counterfeiters and bootleggers who pirate software for profit, the vast majority of software pirates are ordinary people who are simply end users of software. For example, a person has already committed software piracy by copying a piece of pirated software from others, or sharing it to those who are in need. We refer to the former behavior as unauthorized copying and the latter as unauthorized sharing[1]. In fact, with the emergence of peer-to-peer file sharing technologies, large-scale copying and sharing of licensed digital contents becomes convenient and popular.

Although both unauthorized copying and unauthorized sharing belong to software piracy behaviors, a major difference exists in the motivations behind the two: Copying is mainly for self interest while sharing is mainly for other's interests. The vast majority of previous research in software piracy either did not differentiate between unauthorized copying and unauthorized sharing, or focused on unauthorized copying only. In a way, the two behaviors represent the demand and supply sides of the phenomenon. Namely, if most people are unwilling to share software without proper authorization, unauthorized copying would become difficult and thus discouraged. Unfortunately, little research has been done to date in understanding the motivations behind unauthorized sharing of software. Since the implementation of any anti-piracy strategy or policy is likely to incur substantial business, social and political costs, more in-depth understanding of the motivating factors behind unauthorized sharing would be highly desirable in order for the most effective countermeasures against software piracy to be formulated. The target of this paper is to gain such in-depth understanding.

2 LITERATURE REVIEW

Previous studies have revealed a multitude of factors that are associated with software piracy behavior. Demographic characteristics have long been observed to be associated with piracy behavior. Solomon and O'Brien (1991) reported that females as well as aged persons committed less piracy. Their findings have been confirmed by many subsequent researchers (e.g. Sims et al., 1996; Gopal and Sanders, 1997). On the other hand, the effect of a person's education level was not found to be influential (e.g., Peace, 1997; Kwong et al., 2003) except that people with more computer experience were usually more likely to commit software piracy (Wong et al., 1990; Sims et al., 1996). Kini et al. (2000) attempted to investigate the effects of eleven demographic factors (e.g. age, gender, education level, job position, computer experience, etc.) on moral perception of software piracy behavior. In general, they could not find strong indication of demographic effects except that aged and part-time students were more likely to regard piracy as morally wrong.

Besides demographic factors, researchers have also considered a person's dispositional characteristics in relation to piracy behavior. In a study by Harrington (2000), people who pirated more were found to be high on responsibility denial, a dispositional characteristic that reflects an individual's tendency to deny responsibility for the consequences of his behavior. Also, based on the self-control theory (Gottfredson and Hirschi, 1990), Higgins (2005) reported that people with low self-control were more

[1] Unauthorized sharing refers to the dissemination of digital contents without proper authorization from the authorized vendor or distributor. In particular, we only include sharing activities without monetary benefits performed by "end-user", and exclude those piracy activities that are targeted at making profit, e.g. by counterfeiters, bootleggers or other unlawful merchants. Also, the act of unauthorized sharing may involve the physical act of copying a media (e.g. making a copy of your favorite *Eagles Best Hits* CD and give it to your friend). The specific copying action (e.g., making a duplicated copy of a CD) is regarded as part of the overall sharing behavior and not separately as unauthorized copying.

likely to pirate. Wang et al. (2005) found that people who were more value-conscious, who liked to seek novelty, and who were collectivistic tended to have a positive attitude toward piracy.

Because of its profound ethical and social implications, the act of digital piracy and its connection to morality has received much attention by researchers. It was suggested that females and aged persons are less likely to commit piracy because they are in general more ethical (Sims et al., 1996; Arlow, 1991). On the other hand, religious preference was also found to have an impact on an individual's piracy behavior (Simpson et al., 1994). Wagner and Sanders (2001) reported that people who regarded themselves as religious would evaluate piracy as immoral and had less intention to pirate.

While it is intuitive to think that people with high morality would disapprove piracy, inconclusive findings were obtained in more rigorous research. Logsdon et al. (1994) studied the relationship between an individual's moral judgment capacity[2] (Rest, 1979; Rest, 1983; Rest, 1986) and software piracy. Surprisingly, they found that respondents with high moral judgment capacity did not have significantly greater negative attitudes toward piracy. Similarly, Al-Rafee and Cronan (2006) found that a person's attitude toward digital piracy was largely unaffected by his or her moral judgment capacity. In a broader study on IT ethics, the effect of moral judgment capacity on behavioral intention to pirate software as well as other unethical IT behavior was examined (Banerjee et al., 1998). In their study, moral judgment capacity was not found to be a significant predictor of ethical IT behavior. Similar findings were obtained by Leonard and Cronan (2001) in a subsequent study based on a larger sample.

Licensed digital content is often perceived as highly priced and unaffordable. Pricing has been one of the most frequently cited motivations of piracy (Simpson et al., 1994; Glass and Wood, 1996; Cheng et al., 1997; Moores and Dhillon, 2000; Peace et al., 2003; etc.). After observing the high software piracy rates in low GNP countries, Gopal and Sanders (2000) proposed that discriminate pricing strategies can be used as a mean to reduce piracy rates in those countries.

However, a recent research revealed that personal income did not actually affect intention to buy pirated CDs (Kwong et al., 2003), suggesting that affordability may not be the only consideration for piracy. Seale (2002) pointed out that software pricing is actually an issue of perceived proportionality – people often feel reluctant to pay for a product that has a perceived marginal production cost of nearly zero, even though they are actually able to afford it. In other words, people who pirate may not be driven solely by the price of the original but also by the impression that the original is unfairly overpriced. Guilty feeling of pirates would be neutralized when the prices charged by software and media providers are perceived to be excessive and non-proportional to their actual value. This view was reiterated by Al-Rafee and Cronan (2006).

Peace et al. (2003) found that perceived technical difficulty served as an inhibitor to software piracy. With advances in high-capacity storage and high-speed networking technologies, technical difficulties of copying and sharing digital contents are much reduced nowadays. On the other hand, the perception of unavailability of authorized content was found to be a significant driver of piracy by many researchers (e.g. Solomon and O'Brien, 1991; Wong et al., 1990; Moores and Dhillon, 2000; Moores and Chang, 2006). "Not having the time to make the purchase" and "takes too long to get it through proper channels." were among the situational factors that significantly provoked piracy behavior in Simpson et al.'s study (1994).

Christensen and Eining (1991) found that knowledge and awareness of copyright laws did not influence piracy behaviors. However, in a study by Gopal and Sanders (1997), participants were found to indicate significantly less propensity to engage in piracy behaviors if they were presented with deterrence information about copyright laws, consequences of being caught and negative effects caused by piracy on firms and other users. When a similar study was extended to music piracy, however, this propensity was not observed (Gopal et al., 2004). Also, Kreie and Cronan (1999) found

[2] Moral judgment capacity is often measured by the P-index of the Defining Issues Test (DIT) developed by Rest (1986).

that individual's assessment of the acceptability of piracy behavior was significantly affected by consideration of the legal environment.

On the other hand, punishment has long been regarded as an important countermeasure to deter people from illicit behavior, including piracy. However, the effectiveness of punitive measures is usually predicated on law enforcement. Since piracy is often done in private, many perceive law enforcement to be difficult and ineffective. Peace et al. (2003) found that, on average, respondents believed only less than nine percent of software pirates were caught, rendering punitive measures against piracy essentially ineffective. Nevertheless, they also found that more severe punishment could induce a more negative attitude toward piracy.

Social norms play a vital role in shaping one's attitudes toward and intention to commit digital piracy. Christensen and Eining (1991) found that subjective norm was a significant predictor of piracy behaviors. The significant influence of perceived social norms on a person's piracy intention has also been confirmed by many subsequent studies (Lin et al., 1999; Kwong and Lee, 2002; Seale, 2002; Peace et al., 2003; Limayem et al., 2004; Higgins, 2005). Ramakrishna et al. (2001) found that the moral reasoning of university students toward software piracy was affected by their peers; but it was largely unaffected by other persons who might also interact closely with them, such as faculty members or university employees.

3 THEORETICAL DEVELOPMENT

We have briefly reviewed various factors leading to end-user software piracy based on the extant literature. However, the vast majority of previous research in software piracy either did not differentiate between unauthorized copying and unauthorized sharing, or focused only on unauthorized copying. We believe the motivating factors behind the two behaviors can be quite different because beneficiaries of the behaviors are different. For instance, the high price of the software may motivate people to copy it illegally but demotivate those who have paid much to acquire the software to share it with others.

3.1 Unauthorized Sharing as a Helping Behavior

The work by Glass and Wood (1996) is one of the few exceptions in piracy research that studied unauthorized sharing. Drawing on the Equity Theory, Glass and Wood studied the situational factors that led to unauthorized sharing of software. They indeed found that increase in price of software was associated with decrease in intention to provide software to another. In general, they argued that providing software for others to copy was actually a type of social exchange and people who did so would actually expect equity in the exchange (e.g. a favor in return). In this perspective, the underlying motivation of sharing is basically egocentric.

Although we acknowledge the egocentric motivation of unauthorized sharing, the act of unauthorized sharing is basically a response to the needs of others. The role of "others" should be much more salient to the persons who share whereas the role of "self" should be more salient to the persons who copy. A purely egocentric perspective may not suffice to fully understand the behavior of unauthorized sharing. We observe there are many people who share software with others but do not receive any material benefit in return. Although in certain cases these people may gain intangible social recognition, it is difficult to conceive that they are merely driven by self-interest. For example, those who upload licensed digital contents to the Internet for others to download often choose to remain anonymous and thus could hardly derive any material benefit. We expect it may be more influenced by impulsive factors such as emotions than by deliberate cognitive reasoning.

3.2 Emotional Arousal as one of the Three Motivations of Unauthorized Sharing

Reviewing the literature on helping behavior, Schwartz (1977) concluded with three types of explanations for helping behaviors: (1) emotional arousal, (2) social expectations; and (3) self-

expectations. First, emotions aroused by situations or impulses may serve as powerful drivers for helping behaviors. Second, the desire to adhere to social norm or perform one's expected social roles may also motivate helping behaviors. Third, people may also be motivated by their internalized personal norm or moral obligation (Hoffman, 1977; Gorsuch and Ortberg, 1983).

By regarding sharing as a kind of helping behavior, the above three motivations constitute a general framework for understanding the determinants of unauthorized sharing. Past research on piracy has examined moral factors and social norm but emotional arousal is seldom considered. We believe emotional arousal is particularly relevant in studying unauthorized sharing because sharing is often not a well planned and deliberate act but a simple and direct reaction to the needs of others.

We draw on the Attribution Theory (Weiner, 1986; Weiner, 1995) to understand the emotional motivations behind unauthorized sharing. Attribution theory is a general theory for explaining human behaviors. In a nutshell, the theory posits that when faced with a situation, people tend to make attribution or judgment of responsibility. The consequence of such judgment would give rise to different emotions and influence subsequent behaviors. For example, when a student fails an examination, she may attribute the poor result to her lack of ability, feels unhappy with herself and becomes unmotivated in subsequent learning. Alternatively, she may attribute it to her lack of preparation, feels guilty and becomes a hardworking student. Yet she may attribute it to an unfair assessment scheme, feels angry and gives up altogether.

In particular, attribution theory has also been successfully applied to explain motivations behind helping behaviors (Weiner, 1980, Reisenzein, 1986, Weiner, 1995). The theory posits that when faced with a situation where helping is needed, a person would attribute the cause of that situation to the most likely reasons and whether these reasons are perceived to be controllable by the party seeking help would arouse different emotions. For example, in a hypothetical situation of class notes borrowing, researchers consistently found that sympathy would be aroused if the borrower was found to be visually impaired (i.e. uncontrollable) whereas anger would be aroused if the borrower missed the class because he went to play (i.e. controllable).

In the context of software piracy, the dyadic relationship between copying and sharing can naturally be captured by the attribution theory as help seeking and help giving respectively. Perceiving unauthorized sharing as a helping behavior, the commonly perceived reasons for unauthorized copying essentially constitute the eliciting situation leading to help seeking. According to attribution theory, whether a potential sharer perceives these causes result in needs that are controllable by the copier (i.e. the help seeker) would lead to the emotions of sympathy or anger.

We surveyed 108 undergraduate students and asked them to freely suggest the most important reasons for unauthorized copying of software[3]. Text analysis was performed on their responses. The two most frequently mentioned reasons were (1) "can save money" (mentioned 98 times) and (2) "more convenient to obtain" (mentioned 56 times). This is consistent with the literature, suggesting price and availability of licensed software are two particularly salient factors of unauthorized copying. In the light of attribution theory, we posit the need of unauthorized copying would appear to be uncontrollable if software is perceived to be unaffordable or inconvenient to purchase.

According to attribution theory, perceived uncontrollability arouses sympathy with the help seeker. On the contrary, anger would be aroused if the needs are perceived to be controllable and thus the help seeker should be held responsible for the situation. Since the behavior of unauthorized copying is rather common nowadays, it is likely for any anger with unauthorized copiers to be attenuated. We think a milder form of anger, namely annoyance[4], should reflect more accurately the negative emotional reaction in the context of unauthorized sharing. As such, we posit that perceived controllability of the need of unauthorized copying would elicit sympathy or annoyance with the copiers.

[3] Details of this preliminary survey are withheld due to length limitation and can be obtained from the authors.
[4] The decision to use of annoyance in place of anger was made after discussions with a few individuals who had committed unauthorized sharing.

3.3 Affective Model of Unauthorized Sharing

Moral judgment has conventionally been regarded as the outcome of a cognitive moral reasoning process that reflects a person's stage of moral development (Kohlberg, 1971). Recent advances in moral psychology (e.g. Haidt, 2001; Haidt, 2003; Haidt, 2004) suggested that the perceived morality of a certain behavior is more influenced by automatic and intuitive responses than rational and objective reasoning. Haidt (2001) found that rational moral reasoning was often a post hoc construction used to justify one's moral judgment which had already been formed by intuition. In fact, more and more compelling evidence have been discovered in neuroscience and suggest that morality is actually built into, rather than acquired by, the human brain (e.g. see Gazzaniga, 2005). Moreover, Haidt noted that moral behaviors were strongly linked to emotions rather than reasoning. Drawing on studies on psychopaths and patients with damages in prefrontal cortex, Haidt argued that emotions rather than moral reasoning should be a more important determinant of pro-social or anti-social behaviors. The tight relationship between emotion and moral judgment has been confirmed by subsequent empirical studies based on data obtained from fMRI brain imaging (e.g. Greene et al., 2004; Valdesolo and DeSteno, 2006; etc.).

Haidt (2003) identified four families of emotions, called moral emotions, which are tightly linked to moral behaviors. The four families are "other-condemning" (e.g. anger and disgust), "self-conscious" (e.g. shame and guilt), "other-suffering" (e.g. sympathy and compassion) and "other-praising" (e.g. gratitude and elevation). In particular, both "other-suffering" and "other-condemning" emotions are triggered by perceived injustice or unfair situations. A natural consequence of these emotions would be a desire to restore justice and fairness. In particular, "other-suffering" emotions promote help giving whereas "other-condemning" emotions promote disregard, avoidance and even punishment.

In our context, we have considered two possible emotional reactions to unauthorized copying, namely sympathy and annoyance. We believe there is a strong relation between each of these emotions and moral obligation. That is, a person's moral obligation of unauthorized sharing is heavily influenced by such emotions toward the unauthorized copier. We posit that intention to share is influenced directly by emotional arousal of sympathy and annoyance, moral obligation and social norm. In addition, emotion arousal of sympathy and annoyance would also affect a person's moral obligation to share.

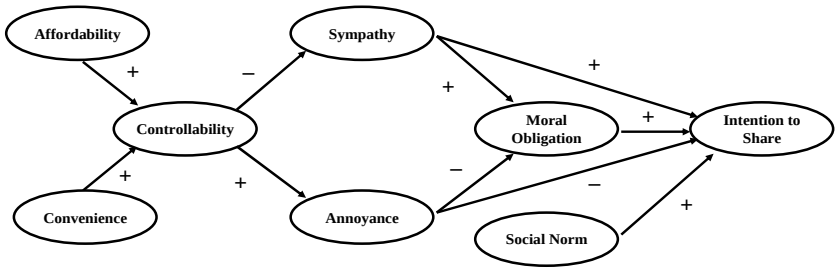

Figure 1. Affective Model of Unauthorized Sharing

We summarize the above discussion into an affective model of unauthorized sharing as shown in Figure 1. The model represents an exploratory account rather than a comprehensive explanation of the phenomenon of unauthorized sharing as it does not include all potentially relevant factors (e.g. punitive or legal ones). However, the model has innovatively captured the most salient factors including personal and social norms, extrinsic beliefs about affordability and availability, as well as emotional factors in a coherent theoretical framework. Although demographic factors are not considered explicitly in the model, they are expected to be controlled for.

4 EMPIRICAL TEST OF THEORETICAL MODEL

4.1 Methodology

We tested the full affective model of unauthorized sharing based on empirical data obtained from a large-scale survey. There are eight constructs in the affective model. Each of them was measured by multiple questions in 7-point Likert scale, as shown in Table A1 in the Appendix. In particular, the measurement items for "affordability" were adapted from the work by Seale (2002). Those for "convenience" were adapted from the measurement of "situation factor" in the work by Simpson et al. (1994). The items for "controllability", "sympathy" and "annoyance" were all adapted from the work by Reisenzein (1986). Measurement items for "moral obligation" (4 items) were adapted from the previous work by Gorsuch and Ortberg (1983) as well as Beck and Ajzen (1991). Measurement items of "social norm" (3 items) and "intention to share" (3 items) were developed following the recommended guidelines by Ajzen (2002). In particular, since we are not measuring subjective norm but a more general social norm, measurement items for "social norm" were all about the descriptive norm (i.e. whether others perform the behavior themselves or approve the behavior) rather than injunctive norm (i.e. whether others approve me of performing the behavior). All measurement items were pretested with a small group of graduate students and wordings were refined accordingly

Participants were recruited from the members of a major e-government portal in Hong Kong. A total of 541 valid[5] responses to the online survey were received. Distributions of gender and age were fairly balanced and resembled those of the sampling frame. Since participants were unaware of the topic of study before they started the questionnaire, representativeness of the collected sample helps support that non-response bias due to the topic's sensitivity should be minimal. Again, age and gender were used as two control variables throughout our analysis. Considering the complexity of the proposed model and the adequacy of our sample size, PLS was used to perform confirmatory structural equation modeling for this research study.

4.2 Findings

Reliability of the measurement model is assessed by examining the composite reliability of each latent construct. As shown in Table A1, all composite reliability figures are above the recommended 0.7 level (Gefen et al., 2000), supporting satisfactory internal reliability of the measurement model. Convergent validity is supported by having statistically significant item loadings (Gefen and Straub, 2005) as well as having the average variance explained (AVE) of all constructs above the recommended 0.5 level (Fornell and Larcker, 1981). From Table A1 and A2, convergent validity of all constructs is strongly supported. Discriminant validity is assessed in two steps in PLS analysis (Gefen and Straub, 2005). First, the "cross loadings" of each measurement item (i.e. its correlations with other latent constructs) are examined to see if the item loads much more higher on its assigned construct than the other constructs that are causally unrelated (Straub et al., 2004). Second, each latent construct's square root of AVE is examined to see if it is higher than its latent correlation with other latent constructs. Our results show no significant cross loadings[6] and the square roots of AVE of all constructs are much higher than its correlation with other constructs (Table A2), supporting strong discriminant validity of the model.

The standardized estimates of the structural paths in the affective model are shown in Figure 2. All posited paths except the direct paths from "sympathy" and "annoyance" to "intention to share" are found to be statistically significant. These paths, with the only exception of the path from "norm" to "intention to share", are above 0.20, representing practically significant and meaningful effects (Chin,

[5] A few "check items" asking simple questions with obvious answers (e.g. "What is the sum of 2 and 3?") were mixed with the questionnaire items. Responses containing incorrect answers to these check items were considered invalid.
[6] Cross loadings are not reported due to length limitation and those who are interested may contact the authors for details.

1998). The amount of variance explained in the dependent variables ranges from 0.294 to 0.436, suggesting acceptable efficacy of the proposed model in explaining the phenomenon.

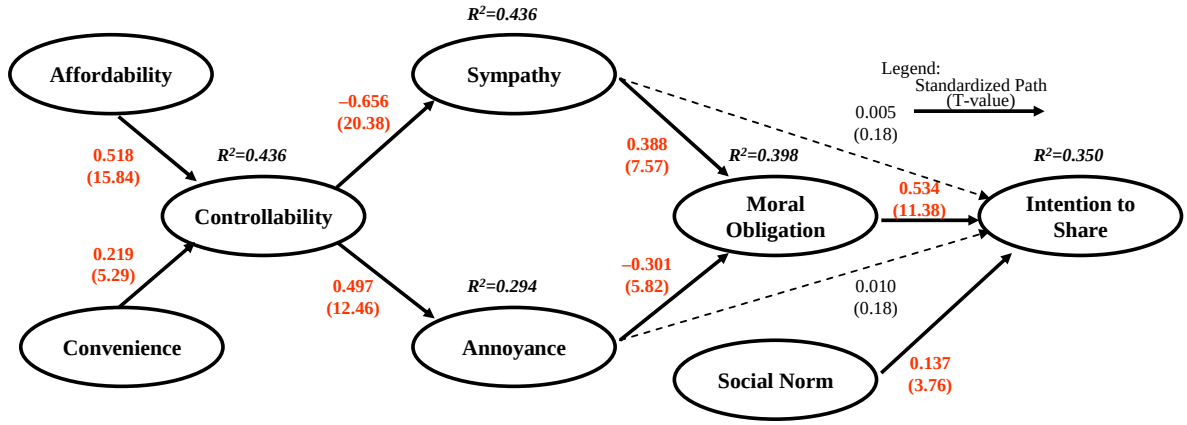

Figure 2. Affective Model of Unauthorized Sharing

Consider the substantive findings from the structural equation modeling. First, both perceived affordability and convenience were found to positively influence the perceived controllability of the need of unauthorized copying. Second, perceived controllability was found to negatively influence sympathy with unauthorized copiers; and positively influence annoyance with unauthorized copiers.

Third, moral obligation of unauthorized sharing was found to be positively influenced by sympathy with unauthorized copiers; and negatively influenced by annoyance with unauthorized copiers. However, sympathy and annoyance did not have statistically significant effects on intention to share.

Fourth, intention to share was found to be positively influenced by moral obligation of unauthorized sharing. Fifth, the influence of social norm on intention to share was found to be positive and statistically significant. However, the unique effect of social norm was small and lacked practical significance (Chin, 1998).

5 DISCUSSION AND CONCLUSION

We found from the survey that both perceived affordability and perceived convenience could arouse sympathy or annoyance with the unauthorized copier, and their effects were mediated by perceived controllability of the need of unauthorized copying. As shown in Figure 2, perceived affordability had a much stronger effect than perceived convenience. Furthermore, emotions of sympathy and annoyance were two key determinants of moral obligation to share. Together, they accounted for nearly 40% of variance in moral obligation. The f^2 effect size indices of sympathy and annoyance were found to be 0.16 and 0.10 respectively, indicating medium effect sizes (Cohen, 1988).

Unique proportion of variance explained by sympathy was 15% while that by annoyance was 9%. Sympathy and annoyance are often negatively related (i.e. one who is annoyed would usually be less sympathetic) and the latent correlation between "sympathy" and "annoyance" was found to be –0.52 as shown in Table A2. Such a high correlation explains the relatively low unique influences of sympathy and annoyance because a large proportion (i.e. 16%) of variance in moral obligation was explained commonly by both. Comparatively, the strength of sympathy (i.e. a standardized path of 0.388) was slightly higher than that of annoyance (a standardized path of –0.301). This suggests that moral obligation to share could be more influenced by sympathy than annoyance with the unauthorized copier. In general, our results complement those findings from recent research in moral psychology we reviewed above that suggest moral intuition should be more important than moral reasoning in shaping a person's moral judgment.

Furthermore, moral obligation was found to be a key determinant of intention to share. In comparison, social norm only had a small influence on the behavioral intention of unauthorized sharing. The f^2

effect size indices of moral obligation and social norm were found to be 0.39 and 0.04 respectively, indicating large effect size for the former and small for the latter (Cohen, 1988).

The unique proportion of variance explained by social norm was merely 2%, and could hardly be considered of much practical relevance. This suggests that social norm is not as important in shaping the behavioral intention of unauthorized sharing, when compared to unauthorized copying (e.g. Eining and Christensen, 1991; Limayem et al., 2004; Higgins, 2005; etc.). Also, moral obligation was not highly related to social norm as their latent correlation was only 0.21 as shown in Table A2. The common proportion of variance explained in behavioral intention by social norm and moral obligation was merely 3%. This suggests a person's moral obligation is quite distinct from the social norm he or she perceives. On the other hand, moral obligation alone accounted for about 26% of variance in behavioral intention. This suggests that self-expectation rather than social expectation is the most important motivation behind unauthorized sharing behavior.

Our work contributes to the literature of digital piracy in a number of ways. First, we focused on the behavior of unauthorized sharing which was seldom differentiated from other piracy behaviors in past literature. Conceiving unauthorized sharing as a distinct behavior facilitates us to better understand the affective and altruistic aspects of it. Second, we unveiled the prime importance of affective motivations in shaping the moral obligation of unauthorized sharing. This sheds new lights on the formation of moral perception and judgment pertaining to software piracy. Contrary to conventional emphasis on developmental moral reasoning, we found that the emotions of sympathy and annoyance exerted very notable and crucial influence on one's moral obligation to share software with others illegally. Third, the most important determinant of intention to share was found to be moral obligation rather than social norm. Self-expectation plays a much more crucial role than social expectation in motivating the behavior of unauthorized sharing. People who share software believe they are actually doing something good rather than merely follow the expectations of others. Our work helps to clarify and strengthen the self-motivating and altruistic nature of unauthorized sharing.

A practical implication of this research is that effective countermeasures to combat software piracy should focus on the arousal of negative emotions toward unauthorized copiers. Potential offenders can be better dissuaded if they develop more annoyance and less sympathy with unauthorized copiers. This may be achieved by reducing the perceived uncontrollability of having to copy software. Our findings suggest that this can be achieved by higher affordability and more convenience in purchasing. Also, persuasive messages about individuals or businesses being victimized by unauthorized copying behaviors may also be used to arouse anger or annoyance with unauthorized copiers.

This research is exploratory in nature and subject to certain limitations. First, we have studied only a single culture as found in Hong Kong. Hong Kong is known as a modernized place where eastern culture and western culture meet and mix well. In particular, intellectual property rights are protected by law in Hong Kong, but the piracy rate in Hong Kong is estimated to be moderately high[7]. While we believe our study should provide good insights into the piracy phenomenon in general, future replications using participants from other cultures would supplement our understanding of the external validity of our findings. Second, the ideal dependent variable should be unauthorized sharing behavior. We have resorted to intention instead of actual behavior because of anticipated difficulty in soliciting truthful self-reports.

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[7] The Business Software Alliance estimated the piracy rate of Hong Kong in 2008 to be 48% (Business Software Alliance, 2009).

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Appendix

Construct		Measurement Items	Mean	S.D.	Loading	Reliability
Affordability	1*	Licensed software is unaffordable.	2.65	1.34	0.91	0.95
	2*	Ordinary people cannot afford licensed software.	2.57	1.44	0.88	
	3*	It is difficult to afford licensed software.	2.75	1.37	0.92	
	4*	Licensed is priced beyond the affordability of ordinary people.	2.79	1.41	0.94	
Convenience	1*	It is troublesome to purchase licensed software.	4.77	1.42	0.89	0.93
	2	It is easy to purchase licensed software.	4.71	1.39	0.87	
	3	It is convenient to purchase licensed software.	4.66	1.36	0.89	
	4*	It is time consuming to purchase licensed software.	4.54	1.51	0.85	
Controllability	1	Those who copy licensed software actually do not have to do so.	4.49	1.16	0.72	0.86
	2*	Those who copy licensed software actually have no other option.	3.83	1.53	0.85	
	3*	Those who copy licensed software are actually forced to do so.	4.34	1.43	0.88	
Sympathy	1	I am sympathetic to those who copy licensed software.	3.57	1.24	0.87	0.89
	2	I sympathize with those who copy licensed software for being in a difficult situation.	4.14	1.25	0.77	
	3	Those who copy licensed software deserve sympathy.	3.14	1.39	0.75	
	4	I sympathize with those who copy licensed software.	3.61	1.25	0.86	
Annoyance	1	Those who copy licensed software annoy me.	3.82	1.30	0.93	0.94
	2	Those who copy licensed software make me feel disgusted.	3.91	1.31	0.94	
	3	I feel those who copy licensed software bothersome.	3.89	1.14	0.78	
	4	I find those who copy licensed software disgusting.	3.96	1.32	0.88	
Moral Obligation	1	Even though unauthorized, it is ethical to share software with others.	2.38	1.21	0.82	0.85
	2*	Unauthorized sharing of software goes against moral principles.	3.08	1.26	0.72	
	3*	People ought not to share software with others without authorization.	3.06	1.26	0.67	
	4	Even though unauthorized, it is right to share software with others.	2.76	1.10	0.84	
Social Norm	1	Most people would share software with others even without authorization.	4.49	1.30	0.87	0.87
	2	Most people would think that it is okay to share software with others even without authorization.	4.41	1.32	0.77	
	3	Most people would not regard unauthorized sharing of software as wrong.	4.58	1.33	0.85	
Intention to Share	1	I may share software with others in the future even without authorization.	2.51	1.34	0.91	0.95
	2	I have intention to share software with others even without authorization.	2.51	1.36	0.94	
	3	If I have the opportunity, I would share software with others without authorization.	2.44	1.35	0.93	
Remark: All items are in 7-point scale from "strongly disagree" (point 1) to "strongly agree" (point 7) and those marked with * are scaled in reverse						

Table A1. Measurement Items and Internal Reliability (Online Survey)

	Affordability	Convenience	Controllability	Sympathy	Annoyance	Moral Obligation	Social Norm	Intention to Share
AVE	**0.83**	**0.77**	**0.68**	**0.66**	**0.78**	**0.59**	**0.69**	**0.86**
Inter-Construct Correlation (diagonal item shows the square root of AVE of the corresponding construct)								
Affordability	**0.91**							
Convenience	0.33	**0.88**						
Controllability	0.61	0.41	**0.82**					
Sympathy	-0.47	-0.35	-0.66	**0.81**				
Annoyance	0.35	0.25	0.52	-0.52	**0.89**			
Moral Obligation	-0.27	-0.30	-0.52	0.55	-0.53	**0.77**		
Social Norm	-0.22	-0.15	-0.19	0.28	-0.15	0.21	**0.83**	
Intention to Share	-0.15	-0.20	-0.28	0.34	-0.31	0.57	0.25	**0.93**

Table A2. Construct Reliability and Validity (Online Survey)