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Do Facts Speak Louder than Words? Understanding the Sources of Punishment Perceptions in Software Piracy Behavior

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DO FACTS SPEAK LOUDER THAN WORDS? UNDERSTANDING THE SOURCES OF PUNISHMENT PERCEPTIONS IN SOFTWARE PIRACY BEHAVIOR

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Abstract

Software piracy has become a global problem that hinders the development of software industry. Therefore, it is important to understand the underlying mechanisms that drive users' software piracy behavior. Previous literature on this issue heavily relied on the general deterrence theory (GDT) suggesting that two key punishment perceptions namely punishment severity and punishment certainty determined the software piracy behavior. However, how these punishment perceptions are formed has been rarely examined. To fill this research gap, from the social learning perspective, this study will investigate the three sources of punishment perceptions – policy awareness, personal experience and vicarious experience – and compare their relative strengths on punishment perceptions. Through a field survey with 253 subjects, we found that: (1) personal and vicarious experience have impacts on both punishment certainty and punishment severity; (2) policy awareness has influence only on punishment severity; and (3) personal and vicarious experience have greater impacts on punishment certainty than policy awareness. The implications for theory and practice are also discussed.

Keywords: Software piracy, general deterrence theory, social learning, policy awareness.

1 INTRODUCTION

Software piracy has been found to be a worldwide problem that induces great losses for IT industry. The annual report from Business Software Alliance shows that, in 2010, the average global software piracy rate was 42%, and economic losses due to unlicensed software hit USD58.8 billion (BSA, 2011). The piracy rate is even higher in less-developed countries and collective societies (Gopal & Sanders, 2000; Shin et al., 2004). For example, the piracy rate of China in 2010 was 78% (BSA, 2011).

Due to its magnitude, software piracy has drawn much attention from both practitioners and scholars (Kwan et al., 2010; Kwan & Tam, 2010; Moores & Chang, 2006; Phau & Ng, 2010). Among a variety of theories used in previous studies, the general deterrence theory (GDT) is regarded as the most influential theory on software piracy behavior (Kwan, et al., 2010; Peace et al., 2003). GDT postulates that users' software piracy behavior is determined by two key individual perceptions relevant to potential punishment: punishment certainty, which captures the probability that people will be caught for their software piracy behavior, and punishment severity, which describes the magnitude of punishment that people will suffer once they are caught (Chiou et al., 2005; Peace, et al., 2003; Zhang et al., 2009). Although this theory sheds light on how users behave when they form certain punishment perceptions, this theory cannot explain where these perceptions come from. In practice, it is with great importance to learn what factors and how these factors shape individuals' punishment perceptions, because the government or software companies can manipulate these factors so as to alter individuals' punishment perceptions and ultimately reduce the occurrence of software piracy. However, previous studies taking general deterrence theory as the theoretical underpinning focus on understanding the consequences of punishment perceptions but pay less attention to the antecedents of punishment perceptions. Thus, in this study, we attempt to fill this research gap by identifying the sources of punishment perceptions.

Drawing on the social learning perspective (Bandura, 1986), we propose that individuals evaluate punishment for software piracy based on three major sources of information: the piracy-relevant policy (e.g., policy awareness), others' piracy experience (e.g., vicarious experience), and their own piracy experience (e.g., personal experience). On the one hand, the literature on security policy compliance has identified a signalling effect of policy on compliance behavior (D'Arcy et al., 2009). On the other hand, the role of personal and vicarious experience on deviant behavior has been examined in the deviant behavior literature (Paternoster & Piquero, 1995; Piquero & Paternoster, 1998; Piquero & Pogarsky, 2002). Thus, in this study, we investigate the extent to which these three factors can affect the punishment perceptions. More importantly, we will further compare the relative strengths of the impacts of these three factors on shaping individual perceptions.

This study makes several key research contributions to the software piracy literature. First, unlike previous studies focusing on the consequences of punishment perceptions, this study is the first study, to the best of our knowledge, to explore the antecedents of these perceptions. Second, by comparing the influences of the different antecedents on punishment perceptions, this study contributes to the literature by understanding which factors are most important

when individuals make assessment on the potential punishments induced by the software piracy behavior.

2 THEORETICAL BACKGROUND

2.1 Software Piracy

Software piracy, which describes any illegal software copying activity (Peace, et al., 2003), is regarded as a major ethical issue deserving greater study in the information age (Mason, 1986; Straub & Collins, 1990). Previous studies on this issue are discussed at two different levels – the country level and the individual level. The studies at the country level use analytical modelling methods and secondary panel data to examine the impacts of national economic factors, institutional factors, and cultural factors on national piracy rate. This stream of research suggests that those countries with relatively less wealth, incomplete intellectual property protection policy, and with a collectivist culture tend to have a higher piracy rate (Gopal & Sanders, 1998; Gopal & Sanders, 1997; Moores, 2008; Shin, et al., 2004). Studies at the individual level attempt to understand the individuals' decision making process and how their cognitions affect their behaviors relevant to software piracy. These studies heavily rely on three major theories namely general deterrence theory (GDT), theory of planned behavior (TPB) or theory of reasoned action (TRA), and ethical decision making theory.

General deterrence theory is the most frequently used theory to explain software piracy behavior (Kwan, et al., 2010; Peace, et al., 2003). This theory suggests that individuals' fear of punishment help to avoid the occurrence of software piracy and the fear of punishment can be further captured by the probability that the punishment will occur (e.g., punishment certainty) and the losses induced by the punishment (e.g., punishment severity). When punishment certainty and severity increase, software piracy behavior decreases. The impacts of punishment perceptions on software piracy behavior have been empirically examined in numerous previous studies (Chiang & Assane, 2009; Chiou, et al., 2005; Christensen & Eining, 1991; Higgins et al., 2005; Kwan, et al., 2010; Li & Nergadze, 2009; Peace, et al., 2003).

As a general theory to explain individual behavior, TPB has also been applied to the analysis of software piracy behavior,. TPB postulates that individual behavior is determined by behavioral intention which is further influenced by attitude (e.g., individuals' general positive or negative feelings about performing a behavior), subjective norm (e.g. the extent to which an individual perceives how the people important to him/her think the behavior should be performed), and perceived behavioral control (e.g., individuals' perceptions of their ability to perform a given behavior) (Ajzen, 1991). When applying TPB to the software piracy research, researchers decomposed the three major components of the theory to better capture the context of software piracy. For example, Lin et al. (1999) used computer deindividuation and computer self-efficacy to represent perceived behavioral control and took perception of piracy issue and organizational ethical climate as the antecedents of attitudes and subjective norm. Al-Rafee and Cronan (2006) investigated a variety of attitudinal beliefs such as moral judgment, affective beliefs, and cognitive beliefs. Liao et al. (2010) examined the

relationships between perceived risks (including performance risk, social risk, prosecution risk, and psychological risk) and attitude. Peace et al. (2003) further integrated GDT and TPB by treating punishment certainty and punishment severity as the antecedents of attitude and perceived behavioral control.

Ethical decision-making theorists view software piracy behavior as an ethics-relevant behavior and draw upon a variety of ethical decision making theories in their analyses. Moores and Chang (2006) used the four-component model of morality to capture the hierarchical effect of moral recognition, moral judgment, moral intention and software piracy behavior. In addressing the Hunt and Vitell's (1986) ethical decision making theory, Thong and Yap (1998) argue that ethical judgment is determined by the deontological evaluation (which is influenced by deontological norms and perceived alternatives) and teleological evaluation (which is affected by the probabilities of consequences happening, desirability of consequences, and importance of stakeholders). Chiou et al. (2005) based on Jones' (1991) issue-contingent model propose that moral intensity factors such as perceived magnitude of consequence, perceived social consensus and perceived proximity influence attitude towards piracy behavior.

All of these theories have provided different angels to view the software piracy issue. However, most of these studies focus on understanding the underlying mechanisms about the impacts of individual perceptions on software piracy behavior. There are only a handful of studies that investigate the sources of these individual perceptions. Our study attempts to fill this research gap by exploring the antecedents rather than consequences of individual perceptions. Specifically, drawing on general deterrence theory, which is one of the most influential theories in software piracy research, we examine the sources of the punishment perceptions.

2.2 Deterrence Theory and Social Learning Process

Deterrence theory suggests that the existence of sanction or punishment systems can deter individuals from committing deviant behaviors (Stafford & Warr, 1993). To exert the power of a punishment system requires that the punishment system to be recognized and internalized by the individuals so as to make them form certain punishment perceptions. To the extent that recognition and internalization processes can be understood as learning processes (Bandura, 1977), it is necessary to better understand how these learning processes occur.

Social learning theory provides a framework to understand how punishment perceptions are formed. This theory states that "people can profit from the successes and mistakes of others as well as from their own experiences" (Bandura, 1977) (p. 117). Specifically, this theory distinguishes two types of learning process, namely experiential learning and vicarious learning. Experiential learning "results from the positive and negative effects that actions produce … Through this process of differential reinforcement, successful forms of behavior are eventually selected and ineffectual ones are discarded" (Bandura, 1977) (p. 117). In contrast, vicarious learning describes that "observed outcomes can alter behavior in their own right in much the same way as directly experienced consequences" (p. 117).

Consistent with these two learning processes, in the criminology research, prior researchers have put forward two types of deterrence: *general deterrence* and *specific deterrence*. General deterrence refers to the effect of punishment on the general public or potential offenders while specific deterrence describes the effects of punishment on the punished offenders who have suffered the punishment (Stafford & Warr, 1993). Stafford and Warr (1993) further re-conceptualize general and specific deterrence and proposed a unified model in which they postulate that punishment perceptions are derived from individuals' personal or direct experience and vicarious or indirect experience in crime behavior and punishment. Later, Piquero and Paternoster (1998) apply this theory in their empirical study on the drunk driving behavior.

Besides personal and vicarious experience, the stream of research on IS security policy compliance has identified individuals' awareness of the policy as another source of the formation of punishment perceptions (e.g., D'Arcy, et al., 2009). Policy-making is a frequently used countermeasure to avoid misconduct (Straub & Collins, 1990). A policy defines rules and guidelines for the appropriate behavior and states the potential punishment once the misconduct occurs. Thus, the policy delivers a signal about what should be done and what should not be performed. According to the social learning theory, a policy can be regarded as a verbal instruction that describes the desired behavior and undesired behavior and instructs individuals on how to engage in a specific behavior (Bandura, 1977). Therefore, the extent to which individuals recognize the policy should also be a source of the formation of individual perceptions.

3 RESEARCH MODEL

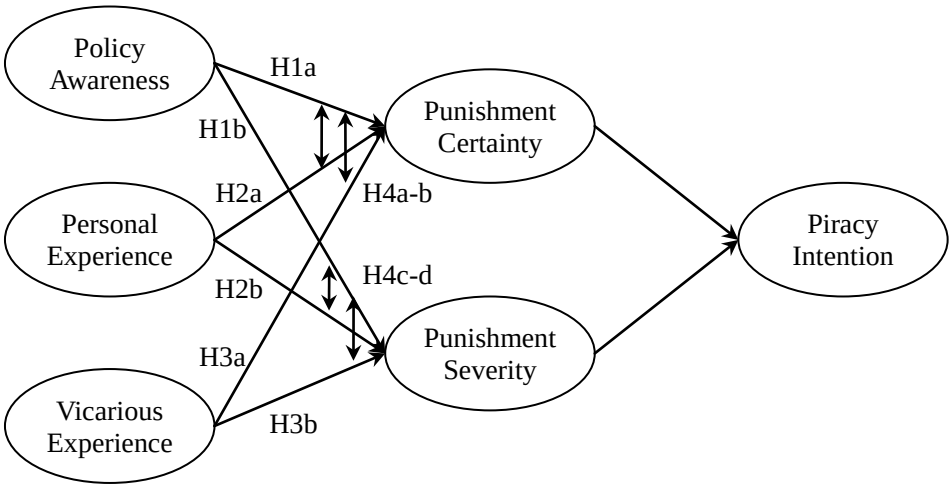

Figure 1. Research Model

From the social learning perspective, we extend the general deterrence theory by identifying three antecedents of punishment perceptions (e.g., policy awareness, personal experience and vicarious experience) and compare the strengths of these three antecedents (see Figure 1).

3.1 Policy Awareness

The deterrence theory suggests that laws or sanction system can discourage individuals from committing crime behavior (e.g., Tittle, 1980). To achieve the deterrence, the individuals need to obtain the knowledge about what conduct is unacceptable and what punishment will be enforced once the misconduct is performed. This knowledge can be delivered by the relevant policies. Within our research context, when individuals recognize the existence of policy relevant to software piracy or intellectual property protection, their punishment perceptions will be enhanced. Specifically, the presence of punishment on software piracy behavior can deliver a signal that the software piracy behavior is unacceptable and will bring individuals with negative consequences once the policy is indeed executed, increasing the perceived certainty of sanctions (Lee & Lee, 2002). Furthermore, compared to the situation where the absence of policy can lead individuals to assume that software piracy is not subject to enforcement, software piracy policy as the basis for litigation that punish software piracy behavior should therefore increase perceived severity of sanctions (Straub & Collins, 1990). Prior studies on IS security policy compliance have confirmed that employees' awareness of security policies can lead to their perceptions about punishment certainty and punishment severity (e.g., D'Arcy, et al., 2009). Therefore, we propose that

H1a: Policy awareness is positively associated with punishment certainty.

H1b: Policy awareness is positively associated with punishment severity.

3.2 Personal and Vicarious Experience

The existence of the policy may not be able to guarantee that individuals can faithfully follow the policy, because individuals can search for other information to evaluate whether the policy is truly enforced in practice. According to the social learning theory, this information can be acquired through experiential learning and vicarious learning (Bandura, 1977). Thus, individuals' personal and vicarious experiences regarding the software piracy behavior and punishment can help to form their punishment perceptions.

Personal experience describes the personal stock of events that an individual acquires by being caught and punished for committing software piracy. When people deal with events, some of their responses lead to positive outcomes while others have no effect or result in negative outcomes. Social learning theory postulates that those behaviors leading to positive outcomes will be enhanced while those leading to negative outcomes will be avoided (i.e., differential reinforcement) (Bandura, 1977). Through this experiential learning process, individuals who have personal experience of being punished after committing software piracy will perceive higher certainty and severity of punishment. Specifically, because they have encountered punishment, these individuals will set a strong association between software piracy behavior and punishment, leading to the belief that it is very likely to be punished once one commits a software piracy behavior. Furthermore, individuals who have been punished indeed have suffered monetary, reputation or other types of losses. This will lead them to perceive relatively higher severity of punishment when compared to those who have no such experience. The impacts of personal experience on punishment perceptions have also been empirically examined by Piquero and Paternoster (1998) in their study on drunk driving

behavior. This effect is also often discussed in the criminology literature as specific deterrence (Stafford & Warr, 1993). Thus, we propose that

H2a: Personal experience is positively associated with punishment certainty.

H2b: Personal experience is positively associated with punishment severity.

Unlike personal experience, which relies on individuals' own experience, vicarious experience captures the experience an individual obtains through observing others' behavior and behavioral consequences (Bandura, 1977). Social learning theory states that, by observing others' behavior, individuals can learn the association between a specific behavior and its consequences and would assume that the same consequences can be induced when the same behavior is performed (Bandura, 1977). Within our research context, when individuals observe that others have been punished for their software piracy behavior, they will perceive higher punishment certainty and severity compared to those who have not observed others' encounters. In their study on drunk driving behavior, Piquero and Paternoster (1998) also examine the role of vicarious experience in the punishment perception formation process. This is called a general deterrence in the criminology literature (Stafford & Warr, 1993). Thus, we propose

H3a: Vicarious experience is positively associated with punishment certainty.

H3b: Vicarious experience is positively associated with punishment severity.

3.3 Comparison of the Strengths of the Impacts

After hypothesizing the effects of the three information sources on punishment perceptions, the next question is: which sources play more important roles than others? This is helpful for researchers and practitioners to understand which strategy (e.g., adjusting policies or social norms) is more effective in curtailing individuals' punishment perceptions and avoiding their software piracy behavior.

Much previous research has examined the persuasion power of information from different sources. For example, in their study on helping-behavior, Catt and Benson (1977) find that when compared to those who are told how others similar to themselves conduct a behavior, individuals who have directly observed a live model of the behavior would be more likely to perform the behavior. Probst et al. (2008) argue that, without observing how a policy is implemented and executed, individuals would be more lax in following the policy, because observing the actual actions can more accurately inform expected behavioral outcomes than mere awareness of the policy per se. In an online word-of-mouth study, Chen et al. (2011) also find that action-based information defined as observational learning in their paper may be perceived as more credible than word-of-mouth. Within our research context, since actions speak louder than words, the action-based information, such as personal and vicarious experience, should exert stronger influences on individual perceptions than the word-based information (e.g., policy awareness). Along the same line, first-hand personal experience of being caught and punished in the past should exert stronger influence on individual punishment perception than second hand experience of knowing someone else has been caught and punished. Therefore, we propose

H4a: Personal experience has a stronger impact on punishment certainty than policy awareness.

H4b: Vicarious experience has a stronger impact on punishment certainty than policy awareness.

H4c: Personal experience has a stronger impact on punishment severity than policy awareness.

H4d: Vicarious experience has a stronger impact on punishment severity than policy awareness.

4 RESEARCH METHODS

4.1 Research Setting

An online survey was conducted to collect data for the current research. Rather than collecting data through a paper-and-pencil questionnaire, an online survey was adopted for two reasons. First, unlike early piracy behavior, which refers to pirated software purchase behavior (Gopal & Sanders, 1998), contemporary piracy behavior, called "piracy 2.0," heavily relies on downloading and sharing pirated software resources through the Internet (Bhattacharjee et al., 2003). In this special context, using online surveys can keep the consistency between the research context and the data collection context. Second, piracy behavior is generally regarded as an unethical and/or illegal behavior. Surveys on this type of behavior should take the anonymity and confidentiality of respondents into consideration. Online surveys, compared with traditional paper-and-pencil surveys, can better ensure the anonymity of respondents and the credibility of their answers (Kwong, 2009; Lin, et al., 1999).

Participants were recruited from people who considered computer usage an important component of their work and daily life in China. Those who did not use computers were not included due to their irrelevance to the current study. China was selected as the research context because piracy behavior is very prevalent in China (Chiou, et al., 2005; Moores, 2008; Shin, et al., 2004), making the research context closely relevant to the research objective. Studying piracy behavior in the Chinese context is of great importance in theory and practice (e.g., for policy establishment).

4.2 Measures

All the measures were adapted from previous studies (See the Appendix) to fit the context of our study. The three items to measure piracy intention were adapted from Bhattacherjeee (2001); the two items to measure punishment certainty and punishment severity were adapted from Peace et al. (2003); the three items to measure policy awareness were adapted from D'Arcy et al. (2009); each of the two items to measure personal experience and vicarious experience were adapted from Paternoster and Piquero (1995). All measures used the 7-point Likert scales.

As the survey was conducted in China, the questionnaire was consequently translated to Chinese according to the translation committee approach (van de Vijver, 2006; van de Vijver & Leung, 1997). According to van de Vijver (2006), the committee approach for measurement translation is appropriate for linguistic equivalence and psychological equivalence through the sense-making process among committee members. Four native Chinese speakers fluent in English were involved in the committee. All were IS Ph.D. students. After introducing the purpose of the study and the definitions of the constructs, each student was requested to translate the items to Chinese individually. Afterwards, they were asked to discuss their translation results, item by item. Upon reaching an agreement on the translation, the Chinese version of the instrument was then compiled.

4.3 Data Collection Procedure

Data were collected through two channels. In the first channel, data were collected from a convenience sample using the snowball sampling technique. The friendship-based feature of snowball sampling determined that the responses were more credible than those of other sampling methods (Biernacki & Waldorf, 1981). In the second channel, data were collected from students in two universities in China. Two faculty members in these two universities facilitated the questionnaire distribution process. Students were strongly encouraged to participate in the survey but participation was voluntary to maintain the confidentiality of subjects. Using student samples to investigate piracy behavior has been employed frequently in previous studies, as software piracy has been confirmed to be prevalent in academic institutions (Phau & Ng, 2010). Thus, in the present study, student samples were included as an important component of the whole sample.

Finally, 253 valid responses were obtained and used in the data analysis. Among the valid responses, 53.4% were male. Over 80% of the participants were between 21 and 29 years old. Over 70% of the participants were students, and more than 97% held a bachelor's degree or a higher level of education. Most of them had over 5 years of computer and Internet experience. The income of the participants was evenly distributed from less than RMB500 to over RMB4000.

5 DATA ANALYSIS

SmartPLS was used as the data analysis tool. Following the two-stage analysis procedure, the measurement model and the structural model were respectively assessed (Hair et al., 1998).

5.1 Measurement Model

Measurement model was assessed by checking the reliability and validity of the constructs. As shown in Table 1, the values of composite reliability (CR) for all of the constructs were higher than the suggested threshold 0.7 and the values of average variance extracted (AVE) for all the constructs were higher than the suggested threshold 0.5 (Fornell & Larcker, 1981), showing that all the constructs were with good reliability.

	CR	AVE	Item	SPI	PC	PS	PSG	EL	VL
Software Piracy Intention	0.975	0.929	SPI1	**0.966**	-0.324	-0.314	0.075	-0.288	-0.371
			SPI2	**0.964**	-0.305	-0.278	0.070	-0.283	-0.351
			SPI3	**0.962**	-0.325	-0.282	0.091	-0.271	-0.334
Punishment Certainty	0.891	0.804	PC1	-0.332	**0.923**	0.450	0.013	0.558	0.550
			PC2	-0.252	**0.869**	0.509	0.125	0.400	0.440
Punishment Severity	0.914	0.842	PS1	-0.286	0.476	**0.912**	0.166	0.381	0.411
			PS2	-0.271	0.494	**0.924**	0.275	0.404	0.397
Policy Awareness	0.941	0.840	PSG1	0.035	0.078	0.231	**0.912**	-0.003	0.027
			PSG2	0.093	0.024	0.240	**0.948**	-0.058	-0.027
			PSG3	0.101	0.091	0.192	**0.888**	0.015	0.079
Experiential Learning	0.917	0.848	EL1	-0.203	0.400	0.297	-0.032	**0.889**	0.639
			EL2	-0.315	0.573	0.464	-0.006	**0.951**	0.701
Vicarious Learning	0.893	0.807	VL1	-0.284	0.485	0.388	0.008	0.629	**0.893**
			VL2	-0.370	0.517	0.402	0.039	0.681	**0.904**

Table 1. Reliability, Validity, Loadings and Cross Loadings

Convergent validity was assessed by examining the item loadings on the corresponding constructs. As shown in Table 1, all item loadings on the corresponding constructs were higher than 0.8, suggesting that all the constructs have good convergent validity for. Discriminant validity was assessed by two criteria. The first criterion was to check if the cross loadings were lower than the loadings on the corresponding constructs. The second criterion was to check if the square root of the average variance extracted (AVE) for a given construct was higher than the correlations relevant to that construct (Fornell & Larcker, 1981). The results in Table 1 and Table 2 showed that all the constructs met both criteria, thus showing good discriminant validity.

	SPI	PC	PS	PSG	EL	VL
SPI	***0.964***					
PC	-0.330	***0.897***				
PS	-0.303	0.529	***0.918***			
PSG	0.082	0.069	0.242	***0.917***		
EL	-0.291	0.544	0.428	-0.018	***0.921***	
VL	-0.365	0.558	0.440	0.027	0.730	***0.898***

Note: 1. The numbers in the diagonal row are square roots of the AVE.

2. EL: Personal experience; PC: Punishment certainty; PS: Punishment severity; PSG: Policy awareness; SPI: Software piracy intention; VL: Vicarious experience.

Table 2. Correlations

5.2 Structural Model

The PLS results were shown in Figure 2. Consistent with general deterrence theory, punishment certainty (β = -.236, t = 2.961) and punishment severity (β = -.178, t = 2.734) were found to have significant effects on software piracy intention. Policy awareness was found to have a significant impact on punishment severity (β = .240, t = 4.938) but an insignificant effect on punishment certainty (β = .065, t = 1.258), lending support to H1b but not H1a. Personal experience had significant effects on both punishment certainty (β = .297, t = 2.855) and punishment severity (β = .248, t = 3.405), supporting H2a and H2b. Vicarious

experience was also found to have significant effects on both punishment certainty (β = .340, t = 3.152) and punishment severity (β = .252, t = 3.190), supporting H3a and H3b.

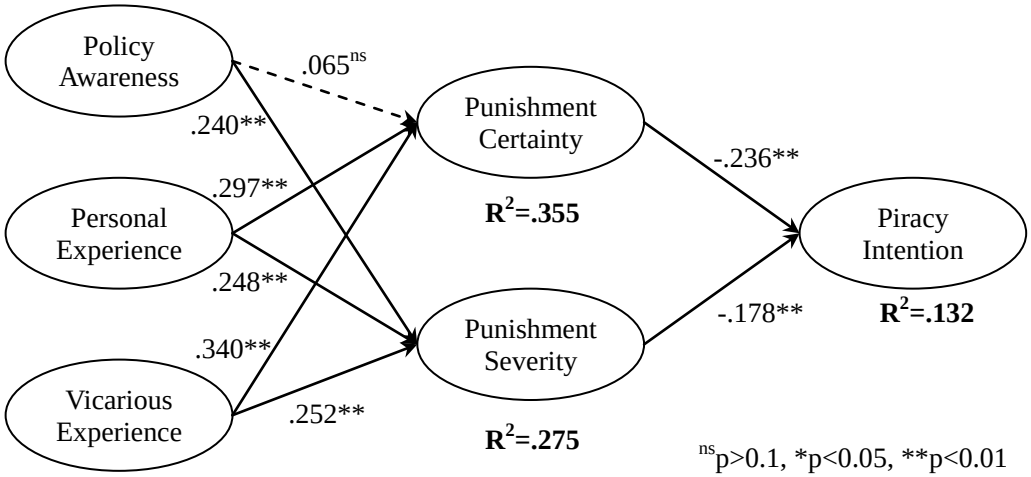

Figure 2. PLS Results

H4a-d were tested by comparing the path coefficients from policy awareness, personal experience and vicarious experience to punishment certainty and severity (Chin et al., 2003). The results showed that personal experience had stronger impact than policy awareness on punishment certainty (Δβ = .232, t = 2.006), and vicarious experience also had stronger impact than policy awareness on punishment certainty (Δβ = .275, t = 2.221), lending support to H4a and H4b. However, the path coefficient between personal experience and punishment severity (Δβ = .008, t = 0.088) and between vicarious experience and punishment severity (Δβ = .012, t = 0.125) were not found to be stronger than the path coefficient between policy awareness and punishment severity. Thus, H4c and H4d were not supported.

6 DISCUSSIONS AND IMPLICATIONS

6.1 Key Findings and Limitations

The study attempts to understand the antecedents of the punishment perceptions and their relative strengths on punishment perceptions. There are several key findings of the study. First, the study shows that policy awareness has positive impacts on punishment severity, suggesting that policy can be regarded as a source for the assessment on the severity of punishment. However, it is found to have no significant effects on punishment certainty. One possible explanation for this finding is that only the existence of policy is not adequate to let individuals believe that the policy will actually be enforced (Straub & Collins, 1990). Second, personal and vicarious experience have positive impacts on both punishment certainty and severity, indicating that if experienced personally or observed others being punished for committing software piracy, individuals will perceive higher punishment certainty and severity. Third, the comparisons of the path strengths suggest that action-based information (through personal or vicarious experience) is more effective than word-based information (through policy awareness) on inducing the perception on punishment certainty. However,

these three antecedents show no significant difference in affecting punishment severity. One possible explanation is that the observed or experienced punishment is consistent with the policy, leading to the equal influence of these three sources on punishment severity.

Before discussing the theoretical and practical contributions, the limitations of the current study need to be discussed. First, a self-reported survey was used to collect our data. This data collection method has often been criticized due to the threat of common method bias (CMB) (Malhotra et al., 2006). However, the statistical analysis shows that the trait variables or substantial factors explain 85.7% of the variance while the method factors only explain 0.6% of the variance, suggesting that CMB may not be a critical concern. Second, the survey is conducted in a single cultural context (i.e., China). Applying the developed research model and research conclusions to other cultural contexts should be cautioned.

6.2 Implications for Theory

This study has two major theoretical implications. First, unlike previous studies focusing on the consequences of punishment perceptions, this study draws on the social learning theory to investigate the antecedents of punishment perceptions. Previous studies on software piracy used the general deterrence theory to examine how individuals behave when certain punishment perceptions have been formed. On the other and, little has been done to understand how these punishment perceptions are formed. In our study, we extend the general deterrence theory by theorizing three sources of the punishment perceptions, namely policy awareness, personal experience and vicarious experience. By doing so, we have enriched the literature on software piracy by providing a comprehensive picture of the software piracy behavior. This study also extends the application scope of the social learning theory to the software piracy research. Future studies from this theoretical perspective to further investigate the antecedents of punishment perceptions are should be encouraged.

Second, this study sheds light on the relative strengths of different sources of punishment perceptions. Besides identifying the three sources of punishment perceptions, this study also finds that these three sources have unequal strength of influence. Specifically, because actions speak louder than words, action-based information (e.g., personal and vicarious experiences) has stronger impacts than word-based information (e.g., policy awareness) on punishment perceptions. This suggests that in future studies, researchers should pay attention to the different roles of different sources.

6.3 Implications for Practice

Several practical implications can also be derived from the study. First, this study provides a framework for the government and software companies to set strategies to curtail individuals' software piracy behavior. To leverage on the deterrence effect, they should consider how to enhance individuals' policy awareness, personal and vicarious experiences in punishment. Second, government and software companies should recognize that creating a policy by itself is insufficient; the actual enforcement of the policy is more effective in making individuals perceive that punishment is very possible through the modelling effect.

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Appendix: Measures

Policy Awareness (D'Arcy, et al., 2009)

PSG1: There are specific guidelines that describe using pirated software is not acceptable.

PSG2: There are established rules showing that using pirated software is not allowed.

PSG3: There is a formal policy that forbids people from using pirated software.

Vicarious Experience (Paternoster & Piquero, 1995)

VL1: The frequency that others have been punished for using pirated software is: very rarely / very often.

VL2: According to my observation, others regularly are punished for using pirated software. (1=strongly disagree to 7=strongly agree)

Personal Experience (Paternoster & Piquero, 1995)

EL1: The frequency that I have been punished for using pirated software is: very rarely / very often.

EL2: I have regularly been punished due to using pirated software. (1=strongly disagree to 7=strongly agree)

Punishment Certainty (Peace, et al., 2003)

PC1: If I use pirated software, the probability I would be caught is: very low / very high.

PC2: If I use pirated software piracy, I would probably be caught: strongly disagree / strongly agree.

Punishment Severity (Peace, et al., 2003)

PS1: If I were caught using software piracy, I think the punishment would be: very low / very high.

PS2: If I were caught using software piracy, I would be severely punished: strongly disagree / strongly agree.

Software Piracy Intention (Bhattacherjee, 2001)

SPI1: I intend to continue using pirated software in the future.

SPI2: If I could, I would like to continue using pirated software.

SPI3: It is likely that I will continue using pirated software.

Reference

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Al-Rafee, S., & Cronan, T. P. (2006). Digital Piracy: Factors that Influence Attitude toward Behavior. *Journal of Business Ethics, 63*(3), 237-259.

Bandura, A. (1977). *Social Learning Theory*. Englewood Cliffs: Prentice-Hall.

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bhattacharjee, S., Gopal, R. D., & Sanders, G. L. (2003). Digital Music and Online Sharing: Software Piracy 2.0? *Communications of the ACM, 46*(7), 107-111.

Bhattacherjee, A. (2001). Understanding Information Systems Continuance: An Expectation-Confirmation Model. *MIS Quarterly, 25*(3), 351-370.

Biernacki, P., & Waldorf, D. (1981). Snowball Sampling: Problems and Techniques of Chain Referral Sampling. *Sociological Methods & Research, 10*(2), 141-163.

BSA. (2011). Eighth Annual BSA Global Software 2010 Piracy Study: Business Software Alliance.

Catt, V., & Benson, P. L. (1977). Effect of Verbal Modeling on Contributions to Charity. *Journal of Applied Psychology, 62*(1), 81.

Chen, Y., Wang, Q., & Xie, J. (2011). Online Social Interactions: A Natural Experiment on Word of Mouth versus Observational Learning. *Journal of Marketing Research, 48*(2), 238-254.

Chiang, E., & Assane, D. (2009). Estimating The Willingness To Pay For Digital Music. *Contemporary Economic Policy, 27*(4), 512-522.

Chin, W. W., Marcolin, B. L., & Newsted, P. R. (2003). A Partial Least Squares Latent Variable Modeling Approach for Measuring Interaction Effects: Results from a Monte Carlo Simulation Study and an Electronic-Mail Emotion/Adoption Study. *Information Systems Research, 14*(2), 189-217.

Chiou, J. S., Huang, C., & Lee, H. (2005). The Antecedents of Music Piracy Attitudes and Intentions. *Journal of Business Ethics, 57*(2), 161-174.

Christensen, A. L., & Eining, M. M. (1991). Factors Influencing Software Piracy: Implications for Accountants. *Journal of Information Systems, 5*(1), 67-80.

D'Arcy, J., Hovav, A., & Galletta, D. (2009). User Awareness of Security Countermeasures and its Impact on Information Systems Misuse: A Deterrence Approach. *Information Systems Research, 20*(1), 79-98.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research, 18*(1), 39-50.

Gopal, R., & Sanders, G. (1998). International Software Piracy: Analysis of Key Issues and Impacts. *Information Systems Research, 9*(4), 380-397.

Gopal, R., & Sanders, G. (2000). Global Software Piracy: You Can't Get Blood Out of a Turnip. *Communications of the ACM, 43*(9), 82-89.

Gopal, R. D., & Sanders, G. L. (1997). Preventive and Deterrent Controls for Software Piracy. *Journal of Management Information Systems, 13*(4), 29-47.

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1998). *Multivariate Data Analysis* (5th ed.). Upper Saddle River, NJ: Prentice-Hall.

Higgins, G. E., Wilson, A. L., & Fell, B. D. (2005). An Application of Deterrence Theory to Software Piracy. *Journal of Criminal Justice and Popular Culture, 12*(3), 166-184.

Hunt, S. D., & Vitell, S. (1986). A General Theory of Marketing Ethics. *Journal of macromarketing, 6*(1), 5-16.

Jones, T. M. (1991). Ethical Decision Making by Individuals in Organizations: An Issue-Contingent Model. *Academy of Management Review, 16*(2), 366-395.

Kwan, S. S. K., So, M. K. P., & Tam, K. Y. (2010). Applying the Randomized Response Technique to Elicit Truthful Responses to Sensitive Questions in IS Research: The Case of Software Piracy Behavior. *Information Systems Research, 21*(4), 941-959.

Kwan, S. S. K., & Tam, K. Y. (2010). An Affective Model for Unauthorized Sharing of Software. *PACIS 2010 Proceedings*, 35.

Kwong, C. (2009). *Understanding Digital Piracy Behavior of Individuals in Virtual Communities.* PhD, City University of Hong Kong, Hong Kong.

Lee, J., & Lee, Y. (2002). A Holistic Model of Computer Abuse within Organizations. *Information Management & Computer Security, 10*(2), 57-63.

Li, X., & Nergadze, N. (2009). Deterrence Effect of Four Legal and Extralegal Factors on Online Copyright Infringement. *Journal of Computer-Mediated Communication, 14*(2), 307-327.

Liao, C., Lin, H.-N., & Liu, Y.-P. (2010). Predicting the Use of Pirated Software: A Contingency Model Integrating Perceived Risk with the Theory of Planned Behavior. *Journal of Business Ethics, 91*(2), 237-252.

Lin, T. C., Hsu, M. H., Kuo, F. Y., Sun, P. C., & Kaohsiung, T. (1999). *An Intention Model-based Study of Software Piracy.* Paper presented at the HICSS 1999.

Malhotra, N. K., Kim, S. S., & Patil, A. (2006). Common Method Variance in IS Research: A Comparison of Alternative Approaches and a Reanalysis of Past Research. *Management Science, 52*(12), 1865-1883.

Mason, R. O. (1986). Four Ethical Issues of the Information Age. *MIS Quarterly, 10*(1), 5-12.

Moores, T. (2008). An Analysis of the Impact of Economic Wealth and National Culture on the Rise and Fall of Software Piracy rates. *Journal of Business Ethics, 81*(1), 39-51.

Moores, T. T., & Chang, C. J. (2006). Ethical Decision Making in Software Piracy: Initial Development and Test of a Four-Component Model. *MIS Quarterly, 30*(1), 167-180.

Paternoster, R., & Piquero, A. (1995). Reconceptualizing Deterrence: An Empirical Test of Personal and Vicarious Experiences. *Journal of Research in Crime and Delinquency, 32*(3), 251-286.

Peace, A. G., Galletta, D. F., & Thong, J. Y. L. (2003). Software Piracy in the Workplace: A Model and Empirical Test. *Journal of Management Information Systems, 20*(1), 153-177.

Phau, I., & Ng, J. (2010). Predictors of Usage Intentions of Pirated Software. *Journal of Business Ethics, 94*(1), 23-37.

Piquero, A., & Paternoster, R. (1998). An Application of Stafford and Warr's Reconceptualization of Deterrence to Drinking and Driving. *Journal of Research in Crime and Delinquency, 35*(1), 3-39.

Piquero, A. R., & Pogarsky, G. (2002). Beyond Stafford and Warr's Reconceptualization of Deterrence: Personal and Vicarious Experiences, Impulsivity, and Offending Behavior. *Journal of Research in Crime and Delinquency, 39*(2), 153-186.

Probst, T. M., Brubaker, T. L., & Barsotti, A. (2008). Organizational Injury Rate Underreporting: The Moderating Effect of Organizational Safety Climate. *Journal of Applied Psychology, 93*(5), 1147-1154.

Shin, S., Gopal, R., Sanders, G., & Whinston, A. (2004). Global Software Piracy Revisited: Beyond Economics. *Communications of the ACM, 47*(1), 103-107.

Stafford, M. C., & Warr, M. (1993). A Reconceptualization of General and Specific Deterrence. *Journal of Research in Crime and Delinquency, 30*(2), 123-135.

Straub, D. W., & Collins, R. W. (1990). Key Information Liability Issues Facing Managers: Software Piracy, Proprietary Databases, and Individual Rights to Privacy. *MIS Quarterly, 14*(2), 143-156.

Thong, J. Y. L., & Yap, C. S. (1998). Testing an Ethical Decision-Making Theory: The Case of Softlifting. *Journal of Management Information Systems, 15*(1), 213-237.

Tittle, C. R. (1980). *Sanctions and Social Deviance: The Question of Deterrence*. New York: Praeger.

van de Vijver, F. J. R. (2006). *Conducting Cross-Cultural Research.* Paper presented at the 2006 Regional Conference of Academy of Management Research Method Division, Hong Kong SAR.

van de Vijver, F. J. R., & Leung, K. (1997). *Methods and Data-Analysis for Cross-Cultural Research*. Thousand Oaks, CA: Sage Publications.

Zhang, L., Smith, W. W., & McDowell, W. C. (2009). Examining Digital Piracy: Self-Control, Punishment, and Self-Efficacy. *Information Resources Management Journal, 22*(1), 24-44.