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ETHICAL DECISION MAKING IN SOFTWARE PIRACY: INITIAL DEVELOPMENT AND TEST OF A FOUR-COMPONENT MODEL[1]

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Abstract

Software piracy costs the software industry billions of dollars each year. To better understand piracy, we propose a model of ethical decision making that is an adaptation of the four-component model of morality. This model defines four internal processes that result in external moral behavior: recognition, judgment, intention, and behavior. We test our model with a sample of Information Systems students in Hong Kong who provided measures of self-reported behavior regarding levels of buying and using pirated software. Using partial least squares, we investigated the causal pathways of the model and the effects of age and gender. We find that use is determined by buying, buying is determined by intention, and intention is determined by judgment. Although respondents recognized software piracy as an infringement of intellectual property rights, this fact did not affect their judgment of the morality of the act. Significant differences are also found in the ethical decision-making process based on age but only limited differences based on gender. The implications of these results, including the development of a professional ethics program, are discussed.

Keywords: Ethics, morality, ethical decision making, moral reasoning, ethical scenarios, intellectual property rights, software piracy, age, gender

Introduction

Despite the best efforts of vendor organizations, such as the Business Software Alliance (BSA), the global software piracy rate continues to hover between 35 and 40 percent (BSA 2005). In other words, out of every 100 business applications in use, 35 to 40 are pirated copies. This translated into losses of $32.70 billion for the software industry in 2004, up from $28.79 billion in 2003. Vietnam (95 percent), the Ukraine (91 percent), and China (90 percent) are among the countries with the highest software piracy rates. Although the United States (21 percent) has the lowest piracy rate in the world, the size of the U.S. software market means it registered $6.65 billion in lost sales in 2004. Other countries with major financial losses in 2004 include China ($3.57 billion), France ($2.93 billion), and Germany ($2.29 billion).

Most countries attempt to protect the rights of software producers through extensions of copyright law that treat software as a literary work. Because most of the world's business software comes from U.S.-based companies, the U.S. legislature has enacted several laws to combat digital theft, including the 1997 No Internet Theft (NET)

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Act, the 1998 Digital Millennium Copyright Act, and the 1999 Digital Theft Deterrence and Copyright Damages Improvement Act. Similar international measures include the 1995 World Trade Organization Agreement on Trade-Related Aspects of Intellectual Property Rights, and the 1996 World Intellectual Property Organization Copyright Treaty.

Even with legislation in place, enforcement can be problematic because the existence of pirated software may also promote a diffusion of buyers into the legitimate software market (Conner and Rumelt 1991; Givon et al. 1995; Gopal and Sanders 1997). Software developers must balance the potential gain of pursuing software pirates with the potential loss of new, legal customers. Extending domestic and international legislation is also problematic, because evidence suggests that governments without domestic software industries are less likely to enforce copyright laws (Gopal and Sanders 1998). This suggests a need to explore alternative ways to prevent infringement of intellectual property rights and theft of digital goods.

One promising area of investigation is the ethical dimension of software piracy. To understand an individual's propensity to pirate software, we develop and test a model of ethical decision making based on the four-component model of morality. The components of the model are outlined in the next section and some are reinterpreted to incorporate other models of ethical decision making. The veracity of the new model is then tested using a sample of 243 students. Tests for differences based on age and gender are also conducted. We find support for the model and for age-based differences but only limited support for gender-based differences.

Theoretical Background

The Four-Component Model of Morality

The four-component model was presented initially as a synthesis of research in moral psychology (Rest 1983). It has developed into a model of the hypothetical components underlying every moral act (Narvaez and Rest 1995; Rest, Bebeau, and Volker 1986; Rest et al. 1999). The four components are

1. **Moral Sensitivity**: Interpreting the situation as moral. Specifically, interpreting how an act will affect the self or others and having empathy for those involved.

2. **Moral Judgment**: Judging which possible course of action is most justified.

3. **Moral Motivation**: Deciding what one intends to do.

4. **Moral Character**: Constructing and implementing a plan of action, resisting distractions, and overcoming impediments such as fatigue and frustration.

Moral sensitivity is the ability to interpret cause-effect relationships in situations where decisions affect the welfare of others. Failure to understand the causal links can result from ignorance of an action's effect (e.g., not knowing that buying certain brands of coffee affects Colombian peasants), or ambiguous cues in the act (e.g., whether a loud argument is a lovers' tiff or domestic abuse). Empathy is the link to judgment, because perceiving distress in another often produces the desire to alleviate it (Hoffman 1981). What must be done? Answering this question is the role of moral judgment.

Moral judgment is the ability to make a decision based on some moral ideal. Moral judgment differs from social norms, which are rote patterns of behavior. Social norms make no provision for allocating rights or distinguishing between moral behavior and other forms of socially regulated behavior, such as dress codes or dining manners. Moral judgment, in contrast, is a cognitive-developmental attribute, in which an understanding of social arrangements is developed so that the individual can adopt cooperation schemes that shift from short-term individual needs to long-term societal needs (Kohlberg 1976, 1984).

The classic Kohlbergian view is that moral judgment develops with age and progresses through six stages, an idea that has generated criticism. Some critics point to Kohlberg's focus on rational thinking and bias toward a justice-oriented view of morality that favors males (Gilligan 1982, 1987). In addition, there is little evidence to support the existence of higher-level moral reasoning (Modgil and Modgil 1986; Wren 1990). The influence of gender in ethical decision making is still debatable, with a recent meta-analysis of moral orientation finding only weak differences between males and females (Jaffee and Hyde 2000).

The third component, moral motivation, is the ability to prioritize moral concerns over competing issues. Social understanding may motivate moral behavior at this stage. As people begin to understand the mutual benefit of respecting the social structure, they are more likely to respect it. Moreover, people are unlikely to use an expected-utility algorithm to make ethical decisions, because such cost/benefit calculations become virtually impossible when many factors are at stake. In this regard, it is interesting to observe when moral obligations override personal self-interest. Conversely, some people may engage in defensive calculations to cancel out their moral obligations, which may lead to a reassessment of moral sensitivity.

Moral character is the ability to transform intention into actual behavior. Ego-strength, self-regulation, and self-efficacy may all play important roles at this stage. For instance, all things being equal, people with greater ego-strength are less likely to cheat on a test. People also maintain self-control longer when they focus on positive goals (Mischel and Mischel 1976). Expectations of efficacy can also help people initiate and maintain coping behavior in the face of obstacles (Bandura 1977).

These four components are not general personality traits but internal processes that must be activated for external moral behavior to

occur. They are not part of a sequential decision-making model. Rather, they influence each other via feedforward and feedback loops, with cognition, affect, and behavior all playing a role.

Other Models of Ethical Decision Making

The theory of reasoned action (TRA) (Ajzen and Fishbein 1980; Fishbein and Ajzen 1975) has been used extensively as a model of rational behavior. It suggests that behavior is determined by intentions. Intentions, in turn, are determined by personal attitudes and subjective norms. Personal attitudes are determined by behavioral beliefs and outcome expectations. Subjective norms are determined by normative beliefs and motivation to comply.

Critics of TRA point out that behavior involves more than intention. Moreover, no provision is made for dealing with the inability to perform the task (Sheppard et al. 1988). Thus, the theory of planned behavior (TPB) (Ajzen 1991) introduced a third determinant of intention and behavior, namely, perceived behavioral control (PBC). PBC refers to a person's perceived ability to perform a given behavior. The apparent similarity between PBC and other constructs, such as self-efficacy and locus of control, has been noted and explored (Ajzen 2002).

When applied to moral reasoning, TRA produces inconsistent results. For scenarios involving prizes or exaggerating a customer's problem to increase sales, attitude and social norms explained 48 to 59 percent of variance in behavioral intention (Dubinsky and Loken 1989). Other studies have found, however, that TRA provides an adequate explanation of moral behavior only by adding correlations between normative beliefs, behavioral beliefs, and outcome expectations, and by adding a causal path between normative beliefs and attitude (Vallerand et al. 1992).

In addition, for scenarios involving stealing technical documentation or reading other people's e-mail, TRA explained only 7 to 14 percent of response variance (Loch and Conger 1996). Some studies also find that PBC does not increase the predictive power of TRA (Randall and Gibson 1991). Others find PBC, defined in terms of an individual's ability to copy software, has a significant impact on the intention to pirate software (Peace et al. 2003).

These results suggest a person's normative beliefs are influenced by the expected consequences of the act (behavioral beliefs) and the value placed on the outcome (outcome expectations). Normative beliefs influence decision making, because moral acts are defined in terms of what people believe ought to be done, not what they actually do. Given that moral acts are usually defined as voluntary, it is not surprising that perceived behavioral controls receive little consideration.

A general theory of marketing ethics has also incorporated the assessment of consequences (Hunt and Vitell 1986). This theory suggests that deontological and teleological evaluations of the act determine ethical judgments;[2] ethical judgments determine intention; and intentions and situational constraints determine behavior. The behavior creates consequences that provide a feedback loop to further ethical reasoning. Hunt and Vitell's model also suggests teleological evaluations affect intention if other, preferred outcomes subvert one's ethical judgment and create the intention to carry out alternative behavior.

A version of Hunt and Vitell's model has been tested empirically (Thong and Yap 1998). The results generally support the model, with teleological and deontological evaluations accounting for 60 to 66 percent of variances in ethical judgment. Teleological evaluations were more important, with a beta up to three times that of deontological evaluations (0.62 to 0.64, compared to 0.21 to 0.25). Finally, although moral judgment and teleological evaluation accounted for between 15 and 30 percent of variance in moral intention, the relationship between teleological evaluation and moral intention was not significant. Thus, the results strongly support the relationship between moral judgment and intention, with judgment based primarily on consequential ethics.

The issue-contingent model (Jones 1991) is a synthesis of several other models. It explicitly incorporates the four-component model, although the components are recognizing the moral issue, making a moral judgment, establishing a moral intent, and engaging in moral behavior. These components form the core of a decision-making model in which characteristics of the moral issue moderate the entire decision-making process. Some characteristics that increase the moral intensity of the act are the magnitude of the consequences, social consensus, and the probability that the act will take place and cause harm (Marshall and Dewe 1997; Morris and McDonald 1995; Weber 1996). The issue-contingent and four-component models highlight how important the moral issue is to any moral decision making.

Research Model

After considering alternative models of ethical decision making, we propose re-interpreting the labels of the four-component model. We retain the names moral behavior and moral judgment. Based on the issue-contingent model, we change moral sensitivity to moral recognition, which refocuses attention on the cognitive aspects of this component. Based on TRA, we change moral motivation to

[2]In brief, teleological ethics involves judging by consequences. The philosopher Jeremy Bentham (1748-1832) developed the Principle of Utility, which states that an action is good if it produces the greatest happiness for the greatest number. Deontological ethics involves judging by motive. The philosopher Immanuel Kant (1724-1804) proposed the Categorical Imperative, which states that one must act as if every action were to become a universal law. In other words, lying is bad because if everyone lied there could be no trust. For a recent discussion of these and other theories, see Paul et al. (2001).

moral intention. The issue-contingent and Hunt and Vitell models both suggest intention mediates between judgment and behavior.

The role of moral character is problematic and does not appear in the issue-contingent model. TRA suggests intention precedes behavior. The four-component model suggests that intention alone cannot guarantee that behavior will occur. When behavior occurs, we assume that moral character has enabled following through on the intention. The model proposed here, therefore, is restricted to voluntary acts (which negates the need for a PBC construct) and to acts with a measurable behavioral construct (which negates the need for a measure of moral character).

In the context of software piracy, we also propose that moral behavior involves buying and using, where the level of use is determined by the extent to which someone buys pirated software. In countries with high software piracy rates, many software arcades openly or surreptitiously sell counterfeit copies of well-known programs. A single pirated copy can then be distributed to friends and family. Thus, the level of use far exceeds the level of buying.

Although Rest (e.g., Rest et al. 1986) specifically rules out a sequential causal model, we investigate the relationship between the components by following the logical order in which they are described. Figure 1 shows the research model. We then use empirical analysis to determine whether a sequential causal model holds. We begin by defining a series of hypotheses that relate to the model's structure.

H1. Moral recognition determines moral judgment.
H2. Moral judgment determines moral intention.
H3. Moral intention determines buy behavior.
H4a. Moral intention determines use behavior.
H4b. Buy behavior determines use behavior.

We also investigate the roles of age and gender in ethical decision making. The cognitive-developmental approach adopted by Rest suggests people become less likely to engage in unethical behavior as they gain an understanding of their place in society. Accordingly, we expect that people are less likely to buy or use pirated software as they grow older because they understand its moral implications. This leads to

H5. Age has a significant moderating effect on the ethical decision-making process.

Gender socialization theory (Gilligan 1982, 1987) argues that males and females perceive ethical problems differently because of differences in socialization. Females are socialized to maintain relationships and empathize with others, while males are socialized according to principles of fairness and equity. Ethics research within Information Systems suggests that males are more likely to pirate software than females (Gattiker and Kelley 1999; Kreie and Cronan 1998; Loch and Conger 1996; Soloman and O'Brien 1991). In this light, our last hypothesis is

H6. Gender has a significant moderating effect on the ethical decision-making process.

Method

Moral reasoning research typically begins with an ethical scenario that is meant to "trigger" a person's ethical decision-making process. We begin by developing a set of scenarios that include examples of buying or using pirated software. The underlying factor that explains the behavior differs in each scenario. The factors are the availability of pirated software for purchase, the high cost of purchasing legal software, and the perceived lack of censure for buying or using pirated software. Although these factors may not exhaust the possibilities, they are often cited as motivating software piracy (e.g., Cheng et al. 1997; Glass and Wood 1996; Peace et al. 2003).

We developed three pairs of scenarios describing positive situations in which software piracy is more likely and negative situations in which it is less likely (see the appendix). The negative scenarios were meant to provoke a greater range of responses. To confirm that the scenarios adequately capture each factor, we performed a manipulation check with 54 participants who were not part of the main survey. Each scenario is followed by the question "What is this scenario about?" and a list of possible descriptions, such as "High Availability (Pirated software is freely available)." Participants were asked to match each scenario with one main description.

The results in Table 1 show that each positive scenario was identified correctly by more than 75 percent of respondents. This suggests the target factors were sufficiently salient and vivid. The negative scenarios, however, were identified weakly. This may be because each scenario necessarily contains an instance of software piracy, making it difficult to communicate conditions under which it is less likely. Therefore, our analysis proceeds using only items associated with the positive scenarios.

We developed a survey that presented each scenario along with recognition and judgment questions adapted from Al-Jabri and Abdul-Gader (1997). The item "I would consider buying pirated software in this case an infringement of intellectual property rights" is used to capture moral recognition. The item "I would consider buying pirated software in this case an acceptable behavior" is used to capture moral judgment. The items following the high availability scenario (H-AVAIL), the high cost scenario (H-COST), and the low censure scenario (L-CENSURE) are labeled REC1 and JDG1, REC2 and JDG2, and REC3 and JDG3, respectively.

Moral intention is captured with the items "I would buy pirated software if it were freely available," "I would buy pirated software if the cost of legal software were too high," and "I would buy pirated software if there is no punishment for doing so." These items are labeled INT1, INT2, and INT3, respectively. As general measures of the propensity to pirate, the moral intention items are presented

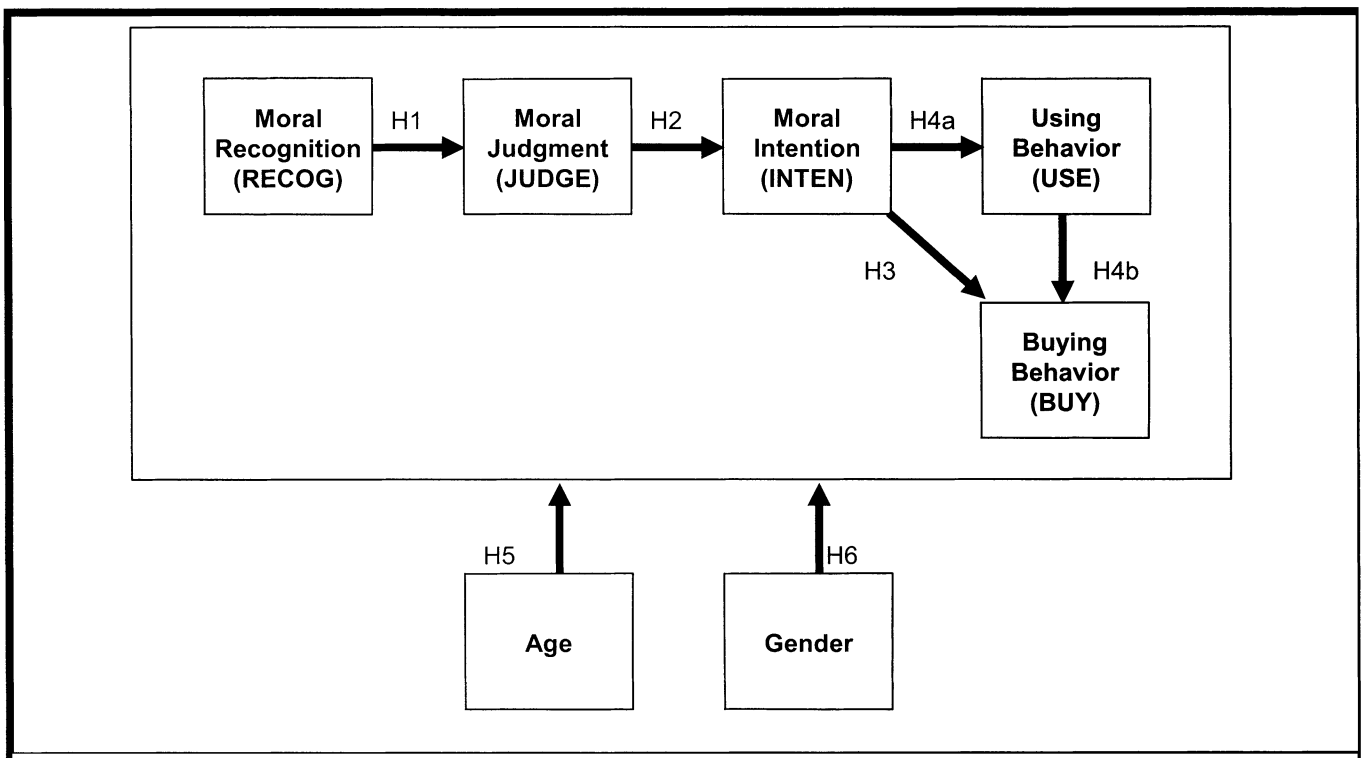


Figure 1. Research Model

Table 1. Results of Scenario Manipulation Check

Scenario	Classified as . . .							Total
	H-AVAIL	H-COST	L-CENSURE	L-AVAIL	L-COST	H-CENSURE	Other	
H-AVAIL	**42 (78%)**	1 (2%)	7 (13%)	1 (2%)	2 (4%)	1 (2%)	0 (0%)	54 (100%)
H-COST	4 (7%)	**41 (76%)**	2 (4%)	1 (2%)	3 (6%)	2 (4%)	1 (2%)	54 (100%)
L-CENSURE	6 (11%)	3 (6%)	**42 (78%)**	1 (2%)	0 (0%)	2 (4%)	0 (0%)	54 (100%)
L-AVAIL	12 (22%)	10 (19%)	8 (15%)	**15 (28%)**	3 (6%)	4 (7%)	2 (4%)	54 (100%)
L-COST	9 (17%)	23 (43%)	4 (7%)	1 (2%)	**17 (31%)**	0 (0%)	0 (0%)	54 (100%)
H-CENSURE	6 (11%)	7 (13%)	7 (13%)	3 (6%)	0 (0%)	**31 (57%)**	0 (0%)	54 (100%)

together separately from the scenarios. The recognition, judgment, and intention items all use a seven-point Likert Scale that ranges from 1 = "Strongly Agree" to 7 = "Strongly Disagree" with 4 = "Neither" as the neutral response.

Because software piracy involves buying and/or using pirated software, we used two sets of items to measure behavior. They are adapted from items that measure the frequency and breadth of computer usage in small firms (Igbaria et al. 1997). Frequency is measured using two questions. The first, "On average, how frequently do you use pirated software?," is defined by a six-point scale ranging from "never" to "every day." The second, "On average, how much time do you spend each day using pirated software?," is measured on a six-point scale ranging from "almost never" to "more than 3 hours a day." These items are labeled USE1 and USE2, respectively.

We measured breadth of use with the items "Please indicate whether you use pirated software to perform the following specific job tasks" and "Please indicate whether you use pirated copies of the following types of computer software." We use a 10-point scale for the first and a 6-point scale for the second. Each scale lists different activities, such as producing reports or data storage, and different applications, such as spreadsheets and databases. These items are labeled USE3 and USE4, respectively.

The buying items BUY1, BUY2, BUY3, and BUY4 mirror those described above, replacing forms of "use" with forms of "buy." The scale for the BUY2 item was also adapted to range from "$0" to "more than $5000." Given that CDs of pirated software are usually sold in arcades for about the same price, regardless of the software they contain, more money spent suggests more CDs bought. We also included four demographic questions relating to age, gender, years of computer experience, and computer ownership.

Sample

We sampled undergraduate and postgraduate students taking MIS courses at a Hong Kong university. Students are a prominent source of software piracy (Davis and Welton 1991; Sims et al. 1996; Soloman and O'Brien 1991), and Hong Kong has a high incidence of software piracy. It is important that respondents understand the nature of the act described in the ethical scenarios. Otherwise, the response may have little to do with their likely behavior (Weber 1992).

As in the United States, Hong Kong has enacted a series of intellectual property laws and levies stiff penalties for software piracy. Although recent reports suggest the new legislation and fear of being reported has led to a jump in new business software sales (Manuel 2001), the software piracy rate still remains relatively high. In 2004, an estimated 52 percent of business software used in Hong Kong was pirated (BSA 2005).

Data Collection

Survey forms were given to instructors teaching first- and second-level B.A. and M.A. MIS courses. Class lists were checked to ensure minimal overlap. Also, students were asked not to complete the questionnaire if they had already done so. Because software piracy is illegal, we decided to keep responses anonymous to encourage participation.

We received 243 usable returns, evenly split by gender (121 males, 122 females). Among the respondents, 93 percent own a personal computer, and 98 percent have one or more years' experience using a personal computer (Table 2). Pirated software is bought regularly by 81 percent of the respondents, with a sizeable minority buying every month. The most popular software packages are spreadsheets, followed by programming languages, databases, word processors, and statistical programs. This list suggests the respondents are buying software to complement their studies. Other software mentioned included e-mail, graphics, and games.

The recognition (REC) items show that respondents understood the scenarios depicted intellectual property rights violations. The judgment (JDG) items show that piracy is deemed acceptable in the high-availability scenario but not in the cost and censure scenarios. The intention (INT) items show a curious reversal of this pattern. We found lower means (i.e., stronger agreement) with the behavior described in the cost and censure scenarios than in the availability scenario. As expected, the frequency of use items (USE1 and USE2) have higher means than the frequency of buy items (BUY1 and BUY2). The means of the breadth items are similar.

Data Analysis and Results

We use partial least squares (PLS-Graph 3.0 Build 1126) to analyze the relationships defined by the theoretical model. PLS is preferred to LISREL because our purpose is to examine the validity of using recognition, judgment, and intention to predict behavior. LISREL is more suited to studying the covariance of these variables. In addition, PLS does not require normal distribution for the manifest variables. Kolmogorov-Smirnov's test of normality indicates that none of the items measured in our study are distributed normally ($p < .001$).

We define each measure as reflective rather than formative, because respondents' answers to each scenario are a function of their cognitive moral development. Therefore, pathways from each latent variable (recognition, judgment, intention, buying, and using) lead outward to each manifest variable (REC1, REC2, REC3, etc.). Figure 2 presents the resulting structural model. Factor loadings should be at least 0.6 and preferably greater than 0.7, while standardized betas (path coefficients) should be at least 0.2 and preferably greater than 0.3 (Chin 1998).

Table 2. Summary of Sample Demographics and Item Responses for the Three Positive Scenarios (n = 243)

Demographics			
Gender		**Own a PC**	
Male	121	Yes	233
Female	122	No	10
Age		**Using a PC**	
16-20 years	20	< 1 year	5
21-25 years	153	1-3 years	60
26-30 years	47	3-5 years	68
> 30 years	23	> 5 years	110
Item Responses	Scenario	Mean	StdDev
REC1	H-AVAIL	2.88	1.23
REC2	H-COST	2.98	1.59
REC3	L-CENSURE	2.95	1.64
JDG1	H-AVAIL	2.81	1.31
JDG2	H-COST	4.52	1.67
JDG3	L-CENSURE	4.68	1.66
INT1	H-AVAIL	2.39	1.24
INT2	H-COST	1.95	1.26
INT3	L-CENSURE	2.25	1.36
BUY1		3.09	0.91
BUY2		2.67	0.88
BUY3		2.56	2.02
BUY4		3.79	2.41
USE1		4.77	1.46
USE2		4.10	1.66
USE3		2.80	2.09
USE4		3.78	2.38

Full-Sample Model

Table 3 shows the PLS factor loadings, composite reliability, and average variance extracted. Other than JDG3 (.611), all items have loadings greater than 0.7. The t-statistic, obtained from bootstrapping (100 resamples), showed that all loadings are significant at the .001 level. Therefore, we retain all items. Composite reliability measures the internal consistency of the construct and the extent to which each item "indicates" the underlying construct. The average variance extracted signifies the amount of indicator variance that is accounted for by the underlying construct (Hair et al. 1998). The composite reliability and average variance extracted for each construct are above the expected thresholds of 0.7 and 0.5, respectively.

Figure 3 shows the path coefficients for the full-sample model with t-statistics derived from bootstrapping (100 resamples) in parentheses. Most paths are significant. The exceptions are (1) recognition does not affect judgment and (2) intention does not affect use. These results provide support for H2, H3, and H4b. Although we cannot definitively address the causality of constructs, the results suggest the four-component model may be defined as a sequential causal model. The significant path from intention to buy to use also supports the assumption that acquisition precedes use. The high R^2 suggests that most people using pirated software have bought their own copy.

Age and Gender

We used PLS to test the moderating effects of age and gender within the model. We divided the age categories into 16 to 25 and over 25 subsamples to compensate for the unequal age distribution in the sample. Most loadings, composite reliabilities, and average variances extracted for each subsample pass the required thresholds described earlier (Table 4). The JDG2 (.203) and JDG3 (.097) items for the female group are below the threshold, but we retain them because their exclusion did not affect the results. Figures 3b to 3e show the resulting path models.

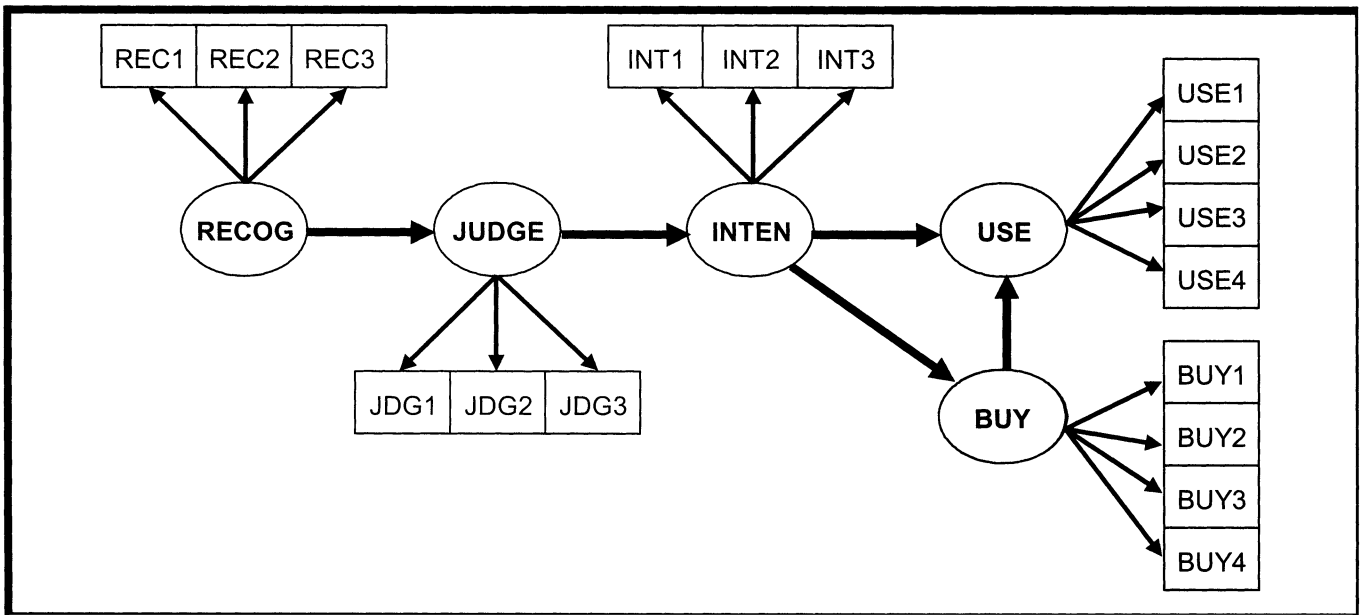
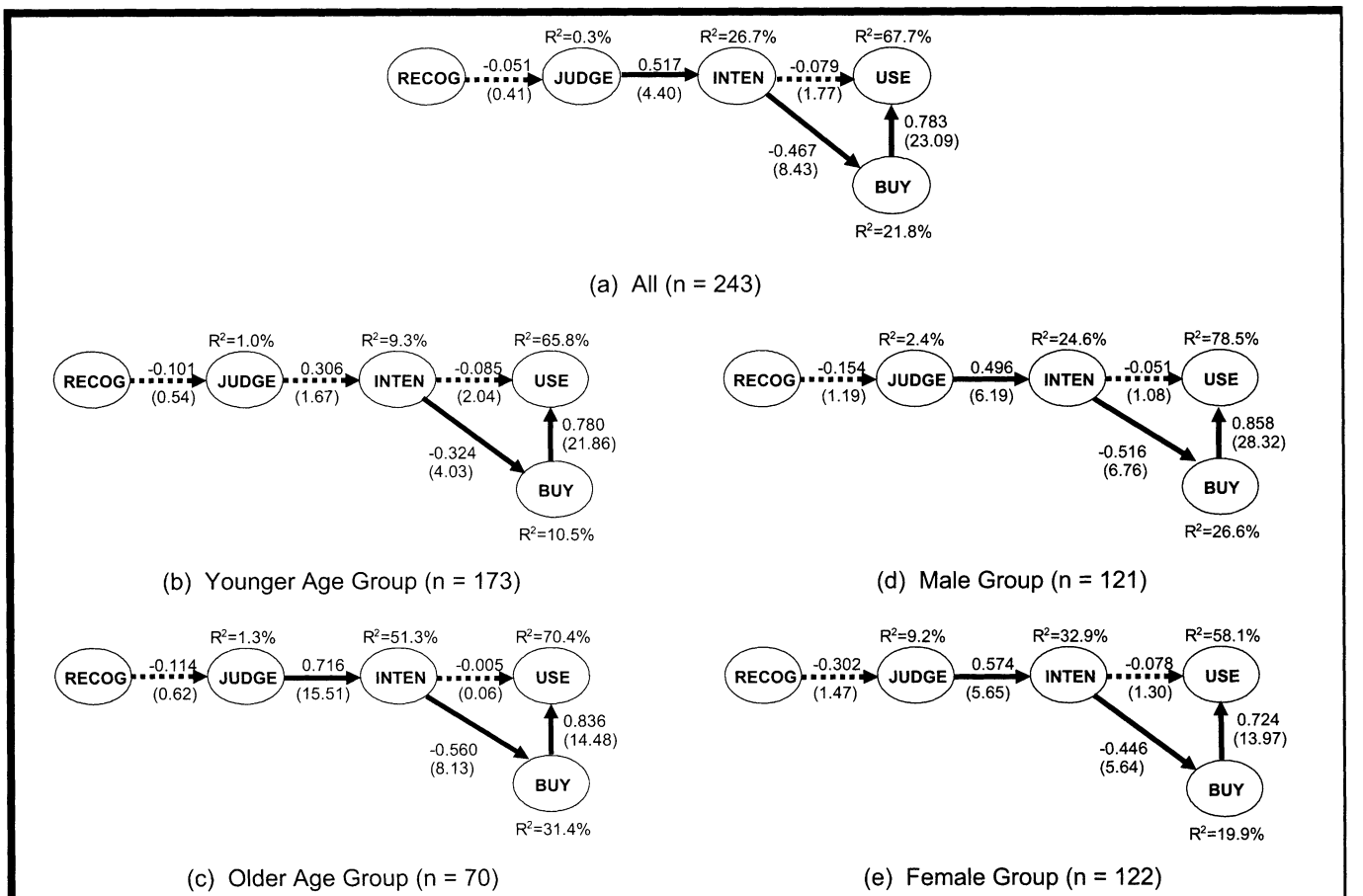


Figure 2. Structural Model

Table 3. PLS Factor Loadings of Items, Composite Reliability (CR), and Average Variance Extracted (AVE) of Constructs

Item	Loading	t-Statistic*
REC1	.784	3.2046
REC2	.786	4.4175
REC3	.933	4.0092
JDG1	.854	4.8265
JDG2	.708	7.3286
JDG3	.611	5.3627
INT1	.869	33.6694
INT2	.822	19.7862
INT3	.837	23.2096
BUY1	.752	25.7816
BUY2	.791	26.5935
BUY3	.790	39.0094
BUY4	.875	69.7419
USE1	.843	39.4840
USE2	.847	41.4721
USE3	.830	57.8880
USE4	.911	105.7872
Construct	**CR**	**AVE**
RECOG	.875	.701
JUDGE	.772	.534
INTEN	.880	.710
BUY	.879	.645
USE	.918	.737

*t-statistics greater than 2.596 are significant at $p < 0.01$.



Note: t-statistics greater than 1.995 are significant at $p < .05$.

Figure 3. Path Models by Group

All subgroup models are consistent with the full-sample model, except the path from judgment to intention for the younger group (Figure 3b). Although the path coefficient is above the required 0.3, the t-statistic is not significant. For younger respondents, this result suggests that judgment plays no role, and behavior stems directly from an intention to buy pirated software. For the other three subgroup models, however, judgment does play a role. These results provide initial support for H5, with differences detected by age.

We calculated a pooled error term t-test to determine statistical significance of the different path coefficients by age and gender.[3] Because the samples are not distributed normally and the variances of the groups are not equal, we use the Smith-Satterthwait test. Based on age, our results suggest a significant difference exists in the path coefficients between (1) judgment and intention and (2) intention and buy (Table 5). This provides additional support for H5. The results also suggest a significant difference between buy and use based on gender, providing limited support for H6.

Discussion

Our results suggest that the four-component model can indeed be defined as a sequential causal model. We did not find a relationship between recognition and judgment, but the strong recognition scores (means less than 3) suggest that respondents may be desensitized to software piracy. In other words, because piracy is perceived as commonplace, recognition of the act does not provoke moral outrage. Deciding whether to engage in software piracy, therefore, begins with an individual's judgment and not recognition of the ethicality of the act itself.

We find limited support for gender differences but significant support for age differences, which supports the four-component

[3]See Chin (2000) for a discussion on how to perform multigroup analysis using PLS.

model's cognitive-developmental approach. The significant difference in path coefficients and the higher R^2 suggests that the role of judgment strengthens with age, and that a strong follow-through exists from judgment to intention to behavior. For younger respondents, judgment has limited impact. Further research is necessary to determine whether the four-component model applies to younger respondents, whether they use some other ethical decision making process, or whether they simply do not apply moral reasoning to issues such as software piracy.

Except for the path from buy to use, the two models by gender are remarkably consistent. This suggests males and females interpret the act of software piracy similarly. The shared view among students that software piracy is wrong but commonplace may account for this consistency. The significant difference in the path coefficient from buy to use and the lower R^2 for buying suggests other factors are influencing pirating behavior for females. One explanation may be that females have other ways of acquiring pirated software. For instance, a higher rate of sharing may exist among females.

If the decision to engage in software piracy is determined by an ethical decision-making process, an effective preventive strategy could be as simple as a course in professional ethics. The movement to teach IS students how to recognize and deal with ethical issues is not new (e.g., Couger 1989). Numerous calls have also been made for the development of a code of ethics for IS/IT professionals (Kock and Davison 2003; Kreie and Cronan 2000; Oz 1992). The problem, however, is that people do not always adhere to codes of ethics (Harrington 1996).

The four-component model suggests that deficiencies in any of the components will result in immoral behavior. People may act immorally if the situation is ambiguous, if they lack the sensitivity to understand how their actions affect others (component 1), if they apply simplistic or inadequate moral reasoning (component 2), if their moral values are compromised (component 3), or if they are distracted (component 4).

An effective intervention strategy would assess an individual's development in each of these components and target any deficiencies (Bebeau 1994). Studies suggest that ethics courses should include profession-specific "intermediate" moral concepts, such as informed consent, confidentiality, and intellectual property. These concepts are easier to understand than abstract moral schemas (Bebeau 1994; Bebeau and Thoma 1999). The most successful programs also involve small-group discussions of moral problems in the students' lives (Bebeau 2002).

An IS professional ethics curricula should first identify the intermediate moral decision facing IS managers and workers. Software piracy is only one such issue. Data privacy is also a serious concern (Culnan 1993; Mason 1986; Smith and Hasnas 1999). A set of scenarios that requires decisions to be made based on ethical considerations and provides material for discussion then needs to be developed. The scenarios developed in the current study can be used as an exemplar to develop more elaborate scenarios or cases for ethics curricula.

Following the four-component model, we can begin by sensitizing students to the problems inherent in software piracy. This would include testing their ability to recognize different examples of piracy, from borrowing from a friend, to buying bootleg copies on the Internet. Next, we could discuss whether software piracy can ever be justified. The social implications of digital theft would need to be stressed at this point. The ability to recognize and judge the act would then impact on one's intention and, consequently, the likelihood of engaging in software piracy. Our results suggest that a first- and second-level ethics course for different age groups may be needed, but dividing the class by gender is not required.

Limitations

This study has a number of limitations. The four-component model defined here is a simplification of the original model. The model was adapted to specifically address the problem of ethical decision making in software piracy. Feedback and feedforward loops that would be part of a more-comprehensive depiction of the ethical decision-making process were not included. We also did not include other moderating factors such as culture that might explain our results. These are areas for future research.

There are also problems associated with asking students about the prevalence of illegal behavior. Some students undoubtedly sought to hide their involvement in software piracy while others might have inflated measures of their behavior to show off. In a large sample, however, these two sets of respondents are likely to cancel each other out.

The high rates of piracy behavior also raise questions about how well the model would perform with samples where the behavior is not prevalent. For instance, high rates of software piracy might explain lack of gender differences because so many respondents reported they are involved in software piracy. In environments with low levels of software piracy, we speculate that age-related differences and lack of gender-related differences will still exist. If the behavior is unfamiliar, however, the score on each scale would be more neutral and there may be insufficient variance to detect differences.

Use of students also limits the external validity of the results. Students do not represent the general workforce. If it is true that software piracy is more readily practiced in organizations where the managers are complicit, however, then the attitudes and behavior of newly graduated IS recruits will significantly affect organizations' software piracy rates.

Table 4. PLS Factor Loading, Composite Reliability (CR), and Average Variance Extracted (AVE) by Subgroups

	Younger		Older		Male		Female	
Item	**Loading**	**t-Statistic***	**Loading**	**t-Statistic***	**Loading**	**t-Statistic***	**Loading**	**t-Statistic***
REC1	0.9024	4.8001	0.6373	2.5013	0.9070	3.9218	0.8969	5.0937
REC2	0.6643	2.1091	0.9391	3.7542	0.7892	3.0124	0.7761	5.8486
REC3	0.8127	2.8116	0.9516	4.6818	0.8094	3.4747	0.7789	5.2978
JDG1	0.7835	2.0946	0.8457	14.3888	0.8671	22.4148	0.9841	6.0219
JDG2	0.7664	3.3331	0.6882	4.1179	0.8108	12.3071	0.2027	0.6195
JDG3	0.6744	2.4841	0.6313	3.4841	0.7036	6.7546	0.0973	0.2755
INT1	0.8157	11.0769	0.9170	29.3273	0.8657	26.0420	0.8692	25.6275
INT2	0.6826	3.9343	0.9130	30.8928	0.8319	15.7034	0.8260	16.3119
INT3	0.8106	12.6604	0.8575	15.7487	0.7992	10.4128	0.8767	33.3506
BUY1	0.6657	10.6153	0.8126	17.5614	0.7283	14.2756	0.7510	13.0495
BUY2	0.7219	14.4821	0.8421	23.8565	0.7610	16.6054	0.8011	17.2361
BUY3	0.8011	30.8134	0.8418	27.6320	0.7742	24.5546	0.8007	28.6589
BUY4	0.8867	61.0388	0.8582	27.4659	0.8723	51.4240	0.8725	45.0652
USE1	0.8345	34.2410	0.8080	15.1652	0.8670	42.4856	0.8123	20.6932
USE2	0.8109	25.0928	0.8587	24.8537	0.8644	35.6049	0.8239	21.2788
USE3	0.8318	47.5327	0.8535	22.7209	0.8506	46.8794	0.8127	31.3449
USE4	0.9112	109.6853	0.9006	38.2858	0.9198	84.5674	0.9028	53.7593
Construct	**CR**	**AVE**	**CR**	**AVE**	**CR**	**AVE**	**CR**	**AVE**
RECOG	0.839	0.639	0.888	0.731	0.875	0.700	0.859	0.671
JUDGE	0.786	0.552	0.768	0.529	0.838	0.635	0.454	0.340
INTEN	0.815	0.596	0.924	0.803	0.871	0.693	0.893	0.735
BUY	0.855	0.598	0.905	0.704	0.865	0.617	0.882	0.652
USE	0.911	0.719	0.916	0.732	0.929	0.767	0.905	0.704

*t-statistics greater than 1.995 are significant at $p < 0.05$.

Table 5. Results of Pooled Error Term t-Tests by Subgroup

	Younger		Older			
Path	Path Coeff.	SE from bootstrap	Path Coeff.	SE from bootstrap	**t-Statistic**	**p (2-tailed)**
RECOG→JUDGE	-0.101	0.1865	-0.114	0.1842	0.0496	.9605
JUDGE→INTEN	0.306	0.1836	0.716	0.0462	-2.1656	.0313
INTEN→BUY	-0.324	0.0804	-0.560	0.0689	2.2289	.0267
INTEN→USE	-0.085	0.0416	-0.005	0.0816	-0.8734	.3833
BUY→USE	0.780	0.0357	0.836	0.0577	-0.8253	.4100
	Male		**Female**			
Path	Path Coeff.	SE from bootstrap	Path Coeff.	SE from bootstrap	**t-Statistic**	**p (2-tailed)**
RECOG→JUDGE	-0.154	0.1299	-0.302	0.2052	0.6094	.5428
JUDGE→INTEN	0.496	0.0802	0.574	0.1016	-0.6026	.5473
INTEN→BUY	-0.516	0.0763	-0.446	0.0790	-0.6374	.5245
INTEN→USE	-0.051	0.0472	-0.078	0.0602	0.3530	.7244
BUY→USE	0.858	0.0303	0.724	0.0518	2.2329	.0265

Summary and Conclusions

Based on the four-component model, a sequential causal model of ethical decision making in which recognition determines judgment, judgment determines intention, intention determines buying behavior, and buying behavior determines levels of use was hypothesized. We tested the model across multiple ethical scenarios related to software piracy. We also investigated the roles of age and gender.

Within a sample of respondents that knew the problem well (students in Hong Kong), the model was generally supported, with differences detected by age. With the exception of the relationship between buying and using pirated software, no differences existed between males and females. These results suggest software piracy, and perhaps other ethical problems facing the IS profession, could be addressed by developing a professional ethics program. The four-component model developed here can be used to guide the design and implementation of such a program.

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Appendix

The Six Scenarios

Positive Scenarios	
High Availability (H-AVAIL)	A person has been told that it is easy to buy pirated copies of the latest software from a local shop. The person goes to the shop and finds that it is true. Indeed, there are many shops selling the pirated software and each of the shops is full of customers.
High Cost (H-COST)	A company decides it wants to install a financial accounting system. The Financial Manager finds that the cost of the system is higher than the company's budget, however, and so buys a pirated copy of a well-known financial accounting package for the company.
Low Censure (L-CENSURE)	A company has been using pirated software in its business for a number of years. The company decides to buy more pirated software because the Managing Director feels that the laws on software piracy are rarely enforced.
Negative Scenarios	
Low Availability (L-AVAIL)	A person wants to buy a pirated copy of a database package. After several months he is told of a small shop that sometimes sells pirated software. After visiting the shop for a number of days, the shop eventually agrees to sell him a pirated copy of the database package.
Low Cost (L-COST)	A student buys a pirated copy of a statistics package for $10. The cost of a legal copy of the same software is $50. The student admits that the original software is not expensive, but still wants to buy the pirated copy because it is cheaper.
High Censure (H-CENSURE)	An import-export company has set up an Internet site using a pirated copy of a leading web-authoring package. The web site is a success and the company doubles the number of orders per month. However, the company is soon prosecuted for the use of the illegal software. A competitor to this company has decided to buy the same pirated software to set up their own web-site even though there is a clear danger of prosecution.