

Nudging the Digital Pirate: An Empirical Investigation of the Conversion of Digital Pirates to Paying Customers

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Abstract

Piracy is a significant source of concern facing content developers, including video game developers, music labels, and movie production companies. Firms continue to invest in digital rights management (DRM) technologies to thwart piracy, but their efforts are quickly defeated by hackers and pirates. In the context of piracy, we also observe a surprising phenomenon: pirates often choose to purchase the digital good after pirating it. From an economic standpoint, one would expect the pirates to not gain any additional utility by converting to a paying customer. In light of this observation, we explore the integration of construal level theory with other theories from the digital piracy literature to determine the impact that exogenous construal level manipulation may have on the pirate's decision to convert, allowing us to observe how intentions are impacted when high or low levels are activated. We find that the manipulation of construal level does have an impact on the decision to pirate or purchase. We also find that construal level interacts with other variables such as perceived behavioral control and attitude among others, thereby providing management with useful insights to combat digital piracy.

1. Introduction

According to industry statistics, software piracy has increased worldwide by over three percent compared to the prior year, extending losses in the market to over \$50 billion dollars in unlicensed software for 2009 (Business Software Alliance 2009). The expansion of access to the Internet, increases in piracy sophistication, and other factors will allow this problem to continue growing in the future. However, a recent discussion with a contact in the software industry

provided the following quote: “We get regular emails from people telling us that they pirated the game and loved it so much that they decided to purchase it. So piracy does some good, not just harm” (Carmel 2009). -Ron Carmel, Co-founder of 2D Boy

While it is quite interesting to capture the perspective of an owner of a software company, we frequently see similar comments in online discussion forums and other venues where digital goods users gather and share experiences and resources. Digital piracy is a growing concern for digital goods producers as even those companies that include DRM technology are still often pirated in zero-day exploits of their DRM technology. Thus the producer may have invested a considerable amount of capital in a technology that is perhaps worthless once their “DRM-protected” software reaches the consumer market. In addition to potentially ineffective DRM, many legitimate software consumers may be hindered by the inclusion of DRM technology as it may make it difficult to manage their purchased software library, or may even result in false enforcement of DRM techniques. These inconvenience factors may potentially result in unhappy customers and future loss of business. However, as mentioned above, some companies such as 2D Boy release their software 100% DRM-free, knowing they cannot compete with those that will choose to pirate their software regardless of the existence of this technology.

1.1 Motivation

In the quote mentioned above, the pirated version of the game in question was exactly the same as the purchased version since the digital good was not protected by DRM. The pirated version was therefore not compromised by any particular hack or limitation. In other words, the digital pirate in this scenario does not gain any additional utility by converting to a paying

customer and accordingly, in economic terms, experiences a reduction of utility. An understanding of this last statement in particular makes this research quite intriguing from an academic perspective as it does not make economic sense. Clearly there must be a non-economic explanation to this behavior, perhaps 2D Boy has somehow been able to “nudge” their customers away from software piracy, motivating the need to logically explain this phenomenon by understanding the underlying problem situation.

1.2 Research Questions

This study contributes to the literature from many perspectives. The current literature has not addressed the fundamental question asked, why do digital pirates convert to paying customers? In order to answer the conversion question, we also need to determine if it is possible to exogenously nudge a potential digital pirate without them knowing they are being influenced. In other words, can we implement a psychological technique to influence the digital goods purchasing decision without discussing theft, stealing, intellectual property, DRM, and so forth with our potential new or converted customers? While the basic antecedents of digital piracy are controlled for in this research, to our knowledge there has not been a prior study conducted that examines this problem specifically. Further understanding of the digital goods² ecosystem is needed in order to provide significant insights and implications for corporate strategic management, as well as creating an appealing environment for motivating potential customers. Additionally, this research represents a novel application of theories based in social psychology to a management problem, reinforcing the opportunity to apply these theories to other domains in management, and improving our ability to extract and explore rich implications of consumer behavior.

² E.g. software, music, movies

The remainder of the paper is organized as follows. Section two discusses the relevant literature, section three introduces the research model used in this paper, section four details our empirical analysis, followed by a discussion and conclusion in section five.

2. Literature Review

2.1 Extant Digital Piracy Literature

The theory of planned behavior (TPB) has been utilized widely in the literature for studying intentions and predicting behavior under various scenarios (Ajzen 1991). TPB was developed as an extension to the theory of reasoned action in order to introduce the concept of perceived behavioral control to the model. Constructs included in the TPB include attitude toward the behavior, subjective norms, perceived behavioral control, intention, and actual behavior. Attitude towards the behavior captures the level of appraisal the individual has towards the behavior considered, subjective norms refers to social pressure and captures how others that are important to you might feel about the behavior, and perceived behavioral control refers to the difficulty of performing the behavior considered (Ajzen 1991; Beck et al. 1991). As quoted in by Ajzen (1991), “the relative importance of attitude, subjective norm, and perceived behavioral control in the prediction of intention is expected to vary across behaviors and situations.” This statement will be more meaningful later in this paper as we develop our understanding of what motivates a digital pirate in a particular scenario.

One of the first studies to use the TPB applied the model under the context of predicting dishonest actions (Beck et al. 1991). This is quite an important study as it developed an understanding and following in the literature for future work, as it illustrated the usefulness of the basic TPB model for studying illegal actions such as piracy. The model developed by Peace

et al. (2003) introduced two new theories to TPB in order to predict software piracy which include deterrence theory and expected utility theory. Expected utility theory is quite important here as the relative cost of a digital good certainly becomes an issue in the piracy decision, especially in the context of trying to convert an existing pirate to a paying customer (Chellappa et al. 2005; Gopal et al. 1997). This work was an refinement of a prior paper with the exception of the removal of perceived moral obligation from the new study (Peace et al. 1996). The introduction of these two new theories to TPB allows the researcher to build a cohesive model to aid in predicting illegal activity such as software piracy, as we might expect that a software pirate might be concerned about the cost of the product, as well as the certainty and severity of sanctions if in fact they are caught. The authors found that all of the constructs from TPB were significant in predicting the intention to pirate, as were the two additional theories identified in their study. What is unique about this study by Peace et al. is the sample that was chosen to conduct their study as their focus was on MBA students within the context of piracy in the workplace. In other words, future managers that are already outside of the age range identified in other literature as being a primary population of interest for a more general context of digital piracy (Higgins et al. 2008; Marshall 2007).

Moral obligation has often been included in digital piracy research, primarily for the simple reason that digital piracy is illegal, and should therefore have moral, ethical, and/or guilt implications. As already mentioned, the extension of TPB to predict dishonest behavior integrated perceived moral obligation in the model, resulting in a significant explanation of variance in their study (Beck et al. 1991). Perceived moral obligation in this context therefore includes a measure for guilt, principles, and whether or not a particular behavior is morally wrong. A recent study built a four-component model of ethical decision making in software

piracy and found that software piracy could be reduced by developing an ethics program for employees (Moore et al. 2006). This study also showed that there is a difference in moral judgment when age is considered, but that gender does not produce measurable differences. Other studies have tried to explain why individuals typically pirate software and conclude that cost and need for a demo of the software are the top reasons why piracy is prevalent (Cheng et al. 1997). A recent study identifies retention strategies to enhance customer intentions to use legal software, including lower-pricing, communication, legal, and product strategies (Chiu et al. 2008). The literature also addresses the intentions of a consumer to purchase a pirated copy of software rather than purchase a legitimate copy using an issue-risk-judgment model, and find that certain components of moral intensity, moral judgment, and perceived risks influence the purchasing decision (Tan 2002).

2.2 Construal Level Theory

Generally speaking, construal level theory (CLT) claims that a person will have different representations of the same information depending upon a time dimension or other measure of psychological distance (Trope et al. 2003). In general, this means that you may make a different choice if the decision has an impact on what you do today versus what you will do a year from now. These temporal construals are classified as high or low level, with the level generally determined by time where low level represents near-future events and high level represents distant-future events. While the basic example only includes a time dimension, CLT has been extended and tested to many other measures of psychological distance, allowing the researcher great flexibility in adapting proven measures of psychological distance to various new contexts. For example, recent research has shown that abstract features are associated with temporally

distant attitude objects versus the association of concrete features with temporally near attitude objects (Fujita et al. 2008). To phrase it another way, describing behavior in general terms represents high construals, while description of the same behavior in concrete or contextualized terms represents low construals (Trope et al. 2003).

In regards to applying CLT to the problem of digital piracy, we can utilize this theory for our problem domain by considering the roles of feasibility and desirability (among others) on near and distant future decisions. The literature has shown that high and low feasibility and high and low desirability do in fact correlate with high and low construals (Liberman et al. 1998; Trope et al. 2003). For example, Liberman and Trope found that students prefer an uninteresting, but easy assignment over the near term, versus a more interesting and difficult assignment over the future term. Using this example, we see that desirability is represented by the information item and feasibility is represented by the difficulty of the assignment. Further, we can make the connection to desirability and feasibility by considering deviance and the perceived ability of the individual to engage in piracy. For example, participating in deviant behavior (acquiring a good illegally) is generally considered undesirable, representing a low level construal, whereas non-deviant behavior (being an honest person) would be considered a high level construal. In contrast participating in deviant behavior may be quite feasible to do since the participant may feel strongly that they are in fact in control of their behavior, representing a low level construal, whereas a non-deviant may rely less on their perceived ability to participate in illegal behavior.

Construal levels have also been shown to be susceptible to priming of the subsequent behavior. For example, studies have shown that simply asking someone to describe “why” they work out in a gym invokes a high construal for any subsequent behavior, whereas asking someone to describe “how” they work out in a gym invokes a low construal for subsequent

behavior (Fujita 2008; Fujita et al. 2006). The distinction is small, but when this concept is related back to abstract versus concrete descriptions of behavior, the concept becomes clear.

Table 1: Construal Level Summary

Dimension	High	Low
Time	Long-term decisions	Short-term decisions
Level of Detail	Abstract	Concrete
Desirability	Non-deviance	Deviance
Feasibility	Less important	More important
Priming	“Why”	“How”

Based upon the prior literature related to construal level theory and theory of planned behavior, we hypothesize the following:

Hypothesis 1a: Manipulating a low construal will moderate constructs in our study such as perceived behavioral control due to invoking feasibility and other low construal considerations.

Hypothesis 1b: Manipulating a high construal will moderate constructs in our study such as attitude and subjective norms due to invoking desirability and other high level considerations.

2.3 Construal Levels and Self-Control

Recent research has examined the relationship between self-control and construal level, suggesting that factors that change the levels of construal may also affect the decisions made due to an individual’s self-control (Fujita et al. 2006; Trope et al. 2007). Specifically, high construal levels motivate high self-control and vice versa. Low self-control has been shown in conjunction with social learning theory to have a link to software piracy, in that individuals with low self-control may not understand the consequences of partaking in this deviant behavior (Higgins

2005). A follow-up study looked at three specific measures of self-control and the potential link to digital piracy. These measures include personality, self-generated inhibitions, and social bonding (Higgins et al. 2008). Again, the authors find that low self-control does influence the decision to engage in digital piracy, and specifically mention impulsive behavior, lack of empathy to the copyright holder, and the ease and simplicity of pirating as factors contributing to low self-control.

Based upon the potential influence of construal level on self-control, we hypothesize the following:

Hypothesis 2: Manipulating a low construal will lead to a higher intention to pirate due to invoking lower self-control. Conversely, manipulating a high construal will lead to a lower intention to pirate due to invoking higher self-control

3. Research Model

3.1 Discussion of Construal Levels

Since the theory of planned behavior and extensions thereof have been shown to be appropriate for studying the digital piracy problem, the basic research design presents itself as a viable platform for introducing a new theory to the model. In particular, we posit that since construal levels may be manipulated exogenously from the decisions made by the potential digital pirate, then we should observe differences amongst the various scenarios that are captured by the model. In order to study this problem, our research model introduces construal level as moderating variable, as we expect construal level to moderate changes in the constructs as they predict digital piracy intention. Recall that the theory of planned behavior contains constructs to measure attitude, subjective norms, perceived behavioral control, perceived moral obligation,

and intention. Peace et al. (2003) exempted a measure of moral obligation from their project, but we reintroduce the measure as it was originally developed in the 1991 work by Beck et al. in 1991 to increase the ability to predict dishonest actions and to be consistent with the original model. The original TPB model also includes a measure for actual behavior, but since we do not implement a longitudinal study, we are not able to measure the causal relationship of intention on actual behavior, and intention is therefore used as a suitable proxy for behavior. It should be noted that since digital piracy is an illegal activity, including a measure of actual behavior may bias the result since respondents may not tell the truth due to the possible admission of guilt. In addition, capturing evidence of actual illegal behavior may expose research participants to a greater amount of risk than is actually necessary to perform our study. Figure one below provides a visual representation of our research model.

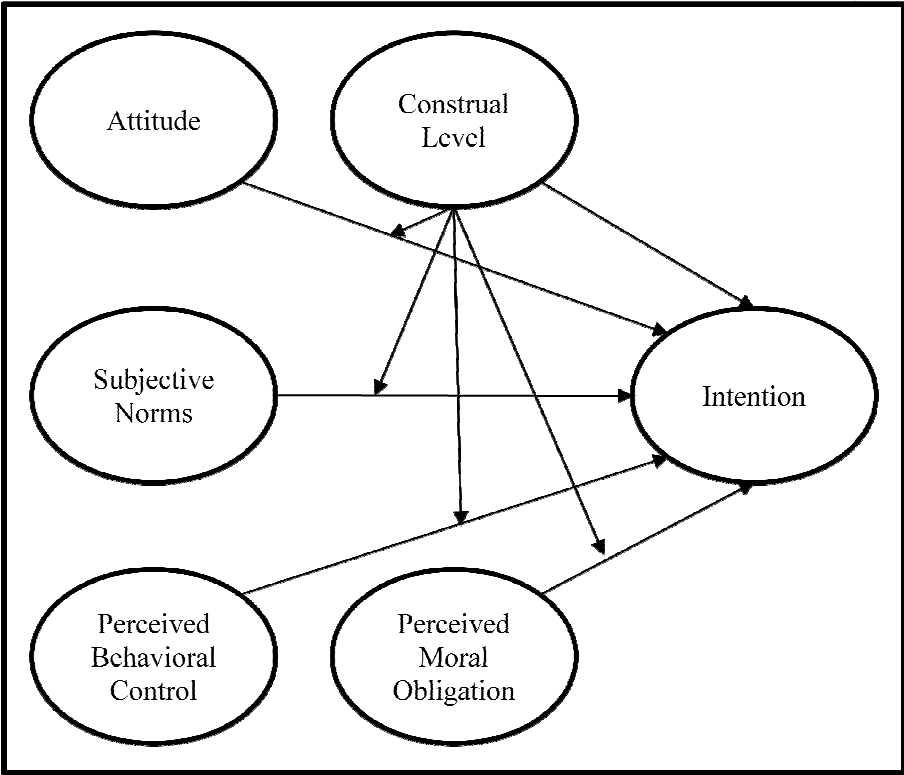


Figure 1: Research Model

Following prior literature, we also include control variables for gender and age, as these are considered as essential for measuring digital piracy intention (Al-Rafee et al. 2006; D'Arcy et al. 2009; Higgins et al. 2008; Marshall 2007; Moores et al. 2006). It should be noted that expected utility theory is missing from the research model as shown in figure one above. Prior work hypothesized that expected utility theory should cause changes in the attitude of the digital pirate (Peace et al. 1996; Peace et al. 2003). However, during testing for mediation effects in our model we found that expected utility was not mediated by attitude (Baron et al. 1986). The reason for this difference could certainly be due to the type of sample identified in our study, or perhaps the fact that our study is focused less on future managers in a business environment and more on general digital piracy events. Since we did not want to drop that variable of interest from our study due to cost being identified in the literature as a factor motivating piracy, we instead chose to include it as a control (Marshall 2007; Peace et al. 1996; Peace et al. 2003).

3.2 Questionnaire Development

Given that this paper introduces a new theory to the prior work on TPB and digital piracy, it is critical that we base our measures on previously validated scales and techniques. Otherwise, it may be difficult to detect what is caused from the manipulation of the construal level, and what is an artifact from the introduction of a modified set of composite variables. We specifically include previously modified questions from the existing literature which are closely based on the original questions from the TPB, in particular those questions used to predict dishonest behavior (Beck et al. 1991; Peace et al. 1996; Peace et al. 2003).

Piracy intention is captured by asking the subject how likely they would be to purchase software or music, given a particular hypothetical scenario. Since one of the goals of this

research is to determine if management may be able to exogenously nudge current digital pirates into becoming paying customers, we generated four scenarios: software original purchase intention, software conversion intention, music original purchase intention, and music conversion intention.³ Software and music were chosen due to the inherent popularity of pirating these types of digital media. Certainly there are other alternatives such as movies and video, however, software and music are quite common and represent an opportunity to capture intentions about heterogeneous products.

Several versions of the survey were generated which can be separated into two subsets. The first set contains only high construal scenarios, and the second set contains only low construal scenarios. Following each scenario is a question that asks how likely they would be to purchase the software (or music). Upon answering all four scenarios, survey respondents are presented with questions that capture the elements of TPB, as well as the control variables previously identified. Scenario order and TPB construct order were randomized throughout the different versions of the survey, in an attempt to minimize any potential bias that may occur due to the order that the questions were presented. Constructs that contained multiple items were always presented together. Please see the appendix for the exact wording of the scenarios and other scales used for this study.

3.3 Sample and Procedures

We sampled undergraduate students at a large university in the Midwest region of the United States due to support from the literature that college students as a target group are representative of the population that tends to engage in digital piracy (Higgins 2005; Higgins et al. 2008; Limayem et al. 2004; Marshall 2007). The choice of this particular sample increases the

³ Scenario descriptions may be found in the appendix

ability for this work to be generalized to the entire population. Survey instruments were distributed during the Fall 2009 academic semester to several classrooms, with students representing various concentrations across the management school (e.g. finance, organizational behavior, information systems, accounting, etc). The directions for completing the survey were read by an administrator, including a definition of what constitutes digital piracy, and voluntary participation was requested. Prior permission was given to the survey administrator by the instructor and surveys were completed during either the first or last fifteen minutes of class time, and responses were recorded anonymously and confidentially. We distributed a total of 168 surveys, 147 of which were returned giving us a response rate of 87.5%. After further review, six of the surveys were incomplete resulting in a final sample of 141 observations giving us an overall response rate of 83.9%.

4. Analysis

4.1 Descriptive Statistics

Before conducting our analysis, it is critical to discuss the descriptive statistics for the respondents in our study. In particular, since we surveyed undergraduate students, we cannot expect the age range to be quite varied. In fact, only six of those that took the survey were older than 24 years old, a fact that is addressed in the robustness check later in this section.

Additionally, 40% of the respondents were females and the other 60% were males. Tests for normality were conducted on the independent variables in this study with none of the variables following a normal distribution. However, this is quite common for survey data and visually the independent variables do not appear to be skewed or extremely non-normal and without any

obvious outliers. Descriptive statistics are reported in table 2 below for both the full sample and for low and high construal separately.

Table 2: Descriptive Statistics

Construct	N	Mean	Std. Dev.	Min.	Max.
Software Initial Intention	141	4.291	1.850	1	7
Music Initial Intention	141	4.426	2.208	1	7
Software conversion Intention	141	4.943	1.820	1	7
Music Conversion Intention	141	5.128	2.101	1	7
Attitude	141	3.962	1.179	1	7
Subjective Norms	141	4.252	1.425	1	7
Perceived Behavioral Control	141	5.191	1.300	1	7
Perceived Moral Obligation	141	3.993	1.479	1	7
Expected Utility Theory	141	5.272	1.156	2	7
Low Construal Only					
Software Initial Intention	69	4.362	1.774	1	7
Music Initial Intention	69	4.826	2.183	1	7
Software conversion Intention	69	4.957	1.835	1	7
Music Conversion Intention	69	5.261	2.146	1	7
Attitude	69	3.947	1.061	1.667	7
Subjective Norms	69	4.246	1.487	1	7
Perceived Behavioral Control	69	5.246	1.303	1	7
Perceived Moral Obligation	69	4.101	1.409	1	7
Expected Utility Theory	69	5.106	1.190	2	7
High Construal Only					
Software Initial Intention	72	4.222	1.930	1	7
Music Initial Intention	72	4.042	2.178	1	7
Software conversion Intention	72	4.931	1.818	1	7
Music Conversion Intention	72	5.000	2.062	1	7
Attitude	72	3.977	1.290	1	7
Subjective Norms	72	4.257	1.374	1	7
Perceived Behavioral Control	72	5.139	1.303	2	7
Perceived Moral Obligation	72	3.889	1.546	1	7
Expected Utility Theory	72	5.431	1.107	2.333	7

4.2 Factor Analysis

As discussed in section three of this paper, our research design reused scales that had been previously developed and tested. These items are formative and are therefore highly correlated and are designed to consistently measure the same variable of interest (Jarvis et al. 2003). Following the psychology literature, we utilized a principal axis factoring technique with a promax oblique rotation in order to test for convergent reliability of our items (Fabrigar et al. 1999). The choice of rotation method aids in interpretation of the resulting factor loadings, with the important note being that an oblique technique is used. Many researchers use orthogonal rotations such as varimax, enforcing the constraint on their data that the resulting factors should not be correlated. This does not appropriately represent the truth as behavioral factors should be expected to be correlated to some degree. The items loaded as we expected and can be seen in table three below. Table four below represents a measure of discriminant reliability by generating correlations amongst each of the items and all of the constructs in our study. Table five below shows the overall correlations amongst the variables as well as the Cronbach's alpha for internal consistency of the factors. Typically an alpha score of 0.70 or above provides confidence in the internal consistency of the items. After performing our factor analysis we made some slight adjustments to some of the items that we chose to include in our study. All of the constructs except subjective norms remain over-identified with three or more items, while our measures for subjective norms resulted in a doublet. Although these items were tested and validated in prior work, one of the questions used to measure subjective norms turned out to be quite confusing for our respondents, resulting in inconsistent correlations between this item and the other two. Perhaps that is a consequence related to our specific sample. Regardless of this

issue, the overall results returned what we expected and we are confident that we have both convergent and discriminant reliability, as well as internal consistency in our measures.

Table 3: Principal Axis Factoring with Promax Oblique Rotation Factor Loadings

Construct	Items	Attitude	Subjective Norms	Perceived Behavioral Control	Perceived Moral Obligation	Expected Utility Theory
Attitude	A2	0.66366	-0.07447	0.07192	0.14227	0.00946
	A3	0.65619	0.17438	-0.09806	0.11335	0.00847
	A4	0.69697	0.09045	0.06234	0.03796	0.03863
Subjective Norms	N1	0.22379	0.60672	-0.05649	0.10243	0.00889
	N2	-0.00838	0.61765	0.21859	0.13907	-0.01637
Perceived Behavioral Control	B1	0.09156	0.01233	0.77527	-0.04828	-0.03835
	B2	0.01495	0.00700	0.78197	-0.06438	0.00031
	B3	-0.10927	0.15025	0.49175	0.11444	0.08692
Perceived Moral Obligation	M1	0.31481	0.02132	0.10102	0.50266	-0.06458
	M2	0.07826	0.01016	-0.03146	0.83418	0.04643
	M3	0.00954	0.10188	-0.04927	0.75253	-0.03841
Expected Utility Theory	C1	-0.12116	0.07294	-0.01554	0.04223	0.81058
	C2	0.08431	-0.24216	0.15038	0.12373	0.57274
	C3	0.10675	0.09199	-0.05366	-0.16670	0.69096

Table 4: Item-to-Construct Correlations vs. Correlations with Other Constructs

Construct	Items	Attitude	Subjective Norms	Perceived Behavioral Control	Perceived Moral Obligation	Expected Utility Theory
Attitude	A2	0.75130	0.35450	0.42014	0.53630	0.17601
	A3	0.76939	0.54298	0.29862	0.58233	0.14772
	A4	0.80576	0.48225	0.44454	0.53498	0.22486
Subjective Norms	N1	0.57000	0.76033	0.23259	0.53923	0.09281
	N2	0.49388	0.73755	0.40137	0.51775	0.08768
Perceived Behavioral Control	B1	0.43564	0.22007	0.79842	0.24079	0.19313
	B2	0.35862	0.17221	0.77231	0.17582	0.21548
	B3	0.29729	0.28108	0.53198	0.26630	0.20406
Perceived Moral Obligation	M1	0.67158	0.46121	0.38795	0.73929	0.03119
	M2	0.59665	0.47825	0.26401	0.87826	0.04608
	M3	0.49534	0.48167	0.18865	0.79743	-0.05124

Expected Utility Theory	C1	0.12384	0.09390	0.17364	-0.01033	0.78334
	C2	0.24500	-0.05302	0.32219	0.08672	0.61201
	C3	0.18531	0.10156	0.15803	-0.07745	0.71096

Table 5: Reliabilities and Correlations among Variables

Construct	Items	Attitude	Subjective Norms	Perceived Behavioral Control	Perceived Moral Obligation	Expected Utility Theory
Attitude	A2, A3, A4	0.829				
Subjective Norms	N1, N2	0.581	0.761			
Perceived Behavioral Control	B1, B2, B3	0.419	0.364	0.745		
Perceived Moral Obligation	M1, M2, M3	0.671	0.588	0.310	0.855	
Expected Utility Theory	C1, C2, C3	0.210	0.082	0.246	0.021	0.749

Cronbach's alpha is in bold along the main diagonal. Correlations are below the main diagonal.

4.3 Moderated Multiple Regressions (MMR)

Rather than generate factor scores for the latent variables, we chose to create composite variables by calculating the mean for the responses of each item, reporting that mean as the overall measure for each variable. Once the composite variable scores were determined, we mean-centered each of the independent variables in order to aid with interpretation of the interaction effects (Aiken et al. 1991). Please note, dependent variables were not mean centered and categorical variables were coded as dummies having values of zero or one. Using a 0/1 coding scheme for the categorical variables allows us to easily interpret the simple effects and interaction effects of our MMR analysis. Simple effects are conditional upon the interaction term having a value of zero whereas interaction effects can be interpreted as the interaction term moves from zero to one (Aiken et al. 1991; Jaccard et al. 2003; Jaccard et al. 1990). This also allows us to reverse code our categorical variables to perform additional regressions to determine how the simple effects might change under each scenario. Our categorical variables are outlined in table 6 below.

Table 6: Categorical Variables

Variable	0	1
Construal Level	Low	High
Gender	Female	Male
Age	18-24	> 24

The results of our regressions provide support for what we expected, but we did observe differences amongst the scenarios. Complete tables reporting the output are included in the appendix (tables A1 through A4), with summarized results to follow in this section. Please keep in mind that a positive coefficient on a main or simple effect means that for every one unit increase in construct measured, intention will increase by the coefficient amount. All items are scaled where one refers to lower intention to pirate, and seven refers to a greater intention to pirate. Interaction effects are interpreted slightly differently, where a positive interaction means that the as the categorical variable moves from zero to one, it increases the role of the interacting variable in influencing piracy.

In regards to main effects, we found that the original purchase intentions for both software and music are significant and with a positive sign. The only surprise here is that both conversion scenarios do not seem to be influenced by moral obligation. This is perhaps since the pirate has already performed the deviant act so it is no longer of moral consequence. We do observe a main effect in regards to construal level having a positive sign under the music initial purchase intention scenario. This provides partial support for hypothesis two in that construal level, in the absence of interaction with other variables, does influence self-control and resulting piracy decision. Under the software conversion scenario, attitude, perceived behavioral control, and subjective norms become significant in influencing piracy. We would expect these to be

significant however we do see a counterintuitive result. Specifically, subjective norms becomes significant and with a negative sign. In other words, if someone important to us approves of digital piracy, we become less likely to pirate? This finding is discussed further later in this section. Lastly, under the music conversion scenario, only age is significant and with a negative sign. Since this is a categorical variable, this means that the older we get, the more likely we are to convert to a paying customer of music we already pirated. This is consistent with the literature. Results of the main effects are summarized in table seven below.

Table 7: Summary of Main Effects Results for Each Scenario

Scenario	Significant Constructs (sign)	Hypothesis Supported?
Software Initial (SI)	PMO (+)	
Music Initial (MI)	PMO (+), Construal (-)	H2
Software Conversion (SC)	Attitude (+), PBC (+), Norms (-)	
Music Conversion (MC)	Age (-)	

An analysis of interaction effects is where we anticipated observing the most interesting results, especially since here is where we can really capture how interactions might occur between the construal levels and the other constructs in our model. Under the software initial purchase scenario, we observe exactly what we wanted to see, specifically as we move from a low to high construal, we see a reduction in the impact of perceived behavioral control on the intention to pirate. The simple effects also show us what we expected as perceived moral obligation is still significant under both low and high construal, but perceived behavioral control increases conditional upon the construal level being low. As we move from low construal to high construal under the music initial purchase scenario, we see a reduction in the impact of attitude on the intention to pirate as expected. In regards to simple effects, additional review is necessary to interpret the coefficients on the construal level so we will not interpret them at this time.

Moving on to the conversion scenarios, under software conversion we find that construal levels interact with perceived behavioral control consistent with what we would expect. In regards to simple effects, we also see that perceived behavioral control is increased conditional upon a low construal as we would expect. In regards to music conversion, the only interaction that is significant is the reduction in piracy intention due to the cost of the music. Interpreting simple effects shows that perceived behavioral control is significant when the construal level is low, and age is significant when the construal level is high. Both of these are consistent with what we would expect and what the literature has shown. All of the results from the simple and interaction effects are summarized in table 8 below.

Table 8: Summary of Simple and Interaction Effects for Each Scenario

Scenario	Significant Constructs (sign)	Hypothesis Supported?
SI – Simple Effects	CL=0: PBC (+), PMO (+) CL=1: PMO (+)	H1a
SI – Interactions	PBC (-)	H1a
MI – Simple Effects	CL=0: Attitude (+), PMO (+) CL=1: PMO (+)	H1b
MI – Interactions	Attitude (-)	H1b
SC – Simple Effects	CL=0: Gender (-), Attitude (+), Norms (-), PBC (+) CL=1: PMO (+)	H1a
SC – Interactions	PBC (-)	H1a
MC – Simple Effects	CL=0: PBC (+) CL=1: Age (-)	H1a
MC – Interactions	Cost (-)	

Due to the unexpected findings for subjective norms under the software conversion scenario, we decided to run additional analyses of our data, introducing gender interactions

instead of construal level interactions. In particular, we find that subjective norms become significant conditional upon the gender variable denoting a male. This finding is interesting because what it says is that regardless of if someone important to you approves of piracy you will be less likely to pirate. Perhaps we can continue developing this study by introducing three-way interactions to see how the results change.

4.4 Robustness Checks

Since we have a possible concern with outliers in terms of the ages of the survey participants, we ran a robustness check by dropping these observations from the study. While age was no longer a significant factor for the music conversion scenario, the general results over all of the scenarios did not change. This gives us confidence that these potential outliers did not skew the results of our regressions and should remain included in our models. In addition, we also performed split sample checks by construal to make sure that we had consistency amongst the main effects of the split samples and the simple effects of the interaction models. Again, the results remained consistent with the full sample models.

4.5 Comments about PLS

Much of the prior work in this field in the last ten years or so, and MIS in general, has relied upon partial least squares (PLS) analysis to conduct their studies. PLS is an alternative to structured equation modeling (SEM) for conducting path analysis and studies with mediated constructs. PLS was originally identified as a technique that could be used in this study, but it turns out that we did not have a need to model mediated effects. In addition, PLS tends to suffer from lack of statistical power when moderating effects are included in the analysis (Goodhue et

al. 2006). PLS has also been claimed to be robust to normality issues in the data, as well as acceptable for use with small sample sizes. These two claims have come under scrutiny over the last couple of years with the reality showing that OLS performs similarly when used with small sample sizes, and we really have not seen substantial testing of the normality assumptions under PLS (Marcoulides et al. 2009). Therefore, we chose to take a conservative route in our analysis and utilize moderated multiple regression instead.

5. Discussion and Conclusion

6.1 Major Findings

Overall, we are quite pleased that we observed notable differences between the scenarios under varying levels of construal. In particular, the most important finding of this research is the construal levels do matter, and that it is entirely possible to make encourage small changes in behavior through exogenous manipulation. To be clear, we did not expect a quantum leap between the high and low scenarios, but we did expect that there would be changes in influence of the constructs that are invoked as significant in predicting digital piracy. For example, it is quite interesting that under the software conversion scenario the constructs representing attitude and perceived behavioral control are both significant, whereas under high construal there are not and instead, perceived moral obligation is significant. What this illustrates is that by manipulating construal levels we can invoke constructs that can change behavior by changing what is most important to the consumer in choosing a particular path. In fact, invoking moral obligation is a common theme under high construal under all scenarios except music conversion. As a digital goods producer, would you rather have your customer thinking about their morals when making this decision, or whether or not they have a favorable attitude towards piracy?

6.2 Implications for Management

The primary implication that management should glean from this research is that it is in fact possible to exogenously nudge their potential consumers away from piracy. Although this was only directly observed under the initial music purchase scenario, evidence from the moderating effects of construal level on the other variables of interest in this study illustrate that we must be mindful of how we engage our customers. In particular, management can perform additional analyses of their customers and what is important to them, and then tailor their message in a way that encourages invoking a high construal rather than a low construal in the customer.

6.3 Limitations

As with any survey based study, we always run the risk that respondents do not answer the question honestly. Also, since the survey instrument was not longitudinal in nature, it is possible that the study could suffer from common method bias. Another limitation of this work is we had a limited focus in terms of the actual variables used to predict digital piracy. While additional dimensions could result in meaningful interpretations, the point of this study was not to determine every possible factor that influences digital piracy. Rather, our focus was on determining if it is possible to nudge would-be pirates, and if so, is it possible to draw differences between various stages of digital piracy.

6.4 Extensions

This work can be extended in many ways. For example, if management is interested in applying construal level theory to the sales and marketing of their products, it may be appropriate

to conduct trials that would allow them to determine exactly what type of construal level manipulation is most appropriate for their consumers, as well as determine what type of influence their customers may be susceptible to. In regards to academic study, the integration of construal level theory with other theories and techniques should give researchers pause, specifically since it is entirely possible to manipulate the responses from their subjects by inadvertently priming or otherwise invoking a particular construal level with their audience.

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APPENDIX

Survey Items and Hypothetical Scenarios

* denotes a reversed scale

INSTRUCTIONS: Digital piracy is defined as the unauthorized copying of digital goods such as software or music. Please consider the following questions and circle the choice that best fits your beliefs. It is important that your answers are as honest and open as possible.

SCENARIO 1 (Software Initial Purchase-High Construal):

You plan to acquire a new software program for your personal computer that will prove useful throughout your long-term studies. You have visited the software provider's website and know about why the owners created this software, and you also know about their future product development plans. You have also visited the software provider's support web page and see that helpful advice is available. This program is available for purchase online, or you can pirate it for free.

How likely do you see yourself purchasing this program?

Very Likely

Very Unlikely

1

2

3

4

5

6

7

SCENARIO 2 (Music Initial Purchase-High Construal):

You plan to acquire a song from one of your all-time favorite bands. You have been to their website and understand that the band is inspired by the artistic nature and creativity of making music. Their song is available for purchase online, or you can pirate it for free.

How likely do you see yourself purchasing this song?

Very Likely

Very Unlikely

1

2

3

4

5

6

7

SCENARIO 3 (Software Conversion Purchase-High Construal):

You have a pirated software program on your personal computer that will prove useful throughout your long-term studies. You have visited the software provider's website and know about why the owners created this software, and you also know about their future product development plans. You have visited the software provider's support web page and see that helpful advice is available. This program is available for purchase online, or you can keep your pirated version and continue using it.

How likely do you see yourself purchasing this program?

Very Likely

Very Unlikely

1

2

3

4

5

6

7

SCENARIO 4 (Music Conversion Purchase-High Construal):

You have a pirated song from one of your all-time favorite bands. You have been to their website and understand that the band is inspired by the artistic nature and creativity of making music.

Their song is available for purchase online, or you can keep your pirated version and continue using it.

How likely do you see yourself purchasing this song?

Very Likely

Very Unlikely

1

2

3

4

5

6

7

SCENARIO 5 (Software Initial Purchase-Low Construal):

You plan to acquire a new software program for your personal computer to use when completing a number of specific assignments for a class this semester. You have used an Internet browser to go to the software provider's website and you know about how the owners started their company and how they developed their software. You browsed the software provider's support web page and see that answers are readily available, including specific walkthroughs for how to install and use the program. This program is available for immediate download from the provider's website by visiting their purchase page, or you can easily pirate it for free by visiting a bit torrent site such as Pirate Bay or using a search engine such as Google.com.

How likely do you see yourself purchasing this program?

Very Likely

Very Unlikely

1

2

3

4

5

6

7

SCENARIO 6 (Music Initial Purchase-Low Construal):

You plan to acquire a new song from one of your new favorite bands. You have been to their website and have checked out their demos on how to create music by using programs like auto-tune and other track mixing tools. Their new song is available for purchase online from iTunes or the band's website, or you can easily pirate the MP3 for free by searching a bit torrent site such as Pirate Bay or using a search engine such as Google.com.

How likely do you see yourself purchasing this song?

Very Likely Very Unlikely

1 2 3 4 5 6 7

SCENARIO 7 (Software Conversion Purchase-Low Construal):

You have a pirated software program on your personal computer that you have been using to complete a number of specific assignments for a class this semester. You have used an Internet browser to go to the software provider's website and you know about how the owners started their company and how they developed their software. You browsed the software provider's support web page and see that answers are readily available, including specific walkthroughs for how to install and use the program. This program is available for immediate download from the provider's website by visiting their purchase page, or you can keep your fully functioning pirated version and continue using it.

How likely do you see yourself purchasing this program?

Very Likely Very Unlikely

1 2 3 4 5 6 7

SCENARIO 8 (Music Conversion Purchase-Low Construal):

You have a pirated copy of a new song from one of your new favorite bands. You have been to their website and have checked out their demos on how to create music by using programs like auto-tune and other track mixing tools. Their new song is available for purchase online from iTunes or the band's website, or you can keep your fully functioning pirated version of the MP3 and continue using it.

How likely do you see yourself purchasing this song?

Very Likely Very Unlikely

1 2 3 4 5 6 7

(C1): I feel that prices of digital products today are:

Very High Very Low

1 2 3 4 5 6 7

(C2): In my opinion, digital products today are:

Very Inexpensive Very Expensive

1 2 3 4 5 6 7

(C3): If I wanted to buy a digital product today, it would cost me a lot of money.

Strongly Agree Strongly Disagree

1 2 3 4 5 6 7

(A1): To me, committing digital piracy is:

Very Good

Very Bad

1 2 3 4 5 6 7

(A2): To me, committing digital piracy is:

Very Pleasant

Very Unpleasant

1 2 3 4 5 6 7

(A3): To me, committing digital piracy is:

Very Foolish

Very Wise

1 2 3 4 5 6 7

(A4): To me, committing digital piracy is:

Very Unattractive

Very Attractive

1 2 3 4 5 6 7

(N1): If I committed digital piracy, most of the people who are important to me would:

Strongly Approve

Strongly Disapprove

1 2 3 4 5 6 7

(N2): Most people who are important to me would look down on me if I committed digital piracy.

Very Likely

Very Unlikely

1 2 3 4 5 6 7

(N3): No one who is important to me thinks it is okay to commit digital piracy.

Strongly Agree

Strongly Disagree

1 2 3 4 5 6 7

(B1): Technically, for me to commit digital piracy is:

Very Easy

Very Difficult

1 2 3 4 5 6 7

(B2): If I want to, I can commit digital piracy.

Strongly Agree

Strongly Disagree

1 2 3 4 5 6 7

(B3): I can imagine times when I might commit digital piracy even if I hadn't planned to.

Very Likely

Very Unlikely

1 2 3 4 5 6 7

(B4): Even if I had a good reason, I could not bring myself to commit digital piracy.

Very Likely

Very Unlikely

1 2 3 4 5 6 7

(M1): I would not feel guilty if I pirated digital goods.

Strongly Agree

Strongly Disagree

1 2 3 4 5 6 7

(M2): Engaging in digital piracy goes against my principles.

Strongly Agree

Strongly Disagree

1

2

3

4

5

6

7

(M3): It would be morally wrong for me to pirate digital goods.

Strongly Agree

Strongly Disagree

1

2

3

4

5

6

7

What is your gender?

Female

Male

What is your age?

Table A1: OLS Moderated Multiple Regression for Software Initial Intention

DV: Software Initial Intention		Construal Coding		Gender Coding	
		High=1	Low=1	Male=1	Female=1
Independent Variables	Main Effects	Simple Effects			
Intercept	4.132***	4.309***	3.948***	.322***	4.423***
Construal Level (CL)	0.002	-0.361	0.361	-0.218	0.234
Gender	0.328	0.013	0.703	0.100	-0.100
Age	0.868	-0.178	-1.371	0.666	-1.470
Attitude	-0.212	-0.264	-0.128	0.257	-0.478 [†]
Subjective Norms	0.062	0.016	0.090	-0.096	0.064
Perceived Behavioral Control (PBC)	0.146	0.381*	-0.157	0.100	0.210
Perceived Moral Obligation (PMO)	0.452**	0.419*	0.530*	0.270	0.536**
Digital Goods Cost (Cost)	-0.025	0.105	-0.131	-0.081	0.029
Interaction Effects					
CL X Age		-1.193	1.193		
CL X Attitude		0.135	-0.135		
CL X Subjective Norms		0.074	-0.074		
CL X PBC		-0.538*	0.538*		
CL X PMO		0.111	-0.111		
CL X Cost		-0.236	0.236		
CL X Gender		0.690	-0.690	0.452	-0.452
Gender X Age				-2.136	2.136
Gender X Attitude				-0.735	0.735
Gender X Subjective Norms				0.160	-0.160
Gender X PBC				0.111	-0.111
Gender X PMO				0.266	-0.266
Gender X Cost				0.110	-0.110
Observations	141	141	141	141	141
R ²	0.153	0.202	0.202	0.183	0.183

[†] p-value < 0.10, * p-value < 0.05, ** p-value < 0.01, *** p-value < 0.001

Table A2: OLS Moderated Multiple Regression for Music Initial Intention

DV: Music Initial Intention		Construal Coding		Gender Coding	
		High=1	Low=1	Male=1	Female=1
Independent Variables	Main Effects	Simple Effects			
Intercept	4.691***	4.913***	3.652***	4.855***	4.909***
Construal Level (CL)	-0.745*	-1.261*	1.261*	-0.937 [†]	-0.562
Gender	0.286	-0.101	0.857	0.054	-0.054
Age	-1.308	-0.616	-1.586	-2.016	-1.593
Attitude	0.183	0.596 [†]	-0.197	0.645	-0.091
Subjective Norms	-0.093	-0.129	0.003	-0.265	-0.153
Perceived Behavioral Control (PBC)	-0.081	0.099	-0.215	-0.309	0.170
Perceived Moral Obligation (PMO)	0.500**	0.514*	0.555*	0.473	0.533*
Digital Goods Cost (Cost)	0.206	0.302	0.104	0.123	0.263
Interaction Effects					
CL X Age		-0.970	0.970		
CL X Attitude		-0.793 [†]	0.793 [†]		
CL X Subjective Norms		0.132	-0.132		
CL X PBC		-0.314	0.314		
CL X PMO		0.041	-0.041		
CL X Cost		-0.197	0.197		
CL X Gender		0.958	-0.958	0.375	-0.375
Gender X Age				0.423	-0.423
Gender X Attitude				-0.736	0.736
Gender X Subjective Norms				0.112	-0.112
Gender X PBC				0.478	-0.478
Gender X PMO				0.060	-0.060
Gender X Cost				0.140	-0.140
Observations	141	141	141	141	141
R ²	0.219	0.272	0.272	0.247	0.247

[†] p-value < 0.10, * p-value < 0.05, ** p-value < 0.01, *** p-value < 0.001

Table A3: OLS Moderated Multiple Regression for Software Conversion Intention

DV: Software Conversion Intention		Construal Coding		Gender Coding	
		High=1	Low=1	Male=1	Female=1
Independent Variables	Main Effects	Simple Effects			
Intercept	5.180***	5.405***	5.052***	5.292***	4.749***
Construal Level (CL)	0.082	-0.353	0.353	-0.122	0.239
Gender	-0.404	-0.796 [†]	0.014	-0.543	0.543
Age	-0.896	-0.364	-1.529	-0.297	-1.098
Attitude	0.414*	0.520*	0.307	0.423	0.301
Subjective Norms	-0.359**	-0.420*	-0.283	-0.300	-0.400*
Perceived Behavioral Control (PBC)	0.338*	0.554**	0.066	0.344 [†]	0.320
Perceived Moral Obligation (PMO)	0.200	0.016	0.395 [†]	0.177	0.220
Digital Goods Cost (Cost)	-0.187	-0.224	-0.152	-0.354 [†]	-0.025
Interaction Effects					
CL X Age		-1.166	1.166		
CL X Attitude		-0.213	0.213		
CL X Subjective Norm		0.137	-0.137		
CL X PBC		-0.487 [†]	0.487 [†]		
CL X PMO		0.379	-0.379		
CL X Cost		0.072	-0.072		
CL X Gender		0.811	-0.811	0.361	-0.361
Gender X Age				-0.801	0.801
Gender X Attitude				-0.121	0.121
Gender X Subjective Norms				-0.100	0.100
Gender X PBC				-0.024	0.024
Gender X PMO				0.043	-0.043
Gender X Cost				0.329	-0.329
Observations	141	141	141	141	141
R ²	0.176	0.223	0.223	0.192	0.192

[†] p-value < 0.10, * p-value < 0.05, ** p-value < 0.01, *** p-value < 0.001

Table A4: OLS Moderated Multiple Regression for Music Conversion Intention

DV: Music Conversion Intention		Construal Coding		Gender Coding	
		High=1	Low=1	Male=1	Female=1
Independent Variables	Main Effects	Simple Effects			
Intercept	5.590***	5.781***	5.117***	5.816***	5.027***
Construal Level (CL)	-0.241	-0.665	0.665	-0.604	0.087
Gender	-0.406	-0.736	0.084	-0.790	0.790
Age	-2.295**	-1.345	-2.661*	-3.697 [†]	-2.409*
Attitude	-0.091	-0.062	-0.042	0.033	-0.305
Subjective Norms	0.224	0.268	0.116	0.509 [†]	-0.019
Perceived Behavioral Control (PBC)	0.181	0.353 [†]	0.001	0.001	0.465*
Perceived Moral Obligation (PMO)	0.181	0.300	0.171	0.068	0.262
Digital Goods Cost (Cost)	0.037	0.329	-0.227	0.118	-0.015
Interaction Effects					
CL X Age		-1.316	1.316		
CL X Attitude		0.020	-0.020		
CL X Subjective Norms		-0.152	0.152		
CL X PBC		-0.352	0.352		
CL X PMO		-0.129	0.129		
CL X Cost		-0.557 [†]	0.557 [†]		
CL X Gender		0.821	-0.821	0.691	-0.691
Gender X Age				1.288	-1.288
Gender X Attitude				-0.339	0.339
Gender X Subjective Norms				-0.528	0.528
Gender X PBC				0.463	-0.463
Gender X PMO				0.194	-0.194
Gender X Cost				-0.133	0.133
Observations	141	141	141	141	141
R ²	0.143	0.200	0.200	0.187	0.187

[†] p-value < 0.10, * p-value < 0.05, ** p-value < 0.01, *** p-value < 0.001