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2011-05-06
http://hdl.handle.net/10539/9660
Journal of eHealth Technology and Application, 7(2), 87-98

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A case for using a social cognitive model to explain intention to pirate software

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***Abstract*— This study uses social cognitive theory as a framework for examining intentions to pirate software. It examines the contributions of key social cognitive constructs: self-efficacy, outcome expectations, facilitators and impediments, moral disengagement, and the interactions among these constructs, to explain and predict software piracy intentions. The findings of this study revealed that social cognitive models including the key determinants of behavior and the key determinants coupled with their interactions, explained between 63% and 67% of the variance in intentions to pirate software. Moral disengagement was the strongest, significant predictor which offers support for its inclusion in models for explaining antisocial conduct, in general, and software piracy intentions, in particular. Facilitators and impediments emerged as the second main effect in this study and emphasized the importance of situational and systemic environmental impacts on piracy intentions. Although the outcome expectations variable was a significant predictor of intentions, its relative contribution to enhancing the predictive accuracy of the models was marginal. Self-efficacy did not feature as a significant predictor and its impact on intentions seemed to have been absorbed by the facilitators and impediments construct. Despite a significant interaction between facilitators and impediments and moral disengagement, further research is required to comment definitively on possible moderating effects in social cognitive models for explaining software piracy intentions. The implications of these findings are explored and directions for future research are proposed.**

***Index Terms*—Social cognitive theory, software piracy, moral disengagement, facilitators and impediments.**

I. Introduction

THE information age has facilitated incredible advances in technologies that have changed the way in which people live, work and play in the twenty-first century. The proliferation of digital commodities, the ease with which they can be accessed and the interminable reliance of human endeavour on information technology have undoubtedly, contributed to progress. However, they have also introduced the potential for the misappropriation of digital goods; more commonly referred to as software piracy.

A generally accepted definition of software piracy is the "unauthorized copying or distribution of copyrighted software" [1]. As an advocate of the value of intellectual property [2], the Business Software Alliance (BSA) has conducted research on a global scale to estimate the extent of the software piracy problem. In the sixth annual BSA-IDC global software piracy study, it was reported that in 2008, software piracy led to monetary losses in the region of US$53 billion among software vendors worldwide, with piracy in the Asia-Pacific region (US$15,261 million) contributing the most significant losses and piracy in the Middle East and Africa region (US$2,999 million) resulting in the lowest dollar losses [3]. Against this backdrop, South Africa, with a piracy rate of 35%, was ranked 19 in a list of 25 countries with the lowest software piracy rates, which translated into losses of US$335 million in 2008 [3]. The prevalence of software piracy in South Africa and across the globe has provided advocates of the value of intellectual property with the impetus to continuously strive to understand the phenomenon and find ways to manage it, and this is likely to continue.

An important line of research in the software piracy domain has been the examination of factors that influence and predict intentions to pirate software and future software piracy behavior, leveraging some of social psychology's popular, general models of human behavior such as the theory of reasoned action [4], [5], the theory of planned behavior [6]-[8], the theory of interpersonal behavior [9] and social cognitive theory [10].

Past research has demonstrated that the inclusion of constructs such as perceived behavioral control, moral obligation, facilitating conditions and past behavior, in general models of human behavior, tended to improve the predictive accuracy of models oriented towards examining software piracy intentions. The addition of *perceived behavioral control* to the original theory of reasoned action model revealed that it was a significant predictor of digital piracy intention (defined as the intention to make illegal copies of or to download copyrighted software and media such music, movies and e-books) together with attitudes, moral obligation and past piracy behavior [8]. The inclusion of the *moral obligation* construct to the traditional theory of planned behavior to predict cheating on a test or exam, shoplifting and lying to get out of taking a test or handing in an assignment on time, produced significant increments in predictive accuracy when applied to explaining intentions to engage in dishonest behaviors but was only moderately successful in the prediction of dishonest behavior; improving the prediction of lying behavior but not cheating and shoplifting behaviors [11]. The inclusion of moral obligation in a model based on the theory of planned behavior yielded a significant negative relationship between moral obligation and intention, suggesting that participants who reported high levels of moral obligation tended to have diminished intentions to pirate digital media [8]. The purposeful inclusion of moral obligation and other similar constructs with a "moral" basis in general models of human behavior that do not expressly cater for such constructs, is suggestive of a broader need to systematically tap into the moral compass that regulates behavior when attempting to predict and explain "unethical" conduct. *Facilitating conditions*, in the form of inappropriate measures to prevent piracy, the availability of assistance with pirating software and the ready access to software that could be pirated, in Triandis' model of interpersonal behavior, were found to have a significant effect on actual software piracy behavior [9]. *Past behavior*, in the context of

models for explaining and predicting software piracy intentions, has also added incrementally to the prediction of piracy intention with more instances of past piracy behavior increasing the propensity to develop intentions to pirate digital material in the future [8].

Past research has also found that in concurrent research designs, intention to pirate software is the reasonable dependent variable. When measures of behavior are included in cross-sectional research, these are usually assessing past behavior and should therefore be treated (based on temporal sequencing) as an antecedent to software piracy intentions [8]. Software piracy behavior is only sensible as a dependent variable in longitudinal research designs in which the measurement of intention to pirate software temporally precedes the measurement of actual piracy behavior. Only in such study designs can intention be used as an antecedent to software piracy behavior in the modelling process. The cross-sectional study of a model of digital piracy intention demonstrates the appropriate use of the past behavior construct as an antecedent to piracy intention [8]. In a longitudinal study based on Triandis' model of interpersonal behavior, intentions of piracy, habits, attitudes, perceived consequences and facilitating conditions were measured in a survey at one point in time. Three months later, a second questionnaire was sent to the same group of participants to measure the level of software piracy they exhibited after completing the initial questionnaire [9]. This longitudinal study captured the optimal operationalization of behavior as a dependent variable in a behavioral model of software piracy.

This study will draw on the insights and lessons gleaned from past research and on the foundational principles of Bandura's [12] social cognitive theory to construct a framework for examining the antecedent factors that impact on the intention to pirate software.

II. Software piracy: A social cognitive perspective

The act of pirating software is an instance of antisocial conduct [4] viewed from the perspective of those who defend the value of intellectual property. It is also illegal because it violates intellectual property rights [13] and infringes on copyright laws [14]. Typically, when issues are regulated through legislation they may become the source of ethical dilemmas [15] which evoke moral reactions in the form of moral judgements, standards and rules of conduct [16]. Despite legislation prohibiting "the unauthorised use or illegal copying of computer software" [9:414], software piracy is prevalent on a global scale [17]. Legal prohibitions are an example of external sanctions which, according to Bandura [18], are relatively weak deterrents of antisocial behavior because most instances of deviance are likely to go undetected by the mechanisms that exist to enforce and prosecute them. This could explain why software piracy is rampant despite the external sanctions (i.e. legislation and educational campaigns) developed to curb it [13], [14]. Self-sanctions, or internalised controls, are arguably more effective regulators of moral conduct because people continue to self-regulate their behavior even when there are no dire external threats [18]. Since software piracy, in general, may be more strongly regulated by internal or self-sanctions than by external ones, it provides a conducive context for the selective activation and disengagement of internal control which activates the moral disengagement process; a phenomenon situated and activated exclusively in antisocial contexts and a distinctive feature of social cognitive theory [12] when compared with other theoretical perspectives purporting general models of human behavior such as the theory of planned behavior [19], the theory of reasoned action [20] and the theory of interpersonal behavior [21].

III. Social cognitive theory

Social cognitive theory was proposed as a framework for analysing human motivation, thought and action [12]. It encompasses factors that explain both the acquisition of competencies and the self-regulation of action [22]. Personal factors, environmental influences and behavioral patterns are three major classes of social cognitive determinants that exert bi-directional influence on each other in a dynamic pattern of triadic reciprocal causation [12]. Although Bandura [12] did not explicitly identify the constituent components of the theory, research on the use of social cognitive theory to promote healthy behaviors led to the identification of some of the major social cognitive determinants of human behavior including, self efficacy, outcome expectations, impediments and goals or intentions [22], [23]. These constructs will be used in conjunction with moral disengagement [12], which is unique to social cognitive theory when applied to explaining antisocial conduct, to examine the factors that influence the intention to pirate software.

A. Self-efficacy

At the heart of human agency is personal efficacy which is the belief that one can produce desired changes and effects through one's actions [24]. Perceived self-efficacy is defined as "people's judgements of their capabilities to organise and execute courses of action required to attain designated types of performances" [12:391]. Competent functioning requires both skills and the self-beliefs of efficacy to use them effectively. Perceived self-efficacy, however, is not concerned with the skills one has but with the judgements of what one can do with these skills [12]. In the theory of planned behavior, the self-efficacy construct is subsumed in the notion of perceived behavioral control. Ajzen [25] acknowledged that perceived behavioral control was not unique to the theory of planned behavior as it had been conceptualised within Bandura's [12] social cognitive theory as the self-efficacy construct.

In the literature on software piracy, perceived

self-efficacy has most commonly been included in models predicting software piracy intentions or behaviors as part of the construct of perceived behavioral control as defined in the theory of planned behavior [8], [20], [26]. Support for perceived behavioral control as a contributor to intention has been sporadic in the software piracy literature [6], [8]. The theory of planned behavior was found to be superior to the theory of reasoned action for predicting software piracy intention due to its inclusion of the perceived behavioral control construct which contributed more than attitudes to the prediction of intention [6]. This finding was supported in a study by Cronan and Al-Rafee [8]. However, a test of an empirical model of software piracy in the workplace revealed that the effect of attitudes on software piracy intention was strongest, followed by subjective norms and then perceived behavioral control [7]. It is important to note that no explicit interaction effects between perceived behavioral control and the other variables in the proposed models were taken into account. It is possible that these interaction effects could have diminished or altered the direct impact of individual variables, particularly perceived behavioral control in this case, on software piracy intention. Due to the significance of its contribution to explaining intentions in previous research in the software piracy arena, and its centrality as a social cognitive determinant of human behavior, self-efficacy will be included in the social cognitive model proposed in this study.

B. Outcome expectations

Outcome expectations are anticipatory judgements about the likely consequences of actions [12]. In his definition of outcome expectations, Bandura [23] envisaged a clustering of the concepts of attitudes and subjective norms as they have traditionally been defined in the theory of planned behavior. Attitudes are defined as "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior" [20:188] and are measured by perceived outcomes and the value placed on those outcomes while subjective norms are measured by perceived social pressures and one's motivation to comply with them [23]. Subjective norms, therefore, are the social predictor of intentions [20] and correspond with the expected social outcomes for a given behavior [23].

Generally, outcome expectations in the software piracy literature have been researched under the attitudes and subjective (or social) norms labels [4], [27]. Some research has shown that both attitudes and social norms are significantly related to software piracy intention [7] while other research found that while attitudes were a significant predictor of intention, subjective norms were not [8]. Few studies have considered the overt linkages between these constructs and how they have interacted with each other to predict software piracy intention [6]. Traditionally, tests of models of software piracy have tended to focus on the influence of model constructs on intention or behavior rather than on each other. Chang [6] tested a causal link between subjective norms and attitude and found that the former had a significant indirect effect on intention through attitudes. The outcome expectations construct in this study will encapsulate both the attitudes and subjective norms aspects and no causality between them is implied.

C. Facilitators and impediments

Facilitators and impediments are the perceived objective contextual and environmental factors that render behaviors easier or more difficult to execute [9]. The specific situations in which individuals find themselves and the systemic factors embedded in the societal systems in which they operate could serve as facilitating or obstructing factors in the formation of intentions and the execution of behavior. In the software piracy literature, easy access to pirated software and the ready availability of illegal software products are cited as two situational facilitators that inform software piracy behavior [28] with legal and economic realities impacting software piracy at a broader systemic level [28], [29].

Conceptually, the facilitating conditions construct proposed by Triandis [21] in his theory of interpersonal behavior most closely resembles Bandura's [12] notion of facilitators and impediments. Limayem, Khalifa and Chin [9] incorporated the elements of inadequate institutional measures to curb software piracy and access to resources to facilitate software piracy. They found that these facilitating conditions significantly affected software piracy behavior. However, the impact of facilitating conditions on intentions was not examined based on an argument put forward by Triandis that individual perceptions of the facilitating conditions that exist at the point of the behavior are likely to be different to those that existed at the point of forming the intention to pirate software and since it is software piracy behavior that ultimately carries more explanatory power in this context, the latest perceptions of facilitating conditions associated with the act of pirating software are more relevant [9]. Social cognitive theory posits that environmental influences, personal factors and behavior interact with and determine one another [12] which suggests that facilitators and impediments (conceptualised as environmental determinants in this study) are likely to impact on and be impacted by both intentions to pirate software (captured in the personal factors determinant) and software piracy behavior (which will not be examined due to the cross-sectional research design employed in this study). In this study, which aims to explore the factors that influence software piracy intention from a social cognitive perspective, individuals' perceptions of facilitators and impediments that support or inhibit the formation of software piracy intentions, are relevant and will be included in the proposed social cognitive model.

D. Moral disengagement

When individuals choose to override the influence of

their internal self-sanctions due to favorable outcome expectations and the facilitating factors operating in their contexts, they distance themselves from the reprehensible consequences of their behavior through moral disengagement. Bandura [18] identified eight mechanisms of moral disengagement through which individuals could justify behavior that deviated from their internal sanctions to render it morally acceptable to themselves and others. These mechanisms are clustered into four groups corresponding to the four major points in the self-regulatory process at which internal moral control may be disengaged from moral conduct. In relation to the *reprehensible behavior* itself the three disengagement mechanisms of moral justification, advantageous comparison and euphemistic labelling are relevant [12]. The displacement and diffusion of responsibility are two mechanisms of moral disengagement activated when the relationship *between reprehensible actions and their effects* are obscured or distorted [12]. The third point at which moral disengagement can occur is in relation to the *consequences of reprehensible acts*. The manner in which self-deterring reactions are weakened in this context is through the minimisation, ignoring or misconstrual of the consequences of reprehensible actions [12]. The final two moral disengagement mechanisms occur at the point of the *consequences experienced by the recipients or victims* of reprehensible deeds and are classified as dehumanization and attribution of blame in social cognitive terms [12].

In a study of music downloading, moral justification, one of the eight mechanisms of moral disengagement identified by Bandura [12], was included in a social cognitive model for explaining downloading intention [10]. Typically, people do not engage in reprehensible conduct until they have convinced themselves of the morality of their intended behaviors [12] and it was this phenomenon that the moral justification construct captured [10]. The findings of this study suggested a significant, direct and positive causal relationship between moral justification and deficient self-regulation (diminished self-control) which in turn, had a significant, direct and positive causal relationship with intention to continue downloading music [10]. This study, therefore, suggested that the effect of moral justification on intention was mediated by diminished self-control [10]. Although it only tapped into one of the eight mechanisms of moral disengagement, this study epitomized a defining moment in research on software piracy in the international domain, with the introduction of social cognitive theory's distinctive moral disengagement construct as a factor influencing software piracy intention.

A South African study on moral disengagement proposed and tested a model of social cognitive theory for understanding software piracy intentions which positioned moral disengagement as a mediator of the relationship between the social cognitive constructs of self-efficacy, attitudes and social norms and behavioral intentions [30]. This study tapped into all eight mechanisms of moral disengagement and found that the moral disengagement construct mediated the relationship between self-efficacy and intentions to pirate software and the relationship between social norms and intentions to pirate software but did not mediate the relationship between attitudes and intentions to pirate software in the hypothesized manner [30].

Moral disengagement's unique relevance to the explanation of software piracy intentions as a specific example of antisocial conduct, and its inclusion in the model of social cognitive theory that will be tested in this study, addresses the broader need, alluded to earlier, for a construct that taps into the moral compass that guides behavior particularly in relation to antisocial, unethical or illegal conduct. Unlike moral obligation, however, which was defined as the guilt or sense of personal obligation one feels to execute or not to execute a behavior [8], moral disengagement refers to the extent to which one is able to distance oneself from the moral consequences of one's actions through one or more rationalisations articulated in the mechanisms of moral disengagement. Thus, while moral obligation shared a negative relationship with intention to pirate software [8], it is posited that the relationship between moral disengagement and intention to pirate software will be positive.

E. Intention

In social cognitive theory intentions are synonymous with goals [23] and play a prominent role in the self-regulation of behavior [12]. In the social cognitive analysis of intention, the process of arriving at what one intends to do and the course of action one actually follows are separate events [12]. The traditional concept of intentions in the theory of reasoned action [19] and the theory of planned behavior [20] correspond with Bandura's [23] notion of proximal or short-term goals.

To avert negative ethical implications some research has focused exclusively on explaining software piracy intentions at the expense of explaining piracy behavior [27], [31]. In the theories of reasoned action [19] and planned behavior [20] intentions existed as an immediate antecedent to behavior and were believed to be the strongest predictors of behavior. Bandura [23] assigned intentions the same position in his model of social cognitive theory for predicting behavior. In this study, software piracy intention is what the proposed model of social cognitive theory aims to predict and is conceptually situated as an immediate antecedent to software piracy behavior.

IV. RESEARCH PROBLEM

The preceding discussion suggests that the constructs of self-efficacy, outcome expectations, facilitators and impediments and moral disengagement could influence software piracy intentions. The direction of the relationships between each of these constructs and

intention is hypothesized to be positive. This implies that greater propensities for moral disengagement, enhanced beliefs of self-efficacy, positive outcome expectations and perceptions of the environment as a facilitator of the intended action are likely to be associated with stronger intentions to pirate software. The literature review illustrated that a general model of social cognitive theory, encompassing the major social cognitive determinants of human behavior, had not yet been applied to the study of software piracy. This study proposes a general social cognitive model of software piracy intentions (Fig 1).

Using this general model as its starting point, this study will explore the utility of using the broad social cognitive constructs (i.e. moral disengagement, self-efficacy, outcome expectations and facilitators and impediments), identified in the literature review, as predictors of software piracy intentions.

<Insert figure 1 here>

It was argued that some of the direct effects of predictor variables on criterion variables in previous research could have been impacted on by the interactions of predictor variables with each other and that traditional tests of models of human behavior tend to underestimate or ignore the impact of these interactions. Social cognitive theory does not explicitly comment on how the social cognitive determinants interact with each other to predict behavior in different contexts [12], [23]. As such, it is unclear if there are any moderating or mediating effects at work in a social cognitive model of software piracy intention. In order to establish if there are any significant interactions among the predictor variables in the proposed model and to comment on the possible nature of these interactions, partial correlations will be calculated and the original predictors will be supplemented with interaction terms that capture every possible permutation of each of the four social cognitive predictor variables interacting with one another. These potential interaction effects will be tested in a separate model. The second model (Fig 2) builds on the first and includes an additional six interaction terms acting as potential predictor variables in a social cognitive model of software piracy intention.

<Insert figure 2 here>

This study will attempt to answer the following exploratory research questions:

1) Do social cognitive constructs act as significant predictors of software piracy intention?

2) Are there significant interactions between the predictors that suggest moderating/mediating effects on software piracy intention?

V. Method

A. Sample

The sample was drawn from a database of consumers of technology-oriented products and services offered by a large telecommunications organization. Approximately 1500 people from this database were contacted via email with an invitation to participate in an online survey. The sample consisted of 106 professionals from varying fields of expertise working across a range of industry sectors in South African organizations (see Table 1); indicating a 7% response rate. The majority of respondents were males (79.8%); with females comprising 20.2% of the sample. Age was captured in ranges with 10.4% of the sample in the less than 30 years category; 30.2% in the between 30-39 years category; 28.3% in the 40-49 years category; 28.3% in the 50-59 years category; and 2.8% in the 60 years and older category. The median age of respondents fell into the 40-44 years range. Secondary education was reported by 21.0% of respondents as their highest level of education; 33.3% reported post-school certification or diplomas; and the remaining 45.7% reported university qualifications (either first degree or postgraduate) as their highest level of education. The majority of participants in the study (92.4%) were in full-time employment with the remaining 7.6% being either in part-time employment, self-employed, or retired. All participants interacted with computers for more than 6 years with the majority of people having worked with computers for between 16 and 20 years; 87.8% of participants used computers for between 6 and 15 hours a day; 97.1% of respondents reported using the Internet daily with 2.9% reporting weekly use of the Internet and 96.2% of respondents reported using desktop applications such as word processing programmes and spreadsheet applications daily.

<Insert table 1 here>

B. Procedures

An online, web-based survey tool was used to collect the data. Emails were sent to prospective respondents from a database of consumers of technology-oriented products and services of a large telecommunications organization inviting them to complete the survey. Data collection spanned one and a half months and a reminder was sent to respondents giving them the opportunity to submit their anonymous and confidential responses one week before the survey closed. A gift voucher to the value of ZAR500.00 was offered to participants who chose to enter into a lucky draw. Entry into this draw did not compromise participants' anonymity or confidentiality as it was hosted on an independent URL from the online survey. In this way, participants' responses to the survey were kept separate from their lucky draw entries.

C. Measurements

A questionnaire was developed to measure the social cognitive constructs in the proposed model of social cognitive theory. The questionnaire consisted of 22 items clustered into five discrete scales for moral disengagement, self-efficacy, outcome expectations, facilitators and impediments and intention. Many of these variables had been investigated before and, to the extent that they met the definitional criteria of the variables in

the present study, the scales in the questionnaire were either adopted unchanged or adapted from item content in previous studies. The questions included in the online survey are provided in the Appendix.

The *self-efficacy* construct emphasized the criterion of competence or proficiency and encompassed judgements of one's skills to engage in the behavior in question. The three items that measured this aspect of the construct were derived from similar variables investigated in studies by Cronan and Al-Rafee [8] [perceived behavioral control: α=0.94] and LaRose and Kim [10] [self-efficacy: α=0.84]. Items in the self-efficacy scale were measured using a 5-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5).

The definition of outcome expectations in the present study subsumed the elements of attitudes and social pressures. The *attitudes* scale was adapted from studies measuring similar constructs by Compeau, Higgins and Huff [34] [performance outcome expectations: α=0.70]; Limayem, Khalifa and Chin [9] [perceived consequences: no reliability data reported]; Cronan and Al-Rafee [8] [attitudes: α=0.91]; LaRose and Kim [10] [novelty outcomes: α=0.75; economic outcomes: α=0.64]; and Wentzell [30] [attitudes: α=0.81]. The *social pressures* scale was derived from studies measuring equivalent constructs by Compeau, Higgins and Huff [34] [personal outcome expectations: α=0.74]; Cronan and Al-Rafee [8] [subjective norms: α=0.76]; LaRose and Kim [10] [social outcomes: α=0.73]; and Wentzell [30] [social pressures: α=0.79]. In this study, the attitudes scale consisted of two items and the social pressures scale consisted of two items which were measured using a 5-point Likert-type rating scale ranging from strongly disagree (1) to strongly agree (5).

The scale for facilitating conditions used by Limayem, Khalifa and Chin [9] constituted the basis for the development of the *facilitators and impediments* scale in the present study. The scale was based on situational and systemic facilitators and impediments and included two items assessing situational facilitators and impediments (i.e. ease with which one can access pirated software) adapted from Limayem, Khalifa and Chin [9] [facilitating conditions: no reliability data reported]; and two items tapping into sociostructural or systemic facilitators and impediments (i.e. legal and economic factors) derived from Kwong and Lee [27] [deterrence effect of legislation: α=0.90]. The response format for these items was a 5-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5).

The *moral disengagement* scale was adapted from studies that explored similar constructs by Wentzell [30] [moral disengagement: α=0.94]; Bandura, Barbaranelli, Caprara and Pastorelli [32] [moral disengagement: α=0.82] and LaRose and Kim [10] [moral justification: α=0.69]. Wentzell's [30], [33] scale was developed and used in the South African context as part of a model of social cognitive theory for understanding the unauthorised copying of software. The scale developed for the present study consisted of 8 items with one item loading onto each of Bandura's [12] eight mechanisms of moral disengagement. Items were measured using a 5-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5).

The *intention* scale used by Cronan and Al-Rafee [8] in their study of the factors that influence digital piracy formed the basis for the scale used to measure the dependent variable in this study. The original scale consisted of three items measured on a seven-point scale. The Cronbach's alpha reliability coefficient of the intention scale was 0.91 [8]. The researchers appended a time-frame of 'in the next three months' to the 'near future' concept, as did Kwong and Lee [27], to capture short-term intention in their study of behavioral intentions in association with internet music piracy. To tap into longer-term intention the concept of 'the future' was appended by the descriptor "in the next year". The intention scale in the present study consisted of 3 items which were measured using a 5-point Likert-type rating scale ranging from strongly disagree (1) to strongly agree (5).

D. Analysis

The data were analysed using the SAS statistical package. Multiple regression analyses (and multiple moderated regression analyses) were conducted to assess the relationships between the independent variables and the dependent variable. Interactions between the independent variables were included in an extended social cognitive model, together with individual social cognitive constructs, to assess their impact on intention to pirate software. Correlations and partial correlations offered additional insight into the associations between variables and into possible mediating effects.

VI. Results

The use of multiple items to measure each social cognitive construct in this study necessitated the calculation of an estimate of the internal consistency reliability for each scale, using the Cronbach coefficient alpha, to verify their unidimensionality. The reliability estimates for the independent variables and the dependent variable, reported in Table 2, met the acceptable recommended minimum of 0.7 [35].

<Insert table 2 here>

Interactions between all possible combinations of the predictors were catered for in the extended social cognitive model for predicting software piracy intentions. The interactions were calculated with centered variables to minimise multicollinearity. Intercorrelations between the social cognitive predictors, their centered interactions and the intention to pirate software dependent variable are captured in Table 3. A perusal of this table reveals that none of the intercorrelations between the predictors exceeded 0.9. When they do, this is generally a significant indication of collinearity among the predictors [35] which

serves to confound the linear relationship between them as a singular variate in multiple regression equations. This was not observed in the present study.

<Insert table 3 here>

Using multiple regression analysis, software piracy intention was regressed on the linear combination of moral disengagement, self-efficacy, outcome expectations and facilitators and impediments in the general model of social cognitive theory. The equation containing these four variables accounted for approximately 63% (R^2=0.63) of the variance observed in intention to pirate software ($F_{4,101}$=43.75; p<0.0001). In the extended model, which consisted of the original general social cognitive model together with all the possible combinations of interactions between the predictors, software piracy intention was regressed on the linear combination of the four social cognitive predictors and their six interaction terms. The equation, encompassing these ten variables, accounted for 67% of the variance (R^2=0.67) observed in intention to pirate software ($F_{10,95}$=19.72; p<0.0001). The difference in R^2 ($F_{6,95}$=1.33; p<0.05) between the model that included interactions among the predictors and the one that did not, was less than the critical value it corresponded with, leading to the acceptance of the null hypothesis that the R^2 difference is zero. This suggests that the inclusion of the interaction variables in the extended model did not explain a significant proportion of unique variance in the intention to pirate software. The stepwise estimation method was used to evaluate the contribution of each independent variable to the regression model. Based on the assumptions of this regression technique, only those independent variables that contributed a statistically significant improvement in predictive accuracy were included in the final regression model [35]. The significance level that was specified to enter independent variables into the model was set at p<0.05. Moral disengagement, facilitators and impediments and outcome expectations were entered into the general social cognitive model for explaining software piracy intentions. Self-efficacy did not satisfy the conditions of the significance threshold and consequently, did not contribute a statistically significant improvement in predictive accuracy to the general social cognitive model of software piracy intention. In the extended model (interactions) of social cognitive theory for explaining intention to pirate software, the interaction effect between moral disengagement and facilitators and impediments was deemed significant in the third step of the model after moral disengagement and facilitators and impediments but before the inclusion of outcome expectations in the fourth step. These findings are summarised in Tables 4 and 5.

<Insert table 4,5 here>

The only interaction variable that emerged as significant in the stepwise estimation of the extended social cognitive model of software piracy intention was between moral disengagement and facilitators and impediments (i.e. the interaction MDxFI). A moderate correlation of 0.52 (p<0.001) between moral disengagement and facilitators and impediments, the use of centered variables to obtain the multiplicative total for the interaction variable and a Variance Inflation Factor score of 1.02 suggest that the likelihood of multicollinearity in the data is reduced. This suggests that the inclusion of this interaction variable in the stepwise estimation procedure is likely to be due to its contribution to the regression variate and not due to the characteristics of the data.

The partial correlations in Table 6 illustrates that when the effect of facilitators and impediments is partialled out, the correlation between self-efficacy and intention transitions from being significant (r=0.47; p<0.001) to being non-significant (r=0.14). This suggests the possibility that facilitators and impediments construct functions as a mediator between the effect of self-efficacy on intention in the proposed social cognitive models.

<Insert table 6 here>

VII. Discussion

This study yielded a statistically significant general and extended model of social cognitive theory for explaining software piracy intention, which each explained more than 60% of the variance in the dependent variable. Moral disengagement was significant and explained approximately 45% of the variance in intention to pirate software in the general and extended stepwise models. This rendered it the single best predictor of software piracy intention in this study. Moral disengagement was identified as a distinctive social cognitive construct which was activated in antisocial contexts. This study corroborates the primacy of moral disengagement in a social cognitive explanation of intention to pirate software which reinforces LaRose and Kim's [10] acknowledgement of the importance of including the moral disengagement construct (which they operationalized as moral justification; but as only one of eight mechanisms of moral disengagement) as a predictor of software piracy intention.

Facilitators and impediments emerged as a significant predictor, explaining approximately 14% of the variance in intention to pirate software in the general and extended stepwise models. This rendered contextual factors, in the form of situational and systemic impacts, the second best predictor of intentions to pirate software. Limayem, Khalifa and Chin [9] found that facilitating conditions had a direct impact on software piracy behavior. Their end-goal was to explain behavior, consequently, while they acknowledged that facilitating conditions were likely to impact intention to pirate software as well as software piracy behavior, they deemed the latter more relevant to their research [9]. With intention to pirate software as the end-goal of this study, the relationship between facilitators and impediments and software piracy intentions became more relevant. Bandura [12] positioned the environmental factors component of social cognitive theory as a key determinant of both personal factors and behavior and emphasized that all three categories of

determinants impacted and were impacted on by the others. This study lends support to the deterministic interaction between environmental factors (in the form of situational and systemic facilitators and impediments) and personal factors (in the form of intention to pirate software) proposed by Bandura [12] in social cognitive theory.

While outcome expectations emerged as a significant predictor of software piracy intentions, they explained under 3% of the variance in the dependent variable in the general and extended stepwise models. In the same vein, the interaction between moral disengagement and facilitators and impediments emerged as a significant interaction term in the extended stepwise model, explaining approximately 4% of the variance in the dependent variable. Despite their significance, the relative predictive contributions of outcome expectations and the interaction between moral disengagement and facilitators and impediments (Interaction MDxFI) to explaining intentions to pirate software were marginal compared to the contributions of the independent moral disengagement and facilitators and impediments constructs. This implies that the main effects in the social cognitive models for predicting software piracy intention emerged unequivocally as moral disengagement and facilitators and impediments. However, the significance of the interaction between moral disengagement and facilitators and impediments (despite its marginal predictive accuracy) suggests either that moral disengagement could moderate the effect of facilitators and impediments on intention to pirate software or that facilitators and impediments could moderate the effect of moral disengagement on software piracy intention. Further longitudinal research is required to examine the intricacies of this potential moderating relationship.

Of the four main social cognitive constructs, self-efficacy did not manifest as a significant, direct predictor of intentions to pirate software in either of the proposed models (note that perceived behavioural control has also not been found to be a significant predictor in some previous studies [7]). However, the partial correlations revealed that the impact of self-efficacy on the dependent variable seemed to have been mediated by the facilitators and impediments construct, which did emerge as a significant predictor in this study. Mediation relationships imply causality [36] and in this instance, theoretically self-efficacy seems to precede facilitating and impeding conditions (i.e. a belief in one's own ability to carry out a behaviour is first achieved independently of the environmental context, although it may be modified later by contextual factors) because when the effect of an independent variable on the dependent variable is absorbed by a third, mediating variable, it is necessary for the independent variable to temporally precede the mediating variable. This finding suggests that beliefs in one's capabilities to pirate software may be a pre-requisite for leveraging situational and systemic facilitators in the environment to solidify intentions to pirate. It also suggests that when self-efficacy interacts with facilitators and impediments to predict and explain software piracy intention, the effect of the former appears to be absorbed by the latter resulting in there being no overt evidence of a direct effect between self-efficacy and intentions to pirate software.

VIII. Limitations and Directions for Future Research

This study used a cross-sectional design and, as such, stopped short of predicting software piracy behavior. Previous research has generally shown intention to be a good predictor of future behavior [8], [20]. Longitudinal research aimed at testing the proposed general and extended models of software piracy with behavior (as opposed to intention) as the dependent variable will help to corroborate the predictive accuracy of the social cognitive constructs examined in this study.

There were also minor statistical violations found in the assumptions of multiple linear regression pertaining to homoscedasticity and normality. To test the effect of these assumptions on the results of the multiple linear regression, a parallel logistic regression was performed on the data. Due to range effects observed in the dependent variable, which could potentially be a function of the under-reporting of intentions to pirate software, it was transformed into a trichotomous variable consisting of categories of people who did not intend to pirate software, those who were unsure about whether or not they would pirate software and those who did intend to pirate software. The results of the non-parametric logistic regression revealed the same main effects in the proposed models of software piracy intention suggesting that the minor violations of the assumptions of multiple linear regression did not significantly alter the pattern of results in the analysis. This test lends support to the robustness of the multiple linear regression technique used in this investigation.

A low response rate of 7%was obtained in this study. Links to the online survey were distributed via email to 1500 professionals across a range of industries and only 106 people submitted completed questionnaires. A low response rate may be an artefact of the types of questions being asked (i.e. an illegal behaviour) or may be an artefact of the completeness of the email lists used (i.e. we were not able to independently test whether every email reached the intended recipient). The models of social cognitive theory proposed in this study should be tested on other samples of different compositions and sizes to extend their validity and generalizability. Other statistical techniques such as structural equation modelling (the sample size of N=106 was insufficient to use robust structural linear modelling techniques) should also be used to test these models to corroborate the findings from this study and to enhance theoretical insights into the application of social cognitive theory, as a general model of human behavior, in the software piracy domain.

IX. Implications of the Study

The findings of this study suggest that research that previously included attitudes, subjective norms and self-efficacy as predictors of software piracy intention and behavior could have benefited from adding moral disengagement and facilitators and impediments into the equation. It is recommended that future research includes these constructs since they contribute significantly to the predictive accuracy of models for explaining software piracy intentions and behavior.

The overwhelming impact of moral disengagement on intention to pirate software suggests that initiatives to curb software piracy should be directed at reinforcing individuals' internal self-sanctions to discourage them from overriding the influence of these internal self-regulators of behavior rather than on emphasising external sanctions in the form of legislation and educational and awareness campaigns.

Social cognitive theory seems well-suited to understanding intentions to pirate software. The social cognitive determinants of human behavior cumulatively contributed to statistically meaningful explanations of intentions to pirate software; an example of antisocial behavior. This theoretical framework should be applied more extensively in the software piracy domain as it seems to possess the potential to yield rich insights into the intentions to pirate software and to software piracy behavior. Its use could also be meaningfully extended to understanding other examples of antisocial behavior.

Appendix

I. Survey Items

A. Self-efficacy

- I could easily acquire unauthorised copies of software if I wanted to
- I believe that I have the ability to make unauthorised copies of software
- I am confident of my ability to make unauthorised copies of software even in challenging situations

B. Outcome expectations

Attitudes

- I could save money by using unauthorised copies of software
- I could learn new skills by using the unauthorised copies of the latest software products

Social norms

- My friends think that making unauthorised copies of software and not getting caught is cool
- Most people who are important to me think that it is unacceptable to infringe software copyright laws

C. Facilitators and impediments

Situational

- I have access to all the resources I need to make unauthorised copies of software
- I know people who can help me to acquire unauthorised copies of software

Systemic

- If you were to make unauthorised copies of software, the chance you would be caught is small
- People who copy licensed software without paying for it will be caught eventually

D. Moral disengagement

Moral justification

- The widespread distribution of software by unauthorised means leads to human progress and advancement and serves the interests of the greater good

Euphemistic labelling

- Copying licensed software without paying for it is like taking from the rich to give to the poor

Advantageous comparison

- The unauthorised copying of one piece of software for personal use is not too serious compared to the unauthorised copying of software in bulk to sell it

Displacement of responsibility

- It is unfair to hold me responsible if my manager told me to copy the licensed software I needed to do my job without paying for it

Diffusion of responsibility

- I cannot be held responsible for infringing software copyright laws if others downloaded and copied licensed software without paying for it and all I did was buy it from them

Distortion of consequences

- Unauthorised copying, use, acquisition and distribution of software does not cause software houses such huge financial losses that they are put out of business

Attribution of blame

- Software companies are to blame for infringement of copyright laws because their products are over-priced

Dehumanization

- Software companies are blood-suckers who drain money from unsuspecting victims

E. Intentions to pirate software

- All things considered, it is likely that I will use unauthorised copies of software in the near future (i.e. in the next three months)
- All things considered, I expect to make unauthorised copies of software at some point in the future (i.e. in the next year)
- I will use unauthorised copies of software in the future (i.e. in the next year)

ACKNOWLEDGMENT

We thank Michael Greyling from the Department of Psychology and Peter Fridjhon from the Department of Statistics and Actuarial Science at the University of the Witwatersrand, Johannesburg, South Africa, for their expert statistical input.

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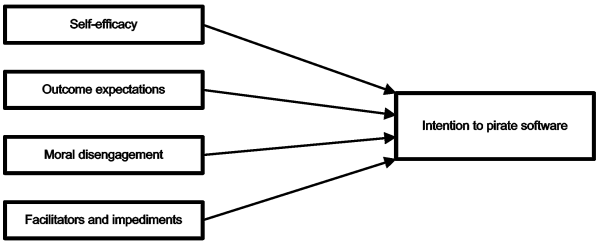

Fig. 1. A general social cognitive model of software piracy intentions.

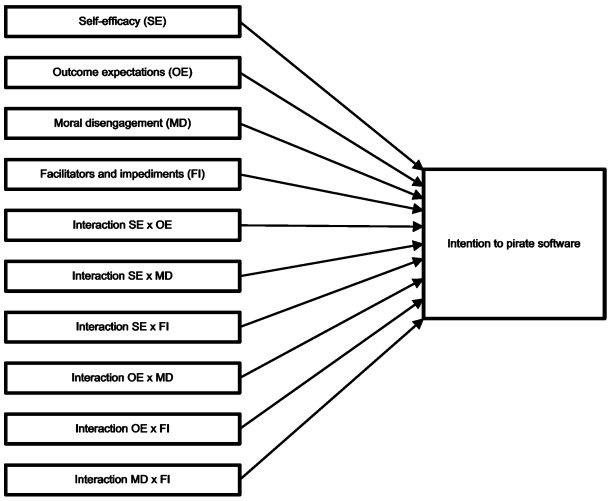

Fig. 2. An extended social cognitive model of software piracy intentions including interactions among the predictor variables.

TABLE I
SAMPLE DISTRIBUTION BASED ON FIELD OF EXPERTISE

Field of expertise	Percentage of respondents
Information technology	40.6
Research	3.8
Human resources	3.8
Legal	1.9
Sales	2.8
Marketing	0.9
Finance	14.2
Technical	24.5
Administration	7.5

TABLE 2
MEANS, STANDARD DEVIATIONS AND RELIABILITY ESTIMATES FOR INDEPENDENT AND DEPENDENT VARIABLES

Variable	No. of items	Mean	Standard Deviation	Cronbach coefficient alpha
Moral disengagement	8	2.46	0.94	0.86
Self-efficacy	3	3.11	1.09	0.83
Outcome expectations	4	3.00	0.99	0.77
Facilitators and impediments	4	2.85	0.94	0.73
Intention	3	2.28	1.24	0.93

TABLE 3
INTERCORRELATIONS BETWEEN THE SOCIAL COGNITIVE PREDICTORS, THEIR INTERACTIONS AND INTENTION TO PIRATE SOFTWARE

Variable	1	2	3	4	5	6	7	8	9	10
1.Moral disengagement (MD)	1.00									
2.Self-efficacy (SE)	0.22*	1.00								
3.Outcome expectations (OE)	0.57**	0.46**	1.00							
4.Facilitators and impediments (FI)	0.52**	0.56**	0.63**	1.00						
5.Interaction MDxSE	0.30*	0.09	0.21*	0.26*	1.00					
6.Interaction MDxOE	0.22*	0.21*	0.03	0.07	0.52**	1.00				
7.Interaction MDxFI	0.11	0.26*	0.07	0.11	0.64**	0.72**	1.00			
8.Interaction SExOE	0.21*	-0.001	0.12	0.12	0.64**	0.34*	0.36**	1.00		
9.Interaction SExFI	0.26*	-0.0009	0.12	0.20*	0.58**	0.31*	0.41**	0.75**	1.00	
10.Interaction OExFI	0.07	0.12	-0.09	0.11	0.43**	0.59**	0.66**	0.58**	0.62**	1.00
11.Intention	0.67**	0.47**	0.64**	0.67**	0.39**	0.28*	0.29*	0.24*	0.25*	0.21*

* $p<0.05$
** $p<0.001$

TABLE 4
SUMMARY OF STEPWISE REGRESSION FOR GENERAL SOCIAL COGNITIVE MODEL OF SOFTWARE PIRACY INTENTION

Step	Variable	Partial R- Square	Model R- Square	F value	Significance
1	Moral disengagement	0.45	0.45	86.75	<0.001
2	Facilitators and impediments	0.14	0.60	36.26	<0.001
3	Outcome expectations	0.02	0.62	6.61	<0.05

R^2=0.6213; Adjusted R^2=0.6102; $F_{3:102}$=55.78; p<0.0001

TABLE 5
SUMMARY OF STEPWISE REGRESSION FOR EXTENDED SOCIAL COGNITIVE MODEL OF SOFTWARE PIRACY INTENTION

Step	Variable	Partial R- Square	Model R- Square	F value	Significance
1	Moral disengagement	0.45	0.45	86.75	<0.001
2	Facilitators and impediments	0.14	0.59	36.26	<0.001
3	Interaction MDxCFI	0.04	0.63	9.89	<0.05
4	Outcome expectations	0.03	0.66	7.64	<0.05

R^2=0.6582; Adjusted R^2=0.6447; $F_{4:101}$=48.63; p<0.0001

TABLE 6
PARTIAL CORRELATIONS

Partialled Variable	$r_{MD.Intention}$	$r_{SE.Intention}$	$r_{OE.Intention}$	$r_{FI.Intention}$
Moral disengagement (MD)	-	0.44**	0.43**	0.51**
Self-efficacy (SE)	0.66**	-	0.55**	0.56**
Outcome expectations (OE)	0.49**	0.25*	-	0.45**
Facilitators and impediments (FI)	0.51**	0.14	0.38**	-

N=106
* p<0.05
** p<0.001