Computer Crime: Software Piracy Among College Students

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COMPUTER CRIME:
SOFTWARE PIRACY AMONG COLLEGE STUDENTS

by

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B.S. May 1997, Old Dominion University

A Thesis Submitted to the Faculties of Old Dominion University and Norfolk State University in Partial Fulfillment of the Requirement for the Degree of

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ABSTRACT

COMPUTER CRIME:
SOFTWARE PIRACY AMONG COLLEGE STUDENTS

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Old Dominion University and Norfolk State University, 1999
Director: Dr. Donald H. Smith

There is a limited amount of research covering the topic of computer software piracy. Few studies focus specifically on software piracy, while the vast majority looks at various forms of unauthorized access and computer hacking. The purpose of this study is to investigate whether students possess attitudes that are supportive of computer-software piracy. Here, attitude means the feeling one has about a certain topic. Operationally, attitude is defined as holding a favorable or unfavorable view of computer-software piracy. Eight research hypotheses are proposed. In order to explore the research question and test the hypotheses, a thirty-six-item questionnaire was administered to students at Old Dominion University and Norfolk State University (N=731). A total of seventeen classes were surveyed. As a whole, the data revealed that student respondents held attitudes that were not supportive of computer-software pirating. However gender, race, early exposure to computers, and participation in other forms of piracy were found to increase students' likelihood of
committing computer-software piracy. The respondents' major (course of study) did not influence whether they participated in computer-software piracy. In fact, Computer Science and Computer Engineering majors did not report the highest levels of software pirating.
This thesis is dedicated to Mr. Bud, Doris, and Ebony. Thank you for your love, encouragement, chastisement, and soul food.
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CHAPTER I

INTRODUCTION

With the number of users increasing, human interaction and the exchange of ideas has "rapidly change[d] [due to] ...computers and communication technologies...locally and worldwide (Neumann 1995: 279)." The Internet, World Wide Web, e-mail, and a host of communication devices allow computer users around the globe to access and exchange information within a matter of seconds.

Along with advantages, this new technology also brings problems (Forrester and Morrison 1990). Though this technology has increased the mobility of computer users, it has also opened a Pandora's box. Computer crime, known as crimes performed with the use of a computer or communications devices, is a growing problem and the newest frontier in crime. Computer crimes are the same in nature as crimes against person or property, but differ in execution, which causes evidentiary problems for investigators and a web of legislation (Hollinger and Lanza-Kaduce 1988; Michalowski and Pfuhl 1991).

The format of this thesis follows current style requirements of the American Sociological Review.
Computer-related crime has "attracted extensive public attention... (Wessells 1990: 126)." This is due to the media's reports on sensational cases involving large volumes of money (Wessells 1990) and on-line harassment (Janal 1998). There are other forms of computer-related crime in which ordinary citizens and youth engage. One form is computer-software piracy. Overall, little is known about computer-related crime, and even less about computer-software piracy (Hollinger 1988; 1993; Wessells 1990; Collier and Spaul 1992; Mercier 1998).

Computer-software piracy, a common form of computer deviance, is the most frequent computer offense occurring on college campuses (Hollinger 1988; 1993; Haworth 1997). For instance, students casually borrow and lend software to other classmates who intentionally download or make unlicensed copies of software onto other computers. In addition, some students post software on personal web pages using university resources (Haworth 1997). In 1995, Software Publishers Association and Business Software Alliance estimated that illegal software usage cost the software industry more than $13.1 billion dollars (Seminario 1998). In general, computer software is copyright-protected material or intellectual property. However, it is easy for people to violate "proprietary
rights" since there are few safeguards built into computer software (Neumann 1995: 279).

Recently, software makers have begun to crack down on student pirates by taking court action against students and their universities (Haworth 1997). While universities come under serious scrutiny from software makers, students generally continue to pirate computer software (Haworth 1997). This blatant disregard of copyright law warrants social scientific investigation. For this reason, the purpose of this study is to examine why college students engage in computer-software piracy. In this study, the focus is on students' attitudes toward computer-software piracy. It is hoped that this research will give computer software makers and proprietors a better understanding as to why students engage in this unlawful activity.

By gaining understanding of students' attitudes and what factors influence their feelings, this research may offer solutions for the problem of software piracy. This problem is important for the protection of intellectual property. Computer software is creative work that is used by American companies to compete on the global market. However, due to continual copyright infringements of computer programs, many companies may stop manufacturing software (Haworth 1997). Software engineers and
programmers may refrain from adding ideas to the umbrella of intellectual inventions and innovations (Haworth 1997). With their interests deeply rooted in international trade and competition, legislators have attempted to protect American businesses by approving "digital copyright protections (McCutcheon 1998: 1953; Gruenwald 1998)."

Moreover, authorities report that computer crime losses cost businesses from $100 million to $3 billion dollars annually (Michalowski and Pfuhl 1991: 260).

For these reasons, more research is needed on computer-software piracy to gain understanding of consumers' attitudes. This study is an exploratory investigation of attitudes toward software piracy. Software piracy involves "the theft of copyright-protected software (Mercier 1998: 201)." For the purpose of this study, computer-software piracy is operationally defined as the distribution and receiving of commercially-sold computer software with the intention of making unlicensed copies. The population consists of college students at Old Dominion University and Norfolk State University in Norfolk, Virginia. Because previous research indicates that gender, race, and major (course of study) are possible factors of software piracy (Hollinger 1993), these factors are examined through a survey instrument. In addition,
This study examines the factors of early exposure to computers (writing, solving equations, and playing video games) and participation in other forms of consumer piracy. The overall goal of this research is to investigate whether gender, race, major, early exposure to computers, and participation in other forms of consumer piracy influence an individual's attitude toward computer-software piracy.
CHAPTER II

REVIEW OF THE LITERATURE

Very little is known about computer crime (Parker 1976; Hollinger 1988; Wessells 1990; Hollinger 1993; Mercier 1998). In fact, the literature covering the topic of software piracy is limited (Hollinger 1988, 1993; Haworth 1997; Mercier 1998). The literature indicates that there is no consensus among social scientists, lawmakers, or law enforcement on what constitutes a computer crime (Bequai 1978). A form of white-collar crime, this type of criminal behavior tears at the social fiber of society by "breed[ing] distrust and lower social morale (Moore and Mills 1990: 413)." For the purpose of this study, computer crime or computer-related crime is defined as any crime in which an offender uses computers (locally or by way of electronic transmission) to commit a harmful act where mens rea\(^1\) is present.

\(^1\)Means rea. The criminal mind. Mens rea refers to criminal intent where an individual knowingly participates in behavior that is illegal or prohibited (Samaha 1993).
CONCEPTUAL FRAMEWORK

It is important to discuss the broad spectrum of computer-related crime in order to understand people's attitudes about computer-software piracy.

The gradual expansion of the "microcomputer industry has caught the legal system unaware [as well as] corporate security [managers] (Wasch 1985: 51; Siegel 1986)." Technology has overtaken the law. Similar to the invention of the press, computers offer a plethora of new responsibilities. For instance, the press "disrupt[ed] [the Catholic Church's] control over scriptural interpretation (Michalowski and Pfuhl 1991: 265)."

Likewise, computers "disrupt[] established patterns of authority and dominance (Siegel 1986)." Using a personal computer (home PC) an individual computer user has free access to databases of information (Siegel 1986). This free access permits a decentralization of information, which leads to a decentralization in power (Levy 1984). The "Hacker Ethic" is a set of beliefs that proposes that all information should be freely accessible by computer or communications device (Levy 1984). Institutions such as governments, corporations, and colleges are seen as bureaucracies that hinder free access to information (Levy 1984: 28). Crimes in which computers are used as
instruments to carry out an offense have been labeled "computer crime." Crimes performed with computers have moved into the public eye. Computer crime has "attracted extensive public attention..." due to the media's report on sensational cases and the large volumes of money entailed (Wessells 1990: 126). There is some truth to the reports. Time and repetition has shown that computer criminals target "banks and financial companies (Forester and Morrison 1990: 261)."

**Deviant Behavior and Computers**

It is important to discuss the nature of crime and what is meant by the word "deviant" within the context of this study. Deviance may be defined as a violation of social norms, where norms are rules or social expectations that reflect values associated with human life and property. In general, there is no consensus on what forms of behavior can be universally categorized as deviant (Goode 1975: 88). In addition, for an act to be labeled "deviant," some argue that there must be a reaction from the community in response to the act (Pollner 1974). So deviance is a highly subjective term which may be applied differently depending upon the situation, time, place, and reaction of witnesses, if they exist. Deviant behavior
refers to acts that do not reflect the socially accepted norms of a culture. For example, good Samaritans are considered positive deviants. One the other hand, individuals who smoke, drink, or use foul language may be considered negative deviants. Their behavior is reprehensible, but far from being criminal. Finally there is criminal behavior, which is clearly identified as such by law. Crime may be defined as an act that violates the criminal law and is punishable by the state. Crime is considered offensive and reprehensible. However, deviant behavior or a deviant act may not be considered a crime.

For the purpose of this study the term "deviance" was used to describe those who violate criminal laws using computers and specifically computer software. It is the researcher's belief that making copies of commercially-sold computer software is becoming an accepted norm within the environment of higher education. Studies show that a growing minority group of computer users generally feel that unrestricted use of computers and information held on computers should be used freely (Hollinger and Lanza-Kaduce 1988: 112). There is a difference between deviant and criminal behavior.
Copyrights and Copyright Infringement

Copyright laws came about in 1710 in England. The British Parliament enacted the Statute of Anne, which contained a clause that created a "public domain" for literature (Association of Research Libraries 1998: 1). Later, the Berne Convention formed to promote "mutual recognition of copyright between sovereign nations in foreign works and to promote development of international norms with regard to copyright protections (Association of Research Libraries 1998: 2)." In 1988, the United States became a member of this association. Moreover, Congress finds it arduous "to balance public interest with the proprietor's rights (Association of Research Libraries 1998)." Today, computer-software piracy is easy to commit because "Internet bulletin boards provide means for rapid and inexpensive reproduction and transmission of information (Gross 1998: 101)."

In an effort to deter computer-related crime, including software piracy, government officials have developed special taskforces and amended laws. In May of 1998, the Federal Bureau of Investigation (FBI) and the Department of Justice released findings from a nationwide law enforcement crackdown on trademark and copyright fraud (United States Department of Justice 1998). The operation
resulted in 35 indictments. In response to the problem of computer crime, President Clinton signed H.R. 2265, The "No Electronic Theft (NET) Act," on December 16, 1997. Lawmakers recognize that civil sanctions are insufficient in preventing copyright infringements (Gessesse and Sanzaro 1996). In order to prevent copyright infringement of digital communications, movies, and on-line service providers (ISP’s), Congress is considering implementing two international treaties that will allow digital copyrights. Opponents feel that the bill will prevent the development of encryption because the bill prohibits companies from cracking (breaking) encryptions on current products (Gruenwald 1998: 1160).

Software makers currently use licenses, which are shown in Figure 1 and 2. With the purchase of a software package, the consumer receives a license that states that the consumer agrees to install the software on their personal computer or a specific number of computers in a business office. Problems occur when consumers, public or corporate, make unlicensed copies of software and distribute it to friends or download it onto more computers than specified by the software license (Wasch 1985: 53). The lack of supervision allows a private consumer to download or copy software without penalty. Likewise, a
Figure 1. Warning Placed on Software Packaging

**ATTENTION:** Use of the software program on the enclosed disks and/or installed on the computer is subject to the terms of the license agreement printed on the license card, in the multilingual license booklet, or in the user's documentation. You should not use the software until you have read the License Agreement. By using the software, you signify that you have read the license agreement and accept its terms (Wasch 1985: 53).

Examples of software license agreements and warnings against making illegal copies.
IBM Program License Agreement

You should carefully read the following items and conditions before opening this diskette package. Opening this diskette package indicates your acceptance of these terms and conditions. If you do not agree with them, you should promptly return the package unopened and your money will be refunded.

License

You may:
a. Use the program on a single machine.
b. Copy the program into any machine readable or printed form for backup or modification purposes in support of your use of the program on the single machine.
c. Modify the program and/or merge it onto another program for use on the single machine (any portion of this program merged into another program will continue to be subject to the terms and conditions of this agreement).
d. Transfer the program and license to another party if the other party agrees to accept the terms and conditions of this agreement. If you transfer the program, you must at the same time either transfer all copies, whether in printed or machine-readable form, to the same party or destroy any copies not transferred; this includes all modifications and portions of the program contained or merged into other programs. You must reproduce and include the copyright notice on any copy, modification, or portion merged into another program.

You may not use, copy, modify, or transfer the program or any copy, modification, or merged portion in whole or in part, except as expressly provided in this license (Wasch 1985: 53).
business employee may take one of the extra copies of licensed software and make unlicensed copies on the employee's home computer. In some cases, software makers allow a select number of employees to make extra copies on home personal computers (PC's) (Wasch 1995). However, many of the employees making the unlicensed copies are not authorized to do so.

It is virtually impossible to detect these illegal copies (Mercier 1998). This is due to the intimate nature of the crime. When normal social controls are removed, an individual may experience what Matza and Sykes (1961) called "an episodic release." Any commitment to the law, U.S. copyright code in this case, is neutralized.

Prosecution

In the past, fraud, theft, espionage, and other laws were used to cover computer crimes (Michalowski and Pfuhl 1991: 268). Presently, computer crimes are rarely prosecuted (Forester and Morrison 1990). This is due primarily to the underreporting by businesses that would rather suffer loss than to let future clients or other computer criminals know that their company is vulnerable to attacks (Hemphill and Hemphill 1978; BloomBecker 1990). For instance, "85 percent of all [computer crime/abuses] go
unreported (Parker 1976: 16)." The lack of unanimity on the definition of computer crime augments the problem.

Moreover, the lack of clarity on what constitutes a computer crime makes it difficult to enforce computer statutes (Parker 1976: 13). In addition, there is little consistency on computer crime statutes from state to state (Nycum 1986: 82). Collier and Spaul attribute the lack of consensus on "... an absence of reliable statistics..." on computer-related crime (Collier and Spaul 1992: 307).

Media hype lead to the passage of numerous computer crime laws in 48 states between 1975 and 1986 (Hollinger and Lanza-Kaduce 1988; Michalowski and Pfuhl 1991: 255). This push for the development of computer crime legislation is largely political (Hollinger and Lanza-Kaduce 1988). Nationally, there has not been a public outcry for effective responses to computer crime. Instead, there has been a "principal force" composed of "those who were most influential in the formation of computer laws[---]computer abuse 'experts' and legislators (Michalowski and Pfuhl 1991: 261)." Hollinger and Lanza-Kaduce (1988) propose that computer crime offers politicians a political platform that will not offend any constituents (Hollinger and Lanza-Kaduce 1988; Michalowski and Pfuhl 1991). Therefore, certain computer usage is being criminalized (Hollinger and
Lanza-Kaduce 1988). While this explains the legal issue at hand, more attention needs to be focused on why people engage in computer crime, especially software piracy.

THEORETICAL FRAMEWORK

This study is rooted in the ideas of Drift theory (Techniques of Neutralization). In 1957, Gresham Sykes and David Matza introduced this social control theory to explain delinquent behavior in juveniles (Matza and Sykes 1961). Their theory proposes that people commit crimes during an "episodic release," in which the individual drifts from normal values when social controls are removed (Matza 1964: 69). In other words, a law-abiding citizen will engage in criminal behavior when control agents or authority figures are momentarily removed. In order to justify criminal behavior, the person develops justifications. Matza (1964) refers to them as Techniques of Neutralization in his book. During this internal process, the delinquent experiences (1) a denial of responsibility in which blame is deflected, (2) a denial of injury where the crime is portrayed as a victimless one, (3) a denial of victim in which students may say that software makers are getting rich off of poor students, (4) condemnation of the condemner where students condemn
“greedy” software makers, or (5) an appeal to higher loyalties where the student admits wrong-doing but says it was done for the greater good (Matza and Sykes 1961; Matza 1964; Akers 1997). The neutralization is used to calm inner feelings of unrest for the delinquent who knows that behavior is wrong. In essence, it helps justify their behavior to themselves. Likewise, the external rationalizations refers to giving socially acceptable excuses to other people. Similar to Sutherland’s Differential Association Theory, Matza and Sykes believe that the delinquent develops definitions favorable to culpable behavior (Akers 1997: 84). By placing more attention on personal needs, the individual creates the illusion that justifications outweigh the seriousness of an offense. By doing so, it becomes easier for the person to experience an “episodic release”. They disassociate themselves from doing what is right or legal in this case. This behavior is then taught and passed on to close associates.

PREVIOUS RESEARCH

In 1976, Donn B. Parker wrote the landmark book Crime by Computer. In this book there is an article entitled “Computer Abuse”. In this article, Parker (1976: 12)
contends that there is a "social problem" with the way in which computer technology is applied as demonstrated by the highly publicized computer crime cases. Parker (1976: 12) defines computer abuse as "an incident associated with computer technology in which a victim suffered or could have suffered loss and a perpetrator by intention made or could have made gain." He found that the types of computer abuses are broad and may be categorized. According to Parker (1976), computers may play four roles: (1) It may be used as the object of attack (possibly for theft of parts). (2) It may be used to create a unique environment for unauthorized activity (where an individual may create or add an account for their personal use). (3) It may be used as the instrument of the act. (4) Or, the computer may be used to symbolically intimidate, deceive, or defraud a victim (Parker 1976: 19).

Past research indicates that participation in computer crime occurs in a linear progression (Hollinger 1988). In 1984, Richard C. Hollinger surveyed 200 computer science students at a Midwestern college. Using self-report questionnaires, Hollinger discovered that most of the respondents disapproved of crimes using computers. However, nearly one-quarter of these respondents said that they would "definitely" or "probably" explore and alter
confidential information stored on a computer if given the opportunity. Only three percent responded that they would not. In this study, Hollinger uses the term deviant to describe those who engage in computer crime.

In his 1988 study of computer-related crime, Hollinger used structured interviews to compare the responses of typical computer science students (n=8) with young apprehended computer criminals (n=3). Through structured interviews, Hollinger (1988) found that criminal computer usage developed in a linear progression. The computer deviant started with software piracy, then browsing, and finally crashing computer systems (cracking). The most important aspect of Hollinger's research is that self-reported responses indicate very little difference in levels of illegal computer activity between the two groups. Though Hollinger finds software piracy and unauthorized access to be an infrequent occurrence, he notes that a small minority of students are consistently involved in criminal behavior using computers. Given these results, the researcher concludes that young college students are amenable to specific types of computer crime: browsing, crashing systems, and software piracy.

Convinced that students and computer crime warranted more attention, Hollinger conducted another study in 1993.
Using a Southeastern university, Hollinger surveyed 1,766 students at the end of the Fall 1989 semester, which consisted of fifteen weeks. Targeting introductory classes, he administered self-report surveys to 27 academic classes, which he purposefully selected. This purposeful selection was used to poll the broadest range of undergraduate student respondents. During his study of the criminalization process of computer uses, Hollinger (1991) decided to investigate two factors: (1) "Who is involved in computer crime?" and (2) "What percentage of the population is involved in computer crime as defined by law?" The results show that 10 percent of the respondents said that they were involved in copyright infringement (software piracy), while 3.3 percent admitted to unauthorized computer access. Software piracy was the most commonly reported offense among respondents. Over 4 percent (4.1) acknowledged that they traded pirated software once during the semester. In addition, 3.2 percent admitted to 2-3 times, and 1.5 percent responded nine or more instances.

Because of his empirical investigations and findings, Hollinger feels that Donn Parker's (1989) assumption that the computer education process is criminogenic may be correct. The education process may contribute to students' opinions and attitudes toward copyright laws.
J.J. BloomBecker researched the prosecution of computer crime(s). In his 1990 study, BloomBecker uses National Center for the Computer Crime Data information. In 1986, 250 prosecutors were surveyed by mail. The survey responses revealed that seventy-five cases of computer crime were reported. Then, in 1989, a mail survey of 2500 prosecutor's offices in the United States showed that there were 100 computer crime cases prosecuted in California between 1986 and 1988. During the 1988, computer security officials were surveyed. All three surveys overwhelmingly show that computer crimes are largely underreported to prosecution authorities (BloomBecker 1990: 36).

With this information, BloomBecker turns his attention to computer criminals. Similar to Hollinger, BloomBecker feels that computer criminals are not geniuses, but average individuals with access to computers and passwords. BloomBecker contends that computer criminals are individuals influenced by media-hype, which gives them the impression that they will be respected for their criminal computer activities (BloomBecker 1990). In order to prevent computer abuse, BloomBecker (1990) recommends that companies and software makers generate commitment to computer security.
Corporate Computer Crime

College students become active participants in the workforce within four to five years. For this reason, some attention must be given to computer crime in the corporate world. A 1984 study of corporate computer crime shows that an estimated 25 percent of all United States firms experience one or more verifiable incidents of serious computer abuse (American Bar Association 1984). Collectively, the loss ranged in average from $2 million to $10 million dollars (American Bar Association 1984). Hollinger (1991: 6) states that the "typical computer criminal is an employee." Supporting Hollinger's assumption, the American Bar Association study on computer crime found that 77 percent of the corporate computer crimes were in fact committed by employees (Zajac 1986).

A 1986 study focuses on computer crimes in the Forbes 500 Corporations. This study found that 56 percent of the Forbes 500 Corporations experienced financial losses between 1984 and 1985 due to computer-related crime. The average reported loss was $118,932 (O'Donoghue 1986). In most incidents, 63 percent of the corporations believed employees were the perpetrators (O'Donoghue 1986: 9). The most startling fact was that more than half the victimized
firms did not report incidents to the authorities (O'Donoghue 1986).

SOFTWARE PIRACY

In relation to computer-software piracy, drift theory offers a logical explanation. This study investigates the attitudes and factors that lead students to engage in computer-software piracy, an illegal act. For the purpose of this study, computer-software piracy is the distribution and receiving of commercially-sold computer software with the intention of making unlicensed copies.

A 1998 study by a market research firm, Dataquest, found that "half of all U.S. homes have computers (Reuters 1999)." With easy access to computers where they may privately use a computer, students are able to make illegal copies of commercially-sold software in their dorm rooms, at home, or in a computer lab, with little or no surveillance. Therefore, the nature of the crime is private. In his book, Matza (1964: 73) states that a person "must have discretion [and] the capacity to do evil, in order to commit a crime." The student may justify illegal behavior by developing definitions favorable to delinquent behavior. They may neutralize the criminal law by drifting (Matza 1964). A "temporary liquidation of the
bind between the actor and legal order…(Matza 1964: 176)” occurs opening the floodgate of subterranean values (Matza and Sykes 1961).

Computer-software piracy is one of the numerous forms of computer-related crime. Increasing in frequency, software piracy represents a “multibillion-dollar, international crime problem (Mercier 1998: 199).” Software piracy involves “the theft of copyright-protected software (Mercier 1998: 199).” This software is valuable as “large computer programs can be worth millions of dollars (Parker 1976: 19).” Within this study, the researcher investigates attitudes towards software piracy whether the values behind computer-software piracy are as deviant as they are commonly depicted. In their 1961 study, Juvenile Delinquency and Subterranean Values, Matza and Sykes argue that the “values behind juvenile delinquency are far less deviant than they are commonly portrayed… (712).”

ATTITUDBINAL STUDIES ON COMPUTER-RELATED CRIME

There is a paucity of studies that focus on students’ attitudes towards computer crime. One investigates the attitudes of students from different academic areas towards computer crime (Coldwell 1993). Results demonstrated differences between students from machine-based and people-
based majors. Compared to students in other majors, engineering and technology students viewed unauthorized access of computers as acceptable. Coldwell proposes that engineering and technology students are socialized by instructors to become deviant. This supports Parker's (1989) and Hollinger's (1988) ideas about the educational process. Because engineering and technology students are taught to be clinically objective, they are less likely to consider social consequences of their technological advances.

Expanding the examination of students' attitudes and computer crime, a 1997 study of U.S. and Singapore students was conducted by Swinyard, Rinne, and Hau (1997). The study focuses on differences in morality and behavior toward software piracy between U.S. and Singapore. Singapore students were more likely to purposefully pirate computer software. American students were more likely to refrain from software piracy due to legal restrictions versus concern for the financial loss of software companies. Overall, the study finds that Singaporean students are more likely to make copies of computer software in comparison to U.S. students. Researchers feel that differences in attitude toward computer crime is due to cultural variance. Asian cultures believe that
innovators of technology possess an obligation to the public at large to share their technological advances. On the other hand, Western societies weigh individual interests over societal interests.

In addition to these studies, Peter Mercier (1998) investigated differences in student and faculty and staff attitudes with regard to unauthorized access of computer systems and computer-software piracy. In regards to relevance of attitudinal research on computer-related crime, Mercier (1998) states that attitudes towards computer abuse may influence latent criminal behavior, which may affect the development of future policies and laws related to computer activity. The instrument he used was a 16-item, Likert-type, survey measuring attitudes about various computer crime issues. Overall, both students and faculty/staff disapproved of unauthorized access of computer systems. However, the vast majority of the student respondents felt that sharing copyright-protected computer software was acceptable. Furthermore, students and faculty/staff did not approve of people pirating software with the intention of selling those copies. The results revealed that students are more supportive of piracy than faculty and staff.
In comparison to 25 percent of the faculty and staff, nearly 59 percent of the student respondents felt that making copies of commercially sold software was acceptable. Only 42 percent of the students felt that software piracy should be punished for copyright infringement. Nearly 66 percent of the faculty and staff felt the same. In addition, 81 percent of the students responded that there is nothing wrong with sharing commercially-sold computer software with friends, while 30 percent of faculty and staff did. Only 46 percent of the student respondents found this behavior culpable, while 59 percent of faculty did. Overall, students appear supportive of copying copyright-protected software, especially when it involves sharing the software with friends. Reminiscent of Coldwell’s study, Mercier also found that engineering and technology students are less likely than other majors to disapprove of unauthorized access of computers. In comparison to other majors, engineering students reported the highest degree of pirating activity. Thus, software piracy seems to be an accepted norm on college campuses.

College Campuses and Piracy

College students make up the largest portion of software pirates (Haworth 1997). Students attending Brown
University, Texas Tech University, University of Wisconsin at Madison, University of Puget Sound, and Massachusetts Institute of Technology (MIT) have been caught or prosecuted for computer-software piracy (Haworth 1997). Using university computer accounts, some students have been known to create unlawful Internet sites to exchange computer software. A student at MIT, David LaMacchia, was "indicted by a federal grand jury in 1994 for conspiring to commit wire fraud (Haworth 1997: A20). Federal Agents discovered that LaMacchia "had been operating a bulletin board on two MIT computers to distribute and use copies of copyrighted software valued at more than $1-million (Haworth 1997: A20)."

On another occasion, a University of Puget Sound freshman used his university Internet account to set up a computer software exchange site. He simply requested that people, who downloaded software, leave him a copy of certain programs. A software maker, Émigré Incorporated, tracked the student’s site down while looking for illegal software sites. The business then reported the matter to the Software Publishers Association who contacted the university. It was later determined that some of the software packages retailed for more than $3,700 apiece. But on the student’s page, posted through the university Internet account, the
programs were all free for the taking (Haworth 1997: A20).

University of Puget Sound shut down the site and punished the student for violating the university conduct code. Despite this action, the Software Publishers Association decided to push for more sanctions. The student also had to "write a 20-page paper about computer piracy and copyright infringement at universities, and perform 50 hours of community service, helping to wire local schools for Internet access (Haworth 1997: A20)." Failure to complete these tasks would result in a $10,000 fine and a possible suit for copyright infringement.

These scenarios seem extreme, however, publishers contend that cases like these are indicative of "a growing epidemic of software piracy among college students (Haworth 1997: A20)." Copyright infringement may cost a university and a student infringer up to $10,000 in fines for each copy (Haworth 1997: A20). Software publishers are trying to hold universities vicariously liable for students' activities on the Internet when students are using university Internet accounts (Haworth 1997; Gross 1998).

Students engage in software piracy for several reasons. As implied by Matza and Sykes (1961), a student may possess hidden or secretly carried views that computer-
software piracy is something that everyone does. Normally, the individual is "likely to adhere to the dominant norms in belief but render them ineffective in practice by holding various attitudes and perceptions which serve to neutralize the norms as checks on behavior (Matza and Sykes 1961: 712)." A delinquent, in this case a student, may justify and excuse their behavior by saying that commercially sold software is too expensive for them to afford on a student's budget. They may even deny injury to software companies and consider intellectual theft a method of "rightful revenge" (Matza and Sykes 1961: 713) for software makers who price the computer software.

Despite the fact that some view downloading or copying software as normal behavior, software piracy is an illegal form of copyright infringement that has been deemed a crime (Wasch 1985; Baron and Reiss 1985; Nycum 1986; Hollinger 1988; 1993).

Copyright infringement is nothing new. The music and film industry has suffered revenue losses for some time (Latif 1996; Bhushan 1998; Fox 1998; Gross 1998). The Internet or information superhighway has added another hurdle for the owners and publishers of intellectual property. According to the British Broadcasting Network Online (McMahon 1998) there are an estimated 26,000 illegal
music sites on the Net where Internet users can download or copy CD quality music without paying royalties (1998). Music pirates on the Net have violated the proprietary rights of owners for years. Likewise, the film industry has suffered similar losses (Latif 1996; Forbes 1998).

The Education Process

The education process is criminogenic in nature when it comes to computers (Hollinger 1988; Coldwell 1993). Social scientists feel that an analytical perspective is pushed with students in computer-related majors. Deviant behavior is encouraged if the student uses it to demonstrate mastery of a computer language or program (Hollinger 1993). Additionally, many people use computers to play games like Solitaire and action-packed games like Tomb-Raider. Initially, the computer is seen as a source of fun and games. Those who engage in computer crime "...see the computer environment as a kind of playpen for their own enjoyment (Forester and Morrison 1990: 267)." As a solution, educators may need to emphasize ethical use of computers and information.

Studies indicate that computer deviants possess a certain profile (Hollinger 1988, 1993). Hollinger found that certain characteristics appeared common among students
who engaged in computer crime activities. For this reason, it is imperative that these attributes (college major, gender, age, race/ethnicity, and class standing) are examined.

College Major

The students' field of study is especially important when determining their computer literacy level (Hollinger 1993) and their likelihood of involvement in computer crime. Research shows that there is a definite difference in students' attitudes about computer-deviant behavior based on their course of study (Coldwell 1993).

Statistically supported research shows that students from machine-based majors versus people-based majors tend to overlook the social consequences of computer hacking (Coldwell 1993). In his study of computer crime, Coldwell (1993) found that students in computer-based majors do not consider hacking into another's computer system unethical. In the area of piracy, "...forestry, engineering, business, liberal arts, and science majors" possessed the highest levels of activity (Hollinger 1993: 9). On the other hand, "nursing, education, health-related professions, and agriculture..." reported the lowest levels (Hollinger 1993: 9). Hollinger contends that these low-level reporting
majors are "undoubtedly a function of gender (Hollinger 1993: 9)." Therefore, gender is a variable that influences participation in computer crime and abuses.

Gender, Age, and Race/Ethnicity

According to gender and delinquency studies, males are more likely to be involved in deviant behavior (Hollinger 1993). Hollinger's 1993 study demonstrates this phenomenon. His findings show that "almost three males... for every one female" are involved in software piracy (Hollinger 1993: 6). The decline of women in computer areas comes at a time when the number of tenured women is declining (Wilson 1997). Schools like Harvard, Yale, and Stanford are granting tenure to fewer women (Wilson 1997). With the number of female contacts and role models decreasing, it is logical that fewer young females become involved and recruited in the male dominated computer field. In addition, age represents a statistically significant factor in computer-software piracy in Hollinger's study. He found a significant relationship ship between pirating and respondents age 22 years and older.

In industry and higher education, White males dominate the computer field (Hollinger 1988, 1993). Another reason
for the decline in the number of women and minorities in the computer field is the decline of affirmative action, which helped qualified minorities gain entrance into colleges nationwide. Some officials are skeptical about whether universities can and will fairly participate in diversity (Healy 1997). In Texas, legislators are creating amendments to help remedy admission disparities (Healy 1997). Despite efforts by the public and private sector to increase the number of ethnic minorities and women in the computer field, males of Anglo-Saxon decent continue be the norm.

Class Standing

Upperclassmen, seniors especially, are more likely to engage in software piracy and hacking. The "slap[] on the wrist of first year undergraduates, who are known to be involved in hacking..." does little to deter students from engaging in more computer crime as they go further in their academic pursuits (Coldwell 1993: 11). Seniors and graduate students, who are older, reported the highest levels of pirating in Hollinger's 1993 study (Hollinger 1993: 9).

Other Characteristics
In addition to these characteristics, there are two areas that will be probed: video games and early exposure. It may be possible that individuals who play video games (arcade or home video system) develop a view of computers as toys. This view combined with subterranean values that usurp the law may create what Hollinger and Parker call the "hacker ethic". Although this study focuses specifically on computer software, it is important to note underlying beliefs and norms that have permeated this generation. Unlike previous generations, the students of today grew up using computers whether in school or home (Mercier 1998). With this early exposure, students are more likely to have the skills and the knowledge needed to pirate software.

RESEARCH QUESTION

Therefore, based on the literature, there is little research on computer-related crime and even less on computer-software piracy (Hollinger 1988, 1993; Mercier 1998). Though the focus of this study is students' attitudes toward computer-software piracy, other forms of piracy dealing with copyright protected music, books, and videocassette tapes will be discussed. For instance, are students who pirate CD's, audiocassette tapes, videocassettes, or make copies of textbooks more likely to
pirate computer software? Are students who play video games more likely to pirate computer-software than those who do not? Are students from computer and technology majors more likely to pirate computer software than non-computer and technology majors. Unlike previous research, this study looks at other types of copyright infringement in relation to computer software piracy. This approach investigates attitudes toward other forms of intellectual property. The focus of this study is to investigate whether students hold attitudes supportive of computer software piracy. With consideration of the literature and the theoretical foundation, eight hypotheses are offered.

HYPOTHESES

1. Students hold attitudes supportive of computer-software piracy.

2. Individuals who pirate other forms of copyright-protected music CD’s (Compact Discs) and tapes, (VHS) video cassette tapes, and/or books are more likely to engage in computer-software piracy in comparison to students who do not pirate other forms of copyright-protected materials.

3. Males are proportionately more likely to engage in computer-software piracy than females.
4. Students in the computer sciences and engineering majors are more likely to pirate computer software than other majors.

5. Students generally feel that computer software is expensive.

6. Students exposed to computers early in life are more likely to commit computer-software piracy.

7. Whites are proportionately more likely to engage in computer-software piracy than blacks.

8. Students drift into computer-software piracy.

Discussion of Hypotheses

1: Students hold attitudes supportive of computer-software piracy.

It is proposed that students hold attitudes supportive of computer-software piracy. Students have long pirated other forms of copyright protected materials such as music CD's and tapes, (VHS) videocassette tapes, books, and written music. If they can pirate copies of these materials, then why should they feel hesitant about making illegal copies of computer software? Therefore, copyright infringement may occur in a linear progression. The individual may start by pirating copies of music, then movies, and progress to computer software.
In addition, finances may play a role in students’ attitude about piracy. With costly tuition rates and fees, computer software may be another unwanted expense for college students. Students justify pirating copies by weakening commitment to an economic system that they see as unjust, in which software companies attempt to get rich off poor students. With this reasoning, students develop definitions favorable to illegal behavior to neutralize the effects of the law.

2: Individuals who pirate other forms of copyright protected materials such as music CD’s (compact discs) and audiocassette tapes, (VHS) videocassette tapes, and/or books are more likely to engage in computer-software piracy in comparison to students who do not pirate other copyright protected materials.

It is proposed that attitudes supportive of other forms of copyright infringement may be projected onto the concept of software pirating. This pattern of thinking may extend from older forms of copyright infringement to a new one, software piracy. Described by Matza and Sykes, subterranean values underlie the individual’s beliefs. Possibly, students have developed values that make copyright infringement normal phenomena. So pirating software would only be a natural progression from one form
of piracy to another. Therefore, students may develop cumulative attitudes so that students who have pirated music, tapes, and books without penalty will make an easy transition to computer software.

3: Males are proportionately more likely to engage in computer-software piracy than females.

As the research indicates, there are few women are in the computer field. It remains a male dominated area where women and minorities are few in number. For this reason, it is proposed that more males will be involved in computer software piracy more than females.

4: Students in the computer sciences and engineering majors are more likely to pirate computer software than other majors.

As indicated by Hollinger’s 1988 and 1993, the student’s major may be a correlate of software piracy. Naturally, students in computer science and engineering majors use sophisticated machinery and computers to complete projects and assignments. Because they spend more time using computers, they are more likely to feel comfortable using computers. In addition, these students may need particular computer software to complete assignments and projects. These specialized programs may be expensive for a college student. Armed with greater
computer knowledge and a need to pass classes, students may privately ask around to find out where they may obtain a program. With little thought, one student may haphazardly loan their copyrighted software to another student in need.

5: Students generally feel that computer software is expensive.

Students will justify committing copyright infringement by neutralizing the fact that piracy is illegal. Disenchanted with the high costs of tuition, the student may feel that software companies are greedy and charge too much for computer programs (Haworth 1997). This neutralization "provides [them] means of intermittently denying the rules to which a person generally is committed (Akers 1997: 329)."

6: Students with longer exposure to computer usage are more likely to engage in computer-software piracy than those with less exposure.

Early exposure to computers allows for more experience. Students who used computers at an early age to play games, solve math problems, write papers are likely to feel more comfortable using computers. In addition, they may be more likely to have a greater knowledge of computer commands, especially commands needed to make copies of files and software.
7. Whites are proportionately more likely to engage in computer software piracy than blacks.

Blacks possess lower educational attainments and social status than do whites (Gottfredson 1981). Some attribute this fact to the dismantling of Affirmative Action (Rowan 1996). College campuses do not reflect America's racial/ethnic composition (Hollinger 1993). With black minorities making up a smaller portion of the student population in colleges, fewer blacks are entering the computer and engineering fields. For these reasons, it is proposed that blacks are proportionately less likely to engage in computer-software piracy.

8. Students drift into computer-software piracy.

If students hold attitudes, possibly "subterranean values" (Matza and Sykes 1961), that justify deviant computer behavior, they are likely to drift (Matza 1964) or make an easy transition to computer crime. Students may neutralize the fact that making illegal copies by pointing out that their illegal actions will not directly hurt software companies. With subterranean values that conflict with conventional rules, the student may easily overlook copyright infringement law to meet the students' own needs.

This study examines these eight factors to see if they are proportionate correlates of computer software piracy, a
form of copyright infringement. It is hoped that this research will investigate whether students hold attitudes supportive of the illegal act of software piracy. In addition, the study will search for a correlation between other forms of copyright infringement and software piracy as well as early exposure to computer usage.

The next chapter will describe the sample, operational definitions, collection procedures, and methodology used. In addition, the analyses are discussed. These procedures are used to answer the research question: Do students hold attitudes supportive of computer-software piracy?
CHAPTER III
METHODOLOGY

It is hoped that this research will help to diminish the dark figure (Bequai 1978; Empey and Stafford 1982; Wessells 1990; Collier and Spaul 1992; Hollinger 1993; Mercier 1998) on computer-related crime and add to the body of literature. This study is important for two primary reasons. First, this study is one step towards diminishing the dark figure on computer crime, specifically in the area of computer-software piracy. Second, this research complements the few studies that deal with computer-software piracy.

INSTRUMENT

Kerlinger (1986) states that research problems suggest research designs. Generally, a “well-designed survey can enhance... understanding of” the research topic (Schutt 1999: 236). The focus of this study, attitudes towards computer-software piracy, lends itself best to a survey in the form of a questionnaire. By administering a 36-item questionnaire to 731 subjects, this study investigates one research question and eight hypotheses. Although the focus of this study is to examine computer-software piracy, questions pertaining to video games, participation in other forms of piracy, and access to computers are also included.
to explore the student attitudes and involvement in computer-software piracy and piracy of music and video materials. The responses indicated what factors shape students' views of computer-software piracy. Nonetheless, it is important to discuss the advantages of using surveys since researchers often question the validity of survey data.

### Surveys

Developed in the twentieth century, surveys have become the most popular measurement instrument in the field of sociology (Schutt 1999). When the research topic is an explanatory one, it is appropriate to use a survey (Babbie 1990). In addition, the questionnaire offers "versatility, efficiency, and generalizability (Schutt 1999: 232-233)." For these reasons, a group-administered survey was used to generate data. Keep in mind "that survey research is generally weak on validity and strong on reliability (Babbie 1990: 274)." To prevent weak structure, certain precautions were taken.

The researcher has attempted to make the questionnaire clear to "convey the intended meaning to the respondents (Schutt 1999: 239)." Because there may be respondents who do not own or have access to a computer, a filter question was added to create a skip pattern. For instance, if a respondent answered "no" to Question 6 (Do you own or have
access to a computer where you may download software?), they were instructed to skip to Question 12. This led the respondent to the attitudinal questions in Section B. The respondent may skip questions 7 through 10. When sampling, it is important to elicit information from a population that is familiar with the focus of the research question (Schutt 1999).

SAMPLE

Because of limited time and financial resources, a purposive sample of college students at Old Dominion University and Norfolk State University was the target population. Seventeen classes were surveyed: 11 at Old Dominion University and 6 at Norfolk State University. The researcher administered the surveys during the Spring semester of 1999.

Founded in 1930, Old Dominion University has a student population of nearly 11,757 undergraduates and 5,941 graduates. These students come from 50 states and over 100 countries. According to the Old Dominion University Catalog, the university maintains a student body that is diverse in age, ethnicity, gender, social, religious, and nationalities. This accredited university has six departments or colleges under which undergraduate majors exist. All undergraduates are required to fulfill basic computer, math, writing, and science courses despite their
concentration of study. For this reason, lower-level courses were targeted for sampling. These classes offer diverse populations.

For the purpose of this study, it must be pointed out that all matriculating students are given access to computer labs and free campus e-mail accounts. It is also important to note that students are not permitted to use these computers to download or copy computer software. In addition, Old Dominion University is one of the 127 universities helping to develop Internet2. Furthermore, the university uses computer technology to offer distance learning through Teletechnet (televised and teleconferenced classes) and the Virtual classroom (classes transmitted over the Internet).

Norfolk State University is a Historically Black College (HBC) that has been in existence since 1935. It is an accredited college with five academic schools. During the 1998-99 school year, the total enrollment was 7,115. The student body consisted of 2,604 males, 4,511 females. Ethnically, there were 6,154 blacks, 811 whites, and 150 students of other ethnic races.

This is a purposive sample of college students aged 14-50. The data were collected January of 1999, the beginning of the spring semester at Old Dominion University and Norfolk State University. Both Universities are located in Norfolk, Virginia. There were 193 respondents (26.4
percent) from Norfolk State University and 535 (73.2 percent) from Old Dominion University. Prior to administration of the survey, the test instrument was approved by Old Dominion University’s Human Subjects Board in December of 1998. Thereafter, introductory level classes were randomly selected for surveying.

The subset of raw data includes responses from males and females. Descriptive statistics generated from the data show a sample size of 731 with 43 percent being male and 54.7 percent being female. The race category indicates that N=712 with 39.3 percent Black, 45.6 percent White, 1.8 percent Hispanic, 5.1 percent Asian/Pacific Islander, 0.4 percent Native American, and 5.3 percent Other. There were 2.6 percent missing data. This is the percentage of the people who did not respond to this survey item or question.

Whites had the greatest representation with blacks being the next largest group. In reference to age, the data show an adult population with a mean of 21. Marital status responses reveal that 82.4 percent are single, never married, 11.8 percent married, 1.4 percent separated, and 2.1 percent widowed. The vast majority of the respondents were Freshman. The data contain 41.6 percent Freshman, 27.9 percent Sophomores, 15.9 percent Juniors, 10.1 percent Seniors, 1.2 percent Graduate students, and 1.0 percent Other. The mean grade point average (GPA) was 2.92. Out of 722 respondents, 77.0 percent reported having access to
computers where they may be able to make copies of software, while only 21.8 percent reported not having access. This indicates that the majority (77.0 percent) of the respondents use computers. Therefore, the respondents are mostly white, female, age 14-50, a college freshman, and single, never married. Please see the Table 1 for descriptive statistics.

VARIABLES

Variables considered for this study are factors that may help explain why people commit computer-software piracy. Statistically this study will investigate the existence and strength of relationships between the independent variables and the dependent variable. The dependent variable (DV) is attitude toward computer-software piracy. The independent variables (IV) are gender, age, race, major, participation in other forms of pirating, and early exposure to computers. Four of these variables (gender, race, major, and age) were used in Hollinger's 1993 study, *Crime by Computer: Correlates of Software Piracy and Unauthorized Account Access*.

DEPENDENT VARIABLE

The dependent variable in this study is attitudes towards computer-software piracy. Here, attitude means the
Table 1. Descriptive Statistics

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<thead>
<tr>
<th>Variable</th>
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<th>Percentage</th>
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<td><strong>Sex</strong></td>
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<tr>
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<td>Graduate Student</td>
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<tr>
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</tr>
<tr>
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feeling one has about a certain topic. Operationally, attitude is defined as holding a favorable or unfavorable view of computer-software piracy. Matza and Sykes (1961) propose that individuals will hold subterranean values that undermine conventional rules. When authority figures are momentarily removed, the individual may engage in deviant activity after developing justifications that neutralize their commitment to the law. Students may justify their participation in computer-software piracy by pointing out the high costs of college tuition and fees (Young 1997). They may even go so far as to view software makers as greedy capitalists. However, students may not consider themselves criminals. In addition, they may not have a criminal background.

As Matza and Sykes (1961) suggest, the deviant has little or no criminal history. Most students do not have felony criminal histories. Likewise, few have misdemeanors on their record. These law-abiding students may make pirated copies of software when in the privacy of their dorm room, apartment, or home.

This type of crime is very intimate and requires the type of privacy Matza (1964) suggests for the individual to experience an "episodic release." The crime involves downloading or making unlicensed copies of copyright-protected software onto another computer, a diskette, or a compact disc (CD). Due to the fact that the central point
of the study moves in the direction of attitudes, the survey asks questions to examine the respondents' views, asking whether they are or are not supportive of making unlicensed and unauthorized copies of software.

To investigate the students' attitudes, Questions 12, 13, and 14 ask whether people have favorable or unfavorable views about copying or allowing others to copy commercially sold computer software. Respondents that answer Strongly Agree (SA=4) or Agree (A=3) to Question 12, 13, or 14 hold views that are supportive of computer-software piracy. On the other hand, those who answer Disagree (D) or Strongly Disagree (SD) indicate unsupportive attitudes toward computer-software piracy.

Software piracy involves "the theft of copyright-protected software (Mercier 1998: 199)." For the purpose of this study, computer-software piracy is operationally defined as the distribution and receiving of commercially sold computer software with the intention of making unlicensed copies. In order to investigate whether students hold attitudes supportive of the illegal act of computer-software pirating, three items will measure attitudes. The answers range from Strongly Agree to Strongly Disagree. A Likert-type scale is used. In more appropriate situations, questions with "yes" or "no" responses are used. The answers to the questions were coded numerically.
INDEPENDENT VARIABLES

Age

Studies indicate that "...computer-software piracy...[has] a potential relationship to school-aged computer users and academic instruction (Hollinger 1988, 1993: 3)." Age is operationally defined as the number of chronological years a person has lived. In the survey, Question 29 is an open-ended question that asks for the respondent's age. Using a fill-in-the-blank question produced a more accurate measure of the mean ages of survey participants.

Gender

The study looks at gender as a factor that may contribute to participation in computer-software piracy (Hollinger 1993). The number of tenured female professors has declined in higher education (Wilson 1997). As the number of tenured female professors decreases, the number of female role models and teachers decreases, especially in the computer field. The computer field remains a male dominant area. With this information, it is hypothesized that males may be more likely to commit this form of piracy than females. Here, gender is defined as the biological sex of an individual at birth. Operationally, it is measured as female and male.
Race and Ethnicity

Another variable that may be related to attitudes towards computer-software piracy is race and ethnicity. A form of self-identification, race is categorized into six categories (Black, White (Non-Hispanic), Hispanic, Asian/Pacific Islander, Native American, and Other). Because race and ethnicity is a method of self-identification, the researcher has attempted to accommodate respondents that do not identify themselves by the listed categories. To remedy this situation, the “Other” option is given. The respondent may then fill in the blank with their description of how they identify themselves.

Major

Previous research indicates that students in computer and engineering majors are more likely to commit software piracy (Hollinger 1993). Based on this information, the survey will ask students to check off which college they are enrolled. A 47-category response was created from student responses to Question 34 on major. These categories were then collapsed into seven categories: Sciences, Business, Computer Sciences, Humanities/Education, Social Sciences, Engineering, and Other (Undecided). In the survey, college major is conceptually defined as the educational branch under which the individual’s major or course of study falls.

It is believed that students in Engineering and
Technology are more likely to participate in computer-software piracy since they are more likely to deal with computers on a daily basis.

Early Exposure

It is proposed that the earlier a student is exposed to computers, the more they will know about computers. More comfortable with computers than people with little or no experience with computers, these students with early exposure are more likely to engage in computer-software piracy. In this case, early exposure is defined as more than four years of experience with computers. In other words, the individual worked with computers before they enrolled in the university. Question 7 is an open-ended question that allowed the respondent to list the age they first remember being exposed to computers. Exposure was specified as actual use.

Other Areas

In addition to the attitudinal and biographical questions, more questions were asked to gain an idea of other phenomena that may explain attitudes toward computer crime. For instance, question 24 asks how often the respondent has played video games within the past year. Other involvement questions were asked regarding actual participation in copyright infringement. These involve
questions (20, 21, 22, 23) in an effort to determine if respondents attitudes are compatible with their activities. Moreover, questions 3 and 4 examine criminal history. These questions are used to test past research findings, which propose that software pirates have similar attitudes as convicted criminals.

ANALYSIS

In order to analyze the data, responses to test questions for all variables were coded and analyzed using the statistical analysis program SPSS. A frequency distribution was used to gain a general knowledge of the populations' characteristics. Thereafter, crosstabulations were performed using Chi Square Test of Independence, Somer's d, Difference of Proportions, and T-tests for Independent Samples. In the case of major, coded responses were collapsed into smaller categories to gain a better analytical view of beliefs and involvement of respondents.

LIMITATIONS OF THE STUDY

In order to test the research question and the research hypotheses, a 36-item survey was administered to a sample of Old Dominion University and Norfolk State University students. This instrument was chosen because it is flexible enough to produce the most accurate and precise data with the study's given resources.
Time limitations prevented more lengthy and thorough investigation of the research topic. Naturally, this means that there may be a problem with the validity of the research. To remedy this problem, the survey instrument was distributed to a small sample. The sample was asked to read and interpret the questions. Bad questions were rewritten or omitted. In order to make the survey completely valid, it is recommended that a random and scientific sampling be taken. This could be obtained through a national mail or national phone survey. This method is costly and requires a great deal of time. In addition, it is the only way to produce the most valid and reliable research on student attitudes towards computer software piracy. The larger the sample size, the more generalizations may be made about people and their behavior. This type of inquiry needs to examine people's opinions and involvement in computer crime outside of the educational setting, namely within the workforce.
CHAPTER IV

RESULTS

The purpose of this chapter is to present and discuss the results of an investigation on factors that may influence student attitudes toward computer-software piracy. As explained in chapter three, data on software pirating was generated from a 36-item survey instrument. Descriptive statistics are first used to characterize the sample. Thereafter, the results of the analyses for the eight hypotheses are presented.

HYPOTHESIS TESTING

The hypotheses were formulated after a review of the literature and findings from similar studies. These relationships are discussed as percentages and frequencies. A discussion of the eight hypotheses follows.

Student Attitudes Toward Software Piracy

Hypothesis one states that students hold attitudes supportive of computer-software piracy. In order to test the first hypothesis, a frequency distribution was run on the Attitude variable (ATTIT) which corresponds with Question 14. As shown by Table 2, the frequency
Table 2. Attitudes Toward Software Piracy

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>143</td>
<td>19.6</td>
<td>20.2</td>
</tr>
<tr>
<td>Disagree</td>
<td>327</td>
<td>44.7</td>
<td>66.4</td>
</tr>
<tr>
<td>Agree</td>
<td>198</td>
<td>27.1</td>
<td>94.4</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>40</td>
<td>5.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>708</td>
<td>96.9</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>731</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
distribution indicates that the majority of the respondents do not hold attitudes supportive of computer-software piracy. For instance, Question 14 reads: "In general, making illegal copies of software is acceptable."

Frequencies show that 19.6 percent Strongly Disagree, 44.7 percent Disagree, 27.1 percent Agree, and 5.5 percent Strongly Agree with this statement.

Even though the majority of the students felt that computer-software piracy was not acceptable, nearly one third of the respondents agreed with the statement that software piracy is generally acceptable. Furthermore, it must be noted that 71.8 percent of the respondents were in the middle (Disagree or Agree). In other words, they did not take a staunch position by strongly agreeing or strongly disagreeing on whether software piracy was acceptable. These responses indicate that students may drift from conventional beliefs or rules.

Overall, the frequency distribution shows that the research hypothesis is rejected. Students do not hold attitudes that are supportive of computer-software piracy.

Other Forms of Piracy and Software Piracy

Hypothesis two states that individuals who pirate other forms of copyright protected materials such as music
CD’s (compact discs) and audiocassette tapes, (VHS) videocassette tapes, and/or books are more likely to engage in computer-software piracy in comparison to students who do not pirate other copyright protected materials.

Crosstabulations of music pirating and computer-software piracy show that a significant relationship exists. Somer’s d (.079) is significant at the .05 level (p=.020). This indicates that a slight positive relationship exists between pirating commercially-sold music and computer-software piracy. Table 3 shows that of the respondents who reported Never making copies of music, 42.6 percent pirated computer software within the past year. Table 3 demonstrates that respondents made copies of commercially-sold music and software at a low level. Many students reported that they had made copies of music and software, but at a low level. Most respondents made copies of music and software one to four times within the past year. Only a small group reported pirating music or software five to eight times within the past year.

Although it is weak, the Somer’s d is significant at the .05 level revealing a relationship between copying commercially-sold music and copying commercially-sold software.
Table 3. Music Piracy and Software Piracy

Within the past year, the respondent copied, gave or received copies, was caught by friends or officials making copies of computer software:

Made Copies of Music CD’s and/or Tapes

<table>
<thead>
<tr>
<th># of times Pirate below</th>
<th>Never</th>
<th>Once</th>
<th>2-4 times</th>
<th>5-8 times</th>
<th>More than 8 times</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>63.5</td>
<td>42.6</td>
<td>52.9</td>
<td>64.4</td>
<td>52.0</td>
<td>56.1</td>
</tr>
<tr>
<td>Once</td>
<td>13.3</td>
<td>19.1</td>
<td>15.7</td>
<td>13.6</td>
<td>12.0</td>
<td>13.8</td>
</tr>
<tr>
<td>2-4 times</td>
<td>15.5</td>
<td>14.9</td>
<td>15.7</td>
<td>10.2</td>
<td>16.0</td>
<td>15.1</td>
</tr>
<tr>
<td>5-8 times</td>
<td>3.3</td>
<td>10.6</td>
<td>9.1</td>
<td>8.5</td>
<td>8.5</td>
<td>7.2</td>
</tr>
<tr>
<td>More than 8 times</td>
<td>4.4</td>
<td>12.8</td>
<td>6.6</td>
<td>3.4</td>
<td>11.5</td>
<td>6.7</td>
</tr>
<tr>
<td>N=608</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

All Figures are in percentages

Example: Of those respondents who reported Never making copies of music CD’s and/or tapes, 63.5% Never participated in any form of computer-software piracy within the past year.

Somer’s d = 0.079        prob .020
The second crosstabulation compared piracy of commercially-sold (VHS) movies and commercially-sold computer software. Table 4 illustrates those respondents who reported Never making copies of commercially-sold movies. For instance, 60.6 percent Never pirated computer-software within the past year. However, of those who reported making copies of commercially-sold (VHS) movies Never, 42.1 percent pirated computer software once within the past year. As with music, respondents generally pirated (VHS) movies at a low level. Likewise, most respondents reported pirating between one and four times within the past year. A Somer's d (.120) is significant at the .05 level (p=.001). This indicates that there is an association between pirating commercially-sold (VHS) movies and commercially-sold computer software.

Table 5 shows the results of a crosstabulation of textbook copyright infringement and computer-software piracy. A significant relationship was found. Somer's d (.097) was significant at the .05 level (p=.009). Somer's d indicates that there is a weak positive relationship between pirating textbooks and computer software.

All three forms of piracy were statistically associated with computer-software piracy. The relationships were weak and positive. Because of the
Table 4. (VHS) Movie Piracy and Software Piracy

Within the past year, the respondent copied, gave or received copies, was caught by friends or officials making copies of computer software:

Made Copies of Movies

<table>
<thead>
<tr>
<th># of times Pirate below</th>
<th>Never</th>
<th>Once</th>
<th>2-4 times</th>
<th>5-8 times</th>
<th>More than 8 times</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>60.6</td>
<td>42.1</td>
<td>49.4</td>
<td>53.4</td>
<td>49.1</td>
<td>56.6</td>
</tr>
<tr>
<td>Once</td>
<td>14.0</td>
<td>18.4</td>
<td>15.6</td>
<td>6.3</td>
<td>10.5</td>
<td>13.8</td>
</tr>
<tr>
<td>2-4 times</td>
<td>15.0</td>
<td>21.1</td>
<td>11.6</td>
<td>18.8</td>
<td>12.3</td>
<td>14.9</td>
</tr>
<tr>
<td>5-8 times</td>
<td>3.7</td>
<td>10.5</td>
<td>13.0</td>
<td>21.9</td>
<td>14.0</td>
<td>7.2</td>
</tr>
<tr>
<td>More than 8 times</td>
<td>6.7</td>
<td>7.9</td>
<td>10.4</td>
<td>14.0</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>N=610</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

All Figures are in percentages

Example: Of those respondents who reported Never making copies of commercially sold movies, 60.6% Never participated in any form of computer-software piracy within the past year.

Somer's d = 0.120          prob .001
Table 5. Copying Textbooks and Software Piracy

Within the past year, the respondent copied, gave or received copies, was caught by friends or officials making copies of computer software:

<table>
<thead>
<tr>
<th># of times Pirate below</th>
<th>Never</th>
<th>Once</th>
<th>2-4 times</th>
<th>5-8 times</th>
<th>More than 8 times</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>58.6</td>
<td>40.8</td>
<td>47.4</td>
<td>42.9</td>
<td>63.0</td>
<td>56.5</td>
</tr>
<tr>
<td>Once</td>
<td>14.3</td>
<td>16.3</td>
<td>10.5</td>
<td>10.5</td>
<td>7.4</td>
<td>13.7</td>
</tr>
<tr>
<td>2-4 times</td>
<td>15.3</td>
<td>10.2</td>
<td>13.2</td>
<td>13.2</td>
<td>11.1</td>
<td>14.9</td>
</tr>
<tr>
<td>5-8 times</td>
<td>5.9</td>
<td>12.2</td>
<td>13.2</td>
<td>13.2</td>
<td>14.8</td>
<td>7.2</td>
</tr>
<tr>
<td>More than 8 times</td>
<td>5.9</td>
<td>20.4</td>
<td>15.8</td>
<td>15.8</td>
<td>3.7</td>
<td>7.7</td>
</tr>
<tr>
<td>N=611</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

All Figures are in percentages

Example: Of those respondents who reported Never making copies of textbooks, 58.6% Never participated in any form of computer-software piracy within the past year.

Somer's d = 0.097        prob .009
ordinal measurement level of each variable, Somer’s d was used. The significance of each variable supports the research hypothesis that individuals who pirate other forms of copyright protected materials such as music CD’s (compact discs) and audiocassette tapes, (VHS) videocassette taps, and/or books are more likely to engage in computer-software piracy.

**Sex and Piracy**

Hypothesis three states that males are proportionately more likely to engage in computer-software piracy than females.

In order to test this hypothesis, a Difference of Proportions test was performed using the sex (SEX) of the respondent and a new variable called “Do or Don’t Pirate”. The new variable was created by recoding responses to questions 20, 21, 22, and 23. As shown by Table 6, those responses were then collapsed into two groups: Those who reported participating in any software pirating activity (Coded 1) and those who reported that they were not participants in any software pirating activities (Coded 0).

The crosstabulation of “Sex” and “Do or Don’t Pirate” revealed that males were proportionately more likely than females to engage in computer-software piracy. The
Table 6. Sex and Computer-Software Piracy

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have Pirated</td>
<td>52.2%</td>
<td>37.7%</td>
</tr>
<tr>
<td>Never Pirated</td>
<td>47.8%</td>
<td>62.3%</td>
</tr>
<tr>
<td>N</td>
<td>245</td>
<td>361</td>
</tr>
</tbody>
</table>

Males and Females pirated computer software:

<table>
<thead>
<tr>
<th>MALES</th>
<th>FEMALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion</td>
<td>Proportion</td>
</tr>
<tr>
<td>Sample 1= 0.552</td>
<td>Sample 2= 0.377</td>
</tr>
<tr>
<td>N of Sample 1= 245</td>
<td>N of Sample 2= 361</td>
</tr>
</tbody>
</table>

Pooled Estimate of:
P = 0.4356221
Q = 0.5643779

Standard Error of Difference:
S = 0.041043

Z = 3.5328759
Probability = 0.0002056
analysis showed that 52.2 percent of the male respondents had pirated computer software. In addition, 37.7 percent of the female respondents reported that they had pirated computer software. There was a significant difference in the amount of pirating between males and females. The Difference of Proportions tests produced a significant Z (3.53) at the .05 level (p=.0002). Statistically, males were proportionately more likely to pirate computer software than females.

Within the past year, males shared, received, or had been caught copying computer software at a statistically significantly higher rate than females. Over half the male population had engaged in some form of computer-software piracy while over half of the female population had not engaged in computer-software pirating. These results support the research hypothesis that males are proportionately more likely to engage in computer-software piracy than females.

Major and Software Piracy

Hypothesis four states that students in the computer sciences and engineering majors are more likely to pirate computer software than other majors.
Item 34 of the survey was used to generate data to test this hypothesis. This item asks the respondent to write their major or course of study. Responses to the question were placed into forty-seven categories. The coded responses were then recoded and collapsed into seven categories to create a new variable called Course of Study. The seven categories developed make interpretation easier and reflects the students' general area of study. The categories were Sciences, Business, Social Sciences, Computer Sciences, Education and Humanities, Engineering, and Other (Undecided) as shown in Table 7. Computer Sciences and Engineering were isolated to allow hypothesis testing.

The frequency distribution shown in Table 7 indicates that major and computer-software piracy are not statistically associated. The Chi Square (11.095 at 6 degrees of freedom) was not significant at the .05 level (p=.135). Percentage wise, respondents who were undecided about their major, reported the highest computer piracy activity. Computer Sciences and Engineering reported the third and fourth highest level of pirating. However, the relationship between major and software piracy is not statistically significant. Therefore, the research hypothesis is not supported.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentage Have Pirated</th>
<th>Percentage Never Pirated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>58.1</td>
<td>58.1</td>
</tr>
<tr>
<td>Engineering</td>
<td>55.8</td>
<td>55.8</td>
</tr>
<tr>
<td>Computer Sciences</td>
<td>51.4</td>
<td>48.6</td>
</tr>
<tr>
<td>Business</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>42.5</td>
<td>57.5</td>
</tr>
<tr>
<td>Humanities/ Education</td>
<td>38.5</td>
<td>61.5</td>
</tr>
<tr>
<td>Sciences</td>
<td>35.6</td>
<td>64.4</td>
</tr>
<tr>
<td>Total</td>
<td>44.0</td>
<td>56.0</td>
</tr>
<tr>
<td>N = 587</td>
<td>80.3</td>
<td></td>
</tr>
</tbody>
</table>
Student Opinion of Software Costs

Hypothesis five students generally feel that computer software is expensive.

Table 8 illustrates the results of a frequency distribution of the variable COST. Here, the students were asked if they generally thought that computer software is cheap, affordable, or expensive. The results support the researcher's hypothesis. A frequency distribution shows that 1.2 percent of the respondents felt that computer software was cheap, 28.0 percent thought that it is affordable, while a majority 48.4 percent thought it was expensive.

Length of Exposure to Computers and Software Piracy

Hypothesis six states that students exposed to computers early in life are more likely to commit computer-software piracy.

Descriptive statistics reveal that the average age in which most respondents began using computers was ten. A new variable called Length of Exposure (LENGHTHT) was created to look at respondents' length of exposure to computer usage by years. To create this variable, the respondent's chronological age in years at the time they reportedly first used a computer was subtracted from their
Table 8. Students' Opinion of Software Costs

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheap</td>
<td>9</td>
<td>1.2</td>
<td>1.6</td>
</tr>
<tr>
<td>Affordable</td>
<td>205</td>
<td>28.0</td>
<td>37.7</td>
</tr>
<tr>
<td>Expensive</td>
<td>354</td>
<td>48.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>568</td>
<td>77.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>731</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
chronological age at the time they filled out the questionnaire. Question seven asks the respondent what age they were when they first used a computer. Also, question twenty-nine asks for the respondent's age.

In Table 9, a T-test for Independent Samples on length of exposure (LENGTH) comparing those who Do or Don't Pirate demonstrates that there is a statistically significant difference between the two variables. Those who Don't Pirate had a Mean of 9.6189 while those who reported that they had pirated had a Mean= 10.5351. With equal variances assumed, F= 2.403 (prob=0.122). The t (2,159) is significant at the .05 level (p=.031). This indicates that there is a significant difference in the length of exposure to computers between those who pirate computer software and those who do not. As the length of exposure increased, the level of software piracy activity increased. These results support the research hypothesis that individuals with longer exposure to computer usage are more likely to engage in computer-software piracy than those with less exposure.

Race and Software Piracy

Hypothesis seven states that whites are proportionately more likely to engage in computer-software piracy than blacks.
Table 9. Length of Exposure to Computers and Piracy

INDEPENDENT SAMPLES TEST

LENGTH and Whether Respondent Does or Does not Pirate Computer Software

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Standard Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don't Pirate</td>
<td>244</td>
<td>9.6189</td>
<td>4.7944</td>
<td>0.3069</td>
</tr>
<tr>
<td>Do Pirate</td>
<td>228</td>
<td>10.5351</td>
<td>4.3980</td>
<td>0.2813</td>
</tr>
</tbody>
</table>

T= 2.159
Probability= 0.031
For this hypothesis, race and software piracy were crosstabulated while controlling for Access. Access refers to whether the respondent reported having access to a computer where they may make copies of computer software. A crosstabulation of Race (RACE) and Do or Don’t Pirate shows that 63.0 percent of blacks and 42.5 percent of white respondents reported that they have never participated in any form of computer-software pirating within the past year. On the other hand, 57.5 percent of white respondents reported that they had. Only 37.0 percent of black respondents reported that they had participated in some form of computer-software piracy. Proportionately, whites report engaging in computer-software piracy more than black respondents. A Chi Square (Test of Independence) demonstrates race is statistically related to involvement in computer-software piracy activity for computer users. The analysis was run first with respondents who reported that they have access to a computer. Table 10 reveals that the analysis statistically supports this hypothesis.

On the other hand, for individuals who did not have access to computers, there was no significant relationship between race and computer-software piracy. A Chi Square (5.647) shows that there is no association at the .05 level
### Table 10. Test for Software Piracy by Race Controlling for Access

All figures expressed in percentages.

#### COMPUTER USERS:

<table>
<thead>
<tr>
<th>Race</th>
<th>Pirated</th>
<th>Never Pirated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>35.0</td>
<td>63.0</td>
</tr>
<tr>
<td>White</td>
<td>57.5</td>
<td>42.5</td>
</tr>
<tr>
<td>Hispanic</td>
<td>66.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>40.7</td>
<td>59.3</td>
</tr>
<tr>
<td>Native American</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>35.0</td>
<td>65.0</td>
</tr>
<tr>
<td>Total</td>
<td>48.2</td>
<td>51.8</td>
</tr>
</tbody>
</table>

N= 463  
Chi Square= 21.737 at 5 degrees of freedom  
Significance= 0.001  
Phi= 0.217  
Significance= 0.001  
Cramer’s V= 0.217  
Significance= 0.001

#### NON-COMPUTER USERS:

<table>
<thead>
<tr>
<th>Race</th>
<th>Pirated</th>
<th>Never Pirated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>26.6</td>
<td>73.4</td>
</tr>
<tr>
<td>White</td>
<td>33.3</td>
<td>66.7</td>
</tr>
<tr>
<td>Hispanic</td>
<td>66.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>25.0</td>
<td>75.0</td>
</tr>
<tr>
<td>Total</td>
<td>28.1</td>
<td>71.9</td>
</tr>
</tbody>
</table>

N= 139  
Chi Square= 5.647 at 5 degrees of freedom  
Significance= 0.342  
Phi= 0.202  
Significance= 0.342  
Cramer’s V= 0.202  
Significance= 0.342
Therefore the research hypothesis is supported when controlling for Access. Whites are proportionately more likely than blacks to pirate computer software.

To further examine the relationship differences in piracy rates between blacks and whites, a difference of proportions test was performed. The difference of proportion test shows that a statistically significant difference in pirating activities exists between blacks and whites who use computers. Table 11 demonstrates this difference. When controlling for computer usage, the proportion of blacks have access to computers and pirate computer software was 0.37. On the other hand, the proportion of whites that pirated was 0.57. The calculated value was greater than the critical value indicating a significant difference between the two samples. In conclusion, there is a statistically significant relationship between race and computer-software piracy among black and white students who have access to computers. The hypothesis that white students are more likely to pirate is accepted.

Looking at those who reported that they do not have access to a computer where they may make copies or download commercially-sold software, there was no statistically significant difference between blacks and whites. It can
Table 11. Test for Software Piracy by Race
Controlling for Access

DIFFERENCE OF PROPORTIONS

Blacks and Whites who have access to a computer:

<table>
<thead>
<tr>
<th></th>
<th>BLACKS</th>
<th>WHITES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proportion Sample 1= 0.37</td>
<td>Proportion Sample 2= 0.57</td>
</tr>
<tr>
<td></td>
<td>N of Sample 1= 165</td>
<td>N of Sample 2= 240</td>
</tr>
</tbody>
</table>

Pooled Estimate of:
P= 0.4885185
Q= 0.5114815

Standard Error of Difference:
S= 0.0505517
Z= -3.9563491
Probability= 3.807E-05

Blacks and Whites who do not have access to a computer:

<table>
<thead>
<tr>
<th></th>
<th>BLACKS</th>
<th>WHITES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proportion Sample 1= 0.266</td>
<td>Proportion Sample 2= 0.333</td>
</tr>
<tr>
<td></td>
<td>N of Sample 1= 79</td>
<td>N of Sample 2= 42</td>
</tr>
</tbody>
</table>

Pooled Estimate of:
P= 0.2892562
Q= 0.7107438

Standard Error of Difference:
S= 0.0865869
Z= -0.7737888
Probability= 0.2195278
be said that there is no statistically significant relationship between race and computer-software piracy for students who do not have access to computers.

Drift Theory and Software Piracy

Hypothesis eight states students drift into computer-software piracy?

This hypothesis test examines whether students drift into computer-software piracy. Crosstabulation was used to investigate whether those students said that they felt that computer-software piracy was wrong reported pirating software. Responses to the attitude test item used for hypothesis one and the variable "Do or Don’t Steal" were used. The results show that 40 percent of those who disapproved of computer-software piracy reported pirating computer software within the past year. This shows that students do drift into delinquency. The Chi Square is 30.4 with a significance of 0.000. The Cramer’s V (.225) is significant at the .05 level. There is clearly a statistically significant relationship, therefore the research hypothesis is accepted. Students will drift into computer-software piracy. This is shown in Table 12.
Table 12. Test of Drift Theory

<table>
<thead>
<tr>
<th>Variable</th>
<th>Don’t Steal Software</th>
<th>Steal Software</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pirating computer software is acceptable:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>100</td>
<td>35</td>
<td>135</td>
</tr>
<tr>
<td>Disagree</td>
<td>157</td>
<td>134</td>
<td>291</td>
</tr>
<tr>
<td>Agree</td>
<td>74</td>
<td>79</td>
<td>153</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>6</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>337</td>
<td>265</td>
<td>602</td>
</tr>
</tbody>
</table>

Figures are percentages.

Total
N= 602

Cramer’s V = 0.225
Significance= .000
FINDINGS

After analyses, these were the findings of the hypothesis testing. Males were proportionately more likely than females and whites were proportionately more likely than blacks to pirate computer software. Individuals who pirated commercially-sold music CD's and tapes pirated computer software at a higher percentage than those who did not make copies of commercially-sold music, (VHS) movies, and books. However, making copies of textbooks or VHS movies did not statistically influence whether a student engaged in computer-software piracy. There was a statistically significant difference in the length of exposure to computers for those who did and did not pirate computer software. Therefore, early exposure to computer usage may influence whether a student engages in computer-software piracy. On the other hand, other hypotheses were not statistically supported and were rejected. For instance, students did not hold attitudes supportive of computer-software piracy. Overall, five of the seven hypotheses were statistically supported. While students did not hold attitudes supportive of computer-software piracy, most felt that computer software was expensive. In fact, statistical analyses show that the opposite is true. Most students felt that computer-software piracy is not an
acceptable behavior, despite the high cost of computer software. The students also did not support the justifications that were given by Questions 12 and 13. These justifications suggest that copying computer software is justifiable because everybody does it and because computer software is too expensive. Along with the query on justifications, the research question was answered clearly. Students do not feel that computer-software piracy is acceptable.

Contrary to other sociological findings, Computer Science and Computer Engineering majors, machine-based majors, did not have the highest rates of piracy. Though the levels of computer-software piracy were high for Computer Science and Computer Engineering majors, no statistically significant relationship was found between students' course of study (major) and involvement in computer-software piracy. Computer Science and Engineering majors participated in higher rates of computer-software piracy than students in other areas of study with the exception of undecided students (Other). Engineering students reported the second highest rate of piracy and Computer Science students the third highest. As stated before, undecided or Other students reported the highest rates of pirating.
Results show that students do drift into computer-software piracy. Although respondents expressed that computer-software piracy is unacceptable, 40 percent of the respondents said that they had made, received, or given illegal copies of computer software within the past year.

In addition, further crosstabulations uncovered a slight relationship between length of exposure, criminal history, and participation in computer-software piracy. The relationship is not statistically significant as the Chi Square = 2.636 at 1 degree of freedom with a significance level of 0.104. Still it should be noted. For instance, 50.4 percent of the respondents with a reported criminal past stated that they had committed computer-software piracy. With N=610, only 42.1 percent of those reporting no criminal history had committed computer-software piracy. Moreover, analysis shows that video games seem to influence whether or not an individual pirates computer software. Individuals who played video games were more likely to pirate software than those who did not play video games. The next chapter will present the conclusion of this study.
CHAPTER V

DISCUSSION and CONCLUSION

As discussed in Chapter Four, analyses show that six of the eight hypothesized relationships are statistically significant. Factors such as gender, race, length of exposure to computer usage (in years), and pirating other forms of commercially-sold materials are statistically correlated to computer-software piracy. In addition, it was found that students drift into computer-software piracy. Although the overwhelming majority of the respondents did not approve of computer-software piracy, a significant proportion (40 percent) did report pirating computer software within the past year.

DISCUSSION

Students do not hold attitudes supportive of computer-software piracy. Over 60 percent of the respondents expressed that software piracy is not acceptable. This indicates that students are mindful of copyright laws and computer ethics. The "hacker ethic" (Parker 1976), which refers to the belief in unrestricted access to information through computer exploration, may not be as strong as it has been in the past. Students may possess a strong
ethical foundation concerning the use of computer technology. Responses reflect students' beliefs in adhering to United States copyright law.

This commitment to conventional law echoes the ideas of drift theory. Students are generally law-abiding people who are not characterized as criminals. While students do not approve of computer-software piracy, nearly one third (32.6 percent) of the student respondents felt that software piracy is acceptable. If one in three students were to engage in computer-software piracy regularly, there would be a significant level of software piracy costing software makers millions of dollars in revenue. As drift theory suggests, the individual believes and supports general rules and laws, but deviates or drifts (Sykes and Matza 1961; Matza 1964).

Also, the significant correlation between other forms of pirating and computer-software piracy indicates that there may be a similar mindset held when individuals pirate commercially-sold computer software and when they pirate commercially-sold music CD’s and tapes, VHS movies, and textbooks. There may be a progression. The individual may copy a textbook, movie, or music and equate copying software similarly. In comparison to copying textbooks, music, or movies, software pirating is easily accomplished
and difficult to detect (Siegel 1986; Mercier 1998). This makes prevention and investigation problematical.

In addition, there seems to be a threshold of involvement in computer-software piracy for those who pirate other forms of copyright protected materials. Respondents' behavior and attitude discloses the subterranean values that students seem to possess. It appears that students feel that it is acceptable to pirate software as well as other types of copyright protected material in moderation. However, when piracy is committed excessively or perhaps for illegal sales and distribution, it is no longer justifiable. A subterranean value may exist stating that it is acceptable to pirate copyright protected music, movies, textbooks, and computer software occasionally, but not frequently. Possibly, this thought pattern underlies and undermines conventional beliefs that copyright infringement is illegal and morally wrong.

This observation is a clear example of Sykes and Matza's (1961) theory that subterranean values exist. The students are aware of the conventional rule that pirating commercially sold materials is wrong. However, underlying beliefs allow students to neutralize their commitment to the law and to engage in piracy. Justifications such as high costs, allows students to divorce themselves from
conventional rules. Approximately 48.4 percent of the students generally felt that computer software is expensive. This may lead to resentment toward computer software makers. When making copies of computer software, students may appeal to higher loyalties and justify their illegal behavior by reflecting on the cost of computer software. Naturally, the expensive costs of college tuition coupled with the extra expenses of books and now software may be the justification used by students to excuse violations of copyright laws.

Analysis shows that gender influences whether a student is likely to pirate software. Clearly males were 14.5 percent more likely to engage in computer-software piracy than females. This finding is consistent with previous research (Hollinger 1993). White males have long dominated the computer field. For instance, the Internet and other highly technical programs were first used by the military, an all male institution until recently.

In addition, college major is not statistically related to computer-software piracy. Coldwell (1993) states that students in machine-based majors more likely to be less sensitive to the effects of technology on society. Drawing on this idea, it was hypothesized that engineering and computer majors are more likely to engage in computer
crime. Other researchers propose that college major may influence participation in computer crime. For instance, Hollinger (1993) found that college major greatly influences the student’s participation in computer-related crime. He credits this to the fact that certain majors are "a function of gender (Hollinger 1993: 408)." Hollinger points out that the students' level of computer literacy depends mainly on the students' major (Hollinger 1993).

However, analysis reveals that students in engineering and computer majors are not more likely to commit computer-software piracy. In fact, there was no significant relationship between college major and participation in computer-software piracy. While all students are given access to computer labs, certain majors may be required to use computers to complete projects, homework, and to communicate with professors. Computer literacy is likely to increase with usage.

Hollinger's findings were applicable at an earlier time when students in technology based majors used computers daily while non-technology majors did not. Today, students are generally required to use computers on a daily basis to type reports, communicate with a professors via e-mail, or to complete assignments using special software packages. Computers are made available to
students at most accredited universities. In addition, the
data from this study reflects the attitudes and piracy
activity of students in the late 1990’s.

On average, respondents began using computers around
age ten. Findings indicate that white males were more
likely than blacks to engage in computer-software piracy.
This may be due to longer exposure to computer usage as
well as socio-economic status. In this study, one
university was a predominantly white college and the other
a Historically Black College. Looking at black respondents
with access to computers, over 50 percent of the black
respondents reported that they had not pirated software
within the past year. However, 57.5 percent of the white
respondents with access to computers had pirated computer
software within the past year. There is always the issue
of access to computer technology.

This study indicates that disparities may exist with
access to computer technology across racial lines. Similar
to other findings, black students reported lower rates of
involvement in computer-software piracy and other forms of
computer-related crime (Hollinger 1993).

Minority students historically have had problems
gaining equal access to quality education and technology,
especially black students (Woodson 1933). In addition,
personal resources may vary greatly. White students may be more likely than black students to own a personal computer, giving the white student unlimited access to a computer. Given this advantage, a student with a personal computer has the equipment, privacy, and opportunity to make copies of computer software.

While students at both universities have access to computer terminals, the quality of the computer equipment may vary. While students at Historically Black Colleges (HBC's) may have access to school computer labs, white students may own personal computers. A lack of financial resources and access to new computer technology will prevent people from learning and utilizing the latest computer technology. Access to up-to-date computer technology is costly. In some cases, economic resources are needed to afford expensive computer equipment (hardware and software). Schools need a great amount of monetary support to obtain, maintain, and upgrade computer equipment. It was thought that computers could close the huge economic gap that exists between the incomes of blacks and whites, however "microcomputers seem likely to reinforce inequalities in our society (Siegel 1986: 9)." Crossing economic lines, "white households are still more than twice as likely (40 percent) to own a computer than
black (19.3 percent) or hispanic (19.4 percent) households (U.S. Department of Commerce 1997)." Computer technology and the benefits thereof "are heavily concentrated among the priviledged, and progressive hackers [young, white, middle class males] seem sometimes to confuse their own advantage with social progress for the masses (Siegel 1986: 9)." While microcomputers may seem like liberating technology to whites, it is an intangible good for many blacks. A 1997 conducted by the U.S. Department of Commerce found that "Blacks and Hispanics now lag even further behind whites in their levels of PC-ownership and on-line access (U.S. Department of Commerce 1997: 2)." As a result of this situation, the "[p]oor and minority children from homes and schools lacking computer resources (not just machines, but trained teachers and programs) will be ill prepared for the 'silicon future' (Siegel 1986: 9)."

This becomes a grave problem for minorities as the wealthy, those with access to computer technology, begin to use computers to bank, shop, pay bills, and other daily living activities (Siegel 1986). Siegel (1986) compares the introduction of the microcomputer to the introduction of automobiles. He states that "computer have-nots, [minorities], will be like the car-less urban poor who became trapped in decaying cities by the rise of the
automobile and the abandonment of mass transit (Siegel 1986: 10)." Past methods of caring out transactions and business will change.

CONCLUSION

Overall computer-software piracy occurs at a relatively low rate on college campuses. It can be concluded that students do not hold attitudes supportive of computer-software piracy. Still, a small group of students drift and engage in software piracy. These students pirate software on a regular basis.

Given the results of the analyses and hypotheses testing, the following profile of a computer software pirate was developed. Those who reported pirating the most were male, white, freshman, and played video games. However, sophomores and juniors, who had prior knowledge of computer operations, reported the highest level of computer-software piracy. This profile is close to the first subculture of computer hackers, who were young, white, middle class, and male computer "hobbyists" (Siegel 1986).

The results and findings of this study may be used to expand the current literature on computer crime, especially software piracy. By gaining a better understanding of
people's attitudes and justifications for following or disregarding the law, prevention methods may be designed to encourage cooperation from both consumers and software makers. It is possible that students may feel that software makers and programmers have an obligation to share computer programs with the masses. Because students are the software makers' best consumers, software makers need to be cognizant of students' software needs and buying power. In addition, computer engineers and software makers need to morally consider the repercussions of allowing their products and information to become tools of the privileged (Siegel 1986).

FUTURE RESEARCH

Echoing the sentiments of other researchers, there is little knowledge or understanding of computer-related crime, especially computer-software piracy (Fagin 1991; Hollinger 1993; Mercier 1998). More research is needed in this area, computer crime. There are varying forms of computer crime that could not be covered by this study alone. While most of the respondents in this study expressed views that were not supportive of the illegal act of computer-software piracy, many of the students expressed a differing opinion during open conversations that would
naturally occur after they completed their survey. For this reason, an ethnographic study would lend itself well to this area of research. This may produce more discussion and reveal justifications of students who do and do not pirate computer software as well as other types of copyright protected materials. Moreover, a longitudinal study would be useful in investigating whether software pirating continues after students enter the workforce.
References


APPENDIX

SURVEY INSTRUMENT
SECTION A.
DIRECTIONS: For each statement below, please indicate the response that best represents your feelings.

Do you own or have access to a VCR that allows you to make copies of videocassette tapes?  

☐ YES  ☐ NO

Do you own or have access to a cassette-recording device that can be used to make copies of audiotapes or compact discs (CD's).  

☐ YES  ☐ NO

Have you ever been convicted of a felony?  

☐ YES  ☐ NO

Have you ever committed an illegal act as a juvenile that would be considered a serious misdemeanor as an adult?  

☐ YES  ☐ NO

Do you own or have access to a “CD Burner” (Compact Disc Read/Write Machine)?  

☐ YES  ☐ NO

Do you own or have access to a computer where you may download or make copies of software programs? (Examples: Games, word processing, or operating systems)

• If you answered NO, please skip to Section B.
• If you answered YES, please continue with the next question.

What age were you when you first used a computer?  

(Examples: typed, played games, solved math problems, etc.)  

About how many hours per week do you spend working with the computer? (Examples: writing papers, Internet searches, chat).  

What proportion of that time is work? (Examples: job related, school related, typing papers, searching for research on the Internet, etc.)  

Please list the computer programs you use to complete class assignments and/or projects? (Examples: SAS, Word, WordPerfect, SPSS, AutoCAD, etc)

In general, would you say that computer software is:

☐ Expensive
☐ Affordable
☐ Cheap
SECTION B.
DIRECTIONS: For each item below please indicate whether you Strongly Agree, Agree, Disagree, or Strongly Disagree with the statement.

<table>
<thead>
<tr>
<th>Option</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Making copies of computer software is acceptable because everybody does it.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Making copies of computer software is acceptable because software is too expensive.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>In general, making illegal copies of computer software is acceptable.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Making copies of textbooks without the author/publisher's permission is acceptable because everybody does it.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Making copies of textbooks is acceptable because they are too expensive.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Making copies of music CD's (compact discs) or cassette tapes is acceptable because everyone does it.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Making copies of music CD's (compact discs) or cassette tapes is acceptable because they are too expensive.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Making copies of movies is acceptable because everybody does it.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
SECTION C. For each item below, please indicate how often you have participated in the following activities Never, Once, 2-4 times, 5-8 times, or More than 8 times within the past year.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never</th>
<th>Once</th>
<th>2-4 times</th>
<th>5-8 times</th>
<th>More than 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have received and copied commercially sold computer software from someone else.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have given commercially sold software, which I purchased, to someone else for them to copy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have been caught copying commercially sold software by other friends or students.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have been caught copying commercially sold software by the authorities or officials.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have played video games. (Arcades and/or home video games)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have made copies of commercially sold music CD’s (compact discs) or audio cassette tapes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have bought or received illegal copies of commercially sold (VHS) movies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have made copies of commercially sold (VHS) movies.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have made copies of textbooks.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
SECTION D. For each statement below, please indicate the response that best represents your feelings. Fill in the blank where appropriate.

What is your age? __________

What is your sex? □ Male □ Female

What is your class standing?
□ Freshman
□ Sophomore
□ Junior
□ Senior
□ Graduate Student
□ Other (Please specify ________________ )

What is your cumulative G.P.A. (Grade Point Average)? __________

How do you describe yourself?
□ African-American
□ White (non-Hispanic)
□ Hispanic
□ Asian/Pacific Islander
□ Native American
□ Other (Please Specify ________________ )

What is your major? ________________

What is your marital status?
□ Single, never married
□ Married
□ Separated
□ Divorced
□ Widowed

Independent of your marital status, are you living with a partner?
□ Yes
□ No

Thank you for your participation.
VITA

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Governor's Fellow/Intern, Commonwealth of Virginia, Department of Criminal Justice Services, Richmond, VA, May 1997-August 1997.

Victim/Witness Assistant, Hampton Commonwealth Attorney's Office, Hampton, VA 1998


Activities and Awards:
• Volunteer, Sickle Cell Anemia Walk, 1998.
• Recipient, 1997 Barbara Jordan Community Service Award.
• Parliamentarian, Zeta Phi Beta Sorority, Incorporated 1997.
• Writer, Inter Alia, ODU Criminal Justice/Sociology Newsletter, 1995-1996.
• Presented Research, Juvenile Justice: The Pendulum Swings to Retribution at the International Adolescent Conference, sponsored by The Institute for Adolescents With Behavioral Disorders, Snowmass Village, Aspen, Colorado, October 4, 1996.
• Youth Minister, Norfolk United Methodist Church, 1996-97.
• Nominated, 1996 Virginia Youth Service Award.