EVALUATION OF AN ONLINE SUBSTANCE ABUSE PREVENTION EXERCISE

by

BHAVANA A. PAHWA

Presented to the Faculty of the Graduate School of

The University of Texas at Arlington in Partial Fulfillment

of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

THE UNIVERSITY OF TEXAS AT ARLINGTON

December 2005

DEDICATION

In loving memory of my mother Bhakti Desai and

maternal grandmother Vijayaben Desai

ACKNOWLEDGMENTS

The road to attaining anything worthwhile is often long and hard and requires tremendous perseverance. Such perseverance is come by only through the support of well wishers and loved ones. I want to take this opportunity to thank those who supported me with their good wishes, love and guidance.

First and foremost is my family, who have lived through years of distracted turmoil, take-out dinners, and the day-to-day oddities of a workaholic family member. Thanks to my children who stepped up to the plate and fulfilled their responsibilities with flying colors, and to my husband who never let me give up on my dream. My father gave me silent support. He miraculously did dishes, transported children to their various destinations, and watched their teenage comings and goings unobtrusively when I was occupied elsewhere.

I will always be indebted to my late grandmother Dadima whose unconditional love and wisdom have always been a guiding light in my life and have provided me comfort when I could not find it anywhere else. Dadima you always believed I could accomplish anything and you will always have a special part of my heart and soul. My mother is not here to share in this special occasion, but I know that she was rooting for me and shares my joy with pride.

Completing a doctoral degree is hard enough, but doing it long distance adds complications that can only be nullified by a supportive and cooperative school and faculty. I want to thank my supervising professor, Dr. Richard Schoech, for giving me the opportunity to work under his expert guidance and for keeping me on track. His feedback was always

timely, relevant, and to the point; challenging me to extend my thinking when I was sure I had no brain power left. His encouragement and guidance were always a source of comfort.

I especially want to thank Dr. Joan Rycraft for making the process of completing a Ph.D. from long distance such a smooth one. Keeping up with the paperwork associated with this degree could have turned into a logistical nightmare if not handled in a timely manner. I am indebted to Dr. Rycraft, Nancy Ashenhart, and Jeanette Rhea for their support and willingness to follow up on things that distance would not have allowed me to take care of.

Thanks also to Dr. Randy Basham for answering *all* the questions I kept badgering him with and never losing patience. Dr. Arangio's not-so-subtle prodding was just the impetus I needed to keep going and to finish. Dr. Tom Watts, your meticulous attention to detail was greatly appreciated at a time when a student is so distracted with just bringing the project to an end.

I want to thank my supervisors Frank Williams and Linda Puoplo, and my coworkers Adrienne Rivers and Dan Isenberg for giving me their absolute support and cooperation. My appreciation also goes to teachers at the Arlington ISD—Jennifer and Linh Nguyen, Courtney Monroe, and Amber Muller—for helping with the data collection.

Lastly, I want to thank my friends Sherry Fairchild, Connie and Gary Grossman, Theresa and Vinod Baliga, Suzie Hearn, and Elaine Cooper for their good wishes, support and for putting up with all my moaning and groaning along the way.

September 28, 2005

ABSTRACT

EVALUATION OF AN ONLINE SUBSTANCE

ABUSE PREVENTION EXERCISE

Publication No. _____

Bhavana A. Pahwa

The University of Texas at Arlington, 2005

Supervising Professor: Richard Schoech

The purpose of this study was to evaluate the effectiveness of an online prevention exercise. The rigorous evaluation of one online exercise using controlled school environment was seen as the first step in understanding the potential of online activities to help teens prevent substance abuse. This study assessed changes in knowledge, attitudes, normative beliefs, perceived behavioral control, and intention to change behavior produced by exposure to a web-based anger management exercise. Results showed significant changes in knowledge after exposure to the teacher led online exercise and the teacher led supplemented by homework groups, but not the other measures. This was as hypothesized since the exercise lasted only 30 minutes and was not designed to produce changes in all the measures in the evaluation model. Further, the effect sizes for the teacher led supplemented by homework session group was much greater than for the teacher led group. This indicates that an online prevention program delivered as a booster to the face-to-face session may be a

viable option. Results also indicated that assigning an exercise and pre- posttests as homework might require more control or teen motivation to be effective.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

The latter part of the 20th century was plagued by a growing concern among parents and school administrators about increasing negative behavior, especially substance abuse, among youth. The challenge has continued to be how to reach and influence the maximum number of students with effective prevention messages in the most cost effective manner. Budget cuts for non academic services in schools and demand for academic accountability continue to be roadblocks in providing effective prevention programs. The rapid growth of information and communication technologies such as the computer and the Internet and its acceptance as a viable medium for education has opened up new possibilities for providing effective prevention programming.

This chapter will review the computer growth and usage trends over the past decade and how such growth influences or detracts from effective online programming for human service delivery to teens. The chapter will end with a statement of the problem and research questions that this study will address. Chapter 2 will examine the theoretical basis for online learning as well as review some of the more popular prevention programs being offered online. The final chapter 5 will outline the research methodology of the proposed research.

Growth of Computers and Online Access in Schools

As an innovation, school use of computers has spread swiftly and widely in the last decade. The rapid proliferation of computers in schools can be attributed to the commitment

made by the federal government in 1994 to assist every school and classroom in connecting to the Internet. The Telecommunications Act of 1996 made telecommunications services and technologies available to schools and libraries at discounted rates (Academy for Educational Development, 2000). According to the National Center for Education Statistics 2001, 99% of U.S. schools reported having Internet access and about 81% of schools have such access in at least one classroom (DeBell & Chapman, 2003). Additionally, the number of students per computer has also dropped dramatically over the years, with 12.1 students per computer in 1998 to 5.4 students per computer in 2001 (DeBell & Chapman, 2003).

The spread of computer ownership and use is not restricted to schools alone. Home access to computers and the Internet has expanded dramatically over the last decade in American households. Access to computers and the Internet outside of the school can be especially important for developing prevention programs that might not be made available to students within a heavily scheduled school curriculum. Currently, 51% or 54.5 million households own at least one computer and the vast majority (43.5 million) also have Internet access. Common uses for the home computer by children and youth include educational programs, games, word processing, and access to the Internet. In 2001, children ages 5–17 were most likely to use home computers to play games (59% of all children), but they also often used home computers for connecting to the Internet (46%) and completing school assignments (44%). Among children who used the Internet, the most common uses included school work (72%), email (65%), and playing games (62%) (DeBell & Chapman, 2003).

Based upon last growth rates, the Employment Policy Foundation forecasts that within the next decade, home computers will become a standard fixture in nearly all American households, regardless of income level. Additionally, the small gaps in computer

and internet adoption based on household income and geography are also closing rapidly. (Contemporary Issues in Employment and Workplace Policy, 2001). Another trend to be noted is the number of online public schools that have grown during the past two years. Online schools have grown from 30 to 82, offering instruction in 19 states. "That number could more than double in 2004, as school districts in Ohio have granted charters to 63 cyber schools, up from seven in 2003" (Wired News, March 15, 2004, p.1).

Growth of Online Activity/Usage Patterns/ Trends by Adolescents

The rapid growth of computer ownership and usage is being paralleled by similar growth in teen online activity. Increasing online activity opens up another medium for reaching youth and adults. The Internet has become to the 21st century what television was to the 20th century—an information superhighway that has truly revolutionized the way we receive, perceive, and process information. According to Computer Economics, by the year 2005, 75% of youth 5–17 years of age will have access to the Internet. In addition, a survey undertaken by America Online/Roper Starch (1999) of 500 children between the ages of 9 and 17 years old found that about 63% of children polled preferred spending time online than watching TV. Fifty five per cent said they would rather spend time online than talk on the phone. Children aged 9 through 11 said they log on about three times a week, while teens aged 15-17 said they log on about five days a week (Media Awareness Network, 2004).

The America Online/Roper Starch Youth Cyberstudy (1999) found that, contrary to common fears, online activity actually encouraged teens into spending more time with parents. After helping their parents reach the decision to get their household online or hooked up to the Internet, young people are going online together with their parents. A majority of

young people (56%) say they go online sitting together with their parents. The younger the children, the more likely they are to say they go online together with their parents; two thirds (67%) of 9 to 11 year olds say so, compared to half of 15 to 17 year olds (49%). While young people say they provide more online help, they report an equal exchange of online *ideas* with their parents. Six in 10 children say they give their parents new ideas about what to do online (60%) and receive ideas from them (60%). The report by Computer Economics also found that youths' reason for going online was to gather information (67%), play games (65%), chat/message boards (49%), creative activities (48%), and download stuff (46%). A July 2003 survey of 2,500 young adults 13–24, also revealed that the Internet surpasses all media in the amount of time spent, "which in an average week is as follows: (1) 16.7 hours online (excluding email), (2) 13.6 hours watching TV, (3) 12 hours listening to the radio, (4) 7.7 hours talking on the phone, (5) Six hours reading books and magazines (personal, not scholastic)" (Harris Interactive and Teenage Research Unlimited [TRU], p. 1). Although the consumer product market was the first to recognize and utilize the vast potential the internet offered in reaching target audiences, the schools and other social service organization are quickly catching up.

Statement of the Problem

Complexities of society have created many social and emotional problems for youth that were not as dominant a few decades ago. One of the biggest challenges faced by youth and adults is substance abuse and increasing violence. At the same time, the technology revolution brought many new innovations in youth communications. The human services are beginning to use new technology to address many issues. The question remains whether online substance abuse prevention services can be used to address the growing need for

prevention given current budget cuts in prevention at the national, state and local level. The answer to this question would be of great significance for addressing other human service issues as well, such as violence, bullying, crime, and divorce. It has implications for adult services since today's teens will be tomorrow's adult internet users.

Problems facing youth have filtered from the society at large into the schools much to the growing concern of parents and school administrators alike. The passage of the compulsory school attendance law, made schools responsible for addressing the individual, academic, and emotional needs that may be barriers to success. Schools find themselves facing the challenge of presenting expanded curriculum to allow students to compete on both a national and international level. The pressure on school systems to help all children achieve their highest potential, both academically and personally, has forced teachers to seek innovative methods to try and reach children with varied learning abilities and learning styles (Felder & Henriques, 1995). Schools are facing the daunting task of accommodating material that would help students develop positive social skills into a rigorous academic curriculum. The increasing importance of technology in youth's lives and in the field of education has created many opportunities for unique methods of disseminating information. Such opportunities allow faculty and administrators to accommodate the individual needs of students and the demands on classroom time. Since youth spend the better part of their waking hours in schools, this arena has become the logical place to concentrate prevention efforts, placing greater demands on an already full school day. However, the current federal budget for prevention programs and services was cut by $5 million (SAHMSA, 2004, May 20). There is every reason to expect funding to remain static or decrease for 2005 (SAHMSA, 2004, May 21). Thus, public and private schools will continue to be under

resourced in providing prevention curricula. One of the biggest challenges facing the school system and society at large is how to provide effective and timely prevention messages to the largest number of youth. The greater challenge is how to reach the maximum number of youth without placing additional demands of time and money on an already constrained school system.

Purpose of the Study

The purpose of this study is to evaluate the effectiveness of an online prevention exercise developed at the University of Texas at Arlington School of Social Work. The exercise is one of several available to teens, parents, and teachers at SubstanceAbusePrevention.org. Since it is difficult to evaluate the learning that occurs from online activities of youth at home and in schools, the rigorous evaluation of one online exercise using a more controlled school environment is a first step in understanding the potential of online activities to help youth prevent substance abuse.

Research Questions

This study is designed to answer the following questions:

1. Is there a change in knowledge via exposure to a Web-based exercise?

2. Is a teacher led Web-guided discussion exercise equivalent in terms of increasing knowledge, and intention to change behavior to a student independently completing the same exercise on the Web?

3. Is a teacher led Web-guided exercise supplemented by a student independently completing the exercise significantly more effective than a teacher led Web-guided exercise only?

4. What difference do demographic variables such as gender, age, ethnicity, school performance level, and environmental variables such as friends' delinquent behavior, and family bonding, make in learning from a web-guided exercise?

5. Does exposure to web-based learning impact future behavior?

Computers, computer usage and especially online access have dramatically increased over the past decade. The trend is predicted to only continue with its upward momentum in the next few decades. Researchers and technology innovators will continue to explore new and innovate ways to capture the users interest and market share. Educators will seek and come to rely on computing and online technology to support in-class and face-to-face learning experiences. Such an environment can present many opportunities and challenges for social service providers to deliver their services more effectively and efficiently.

CHAPTER II

LITERATURE REVIEW

Introduction

Before attempting to review the various prevention programs available online, it would be helpful to understand what features make online learning environments effective and any theoretical underpinnings that support the use of such features. Additionally, this chapter will also address the relevance and importance of online learning methods to the delivery of social services. A review of several online prevention programs will follow.

Prevention programming is increasingly required by funding sources to be based on sound theoretical framework, and adhere to scientific principles guiding evaluation research. This chapter will also review and present the resiliency, social development, and development asset models used as a theoretical basis for many prevention programs. Since this study attempts to evaluate the anger management component of the substance abuse prevention virtual community (sapvc.org), the link between anger and substance abuse will also be substantiated.

Theories of Learning and Online Learning

The designs of online learning materials predominantly include principles from behavioral, cognitive, and constructivism theories (Ally, 2004). The behaviorist school of thought (Thorndike, 1913; Pavlov 1927; Skinner, 1974) saw learning as a process of forming connections between stimuli and responses (Skinner, 1974). This had limitations due to its

focus on observable behavior and not the underlying phenomena such as understanding, reasoning and thinking. Cognitive psychology attempts to bridge the gap with the claim that learning involves the use of memory, motivation, and thinking, and that reflection plays an important part in learning. In the cognitive approach learning is seen as an internal process, theorizing that the amount learned depends on the amount of information the learner can process, the amount of effort used to learn the information, how in-depth the learning is (Craik & Lockhart, 1972; Craik & Tulving, 1975), and what the learner already knows prior to the current learning experience (Ausubel, 1960). Constructivist theorists attempt to further refine the concept of learning with the claim that learners interpret information and the world according to their personal reality, and that they learn by observation, processing, and interpretation, and then personalize the information into personal knowledge (Cooper, 1993; Wilson, 1997). Learners learn best when they can contextualize what they learn for immediate application and to acquire personal meaning.

According to Ertmer and Newby (1993, as in Ally, 2004) behaviorists' strategies can be used to teach the facts, cognitive strategies can be used to teach processes and principles, and constructivist strategies can be used to teach higher level thinking that promotes personal meaning and situated and contextual learning. According to Buckley and Toto (2000) we learn by doing, by being engaged in authentic tasks. Learning is a process where students explore information and discover connections in order to construct new ideas and create meaning. In order for learning to take place the learner must interact with the content, materials, and others in the learning environment. The learning environment, therefore, needs to be fluid, flexible, easy to manipulate and dynamic. The online environment should provide the opportunity for students to engage in active learning where they may read, write, interact,

and problem solve (United Nations Office on Drugs and Crime, 2002). Interactive learning environments presume that learning is an active process that engages both the learner and the instructor.

Use of the Internet for Social Services

Several programs are now offered via the internet for prevention of various problems from AIDS to teen pregnancy to bullying. For example, http://www.bullying.org is a site to prevent bullying. Several other internet based programs dealing with issues other than substance abuse are reviewed in this chapter and summarized in tables 1 and 2.

The internet provides an ideal arena for creating effective interactive learning environment. Various features of the internet make it suitable for prevention programming. The internet can reach large audiences in a cost effective manner and lends support to components applicable to all three learning theories described above. Supporting the constructivist approach to learning, the internet can be used to create individually tailored prevention programs based on the user's demographic and risk profile (Christensen & Griffiths, 2002). The internet also lends itself to maintaining intervention reliability, with the ability of large numbers of users receiving the intervention without any transfer effects (Christensen & Griffiths, 2002). Follow-up sessions that may be required to maintain intervention effects can also be designed and delivered at pre-determined times as needed. Additionally, information about the effectiveness of the interventions for specific user groups, and for specific interventional components, can be collected readily by researchers over the internet and on an on-going basis. Demographic and personal information and other factors make it possible to determine the applicability of cognitive behavior based prevention programs. Although interventions can be modified in conventional school and adult

prevention programs, this is both more difficult and more time and resource intensive (Christensen & Griffiths, 2002). Finally, internet based prevention programs may afford greater anonymity for the user thereby generating more honest and candid responses. This is especially important for health related prevention programs (such as substance abuse) where people may be reluctant to share personal information due to embarrassment or fear of negative reprisals.

Review of Online Prevention

Before attempting to design a study that may help answer the research questions posed earlier, it is useful to review some of the popular online prevention programs already being offered. A review of various online prevention programs revealed that the internet is becoming a popular medium for disseminating prevention messages. For the purpose of this study, the programs were reviewed for content as well as complexity of the features and structures (see tables 1 and 2). A publication offered by the United Nations Office on Drugs and Crime (Using the Internet for Drug Abuse Prevention, 2002) provides a rating scale for web sites based on the complexity and difficulty of features (see appendix A). Table A.1 represents a sampling of some of the online prevention programs available. Each prevention program will be discussed in this section for the purpose of examining the learning tools and techniques used and evaluative methods and results.

AlcoholEdu is an interactive, online course currently aimed at college students rather than youth. A version for high school students has just been launched in February of this year 2004 and is being pilot tested in several schools around the country. **AlcoholEdu** provides science-based information to help strengthen understanding of drinking decisions and what influences them. Students are asked to complete an online pre-program survey that

customizes the information presented on the web site according to the answers given. Questions revolve around existing knowledge, usage patterns, and attitudes. According to the information provided at the web site for Outside the Classroom (the sponsoring agency) the program is designed based on the resiliency model. A pre- post assessment in 2002 conducted with over 3,000 college students who completed the **AlcoholEdu** program reports that the proportion of students abstaining from alcohol increased by 10%, from 39.4% to 43.4%. Among students who continued to drink, the average number of drinks consumed per week declined more than 13%, from 9.9% before taking **AlcoholEdu** to 8.6% when measured a month after completing the program. Additionally, "pre-partying" drinking showed significant decreases; as well as improvements in healthier and safer behaviors such as pacing drinks at one per hour and avoiding drinking when taking prescription medications.

MyStudentBody.com - Alcohol (MSB-A) is another website for college students, developed with support from the National Institute on Alcohol Abuse and Alcoholism (NIAAA). This program educates students about alcohol and aims to decrease the negative consequences of high-risk drinking. Much of the site content was written by students for students, e.g. personal accounts of real students' alcohol-related experiences presented interactively. The site enables students to build a confidential, personal and password-protected risk-assessment profile. Students can use interactive tools such as a Drinking Comparison Tool, Calorie Calculator, Drug Effects Tool, Budget Calculator, Medical Interactions Tool, STD Calculator, Anatomy Tool, and Alcohol Laws by State Tool. Using these tools they can track their own weekly alcohol consumption and compare their own drinking to national averages based on age, gender, race, year in school, and Greek/athletic participation. Students can also get personal questions answered anonymously and

confidentially, learn from experts and peers and read updated alcohol-related news. The site also allows administrators to view aggregate, anonymous data about students' drinking habits and beliefs. Additionally, they may require students to visit certain areas of the site for alcohol education/judiciary purposes and print out a "Certificate of Completion" when finished. A randomized, controlled clinical trial of MyStudentBody.com - Alcohol, was conducted with 265 students ages 18 to 24 from five colleges. The study revealed that 88% rated the quality of information on MSB-A as good to excellent. Although the web utilizes primarily text based information, this might be acceptable with older college students who are used to reading and processing large amount of information. Compared to an information-only website, overall, the number of binge drinking episodes, typical drinking amounts and frequency, and the quantity of alcohol consumed on special occasions all decreased over the study period. All participants fulfilled the criteria of "binge drinking" (which was defined as four or more drinks on a single occasion for women; five or more drinks on a single occasion for men) within the previous week, According to the research information available at the website, females who used MSB-Alcohol reported significantly fewer binge drinking episodes per week and significantly less total alcohol consumption during special occasions relative to females who used the control website (scored high on the RAPI (Rutgers Alcohol Problem Index), a measure of alcohol-related negative consequences). Problem drinkers in the MSB-Alcohol group reported significantly fewer binge drinking episodes compared to those in the control group. Among students less willing to change their drinking behavior (pre-contemplation), those who used MSB-Alcohol reduced the number of drinks per day at a significantly greater rate than those in the control group.

Compared to an information-only website, a significantly greater number of high-risk drinkers using MSB-A, stated that they would recommend the website to friends. Two out of three students stated that they would visit MSB-A at least monthly. There was no information available on whether the web site was successful in reducing risk taking behaviors. And here**Freevibe.com** is a web based drug prevention program that targets teens. This website promotes a drug-free lifestyle for adolescents and is sponsored by the National Clearinghouse for Alcohol and Drug Information of the United States Public Health Service. Each section or article can be accessed from the main page of the site which has a collage of photos and text. There was no information available as to the efficacy of the website**.**

The **Joe Chemo** site is a tool for teachers, health educators, and parents to reduce teen smoking. Target grade levels for this web site are grades 6–12. Joe Chemo is a takeoff on the Joe Camel advertisements encouraging teens not to smoke. As users test their Tobacco IQ, they learn the facts about smoking. The answers are supported with research, and all sources of information are given. Joe Chemo can predict your future with a personalized Smoke-o-Scope and offers free anti-smoking E-cards. Visitors can also find tips on quitting smoking; access links to more information on teen smoking, research organizations, and reports; or read Joe's biography. No information was available on any evaluations conducted on the efficacy of this web site in preventing experimentation with smoking.

Science, Tobacco & You is a multidisciplinary, multimedia, science curriculum resource developed by the Center for Integrating Research and Learning at the National High Magnetic Field Laboratory at Florida State University. Target grade levels for this web site are grades 3–8. The content is organized into four major areas. Each area has graphical links to the detailed information. There is also a Navigation Help section. Science, Tobacco and

Table 1. Features Used in Online Programs

Web site URL	Games	Exercises for teens, families, educators, counselors	Information & referral	News & resources	Music, animation & artistic efforts	Screening	FAQ	Prevention information for adults
http://www.alcoholedu.com/	no	students only	yes	yes	no	yes	yes	no
http://www.mystudentbody.com	no	students only	yes	yes	no	yes	no	no
http://freevibe.com/	no	students only	yes	yes	no	no	yes	no
http://www.joechemo.org/	no	no	no	yes	no	yes	no	yes
http://scienceu.fsu.edu/	no	yes	no	no	no	no	yes	yes
http://www.teens.drugabuse.gov/	yes	yes	yes	yes	no	no	yes	yes
http://www.step`online.com/	no	yes	yes	yes	no	no	yes	no
http://reconstructors.rice.edu/recon1/	yes	yes	no	no	no	no	yes	yes
http://www.disciplinehelp.com/	no	no	no	no	no	no	yes	yes
http://www.bullying.org/public/frameset.cfm	yes	yes	no	yes	no	no	yes	yes
http://www.teencentral.net/	no	no	no	no	yes	no	no	no
http://www.angriesout.com/namka.htm	no	yes	yes	yes	no	no	no	yes
www.cyberisle.org/access/buspass.php3	yes	yes	yes	no	no	no	no	no
http://www.girlpower.gov/	yes	yes	no	yes	no	no	no	yes

Table 2. Online Prevention Programs

Web site URL	Subject	Features[1]	Complexity[2]	Research based [3]	Theory/ Model
http://www.mystudentbody.com/login.asp?ru=/lobby.asp SponsoringAgency: Inflexxion, Inc. and NIH	Alcohol use by college students	5	Two dimensional	yes	None Specified
http://freevibe.com/ Sponsoring Agency: Partnership for a Drug-Free America	Drug use by teens	3-4	Two dimensional	No information	None Specified
http://www.joechemo.org/ Sponsoring Agency: Dept. of Psychology, Wesleyan Univ.	Tobacco (target audience not specified)	1-2	One dimensional	No information	None Specified
http://scienceu.fsu.edu/ Sponsoring Agency: Center for Integrating Research and Learning, Florida State Univ.	Tobacco use by 4th & 5th grade students	1-2	One dimensional	yes	None Specified
http://www.teens.drugabuse.gov/ Sponsoring Agency: NIDA	Drug use by teens	1-2	One dimensional	No information	None Specified
http://www.steponline.com/ Sponsoring Agency: Affinity Holdings International	Drugs, peer pressure, Media literacy, goal setting, decision making (target audience not specified)	3-4	Two dimensional	No information	None Specified
http://reconstructors.rice.edu/recon1/ Sponsoring Agency: Rice Univ. & Science Education Drug Abuse Partnership Award	Opioid use by all age groups	3-4	Two dimensional	yes	None Specified

Table 2—*Continued*.

http://www.disciplinehelp.com/ Sponsoring Agency: The Master Teacher	Discipline (site to be used by teachers)	1-2	One dimensional	No Information	None Specified
http://www.bullying.org/public/frameset.cfm Supporting Agency: Govt. of Canada	Bullying (all age groups)	3-4	Two dimensional	No Information	None Specified
http://www.teencentral.net/ Sponsoring Agency: KidsPeace	Kids Problems (all age groups)	1-2	Two dimensional	No Information	None Specified
http://www.angriesout.com/namka.htm Sponsoring Agency: Talk, Trust & Feel Therapeutics	Anger Mgt. (all age groups)	1-2	One dimensional	No Information	None Specified
www.cyberisle.org/access/buspass.php3 Sponsoring Agency: U of Toronto, Canada				yes	
Girl Power http://www.girlpower.gov/ Sponsoring Agency: US Dept. of Health & Human Services	Promoting positive body image, healthy choices for girls ages 9-13 yrs.	3-4	Two Dimensional	yes	None Specified

[1] Basic Features = 1-2; Moderately Difficult Features = 3-4; Difficult = 5. Detailed description given in Index 1.

[2] Refer to Index 2 for description.

[3] Has the web site been evaluated for effectiveness?

You educates students on the issues of tobacco with the hope of reducing tobacco use. Resources are available for teachers and students. Engaging activities help students explore the harmful effects of tobacco on the body, strategies for handling peer pressure, and how advertising promotes tobacco usage. Teachers are provided with information they can use in teaching the curriculum in the Teacher/Student Guidebook. Also included is an area for sharing lesson plans with other teachers, a bulletin board for discussions, frequently asked questions, and tobacco-related news stories.

A three-phase evaluation of the program was conducted by an independent research firm in 2000. The first phase evaluated how the program was being used by teachers, their experiences with it, and their views and opinions about it. A summary of the research findings is available at http://scienceu.fsu.edu/evaluations/summary.doc. The outcome evaluation phase sampled over 1,300 students in the 4^{th} and 5^{th} grades who were divided into treatment and comparison groups. The results indicated students exposed to the online curriculum showed significantly higher ($p<0.01$) knowledge about respiration, heart rate, and the body systems that are affected by tobacco use, and in improving their beliefs and attitudes about tobacco use than the comparison group. Beliefs about tobacco use also increased over the pretest to posttest period among students in the comparison group. Exposure to the online curriculum, however, did not have any significant effect on changing students' short-term behaviors or intentions of using tobacco in the future. Questions on short-term behaviors are good questions to ask (e.g., as a result of completing the anger management exercise, I am more likely to be able to control my anger in the future). This may have been, however, because only a very small percentage of the 4^{th} and 5^{th} grade sample had ever tried tobacco

(3%-5%). It was recommended that impact on behaviors and intentions may be better suited to evaluations during the more "vulnerable" years of junior high and high school.

STEPonline provides information about drug education programs, media literacy, peer pressure, goal setting, and decision-making. Target grade levels for this web site are grades 3–8. *STEP* stands for students, teachers, employers, and parents. The Need to Know section deals with general information about kinds of drugs and drug use. Arugula Jones, a kind of mentor figure, is available to answer students' questions about drugs, health issues, and relationships. Students can analyze the messages of popular advertisements in the Deconstruct the Message section. Included are discussion forums for each section of the site for teachers, students, and parents to discuss the issues that concern them. No information was available on any evaluation studies conducted.

The Reconstructors was designed by the Center for Technology in Teaching and Learning at Rice University for students in grades 6–8. The web site utilizes an interactive adventure based format to further students' understanding about drug abuse. Students learn about drugs and how to make informed decisions about avoiding drugs through the use of interactive online games. Students take on the roles of scientists, historians, geographers, and detectives to solve the medicinal mysteries of drugs in these learning adventures. There are three episodes available, each with its own learning objectives. A Plaguing Problem, Ancient Alarm, and Analgesic Anxiety. Pre- and posttests are available for each of the episodes, and teacher notes are included in the games. No detailed information was available on any evaluation studies conducted. The information on the web site reported that pre- and posttests on content knowledge were administered to middle school students in Texas, Colorado, and New Zealand and that results demonstrated significant gain across episodes.

It is difficult to provide an overall summary of the sites above given their diverse foci and the variety of programming found. Many of the programs were information only programs that provided large amounts of text for the users to read. The majority of the sites failed to utilize multimedia and interactive tools which are available for internet programming to enhance user involvement.

Although information about the results of effectiveness studies was available for some of the sites, research on the effectiveness of the sites was scarce and incomplete. Little or no information regarding the design of the evaluative studies was found. Additionally, although many of the online sites used research based information regarding the issues being addressed, none of them provided any information regarding the theoretical justification for the types of tools used. Attempts at contacting the creators/ administrators of the online sites were also not successful. Many of the evaluative studies relied on self-report of behavioral intent rather than measuring actual behavior of an experimental and a control group.

Prevention Curriculum

Much research has been conducted in the last 20 years on how best to prevent substance abuse in youth (Bosworth, 1997; Schinke, Brounstein, Gardner, 2002; SAHMSA, 2000; NIDA, 2004).

Prevention programs make a difference. Current research shows that research-based prevention programs are effective not only in preventing youth from initiating substance use in the first place, but also in reducing the number of individuals who become dependent. Recently identified model prevention programs show that on the average a 25% reduction in substance use by program participants (US Dept. of Health & Human Services, paragraph 29). According to the Monitoring the Future survey of 8^{th}, 10^{th}, and 12^{th} graders, illicit drug

use between 2001 and 2003 among students declined 11% (from 19.4% to 17.3%), representing 400,000 fewer drug users over two years. (NIDA, 2004)

Over the last 10 years, youth substance abuse prevention research has been actualized in several different model youth prevention curricula. Both SAMSHA and NIDA provide a list of programs that have been proven effective for various outcome criteria (SAMHSA, 2000; Tobler, 1992; NIDA, 1997; Dusenbury, 1995). This literature also suggests that prevention strategies based on information alone or "one shot" methods that utilize scare tactics are not effective (Tobler, 1992; Bosworth, 1997; Skiba, Monroe, & Wodarski, 2004). No longer are single-focused prevention strategies effective in achieving long-term changes (Jansen et al., 1996; Wallack & Corbett, 1990 as cited in Skiba, Monroe, & Wodarski, 2004). Programs that adhere strictly to an intervention model based on developing social skills and skills for managing negative feelings are best. NIDA (1997, 2004) outlined salient factors attributable to successful prevention efforts:

1. Most successful programs are comprehensive, have multiple components, and are directed at individuals, families, peers, schools, communities, the media, and the workplace.

2. Prevention strategies need to use the media to educate the community, raise public awareness, develop community support, and maintain the momentum of established prevention efforts.

3. Prevention strategies need to be provided in sufficient intensity and duration to achieve desired effects.

4. Booster sessions are important in establishing initial progress and in maintaining effects over time.

5. Prevention programming should follow a primary prevention model of targeting the large, diverse population and be adaptable to subpopulations (for example, high-risk adolescents) to address differences in gender, culture or ethnicity, socioeconomic status, stage of adolescent development (for example, adolescence of preadolescence), and be adaptable to the type of drugs being used.

6. Programs should follow a structured organizational plan that includes needs assessments, program reviews, refinement processes, and feedback to and from the community. These objectives should be time-limited and feasible according to the capabilities of each program or component.

Developing Resiliency: Addressing Risk and Protective Factors Linked to Substance Abuse

There is growing emphasis on increasing protective factors and reducing of risk factors to promote positive youth development and resiliency in youth (Hawkins, Catalano, & Miller 1992; Bernard, 1991). The resiliency model suggests teen substance abuse may be prevented by increasing their protective factors and reducing their risk factors (http://www.sapvc.org/resources/resilience.htm, retrieved 8/28/2005). Resiliency refers to the ability of an individual to function normally even in the face of personal and environmental stressors. The social development model proposed by Catalano and Hawkins (1996) and the asset development model (Search Institute, 2005) divide the risk and protective factors into individual, family, community, and school related domains and internal and external protective factors (see appendix E). Risk factors are personal characteristics or environmental and familial conditions that predict the probability of involvement with risky behavior including substance abuse. Conversely, protective factors shield or inoculate youth from the

various factors that put them at risk for delinquent behaviors. In order to adequately address the problem of drug abuse among youth, there must be a balanced understanding of the protective factors that reducing risk.

Increased intolerance of drug use by the teen's friends has been cited as an important factor linked to the decrease in substance abuse among youth. Parental drug and alcohol use, failure of the adolescent to bond to school, problems in ability to regulate emotion, poor interpersonal skills and peer relations, are cited as factors increasing the risk of drug problem development as well (Brook et al., 1988; Hilarski, 2004). Peers become a significant source of support and intimacy in early adolescence. During and shortly after puberty, youth begin spending more time with friends and less time at home (Berndt & Perry, 1990). Research has consistently shown that young adolescents with positive life styles are apt to select pro-social peers, whereas young adolescents oriented toward antisocial or problem behavior are likely to select similarly deviant peers (Bush, Weinfurt, & Ianotti, 2003). Adolescents also need to receive appropriate direction, nurturing, encouragement and guidance from significant adults for their successful transition into adult life. If children and adolescents do not receive these from their families, schools, communities or social systems, the result is that they are "impulsive, lack planning skills, decision-making skills, problem-solving skills, negotiating skills, and the ability to appropriately control and deal with their anger. The result has been cited as frequently leading to delinquent behavior and drug and alcohol use (Goldstein & Glick, 1987; Hilarski, 2004).

While many adolescents are at high risk for delinquency, not all of them actually become delinquent. Protective factors help shield these "resilient" youth from the risk of delinquent behavior. Positive personal relationships, both with family and peers, play an

important and significant role in developing positive behaviors in youth (Minuchin & Fishman, 1981). Among the family factors, parental supervision, family bonding, and consistency of discipline appear to be the most important (Hilarski, 2004). Commitment to school and especially avoidance of delinquent and drug-using peers also appear to be major protective factors (Hilarski, 2004).

Demographic factors, such as age and gender were not found to be directly linked with substance abuse or with delinquent behavior (Svensson, 2003). Yong (2003) also found that there were no significant differences among males and females in the way they handled negative emotions. According to Svensson (2003) environmental factors, such as parental monitoring and peer delinquency were directly linked with age and gender. Younger children and girls were more closely supervised and controlled by parents and therefore tended to have less involvement with delinquent peers. This in turn reduced the likelihood that younger children and girls would get involved in substance abuse and other delinquent behavior.

In a study on urban delinquency and substance abuse Huzinga, Loeber, and Thornberry (1994) suggest that prevention and intervention programs need to address multiple factors that are correlated with drug use. Other studies have suggested that social skills training that include learning how to mange negative emotions (such as anger) and developing conflict resolution skills can help in reducing the risk of involvement with drugs and other anti social behaviors (Gonet, 1994; Skiba, Monroe, & Wodarski, 2004).

Anger and Substance Abuse

Several studies have found a definite link between inability to regulate emotions and express anger appropriately to the increased risk of substance abuse. Cautin, Overholser, Goetz, (2001) found that externalized anger is linked with increased risk of alcohol abuse.

Conger (1997) describes at length the relationship between negative environmental experiences that cause negative emotions and the increased risk of delinquent behavior in the future. Such delinquent behavior includes substance abuse. A cross-sectional study of high school students found that children with high levels of anxiety were four times more likely to have used alcohol than those who had significantly lower levels of anxiety (Merikangas, Dierker, &Fenton, 1998). Merikangas et al. (1998) also suggest that deviant behaviors, conduct problems, and antisocial personality are strongly associated with both alcohol and illicit drug use/abuse. In yet another study of 8-to-12-year-olds reported by Merikangas and colleagues (1998), teacher-rated conduct disorder predicted the use of alcohol and hard drugs four years later. Ina report from the office of the Surgeon General (http://www.surgeongeneral.gov/library/youthviolence/chapter4/sec3.html#UnexpectedFindingsEffects, paragraph 30) cites that there is some evidence that physical aggression accounts for most of the predictive power of conduct disorder and has a moderate to small effect size as a predictor of violence. Antisocial attitudes and beliefs also predict violence. Conduct disorder and violence in youth has also been linked with the onset of adolescence substance abuse (Brook et al., 1988).

Measuring Intent and Behavior

One key difficulty in prevention research is how to measure the desired outcome (i.e., change in short and long term behavior). The purpose of any prevention based program is to ultimately decrease the likelihood that the individual will engage in delinquent or at-risk behaviors. Many of the web sites reviewed above measure intent (e.g., I intend to change my behavior) rather than measuring actual behavioral changes. The relationship between behavior and intention has been addressed by Ajzen and Fishbein (1973), who developed the

theory of planned behavior. This theory suggests that the best predictor of behavior is intention. Intention is defined as the cognitive representation of a person's readiness to perform a given behavior. This intention is determined by three things: a person's attitude toward the specific behavior, their subjective norms and their perceived behavioral control. According to the theory of planned behavior (Ajzen, 1991a) only specific attitudes toward the behavior in question can be expected to predict that behavior. In addition, subjective norms— their beliefs about how people they care about will view the behavior in question—are also significant in predicting intention. Finally, perceived behavioral control, people's perception of their ability to perform a given behavior, also influences intentions. These predictors lead to intention. Interventions designed to change behavior can be directed at one or more of its determinants: attitudes, subjective norms, or perceptions of behavioral control. Changes in these factors should produce changes in behavioral intentions which in turn should be carried out as behavior under appropriate circumstances (see figure 1[*]):

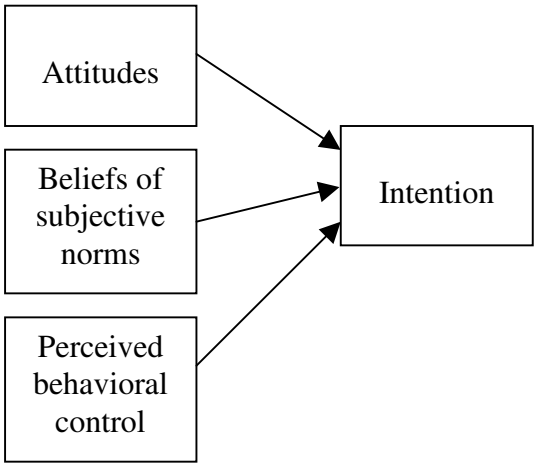

Figure 1. Theory of planned behavior.

[*] Aizen, I. (1991a). *Behavioral interventions based on the theory of planned behavior.* http://aee6300.ifas.ufl. edu/Aizen.pdf.

Ajzen and Fishbein's theory of planned behavior (1973) also support the findings from the literature, which suggest that, programs focused on providing information alone are not as effective as when this information is combined with efforts that are aimed at increasing skills (Huzinga, Loeber & Thornberry, 1994; Gonet, 1994; Tobler, 1992; Bosworth, 1997).

The above model may be revised to accommodate the effects of various demographic and environmental factors on the development of beliefs, attitudes, and perceived behavioral control. The preceding review of the literature on developing resiliency in youth and the various risk and protective factors that impact a person's ability to bounce back from adversity are reflected in the model through environmental and demographic variables. Families affect children's drug use behavior in several ways. Family modeling of drug using behavior and parental attitudes toward children's drug use are family influences specifically related to the risk of alcohol and other drug abuse (Dyer, 2005). Poor parenting practices, high levels of conflict in the family and a low degree of bonding between children and parents appear to increase risk for adolescent problem behaviors generally, including the abuse of alcohol and other drugs (Dyer, 2005; Minuchin & Fishman, 1981; Hilarski, 2004). Peers become a significant source of support and intimacy in early adolescence. During and shortly after puberty, youth begin spending more time with friends and less time at home (Berndt & Perry, 1990). Research has consistently shown that young adolescents with positive life styles are apt to select pro-social peers, whereas young adolescents oriented toward antisocial or problem behavior are likely to select similarly deviant peers (Bush, Weinfurt, & Ianotti, 2003). Demographic factors, such as age and gender were not found to be directly linked with substance abuse or with delinquent behavior (Svensson, 2003). Yong (2003) also found that there were no significant differences among males and females in the

way they handled negative emotions. According to Svensson (2003) environmental factors, such as parental monitoring and peer delinquency were directly linked with age and gender. Younger children and girls were more closely supervised and controlled by parents and therefore tended to have less involvement with delinquent peers. This in turn reduced the likelihood that younger children and girls would get involved in substance abuse and other delinquent behavior.

In addition to demographic and environmental factors, exposure to prevention messages would impact attitudes, beliefs and perceived behavioral control which in turn would impact intention to modify negative behaviors in the future. These additional variables may be accommodated into the following model:

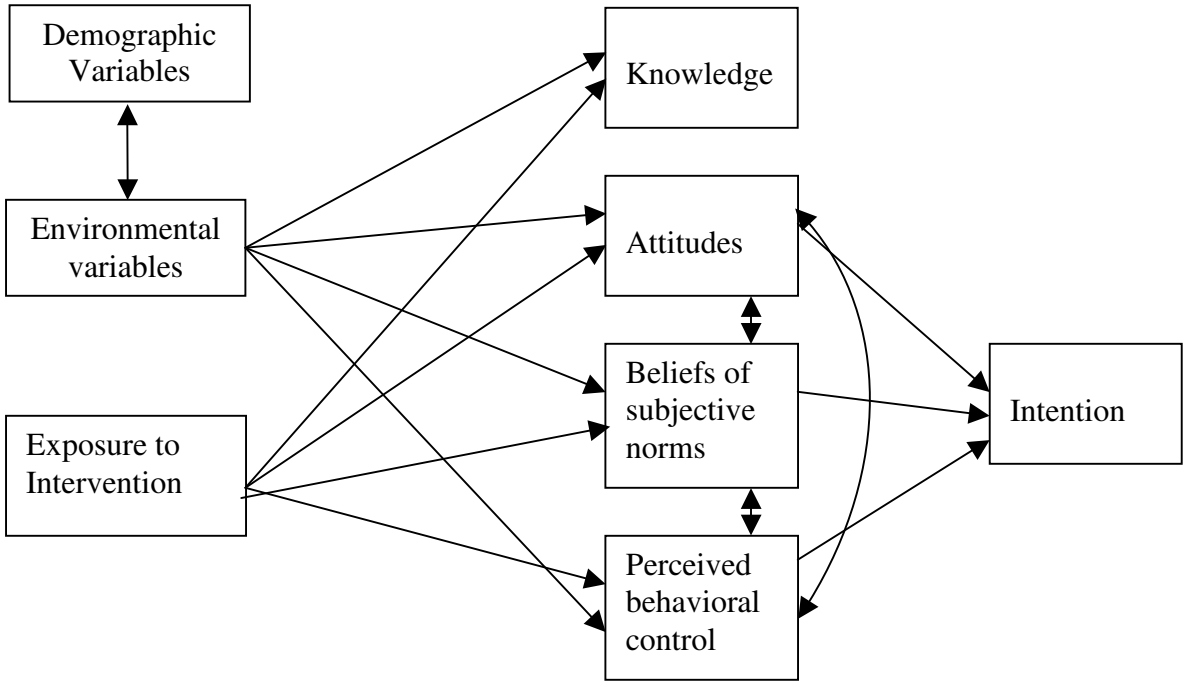

Figure 2. Hypothesized model for behavior change.

The Model Defined

In the model (figure 2), the variables are defined as:

Exposure to intervention. In this model, and for the purpose of this study, this refers to exposure to the prevention program in either a face-to-face situation or via an online program.

Demographic variables. These variables are grade, gender, age, and ethnicity.

Environmental factors. Although the literature suggests several constructs that relate to environmental factors, only two are chosen for this study. This is primarily to restrict the length of the survey instrument and also because this is just an exploratory research into the efficacy of the online prevention environment.

Family bonding. The extent to which family members interact openly with each other. The extent to which parents are involved in the daily activities of their children and facilitate discussions with them. Family bonding also includes the extent to which children feel safe and comfortable seeking help from parents when needed and accept guidance when offered.

Friends' delinquent behavior. The extent to which the majority of a teen's friends are involved in at-risk behavior such as using drugs, drinking alcohol, smoking, skipping school, fighting, and stealing.

Knowledge. Knowledge is defined as the remembering of previously learned material. It is information evaluated, organized, and stored, in the human mind so that it can be used purposefully (*Web definitions for knowledge*, 2005). In the context of the model, knowledge refers to the theoretical information about a given issue or behavior (e.g., knowledge about the harmful effects of various drugs or the physical effects of anger).

Perceived behavioral control. Perceived behavioral control is a person's perception of their ability to perform a given behavior (Fishbein & Ajzen, 1975).

Behavioral Intention. Intention is the likelihood the respondent will engage in the behavior (Fishbein & Ajzen, 1975).

Beliefs of subjective norms. Beliefs of subjective norms is defined as the perceived social pressure and influence of important people in the environment. This is based on someone's normative beliefs and on someone's motivation to comply (Fishbein & Ajzen, 1975).

Attitudes. Attitudes are a person's consistently favorable or unfavorable evaluations, feelings, and tendencies toward an object or idea (Web definitions of attitudes, 2005).

An individual who is exposed to a prevention program will acquire certain information about the issue or behavior being addressed. This acquisition of information—or "knowledge"—will not have any direct impact on intention to change future behavior unless the information is internalized into actual behavioral skills. Such skills will only be acquired if the prevention program curriculum is designed to impact the youths' attitudes, beliefs of subjective norms, and perceived behavioral control. Only when the prevention program successfully impacts a positive change in these factors, will it translate into intention to change future behavior. Additionally, as suggested in the literature (Hilarky, 2004, Skiba, Monroe, and Wodarski, 2004) the prevention programs will have to be presented with sufficient frequency and intensity for such intention to change future behavior to translate into actual behavior change.

Synthesizing the Literature Review into the Current Study

Although a lot of research has been done over the last years on the best and proven ways of preventing substance abuse among youth, the problem still remains of how best to reach the target audience at the appropriate time. As stated earlier, school systems continue to be burdened with the responsibility of teaching non-academic material, thus placing a strain on resources and accountability for academic outcomes. In addition, delivery of prevention messages in a consistent and timely manner is also an issue due to the growing fragmentation of the student body across public, private, home and online schools. The use of the internet is therefore, gaining in popularity as a potentially viable medium for disseminating prevention programming.

Another aspect of online programming that would be of interest to the creators of web based prevention programs is the relative efficacy of such programs compared to traditional methods of delivery. Traditional methods of delivering prevention programs to youth have primarily been restricted to face-to-face presentations either in group or one-on-one settings.

Although many online programs reviewed demonstrated effectiveness in reducing the negative behaviors being addressed, none of them seemed to have studied the effectiveness of the program in comparison to such programs being delivered instead of or in combination with traditional methods.

Further, prevention efforts need to make a stronger link between exposure to prevention messages and actual behavior change. Ajen and Fishbein's proposed model of planned behavior change may be a possible explanatory model worth investigating.

The preceding literature review may be synthesized into the following key findings and observations:

1. The internet is a popular and viable option for dissemination of information to large audiences.

2. The internet is accessible by most youth, regardless of socioeconomic strata, both at home and in schools.

3. The internet is the media of choice for youth for collecting information and communicating with others.

4. The internet has various inherent qualities that lend itself to prevention programming.

5. The internet may be better suited to reach audiences with various learning approaches.

6. The best use of internet programming should incorporate and make full use of as many of the various interactive technologies that are available online.

7. Use of the internet allows for ongoing program evaluation and also allows for making any changes necessary to keep up with new information and user feedback.

8. Use of the internet as a tool for prevention programming is in its infancy and therefore, needs much more research as to effectiveness as compared to other means of providing such program—such as face-to-face programming.

9. Findings from evaluations of traditional substance abuse prevention suggest that the most effective programs address development of social skills and management of negative emotions in addition to providing factual information about the dangers of drug use.

10. In order for prevention programs to be effective, they must be delivered with adequate intensity y and frequency. One shot programs, especially those using fear tactics do not produce any lasting behavior changes.

11. Effective prevention programs do not focus only on providing knowledge about the issue being addressed. Programs need to focus on bringing about changes in attitudes, beliefs about subjective norms and perceived control over behavior.

12. Research also suggests that, although it may be difficult to measure actual changes in behavior, measuring intent to change behavior may be a good substitute.

In conclusion, teen substance abuse is a major human service problem. Prevention programs work if they are presented with enough frequency and intensity. Additionally, they must also go beyond providing theoretical information to helping students internalize the information by building skills, The problem of budget cuts poses a serious challenge in accomplishing these goals. Since teens view the internet as the medium of choice, it makes sense to investigate if and how online social services and prevention programs have proven themselves over the years. Learning theories and other theories suggest that successful prevention programs are those that make use of interactive tools that facilitate user involvement. A review of online prevention programs found that successful programs made use of as many features that the online environment had available (e.g., videos, interactive games, music, feedback). (see table 1). SAPVC.org is different from current online prevention programs in that it uses multimedia, games, music, stories that have all been developed by teens. This makes the program more “real” for the user. It would be very useful for the creators of sapvc.org, and, for those interested in developing future social service prevention programs, to know if and how sapvc.org works.

Thus, the purpose of this study is to assess the effectiveness of an online prevention program. The program being evaluated is the anger management exercise of SubstanceAbusePrevention.org, which is a web-based virtual prevention community for teens ages 13–18. The study will assess how effective the online anger management exercise is in changing students' knowledge, attitudes, beliefs, perceived behavioral control, and intention to use anger management methods.

CHAPTER III

METHODOLOGY

Introduction

This research is an exploratory study about the relative efficacy of online prevention methods compared to face-to-face methods. Additionally it seeks to examine the plausible link between prevention and actual intention to change behavior in the future. If such a link can be established, it would allow prevention program developers a way to actually measure the behavioral impact of prevention messages. The model planned behavior change presented by Ajzen (1991a) is used as a framework for examining the existence of such a link.

The Intervention Being Studied: SubstanceAbusePrevention.org

The Substance Abuse Prevention Virtual Community (SAPVC.org) is a prevention program focusing on reducing risk factors and fostering protective factors among teen ages 13–18 at risk for substance abuse or other adolescent problems. For simplicity, the term sapvc.org will be used for Substance Abuse Prevention Virtual Community. The virtual community is based on the resiliency model and utilizes both cognitive and behavioral approaches to addressing the issues. SubstanceAbusePrevention.org provides a variety of services including psycho-educational games, telling of stories, rap music, and interactive exercises in areas such as anger management, refusal skills, and handling difficult situations. Internet tools used include streaming audio and video, games, chat rooms, BBSs, listservs,

web pages, and email. Although many of the features are still being developed, the site intends to also provide a mechanism for counselors or parents to interact asynchronously with teens on many of the exercises. These students can get instant feedback from an adult while completing various exercises. The program is divided into areas for teens ages 13–15 and 15–18, adults, members and other visitors. There is also a section that contains music, stories, and animation messages written by various teens. Visiting teens can also create and submit their music, stories and animations. The skill building sections address conflict resolution, anger management, learning to deal with difficult situations, and substance abuse information. These exercises can be completed in an unstructured manner or in a structured format which contains a pre and post test and provides the user with a certificate of completion at the end of the exercise. Each of the skill building areas contains videos of scenarios depicting realistic events followed by discussion from an expert. This study will evaluate the anger management feature of this virtual community.

SubstanceAbusePrevention.org provides a variety of services including psycho-educational games, telling of stories, rap music, and interactive exercises in areas such as anger management, refusal skills, and handling difficult situations. The technologies used by SubstanceAbusePrevention.org include streaming audio/video, Flash animation, Java, and a dot net infrastructure.

In the exercises, the teen must first play the introductory video before any other action can occur. The video sets up a situation where a skill such as refusing drugs must be used. Users record what they would do in the situation. They then can listen to two or more teen stories, two or more adult experts, and watch three scenarios that illustrate the teens using refusal skills. Throughout the exercise, help, guidance, and supportive messages appear

Table 3. Services Available on sapvc.org

Service	How Services are Provided
Games such as Puzzles, Hockey, Choices, Trivia, Drugs & Ladders, Wordblaster, & Short Stories.	Games are designed to increase teens' knowledge and skills to make the healthy choices necessary to prevent substance abuse. Current game formats include (a) a puzzle game which uses teen created pictures and drawings that contain positive messages, (b) a choices game that presents scenarios where teens must make good choices to win, such as in dating and managing anger, (c) substance abuse educational games such as trivia and drugs and ladders, (d) a word building game using positive words and (e) a story construction game with positive prevention stories.
Exercises for teens, families, educators, & counselors	Exercises help teens, families, counselors, and school classes prevent substance abuse by improving their knowledge, attitudes, and skills. Teens can work independently or as part of a group guided by an adult counselor, teacher, or parent. Registration is required to complete the exercises if a teen wants a certificate, wants to participate as part of a group, or requests a exercise that requires logging on over a several day period. Families, educators, and counselors can set up a group by registering. Only those using the group name can see the exercise comments of the group. A completion notice and pre-post test scores are automatically sent to the person setting up the group when a group member completes the exercise.
News & resources	The substance abuse news and resources section provides the latest information and resources on substance abuse.
Music, animation, & artistic efforts	Teens have consistently told us that music is one of their most important communication mediums. We have several raps from teen artists wanting to communicate a message. Animation also is a powerful medium that we use to appeal to teens. Another artistic medium under development is our Mosaic, which is modeled after the AIDS quilt project.
Stories	Teens with substance abuse problems tell their stories and share what they have learned. Substance abuse is sometimes pictured as glamorous by the media. These stories paint a very different picture.
Information & referral	Throughout the web site, we provide links to other substance abuse prevention and treatment Web pages for teens. We also present the most important links on one page.
Screening	The screening page administers a 28 item screening for substance abuse risk based on the DAST (see reference links at the bottom of the screening page). Considering each item helps users understand their substance abuse risk, their potential to prevent abuse, and the health issues involved. The screening does not provide a diagnosis of substance abuse, dependence, or any other medical condition.
Educational information for teens	This page is for teens wanting to learn more about substance abuse.

in the center of the screen. Links to additional help, discussion questions, future activities, a discussion forum, and resources/references appear at the bottom right of the screen. Exercises can be delivered in three ways: (1) unstructured, (2) with pretest, posttest and certificate of completion emailed to a teacher or another significant adult, and (3) with adult guidance and interaction.

Protection of Human Subjects

The researcher completed the Institutional Review Board training for protection of human subjects and received a certificate of completion. The sapvc.org project had already received clearance from the IRB under protocol # 03-011 on July 22, 2003. Additional papers were filed for approval of changes made to the pre-post test. The IRB approved the modifications under the same protocol. Pre-post tests were pre numbered and distributed randomly among the students. There was no identifying information collected that could link the data to any particular student.

Hypotheses

To understand the hypotheses, it is important to know that the sample was divided into four groups as shown in table 5: (1) teacher-guided only; (2) teacher-guided supplemented by homework; (3) homework only; and (4) control (no intervention). The hypotheses that were tested are based on the findings from the literature and the model (figure 3) for planned behavior change proposed by Ajzen (1991a). Although the literature suggests several variables that impact risk behavior in youth (Hilarski, 2004), all the variables suggested by the literature and by the Ajzen model were not included in the model presented here. This was primarily due to the fact that this was a preliminary study with

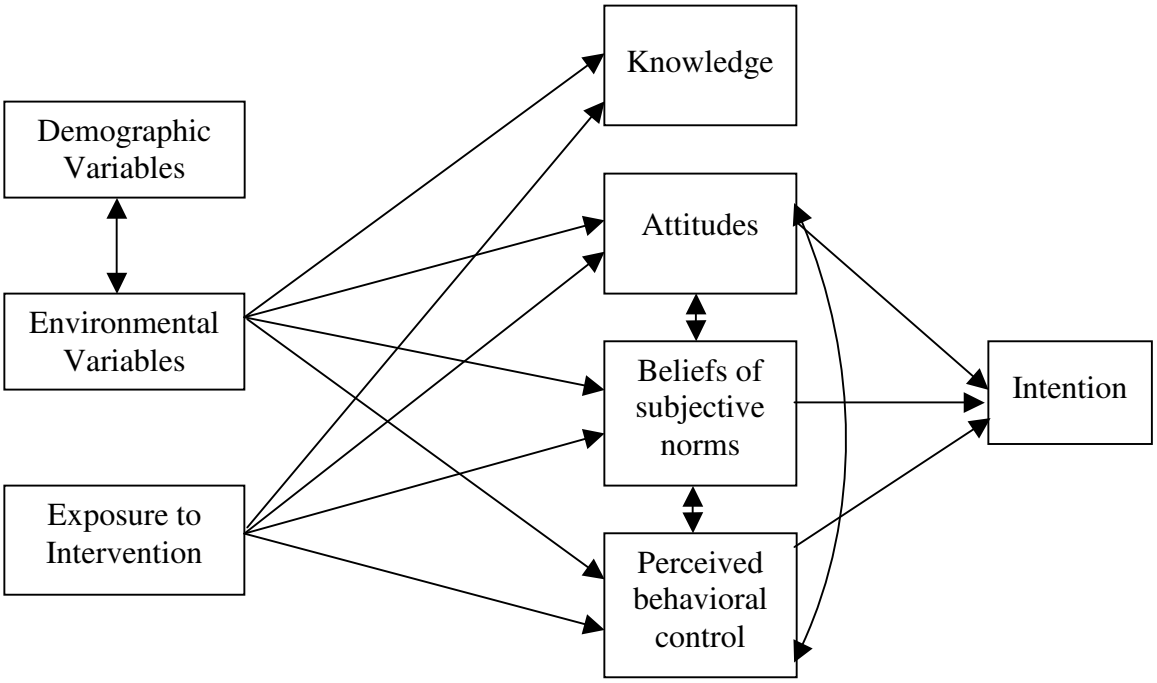

Figure 3. Hypothesized model for behavior change.

constraints in length of pre- and posttests. Some examples of variables excluded were consistency in discipline, parental supervision, parental and family history of drug use.

The following hypotheses were proposed:

1 **Exposure** to the online anger management exercise of the sapvc.org will be significantly related to **intention** to change future behavior.

*Teacher- guided sessions only **or** homework session only:*

1a. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** will have significantly higher scores on the posttest for **knowledge** of anger management compared to the control group.

1b. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session** only or **homework session only** will not have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, and perceived behavioral control** compared to the control group.

1c. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session** only or **homework session only** will not have a significant change in pretest versus post scores for **intention to change future behavior** compared to the control group.

*Teacher-guided session **supplemented by** homework session:*

1d. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session will have significant change in pretest versus post scores for **knowledge, attitudes, beliefs of subjective norms, and perceived behavioral control** compared to the control group.

1e. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session will have significant change in pretest versus post scores for **intention to change future behavior** compared to the control group.

Rationale. The above hypotheses are all consistent with Ajzen's (1991a) model of planned behavior change that proposes that exposure to an intervention or prevention message that impacts attitudes, beliefs of subjective norms and perceived behavioral control will also impact intention to change future behavior. Additionally, hypotheses **1d** and **1e** are

also consistent with the literature that suggests prevention messages need to be implemented with sufficient frequency and intensity for them to have any effect on behavior change (Hilarky, 2004; Skiba, Monroe, & Wodarski, 2004). Also of additional interest was how the outcome results of the delivery of the online sapvc.org program compares to the outcome results of more traditional methods used till now, namely classroom instruction.

2. **Environmental variables** (family bonding and friend's delinquent behavior) will be significantly related to **intention to change future behavior** compared to the control group.

Family bonding *with teacher-guided session only* ***or*** *homework session only:*

2a. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** **and** who have **strong family bonds** will have significantly increased scores on the posttest for **knowledge** of anger management compared to the control group.

2b. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** **and** who have **strong family bonds** will have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, and perceived behavioral control** compared to the control group.

Family bonding *with teacher-guided session* ***supplemented by*** *homework session:*

2c. Students exposed to the online anger management exercise of the sapvc.org in teacher-guided session **supplemented by** homework session **and** who have **strong family bonds** will have increased scores on the

posttest for **knowledge** of anger management compared to the control group.

2d. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session **and** who have **strong family bonds** will have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, and perceived behavioral control** compared to the control group.

Rationale. Hypotheses 2–2d are consistent with the literature related to the relationship between environmental variables and involvement with substance abuse and other delinquent behavior. The findings in the literature state that family bonding is a major protective factor against delinquent behavior and substance abuse (Hilarky, 2004; Skiba, Monroe, & Wodarski, 2004).

Friends who have delinquent behaviors *with teacher-guided session only or homework session only:*

2e. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** **and** who have **friends who have delinquent behaviors** will have increased scores on the posttest for **knowledge** of anger management compared to the control group.

2f. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** **and** who have **friends who have delinquent behaviors** will **not** have a significant change in pretest versus post scores for **attitudes, beliefs of**

subjective norms, and perceived behavioral control compared to the control group.

Friends who have delinquent behaviors *with teacher-guided session* ***supplemented by*** *homework session:*

2g. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session **and** who have **friends who engage in delinquent behaviors** will have significantly increased scores on the posttest for **knowledge** of anger management compared to the control group.

2h. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session **and** who have **friends who engage in delinquent behaviors** will have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, and perceived behavioral control** compared to the control group.

Rationale. Hypotheses 2e–2h are consistent with the literature related to the relationship between environmental variables and involvement with substance abuse and other delinquent behavior. The findings in the literature state that peer influences, in particular peer involvement in delinquent behavior, is a major risk factor for delinquent behavior and substance abuse (Hilarky, 2004; Skiba, Monroe, & Wodarski, 2004). Hypothesis 2h is also consistent with the suggestion in the literature that prevention programs should be delivered with adequate intensity and frequency for them to be effective.

Additionally, if presented with the required intensity and frequency they may be effective in mitigating the effects of some of the risk factors.

3. **Demographic variables:**

   3a. Demographic variables (age, gender, grade) will not be significantly related to **knowledge, attitudes, beliefs of subjective norms, perceived behavioral control and intention to change future behavior** while controlling for environmental variables.

   3b. Demographic variables (age, gender, and grade) will be significantly related to **environmental variables (family bonding, friend's delinquent behavior).**

Rationale. These hypotheses are consistent with the findings of Svensson (2003) and Yong (2003) which state that demographic variables are not directly linked to substance abuse or delinquent behavior. The authors state further that demographic factors such as gender and age are significantly related to environmental variables such as family bonding and supervision, and peer influences.

Measurement of Variables

The following variables were measured via a pre- and/or post test survey. The survey measured 8 variables with a total of 58 items. Items for each variable were averaged to get an individual score for every respondent.

Independent Variable

Exposure to intervention. Sample was divided into four groups as shown in table 4: (1) teacher-guided only, (2) teacher-guided supplemented by homework, (3) homework only,

and (4) control (no intervention). Additionally, exposure to prior anger control messages was assessed by questions 1–6 in appendix B.

1. Were you taught in any of your classes, including this one, about anger control?
2. Did you practice in any of your classes ways to control your anger?
3. Were you taught in any of your classes about the health effects of anger?
4. Have you read any books about anger control?
5. Have you completed any exercises on the internet (other than this one) or used a CD-ROM about anger control?
6. Have you attended any classes at church or in the community that taught you about anger control?

Control Variables

Demographic variables. Grade, gender, age. These were categorical variables to maintain consistency with the data collected online. Since data was being collected from youth the demographic information were restricted to these variables. For example, students may not know what their family income was to record socio-economic status.

Environmental Variables

Family bonding. This 6-item Family Bonding—Individual Protective Factor Index (Dahlberg, Toal, Swahn & Behrens, 2005) was proposed to be used to measure this construct. The school administrators were reluctant to grant permission to use the scale in its original form with negative statements about parent-child relationships. The negative statements were reworded to read positively and the scale was administered to a random sample of 20 teens (ages 13–17) to test for reliability. Reliability analysis provided an alpha of 0.84 after

deleting the second item, “My family expects too much of me.” The final scale used had the following five items (see question 2, appendix B):

1. I can tell my parents the way I feel about things.
2. I feel proud of my parents.
3. My family never lets me down.
4. I like to do things with my family.
5. I enjoy talking with my family.

Friends' delinquent behavior. Delinquent behavior is measured by the Friends' Delinquent Behavior-Adolescent Attitude Survey (Dahlberg, Toal, Swahn & Behrens, 2005). This is a 7-item survey that is designed to measure friends' risky and pro-social activities (e.g., gang, vandalism, church, homework). The scale was normed on middle school students in grades 6–8 and has an internal consistency of 0.55 to 0.68. It was developed by the Center for Urban Affairs and Policy Research, 1995 (as in Dahlberg, Toal, Swahn & Behrens, 2005).

Over the past 30 days, how many of the <u>friends</u> you spend most of your time with**:**

1. Suggested that you do something that was against the law?
2. Did nearly all of their homework?
3. Damaged or destroyed property that did not belong to them?
4. Participated in religious activities like going to church?
5. Were involved in gang activities?
6. Stopped a fight?
7. Hit or threatened to hit someone?

These items are given in question 3, appendix B.

Intervening Variables

*Knowledge***.** This variable will be measured in the context of anger control by seven statements based on information learned from the exercises in the sapvc.org program. These items are taken from the existing post test on the sapvc.org web site. The items represent factual information about anger and anger control as follows:

1. I know what an anger trigger is.
2. I know at least 3 anger triggers in my life.
3. I can identify at least three signs that I am getting angry.
4. Anger can have some negative effects on our bodies as well.
5. I know how I usually respond to anger triggers.
6. A good way to control your anger is to be a good listener.
7. I know of at least 3 healthy things I can do to diffuse my angry feelings.

These statements are given in question 1, items 7–13 in appendix B.

Perceived behavioral control. Behavioral control is measured by the 5-item Self-Efficacy Teen Conflict Survey (Dahlberg, Toal, Swahn & Behrens, 2005). These items measure an individual's confidence in his or her ability to control anger and resolve conflicts nonviolently. Respondents are asked to indicate how likely they would be to use certain nonviolent strategies. The scale was normed on middle school students, grades 6–8, and is reported as having internal consistency of 0.85. It was developed by Bosworth and Espelage 1995 (as in Dahlberg, Toal, Swahn & Behrens, 2005).

Please indicate how confident you feel in being able to:

1. Stay out of fights?
2. Understand another person's point of view?

3. Calm down when you are mad?
4. Talk out a disagreement?
5. Learn to stay out of fights?

These items are given in question 4, appendix B.

Behavioral intention. This was measured by the Violent Intentions—Teen Conflict Survey (Dahlberg, Toal, Swahn & Behrens, 2005). This 8-item scale measures intentions to use nonviolent strategies to control anger and conflict. The scale was normed on middle school students grades 6–8 and is reported as having internal consistency of 0.84. It was developed by Bosworth and Espelage, 1995 (as in Dahlberg, Toal, Swahn & Behrens, 2005)

The next time you are in a situation that makes me you angry, please indicate how likely you would be to:

1. Ignore the situation.
2. Ignore the situation and get the person later.
3. Try to talk it out.
4. Suggest peer mediation.
5. Channel your anger into something constructive.
6. Laugh it off.
7. Try to reduce your anger.
8. Try to see the other person's point of view.

These items are given in question 5, appendix B**.**

Beliefs of subjective norms. There are no existing scales available assessing beliefs about anger. Therefore, 10 belief statements about anger management were compiled for this study from two sources: Anger management for substance abuse and mental health clients,

http://kap.samhsa.gov/products/manuals/pdfs/anger2.pdf and Controlling anger—a self help guide, http://www.welwyn-hatfield-pct.nhs.uk/comms/counselling/ Controlling%20 Anger.pdf.

The 10 items were:

1. Most people believe that anger is inherited
2. Most people believe that anger automatically leads to aggression.
3. Most people believe that people must be aggressive to get what they want.
4. Most people believe that venting anger is always desirable.
5. Most people believe that anger is a habit.
6. Most people believe that if you don't let your anger out you'll explode
7. Most people believe that if you don't show anger you're either a saint or a wimp.
8. Most people believe that anger is something people fear and it stops them taking advantage of you.
9. Most people believe that if you get angry it takes away your anxiety.
10. Most people believe that they have good reason to be angry because of things other people have done to them.

The scale was administered to a random sample of 20 teens (ages 13–17) and tested for reliability using Cronbach's Alpha. The following items were deleted to produce a final reliability score of 0.76.

1. Most people believe that venting anger is always desirable
2. Most people believe that anger is a habit
3. Most people believe that if you don't let your anger out you'll explode

The final scale used consisted of the following 7 items:

1. Most people believe that anger is inherited.
2. Most people believe that anger automatically leads to aggression.
3. Most people believe that people must be aggressive to get what they want.
4. Most people believe that if you don't show anger you're either a saint or a wimp.
5. Most people believe that anger is something people fear and it stops them taking advantage of you.
6. Most people believe that if you get angry it takes away your anxiety.
7. Most people believe that they have good reason to be angry because of things other people have done to them.

The scale is represented by question 6, appendix B.

Attitudes. There were no scales found in the literature that measured this construct. The scale was, therefore, adapted from the Attitude Toward Conflict Scale (Dahlberg, Toal, Swahn & Behrens, 2005). The Attitude toward Conflict Scale was normed on 6th grade students in an urban school and was reported as having an internal consistency of 0.66 to 0.72.

1. If I'm mad at someone I just ignore them.
2. Even if other kids would think I'm weird I would try to stop from becoming really angry.
3. It's O.K. for me to get angry at someone to get them to do what I want.
4. Sometimes a person doesn't have any choice but to blow his top.

5. Sometimes the only way to calm down when you are really mad is by having a drink, taking a pill or smoking.
6. When my friends get mad I try to get them to calm down.
7. There are better ways to solve problems than by getting angry.
8. I try to talk out a problem instead of getting angry.
9. If people do something to make me really mad, they deserve to be shouted at.

The modified items measuring attitude towards anger are represented by question 7, appendix B.

Design

This study was a non-randomized control group with a pre- posttest design as described by Isaac and Michael (1977). This design utilizes treatment groups and a comparison group. In this design the subjects are not assigned to groups at random. Subjects are selected from pre-assembled groups, as availability permits, that are similar. Although the randomized control trial is the "ideal" design, this design is the next best available. Conducting a randomized control trial with an acceptably large sample size is extremely difficult. The problem is primarily due to time constraints. For this study the issue was availability of students and also time constraints. Students and teachers were on a tight schedule, for both the junior high schools and the high schools, and were unwilling to participate in the a study that had a complex research protocol. If the subjects in the groups are similar in demographic and other relevant characteristics, the non-randomized control group with a pre- posttest design is cited as providing reliable results (Isaac & Michael, 1977; U.S. Dept. of Education, http://www.ed.gov/rschstat/research/pubs/rigorousevid/guide_pg5.html, section #3)

The study compared the pre- and posttest scores of students who used this exercise under three different conditions (the experimental groups) with a comparable group of students who had not used the program (the comparison group). The design used maybe illustrated by the following table:

Table 4. Study Design

Group	**Pre test**	**Exer-cise in class-room**	**Post test**	**Pre test**	**Exer-cise in compu-ter lab**	**Post test**	**Pre test**	**No treat-ment**	**Post test**
	Pre/post tests completed by students in class – paper/pencil			Pre/post test completed by students online or paper/pencil			Pre/post test completed by students in class – paper/pencil		
Teacher-guided only	X	X	X						
Teacher-guided and homework	X	X	X	X	X	X			
Homework only				X	X	X			
Control group							X		X

X represents the administration of the pre/post tests and exposure to exercises.

Sample

G*Power (http://www.psycho.uni-duesseldorf.de/aap/projects/gpower/) a general power analysis program available online, was used to estimate the optimal sample size. G*Power performs high-precision statistical power analyses for statistical tests such as t-tests (independent samples, correlations, and any other t-test), F-tests (ANOVAS, multiple correlation and regression, and any other F-test), and Chi^2-tests (goodness of fit and

contingency tables). G*Power computes power values for given sample sizes, effect sizes, and alpha levels (*post hoc power analyses*), sample sizes for given effect sizes, alpha levels, and power values (*a priori power analyses*), and alpha and beta values for given sample sizes, effect sizes, and beta/alpha ratios (*compromise power analyses).*

Table 5. Distribution of Sample

	Teacher-guided Pretest -X- Posttest	Teacher-guided Followed by Homework Pretest -X- Posttest	Homework Pretest -X- Posttest	Control Group Pretest Posttest	Total
School	Number of Students				
Junior High	23	12	21	22	78
Senior High	21	17	22	17	77

The recommended total sample size for a medium effect size of 0.5 and power of 0.95 with alpha of 0.05 was 176 (a priori analysis). This study recruited 155 students which were divided among the treatment and control groups as in table 5. Post hoc power analysis for a sample of 155 respondents with a medium effect size of 0.5 and an alpha of 0.05 was 0.93. The power of a test is defined as 1-beta, where beta is the probability of failing to reject the hypothesis tested when that hypothesis is false. Alpha to indicate the probability of rejecting the statistical hypothesis tested when in fact the hypothesis is true. The effect size is a statistic used to quantify the difference between two groups (Isaac & Michaels, 1977).

The junior high school sample was recruited from the after school program at the White Plains Youth Bureau in New York. Overall, there were an equal number of male and

female students in the sample. The majority of the sample was in 7th grade (83%) and under 13 years of age (76%). Seventy six percent of the sample was non-white, either African American (39%) or Hispanic (37%). Since all the junior high school sample was recruited from the same school the demographic distribution was more even across each of the four groups being studied (see table 6).

Table 6. Junior High Sample Demographics

	Group				Total
	HW only*	TG only*	TG+HW*	Control	
Gender					
Male	10	6	10	14	40
Female	11	17	2	8	38
Total	21	23	12	22	78
Grade					
7	14	21	10	20	65
8	7	2	2	2	13
Total	21	23	12	22	78
Age					
Under 13	8	19	8	14	49
13-15	13	4	4	8	29
Total	21	23	12	22	78
Ethnicity					
White	5	4	--	1	10
African-Am.	10	6	6	9	31
Hispanic	4	10	5	10	29
Asian	--	1	1	2	4
Other	2	2	--	--	4
Total	21	23	12	22	78

*HW = exposure to sapvc.org as homework assignment
TG = exposure to sapvc.org in a teacher-guided session
TG + HW = exposure to sapvc.org in a teacher-guided session supplemented by homework session

In the high school sample, students for two groups (teacher-guided and control) were provided by the Peer Assistance Leadership classes in the Arlington ISD, Texas. The students for the other two groups (teacher-guided + homework and homework only) were provided by the White Plains Youth Bureau.

Table 7. High School Sample Demographics

	Group				Total
	HW only*	TG only*	TG+HW*	Control	
Gender					
Male	7	2	6	7	22
Female	15	19	11	10	55
Total	22	21	17	17	77
Grade					
9	3		10		13
10	1		6		7
11	8	19	1	12	40
12	10	2		5	17
Total	22	21	17	17	77
Age					
13-15	3		8		11
15-18	19	21	9	17	66
Total	22	21	17	17	77
Ethnicity					
White	5	14	5	10	34
African-Am.	8	5	3	6	22
Hispanic	7	2	6	1	16
Asian	1		1		2
Other	1		2		3
Total	22	21	17	17	77

*HW = exposure to sapvc.org as homework assignment
TG = exposure to sapvc.org in a teacher-guided session
TG + HW = exposure to sapvc.org in a teacher-guided session supplemented by homework session

The Arlington ISD groups comprised entirely of 11th and 12th grade students sentence does not make sense. What does location have to do with grade? The teacher-guided + homework and the homework only groups were selected from the White Plains Youth Bureau program and had students from 9th–12th grade (see table 7). The majority of students in the high school sample were White (44%) compared to African American (28%) and Hispanic (21%).

Internal Validity

In studies that have groups with matched or similar subjects, the use of a control group insures against mistaking the effects of history, pre-testing, maturation, and instrumentation as the main effects of the experimental treatment (Isaac & Michael, 1977). The control group also addresses concerns related to regression towards the mean.

In this study, the subjects were not randomly assigned and the groups did not have matched samples. An F test was conducted to estimate any differences between group means at pretest for both the junior high and high school samples (see tables 8 and 9). In the junior high school sample there were significant differences at pretest for the variable "attitude" and prior exposure to anger management exercises (see table 8). For the high school sample there were significant differences between groups at the pretest on all the dependent variables except "normative beliefs" (see table 9). This may affect the degree of change that occurs at posttest and should be kept in mind when interpreting the results. Data transformations could have been performed to equalize the group means at pretest; however, researchers caution against the use of extensive transformations (Garson, 2001).

Additionally, effects from carry over learning from pretest to post test may occur and may contaminate the final results. Students from the various sub samples may also

Table 8. Junior High Sample–ANOVA

		df	F	Sig.
Prior exposure	Between groups*	3	7.774	0.000**
Pre-test knowledge	Between groups*	3	0.980	0.407
Pre-test perceived behavioral control	Between groups*	3	0.736	0.534
Pre-test intention to change behavior	Between groups*	3	1.133	0.342
Pre-test attitude	Between groups*	3	3.290	0.025**
Pre-test normative beliefs	Between groups*	3	0.397	0.755

*groups = Homework only, Teacher-guided only, Teacher-guided + homework, Control
** p< 0.05

Table 9. High School Sample—ANOVA

		df	F	Sig.
Prior exposure	Between groups*	3	4.338	0.007**
Pre-test knowledge	Between groups *	3	10.772	0.000***
Pre-test perceived behavioral control	Between groups*	3	4.019	0.011***
Pre-test intention to change behavior	Between groups*	3	6.579	0.001***
Pre-test attitude	Between groups*	3	3.930	0.012**
Pre-test normative beliefs	Between groups*	3	0.455	0.715

*groups = Homework only, Teacher –guided only, Teacher-guided + homework, Control
** p< 0.05; *** p< .01

communicate with one another which may affect the independence of the results. Pretest and post test records were examined to check for effects from mortality. Each of the students in the final sample had both pre and post test scores.

Survey Reliability

The survey used is made up of several individual subscales that measure into various constructs. The reliability of these individual subscales is given under the section on "Measurement of Variables."

Additionally, reliability tests were also run for the high school survey and the junior high school survey. The pretest scores for each sample were used to test for reliability. The high school group survey had a reliability of 0.8834 and the junior high school group survey had a reliability score of 0.7489. It is possible that the junior high school reliability score is lower because many of the students answered the questions in a random manner, not taking the process very seriously.

Procedure

Due to problems encountered with the web site and the reluctance of students to complete the exercises as required, some modifications had to be made to the way the design was implemented. Originally, the entire sample was to be provided by the Arlington ISD, Texas. However, the high school teachers were restricted by school policy from assigning computer based assignment as homework. The reason cited was that not all students had access to computers outside of school. The teachers, therefore, took the "homework" group to the school computer lab and provided them time to complete the exercise on their own (a condition that could have permitted group members to discuss computer strategies or homework solutions. This would mean high risk that each student could have shared observations that in turn affected scores or non-independence of observations). However, although the students were able to log in to the sapvc.org site and complete the pretest, the computer software did not support the viewing of video files and students were unable to complete the exercises. Thus, the researcher recruited the remaining sample from the after-school program at the White Plains Youth Bureau in New York. Only the high school teacher-guided and control groups were provided by the Arlington ISD. Additionally, because of technical difficulties encountered with the program, most students were unable to

complete the pre- posttests online and had to complete them using paper tests. The researcher had anticipated the possibility of technical difficulties and had the paper tests available as a backup.

Groups were set up using unique identifiers to differentiate between high school and junior high school samples. The researcher set up unique usernames and passwords for each student which was used to log into the sapvc.org program. These usernames/ passwords also differentiated between the various treatment and control groups.

Each session lasted approximately 45–50 minutes. Pre- and posttests were administered and completed by each student (see appendix B). Note that the scoring indicated for each of the items was all in the same direction when the survey was administered so as not to bias the responses. Since the scales used to design the survey were adapted from several sources, in order to bring about some degree of consistency in data, they were modified from discrete type to continuous type scales (see appendix B). This is also in keeping with the design of scales suggested by Ajzen (1991c) that he used to test the model of planned behavior

Data Analysis

The key data to be examined was the change in scores from pretest to posttest for each of the dependant variables across the treatment and control groups. Additionally, data was analyzed separately for the junior school and high school samples. Originally the sapvc.org program was set up to offer separate exercises for the junior high and high school groups. Separate analyses would indicate if there was any difference in the way the two groups interacted with and responded to the content. Change scores were computed for each of the dependent variables. The mean change scores and standard deviations for the junior high

school and high school samples are given in tables 10 and 11. Examination of this data reveals that there was a large spread in change scores for each variable across the groups in both samples. This may be an indication of the randomness with which respondents may have responded to the survey items. Thus, results for the hypotheses tests must be interpreted with caution.

Table 10. Junior High Sample Descriptive Statistics

	Change in Knowledge	Change in Behavioral Control	Change in Intention	Change in Attitude	Change in Beliefs	Family Bond-ing	Friends Del. Behavior
HW only							
N	20	21	20	21	21	21	21
Mean	0.07	-0.12	0.04	0.11	0.35	2.73	3.24
Std. Dev	0.33	0.89	0.56	0.50	0.72	0.56	0.58
TG only							
N	22	22	20	22	18	22	20
Mean	0.24	0.45	0.31	-0.09	-0.21	2.59	3.67
Std. Dev	0.31	0.85	0.62	0.50	0.83	0.73	0.55
TG+HW only							
N	12	10	12	12	11	12	10
Mean	0.05	0.52	0.20	-0.28	0.74	2.39	0.63
Std. Dev	0.27	0.94	0.72	0.66	0.62	0.73	0.66
Control							
N	22	21	18	21	21	22	21
Mean	0.50	0.06	-0.06	-0.01	0.21	2.61	3.73
Std. Dev	0.16	0.77	0.71	0.47	0.46	0.62	0.45

*HW = exposure to sapvc.org as homework assignment
TG = exposure to sapvc.org in a teacher-guided session
TG + HW = exposure to sapvc.org in a teacher-guided session supplemented by homework session

Table 11. High School Sample Descriptive Statistics

	Change in Knowledge	Change in Behavioral Control	Change in Intention	Change in Attitude	Change in Beliefs	Family Bond-ing	Friends Del. Behavior
HW only							
N	22	22	21	22	22	22	22
Mean	-0.12	-1.27	-0.12	-0.77	-0.17	3.86	3.62
Std. Dev	0.22	0.93	0.92	0.85	1.04	0.65	0.41
TG only							
N	21	20	21	20	21	21	21
Mean	0.21	0.10	0.10	0.06	0.14	3.40	3.86
Std. Dev	0.18	0.26	0.48	0.38	0.74	0.65	0.36
TG+HW only							
N	17	16	17	17	17	17	17
Mean	0.32	-1.27	0.59	-0.10	0.24	3.34	3.23
Std. Dev	0.15	1.47	1.19	0.60	0.74	0.99	0.57
Control							
N	17	17	17	17	17	16	17
Mean	0.00	-0.02	0.07	0.14	0.14	3.91	3.79
Std. Dev	0.15	0.27	0.86	0.40	0.43	0.65	0.46

*HW = exposure to sapvc.org as homework assignment
TG = exposure to sapvc.org in a teacher-guided session
TG + HW = exposure to sapvc.org in a teacher-guided session supplemented by homework session

Data Assumptions

The tests used for hypotheses testing were correlation, partial correlation, and linear regression analysis. Each of these tests is based on certain assumptions about the data. Violations of these assumptions render the test results difficult to interpret. This data set was tested for violations of normal distribution of the residuals (predicted minus observed values), linearity, homogeneity of variance, multicollinearity, and independence of observations.

Normality. The Kolmogrov-Smirnov D test was used to test whether the data conformed to a normal distribution (see tables 12 and 13). Histograms for each variable with the normal curve superimposed are given in appendix A. Significant finding indicates deviation from normality. All variables failed the test for normality except "change in attitude." For the junior high school sample all variables met the test for assumption that the data was normally distributed except "change in Belief" and "change in Perceived Behavioral Control." Histograms for each variable with the normal curve superimposed are given in appendix A.

Table 12. High School Sample Tests of Normality

	Kolmogorov-Smirnov Statistic*	df	Sig.
Change in Belief	0.136	72	0.002**
Change in Attitude	0.077	72	0.200
Change in Intention to Change Behavior	0.194	72	0.000**
Change in Perceived behavioral Control	0.223	72	0.000**
Change in Knowledge	0.153	72	0.000**
Friends with Delinquent Behavior	0.198	72	0.000**
Family Bonding	0.126	72	0.007**

*Lilliefors Significance Correction; **significant at p<0.01

Table 13. Junior High School Sample Tests of Normality

	Kolmogorov-Smirnov Statistic*	df	Sig.
Change in Belief	0.215	53	0.000**
Change in Attitude	0.092	53	0.200
Change in Intention to Change Behavior	0.094	53	0.200
Change in Perceived Behavioral Control	0.123	53	0.045*
Change in Knowledge	0.103	53	0.200
Friends with Delinquent Behavior	0.102	53	0.200
Family Bonding	0.104	53	0.200

Lilliefors Significance Correction; *significant at p<0.05; ** significant at p<0.01

Linearity. Correlation and regression analysis assume a linear relationship between the independent and dependent variables. If the relationship between independent variables and the dependent variable is not linear, the results of the regression analysis will under-estimate the true relationship. Linear relationship was tested by examining the scatterplots of the predicted and residual values for each regression test. A random distribution of the values indicates a linear relationship. All the scatterplots examined followed a random distribution of values indicating a linear relationship between the dependent and independent variables.

Homogeneity of variance. The Levene statistic was used to test for homogeneity of variance (see tables 14 and 15) for each variable.

Table 14. Junior High School Sample: Test of Homogeneity of Variance

	Levene Statistic	df1	df2	Sig.
Change in Knowledge	3.277	3	72	0.026*
Family Bonding	0.599	3	73	0.618
Friends with Delinquent Behavior	1.277	3	68	0.289
Perceived Behavioral Control	0.685	3	70	0.564
Change in Intention	0.251	3	66	0.860
Change in Attitude	0.639	3	72	0.592
Change in Normative Beliefs	2.924	3	67	0.040*

*significant at $p<0.05$

This test of homogeneity of variance tests the assumption that each group of the independent variable has the same variance on a dependent variable (Garson, 2001). For the junior high school sample, change in knowledge and change in beliefs had significant differences in variances across groups. For the high school sample, change in intention, change in behavioral control, change in beliefs, and change in attitude all had significant differences in variances across groups.

Table 15. High School Sample: Test of Homogeneity of Variance

	Levene Statistic	df1	df2	Sig.
Change in Knowledge	1.268	3	73	0.292
Family Bonding	2.108	3	72	0.107
Friends with Delinquent Behavior	1.452	3	73	0.235
Perceived Behavioral Control	14.200	3	71	0.000**
Change in Intention	4.182	3	72	0.009**
Change in Attitude	6.236	3	72	0.001**
Change in Normative Beliefs	3.969	3	73	0.011*

* significant at p<0.05; ** significant at p<0.01

Multicollinearity. The tolerance value and the variance inflation factor (VIF) were examined for each of the independent variables used for the regression analysis. As the tolerance level decreases from 1, the greater the inter-correlation among the independent variables. None of the independent variables had a problem with multicollinearity.

*Independence***.** Regression analysis also assumes an independence of observations. Since this study involves a "before and after" design, the observations cannot be truly independent. The respondents may have some carry over effect from the pretest or the respondents may have discussed the study between tests. All these effects may contaminate the tests.

Results

The following hypotheses were tested at the 95% level of significance:

1. **Exposure** to the online anger management exercise of the sapvc.org will be significantly related to **intention** to change future behavior controlling for prior exposure to anger control prevention.

Partial correlation analysis was used to test this hypothesis**.** The correlation coefficient is a measure of the degree of linear relationship between two variables, usually labeled X and Y. While in regression the emphasis is on predicting one variable from the other, in correlation the emphasis is on the degree to which a linear model may describe the relationship between two variables. In regression the interest is directional, one variable is predicted and the other is the predictor; in correlation the interest is non-directional, the relationship is the critical aspect (Stockburger, 1996).

Findings. No significant relationship was found between exposure and intention to change behavior for either the junior high school sample (r=0.159, p=0.189) or the high school sample (r=0.0762, p=0.516).

*Teacher-guided session only **or** homework session only:*

1a. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** will have significantly higher scores on the post test for **knowledge** of anger management compared to the control group while controlling for prior exposure to anger management**.**

1b. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session** only or **homework session only** will not have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, and perceived behavioral control** compared to the control group while controlling for prior exposure to anger management**.**

1c. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session** only or **homework session only** will not have a significant change in pretest versus post scores for **intention to change future behavior** compared to the control group while controlling for prior exposure to anger management**.**

*Teacher-guided session **supplemented by** homework session:*

1d. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session will have significant change in pretest versus post scores for **knowledge, attitudes, beliefs of subjective norms, and perceived behavioral control** compared to the control group while controlling for prior exposure to anger management**.**

1e. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session will have significant change in pretest versus post scores for **intention to change future behavior** compared to the control group while controlling for prior exposure to anger management.

A regression equation was used to test hypotheses 1a–1e. Multiple regression analysis, studies the relationship between one dependent variable and several independent variables (called predictors). For this hypothesis the independent variables would be exposure to sapvc.org. Dummy variables were created for each treatment group which was used as the independent variable. Multiple regression can establish that a set of independent variables explains a proportion of the variance in a dependent variable at a significant level

(significance test of R^2). It can also establish the relative predictive importance of the independent variables (comparing beta weights). In this study, multiple regression was used to assess whether exposure to the online sapvc.org program in three different situations explains any variance in intention to change future anger control behavior. Prior exposure to anger management was controlled for by entering this variable in the first step of the regression analysis. Sub samples were selected using the criteria of type of exposure and a separate regression equation was tested for each of the dependent variables. It was also used to assess the relative predictive importance of each type of exposure on intention to change behavior.

Findings. For both the Junior high and the high school samples (see tables 16 and 17) only the teacher-guided group had significantly higher scores on knowledge compared to the control group (B=0.341 and 0.547, p=0.027 and 0.000 respectively). There are two plausible reasons for this finding. The subjects may have discussed answers while taking the tests or the teacher-guided session is truly a stronger format for dissemination of information. For the junior high sample there was no significant change from pre test to post test for attitudes, beliefs of subjective norms, perceived behavioral control, and intention to change behavior compared to the control group. Thus, the hypotheses were accepted for this sample. For the high school sample there was no significant change from pre- test to posttest for beliefs of subjective norms, intention to change behavior, attitude and perceived behavioral control for the teacher-guided group compared to the control group**.** Thus, the hypotheses were accepted for this sample also. There was, however, a significant difference for attitude and perceived behavioral control (see table 16) for the homework group only compared to the control group.

For the junior high sample, the teacher-guided supplemented by homework group (see table 16) showed significant change in normative beliefs but not on any other variables. For the high school sample, the teacher-guided supplemented by homework group had significantly higher scores on knowledge and perceived behavioral control compared to the control group.

The results are also graphically depicted in the tables and charts in appendix B. The pre- and posttest means of each dependent variable has been graphed for each treatment group.

Table 16. Regression of Exposure on Dependent Variables

	Junior High Sample		High School Sample	
	Groups		Groups	
	Homework Only	Teacher-guided	Homework Only	Teacher-guided
Knowledge	B=0.206 p=0.278	**B=0.341** **p=0.027***	B= -0.165 p=0.332	**B=0.547** **p=0.000****
Intention to change behavior	B=0.172 p=0.458	B=0.236 p=0.184	B= -0.087 p=0.643	B=0.017 p=0.922
Normative Beliefs	B=0.058 p=0.768	B= -0.199 p=0.220	B= -0.134 p=0.461	B=0.001 p=0.997
Perceived behavior control	B=0.121 p=0.504	B=0.287 p=0.076	**B= -0.616** **p=0.000****	B=0.242 p=0.141
Attitude	B=0.137 p=0.477	B= -0.144 p=0.362	**B= -0.511** **p=0.002****	B= -0.107 p=0.534

*significant at p<0.05; ** significant at p<0.01. B = standardized regression coefficient

Table 17. Regression of Exposure on Dependent Variables

	Junior High Sample	High School Sample
	Teacher-guided + Homework group	Teacher-guided + Homework group
Knowledge	B=0.007 p=0.907	**B=0.755** **p=0.000***
Intention to change behavior	B=0.223 p=0.228	B=0.288 p=0.086
Normative Beliefs	**B= 0.450** **p=0.011***	B=0.094 p=0.602
Perceived behavioral control	B=0.225 p=0.196	**B=0.501** **p=0.003***
Attitude	B= -0.244 p=0.178	B= -0.227 p=0.205

* significant at p<0.01. B = standardized regression coefficient

The R-square explains the amount of variance in the dependent variable explained by the independent variable. Being in the teacher-guided versus the control group accounted for 30% of the variance in the change of knowledge scores for the high school group (see table 18) but only 16% of the variance in the junior high school sample (see table 19). Being in the homework group versus the control group (see table 18) accounted for 44% of the variance in change in perceived behavioral control and 32% of the variance in change in attitude.

Table 18. High School Sample: Variance Explained by Treatment Group for Significant Dependent Variables

	R-square	Mean	Std. Error of estimate
Knowledge–TG group	0.304	0.117	0.1684
Perceived Behavior Control–HW group	0.440	-0.7262	0.7308
Attitude–HW group	0.316	-0.3732	0.6963

Table 19. Junior High School Sample: Variance Explained by Treatment Group for Significant Dependent Variables

	R-square	Mean	Std. Error of estimate
Knowledge	0.156	0.1429	0.2477

Table 20. Junior High and High School Sample: Variance Explained by Treatment Group for Significant Dependent Variables

	R- square		Mean		Std. Error of estimate	
	Jr. High TG+HW	High Sc. TG+HW	Jr. High TG+HW	High Sc. TG+HW	Jr. High TG+HW	High Sc. TG+HW
Knowledge	--	0.562	--	0.1585	--	0.1483
Normative Beliefs	0.204	--	0.3929	--	0.5240	--
Perceived Behavior Control	--	0.308	--	-0.6306	--	1.0322

Being in the teacher-guided + homework group versus the control group for the high school sample accounted for 56% variance in change in knowledge and 30% variance in change in perceived behavioral control. For the junior high school group, being in the teacher-guided + homework group versus the control group accounted for 20% of the variance in change in normative beliefs.

2. **Environmental variables** (family bonding and friend's delinquent behavior) will be significantly related to **intention to change future behavior** controlling for prior exposure to anger management exercises.

Partial correlation analysis was used to test this hypothesis and to determine if there was a significant relationship between environmental variables and intention to change behavior.

Findings. Strong Family Bonding was defined as any respondent that scored more than 3 on the family bonding scale (question 2) on the survey. Friends with Delinquent Behavior was defined as any respondent scoring less than 4 on the Friends with Delinquent Behavior scale (question 3) on the survey.

For the high school sample family bonding was significantly related to intention to change behavior (r= -0.244, p=0.035), however the variables were negatively related meaning that respondents with strong family bonds exhibited lower intention to change behavior than those with weaker family bonds. Having friends with delinquent behavior was not significantly related to intention to change behavior (r= -0.219, =0.057).

For the junior high school sample neither family bonding (r=0.134, p=0.269) nor having friends with delinquent behavior (r=0.038, p=0.766) were significantly related to intention to change behavior.

Family bonding *with teacher-guided session only* ***or*** *homework session only:*

2a. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** **and** who have **strong family bonds** will have significantly increased scores on the post test for **knowledge** of anger management compared to the control group and controlling for prior exposure to anger management exercises.

2b. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only**

and who have **strong family bonds** will have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, perceived behavioral control, and intention to change behavior** compared to the control group and controlling for prior exposure to anger management exercises.

A regression equation was used to test the hypotheses 2a–2h. Sub samples of students were selected based on each of the different types of exposure and a separate regression equation was tested for the effect of each of the environmental variables separately on each of the dependent variables.

Findings. For the junior high school sample neither the homework group nor the teacher-guided group was significantly different from the control group on any of the dependent variables (see table 21). The lack of significant findings may be due, in part to the small sample sizes. However, some of the effect size (B weights) were in the mid to high range.

For the high school sample (see table 22), the sample sizes were somewhat larger. For this sample the homework group was negatively related to perceived behavioral control and attitude. This indicates that the control group had significantly higher scores at post test than the homework group. Visa versa, the results also indicate that although the change in scores from pre- to posttest was much larger for the treatment group, the change was a decline in post test scores compared to the control group. These pre- and post mean scores of each dependent variable has been graphed for each treatment group for those respondents that had strong family bonds (see appendix C). Thus, although there was a statistically significant change in scores, the hypothesis was rejected.

Table 21. Regression of Teacher-guided or Homework Groups with Strong Family Bonds* on Dependent Variables

	Junior High Sample			
	Homework Only Group	N	Teacher-guided Group	N
Knowledge	B=0.579 p=0.249	11	B= -0.223 p=0.442	14
Intention to change behavior	B=0.431 p=0.659	9	B=0.394 p=0.281	12
Normative Beliefs	B= -0.017 p=0.966	11	B= -0.304 p=0.410	11
Perceived behavioral control	B= -0.004 p=0.993	11	B=0.199 p=0.531	14
Attitude	B= -0.821 p=0.100	11	B= -0.190 p=0.419	13

*Strong Family Bonding (score > 3). B = standardized regression coefficient

Table 22. Regression of Teacher-guided or Homework Groups with Strong Family Bonds* on Dependent Variables

	High School Sample			
	Homework Only Group	N	Teacher-guided Group	N
Knowledge	B= -0.134 p=0.464	33	**B=0.544, p=0.003****	29
Intention to change behavior	B= -0.068, p=0.738	32	B= -0.046, p=0.814	29
Normative Beliefs	B= -0.030, p=0.876	33	B= -0.163, p=0.399	29
Perceived behavioral control	**B= -0.602, p=0.000****	33	B=0.304, p=0.096	29
Attitude	**B= -0.476, p=0.005****	33	B= -0.047, p=0.817	28

*Strong Family Bonding (score>3); ** significant at p<0.01.

Table 23. High School Sample with Strong Family Bonds Variance Explained by Treatment Group for Significant Dependent Variables

	R-square	Mean	Std. Error of estimate
Knowledge–TG group	0.303	0.1909	0.1599
Perceived Behavioral Control—HW group	0.433	-0.7597	0.7639
Attitude – HW group	0.368	-0.4478	0.6836

For the teacher-guided group, significant differences were found only for change in knowledge where the treatment group showed higher post test scores than the control group (see table 22). Being in the treatment group versus being in the control group accounted for approximately 30% of the variance in change in knowledge scores for this sample (see table 23).

Family bonding *with teacher-guided session* ***supplemented by*** *homework session:*

2c. Students exposed to the online anger management exercise of the sapvc.org in teacher-guided session **supplemented by** homework session **and** who have **strong family bonds** will have increased scores on the post test for **knowledge** of anger management compared to the control group and controlling for prior exposure to anger management exercises.

2d. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session: **and** who have **strong family bonds** will have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, perceived behavioral control, and intention to change**

behavior compared to the control group and controlling for prior exposure to anger management exercises.

Findings. Here again, for the junior high school groups the sample size was small (see table 24). There were no significant differences found in the post test for the treatment group compared to the control group. The B weight for normative beliefs was high (0.774). It is possible that if the sample size had been larger, the finding may have been statistically significant.

Table 24. Regression of Teacher-guided + Homework Group with Strong Family Bonds* on Dependent Variables

	Junior High Sample	N	High School Sample	N
	Teacher-guided + Homework group		Teacher-guided + Homework group	
Knowledge	B=0.098 p=0.674	7	**B=0.793** **p=0.000****	26
Intention to change behavior	B=0.129 p=0.815	6	B=0.107 p=0.569	26
Normative Beliefs	B=0.774 p=0.053	7	B=0.163 p=0.425	26
Perceived behavioral control	B= -0.088 p=0.859	7	**B= -0.603** **p=0.001****	25
Attitude	B=0.352 p=0.172	7	B= -0.173 p=0.395	26

*Strong Family Bonding (score > 3); ** significant at p<0.01
B = standardized regression coefficient

For the high school sample, the treatment group did have significantly higher post test scores compared to the control group for knowledge. The treatment group had significantly *lower* scores at post test for perceived behavioral control compared to the

control group (negative relationship). No significant differences were found for any other dependent variables (see appendix C)

Table 25. TG + HW Group with Strong Family Bonds* Variance Explained by Treatment Group for Significant Dependent Variables

	R-square	Mean	Std. Error of Estimate
Knowledge–HS sample	0.623	0.1490	0.1383
Perceived behavioral control–HS sample	0.441	-0.7605	1.036
Normative Beliefs–Jr. High sample (not significant)	(0.650)	(0.5102)	Not computed due to non significance

*Strong Family Bonding (score > 3)

Friends who have delinquent behaviors *with teacher-guided session only* ***or*** *homework session only*

2e. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** **and** who have **friends who have delinquent behaviors** will have increased scores on the post test for **knowledge** of anger management compared to the control group and controlling for prior exposure to anger management exercises.

2f. Students exposed to the online anger management exercise of the sapvc.org in a **teacher-guided session only** or **homework session only** **and** who have **friends who have delinquent behaviors** will **not** have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, perceived behavioral control, and intention to**

change behavior compared to the control group and controlling for prior exposure to anger management exercises.

*Findings***.** For the junior high sample the teacher-guided group did have significantly higher scores at post test compared to the control group (see table 26).

Table 26. Junior High Sample: Regression of Teacher-guided or Homework Group Who Have Friends with Delinquent Behavior* on Dependent Variables

	Junior High Sample			
	Homework Only Group	N	Teacher-guided Group	N
Knowledge	B=0.381 p=0.077	30	**B=0.407** **p=0.035****	28
Intention to change behavior	B=0.090 p=0.732	28	B=0.289 p=0.197	24
Normative Beliefs	B=0.371 p=0.106	30	B=0.088 p=0.680	24
Perceived behavioral control	B=0.067 p=0.754	31	B=0.215 p=0.271	29
Attitude	B=0.044 p=0.843	30	B= -0.328 p=0.097	28

*Friends with Delinquent Behavior = (score <4); ** significant at p<0.05
B = standardized regression coefficient

Approximately 20% of the variance in change of knowledge scores is accounted for by being in the teacher-guided versus the control group (see table 28). However, the homework group was not significantly different than the control group at post test for any of the dependent variables. Thus hypothesis 2e was rejected for the homework group but accepted for the teacher-guided group. Hypothesis 2f was accepted for both the teacher-

guided and homework groups (see table 26). The pre- and posttest means are also graphically depicted in appendix D.

Table 27. High School Sample: Regression of Teacher-guided or Homework Group Who Have Friends with Delinquent Behavior* on Dependent Variables

	High School Sample			
	Homework Only Group	N	Teacher-guided group	N
Knowledge	B= -0.301 p=0.118	27	**B=0.597** **p=0.005****	21
Intention to change behavior	B= -0.047 p=0.827	26	B=0.165 p=0.484	21
Normative Beliefs	B= -0.251 p=0.234	27	B=0.054 p=0.823	21
Perceived behavioral control	**B= -0.603** **p=0.001****	27	B=0.392 p=0.074	20
Attitude	**B= -0.518** **p=0.008****	27	B= -0.101 p=0.679	20

*Friends with Delinquent Behavior = (score <4); ** significant at p<0.01
B = standardized regression coefficient

Table 28. Teacher-guided or Homework Work Group with Friends with Delinquent Behaviors Variance Explained by Treatment Group for Significant Dependent Variables

	R- square	Mean	Std. Error of Estimate
Knowledge –TG group			
Junior High Sample	0.201	0.1378	0.2354
High School Sample	0.381	0.1333	0.1458

For the High school sample respondents in the teacher-guided group who had friends with delinquent behaviors had significantly higher scores on the post test compared to the

control group. This group did not have significantly different scores on any of the other variables compared to the control group (see table 27). Approximately 38% of the variance in the scores on change in knowledge was accounted for by being in the teacher-guided versus the control group (see table 28). Although the homework group had significant change scores for perceived behavioral control and attitude, the scores at post test were *lower* than at pretest (see table 27).

Friends who have delinquent behaviors *with teacher-guided session* ***supplemented by*** *homework session:*

2g. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session **and** who have **friends who engage in delinquent behaviors** will have significantly increased scores on the post test for **knowledge** of anger management compared to the control group and controlling for prior exposure to anger management exercises.

2h. Students exposed to the online anger management exercise of the sapvc.org in a teacher-guided session **supplemented by** homework session **and** who have **friends who engage in delinquent behaviors** will have a significant change in pretest versus post scores for **attitudes, beliefs of subjective norms, perceived behavioral control, and intention to change behavior** compared to the control group and controlling for prior exposure to anger management exercises.

Findings. The high school teacher-guided + homework group had significantly higher scores for knowledge and intention to change behavior compared to the control group.

The group had lower scores for change in perceived behavioral control compared to the control group (see table 29). The junior high school teacher-guided + homework group

Table 29. Regression of Teacher-guided + Homework Group Who Have Friends with Delinquent Behavior* on Dependent Variables

	Junior High Sample		High School Sample	
	Teacher-guided + Homework group	N	Teacher-guided + Homework group	N
Knowledge	B=-0.254 p=0.299	20	**B=0.734 p=0.000*** **	25
Intention to Change Behavior	B=0.262 p=0.315	18	**B=0.491 p=0.008*** **	25
Normative Beliefs	**B=0.516 p=0.039** **	18	B= -0.120 p=0.572	25
Perceived Behavioral Control	**B=0.434, p=0.049** **	19	**B= -0.430 p=0.037** **	24
Attitude	B= -0.279 p=0.243	19	B= -0.348 p=0.094	25

*Friends with Delinquent Behavior = (score <4); ** significant at p<0.05;
*** significant at p<0.01; B = standardized regression coefficient

had significantly higher scores on change in perceived behavioral control and change in normative beliefs compared to the control group (see table 29). Thus hypothesis 2g was accepted for the high school teacher-guided + homework group and rejected for the junior high school group.

Hypothesis 2h held true for perceived behavioral control for both the groups. Hypothesis 2h was accepted for change in normative beliefs for the junior high TG + HW sample. For the high school group, approximately 58% variance in change in knowledge scores and 37% variance in change in intention to change behaviors was attributable to being

in the TG + HW group versus the control group. For the junior high school group, approximately 26% variance in change in normative beliefs scores and 33% variance in

Table 30. TG + HW Group with Friends with Delinquent Behaviors Variance Explained by Treatment Group for Significant Dependent Variables

	R- square	Mean	Std. Error of Estimate
Knowledge – HS Sample	0.579	0.2068	0.1389
Intention to Change Behavior – HS sample	0.368	0.5181	0.7214
Normative Beliefs – Junior High Sample	0.255	0.3254	0.5710
Perceived Behavioral Control – Junior High Sample	0.334	0.2211	0.7366

change in perceived behavioral control scores was attributable to being in the TG + HW group versus the control group (see table 30).

3. Demographic variables (age, gender, grade, ethnicity) will not be significantly related to **knowledge, attitudes, beliefs of subjective norms, perceived behavioral control, and intention to change future behavior,** while controlling for environmental variables and prior exposure to anger management exercises.

Partial correlation analysis was used to test whether demographic variables are related to intention to change behavior. The Partial Correlations procedure computes partial correlation coefficients that describe the linear relationship between two variables while controlling for the effects of one or more additional variables (Statistical Package for Social Science).

Findings. In the high school sample, age and grade level were significantly related to change in knowledge (see table 31). The relationships were all negative indicating that the younger and teens in lower grades had greater change scores for knowledge than the older and upper grade level teens. Age, gender, and grade level were all significantly related to change in attitude. Here again the younger teens and teens in lower grade level had higher change scores than older teens. Additionally, boys had higher change scores for change in attitude scores than girls. There was no significant relationship between ethnicity and the dependent variables. None of the ethnic groups were significantly related to the dependant variables

Table 31. High School Sample: Partial Correlation While Controlling for Family Bonding, Friends with Delinquent Behavior, and Prior Exposure to Anger Management Exercises

	Age	Gender	Grade
Knowledge	**-0.4182****	-0.1438	**-0.4885****
Attitudes	**-0.2954***	**-0.2385***	**-0.3522****
Beliefs	-0.0401	-0.0699	-0.0545
Behavioral Control	0.1500	0.0579	0.1075
Intention	-0.1466	0.2158	-0.1294

*= Significant at 0.05
** = Significant at 0.01

In the junior high school sample, neither age, grade, nor gender were significantly related to the dependent variables (see table 32). However, the African American group was positively related to change in attitude (r=0.32, p=0.023). The Hispanic group was negatively related to change in attitude (r= -0.4001, p=0.004).

Table 32. Junior High Sample: Partial Correlation While Controlling for Family Bonding, Friends with Delinquent Behavior, and Prior Exposure to Anger Management Exercises

	Age (r)	Gender (r)	Grade (r)
Knowledge	-0.1556	0.1515	0.0189
Attitudes	0.2468	0.0275	0.1705
Beliefs	0.0523	-0.1823	-0.0241
Behavioral Control	-0.0937	-0.0041	0.2169
Intention	-0.2375	-0.0060	-0.1889

3a. Demographic variables (age, gender, grade, ethnicity) will be significantly related to **environmental variables (family bonding, friend's delinquent behavior)** while controlling for prior exposure to anger management exercises.

Partial Correlation analysis was used to test if there is a significant relationship between demographic variables and environmental variables.

Findings. For the junior high school the hypothesis was rejected since none of the demographic variables were significantly related to either family bonding or friends with delinquent behaviors (see table 33).

For the high school group (see table 34), gender was significantly related to friends with delinquent behaviors. Thus the boys had more friends who exhibited delinquent behaviors than the girls. Being in the Hispanic group was negatively related to friends with delinquent behaviors. Thus, respondents who were Hispanic had more friends who exhibited delinquent behaviors than those teens who were not Hispanic.

Table 33. Junior High Sample Controlling for Prior Exposure to Anger Management

		White	Afr. Am	Hispanic	Asian	Gender	Grade	Age
Friends w / Delinquent Behavior	r =	-0.079	0.228	-0.156	0.023	0.123	-0.229	-0.172
	p =	0.509	0.054	0.192	0.847	0.302	0.053	0.149
Family Bonding	r =	0.026	-0.042	0.073	-0.154	-0.158	0.015	-0.034
	p =	0.824	0.715	0.526	0.181	0.169	0.870	0.768

Table 34. High School Sample Controlling for Prior Exposure to Anger Management

		White	Afr. Am	Hispanic	Asian	Gender	Grade	Age
Friends w / Delinquent Behavior	r =	0.147	-0.074	**-0.3097**	-0.081	0.246	0.3003	0.010
	p =	0.196	0.516	**0.007****	0.477	0.029*	0.009**	0.931
Family Bonding	r =	0.166	-0.087	-0.068	-0.057	-0.116	-0.103	0.086
	p =	0.147	0.450	0.555	0.623	0.310	0.371	0.456

** significant at p <0.01; *significant at p <0.05

CHAPTER IV

DISCUSSION AND CONCLUSION

This chapter will discuss the findings in relation to the original research questions outlined for this study. The findings will also be reviewed to determine the appropriateness of the model used as the framework for this study. The chapter will also discuss any implications of the results of this study may have on policy and practice followed by suggestions for future research.

Limitations of the Results

It must be kept in mind that the results for the teacher-guided supplemented by homework group are not very reliable. This is primarily due to the fact that the students were reluctant to complete the exercise twice in the same day and take a lengthy survey four times. This resulted in surveys that were completed in a random manner without actually reading the questions or giving much thought to the answers. The reluctance of the students to complete the survey and participate in the study also impacted the cell sample sizes. Many of the sub groups had very few respondents (see table 36) and did not meet the power criteria originally anticipated (see discussion on sample). Additionally, the data set did not meet many of the assumptions for the statistical tests used (see discussion on data assumptions and internal validity). Data for several variables were not normally distributed which confound the interpretation of effect size (Coe, 2000). There were also differences at pretest for several variables which can impact the degree of change from pre to post test. Keeping these factors

in mind, it is difficult to make any conclusive statements regarding the findings and the results must be interpreted with caution.

However, this study is an exploratory study and therefore, the findings can provide some indications about the existence of possible relationships between variables examined. Further research will have to confirm or disprove the suggested conclusions based on this study.

The original research questions are listed below followed by the discussion:

Original Research Questions

1. *Is there any change in knowledge via exposure to a web-based exercise?*

Based on the results of this study, it would seem that the teacher-guided web-based exercise was more effective in increasing knowledge compared to the student independently completing the exercise on the web (see tables 16–29). The teacher-guided group showed significant knowledge acquisition compared to the control group as predicted by hypothesis 1a except for the group with strong family bonds (see table 36). Hypothesis 2a predicted that students in the treatment groups who had strong family bonds would have a significant increase in knowledge compared to the control group. This was not verified by the results of this study. It is possible that this may be because youth who have strong family bonds already have the knowledge of appropriate ways of managing anger. Partial correlation analysis between family bonding and change in knowledge (controlling for prior exposure to anger management messages) revealed that for both the junior high and high school samples the variables were negatively correlated (junior high sample: r= -0.2512, p=0.031; HS sample: r= -0.1671, p=0.152). Although the correlation coefficient for the high school sample was not statistically significant, the direction of the relationship for both school groups is the

Table 35. Hypotheses Accepted or Rejected for Treatment Group by Dependent Variables

	Hypotheses 1a–1e			Hypotheses 2a–2d			Hypotheses 2e–2h		
				Group with Strong Family Bonds			Group with Friends with Delinquent Behaviors		
Jr. High	HW	TG	TG+HW	HW	TG	TG+HW	HW	TG	TG+HW
Knowledge	*reject*	**accept**	*reject*	*reject*	*reject*	*reject*	*reject*	**accept**	*reject*
Behavioral Control	**accept**	**accept**	*reject*	*reject*	*reject*	*reject*	**accept**	**accept**	**accept**
Intention	**accept**	**accept**	*reject*	*reject*	*reject*	*reject*	**accept**	**accept**	*reject*
Beliefs	**accept**	**accept**	**accept**	*reject*	*reject*	*reject*	**accept**	**accept**	**accept**
Attitude	**accept**	**accept**	*reject*	*reject*	*reject*	*reject*	**accept**	**accept**	*reject*
High School	HW	TG	TG+HW	HW	TG	TG+HW	HW	TG	TG+HW
Knowledge	*reject*	**accept**	**accept**	*reject*	**accept**	**accept**	*reject*	**accept**	**accept**
Behavioral Control	**accept**	**accept**	**accept**	*reject*	*reject*	*reject*	**accept**	**accept**	*reject*
Intention	**accept**	**accept**	*reject*	*reject*	*reject*	*reject*	**accept**	**accept**	**accept**
Beliefs	**accept**	**accept**	*reject*	*reject*	*reject*	*reject*	**accept**	**accept**	*reject*
Attitude	**accept**	**accept**	*reject*	*reject*	*reject*	*reject*	**accept**	**accept**	*reject*

Note: Controlling for prior exposure to anger control exercises

same (negative relation). This indicates that the group with lower scores on family bonding had higher change scores for knowledge. For the high school group, the teacher-guided supplemented with homework (TG+HW) group also showed significant increases in knowledge compared to the control group as predicted by hypothesis 2c. Comparison of the effect sizes (see table 36) for the TG+HW group with the teacher-guided only group reveals a much greater effect size for the TG+HW group compared to the control group. These effect sizes may be interpreted that the high school TG+HW group had higher change of knowledge scores than approximately 76% of the control group, whereas the change in knowledge

Table 36. Effect Size (standardized regression coefficient) for Each Hypothesis Accepted or Rejected for Treatment Groups vs. Control Group by Change in Dependent Variables

	Hypotheses 1–1e			Hypotheses 2a–2d			Hypotheses 2e–2h		
				Group with Strong Family Bonds			Group with Friends with Delinquent Behaviors		
Jr. High	HW	TG	TG+HW	HW	TG	TG+HW	HW	TG	TG+HW
N	**21**	**20-21**	**12**	**4-5**	**6-8**	**1**	**16-17**	**13-15**	**5-6**
Intention	0.172-a	0.236-a	0.223-r	0.431-r	0.394-r	0.129-r	0.090-a	0.289-a	0.262-r
Knowledge	0.206-r	0.341-a*	0.007-r	0.579-r	-0.223-r	0.098-r	0.381-r	0.407-a*	-0.254-r
Behavioral Control	0.121-a	0.287-a	0.225-r	-0.004-r	0.199-r	-0.088-r	0.067-a	0.215-a	0.434-a*
Beliefs	0.058-a	-0.199-a	0.450-a*	-0.017-r	-0.304-r	0.774-r	0.371-a	0.088-a	0.516-a*
Attitude	0.137-a	-0.144-a	-0.244-r	-0.821-r	-0.190-r	0.352-r	0.044-a	-0.328-a	-0.279-r
High School	HW	TG	TG+HW	HW	TG	TG+HW	HW	TG	TG+HW
N	**22**	**21**	**17**	**18-19**	**15**	**12**	**17**	**10-11**	**15**
Intention	-0.087-a	0.017-a	0.288-r	-0.068-r	-0.046-r	0.107-r	-0.047-a	0.165-a	0.491-a*
Knowledge	-0.165-r	0.547-a*	0.755-a*	-0.134-r	0.544-a*	0.793-a*	-0.301-r	0.597-a*	0.734-a*
Behavioral Control	-0.616-a*	0.242-a	-0.501-r*	-0.602-r*	0.304-r	-0.603-r*	-0.603-a*	0.392-a	-0.430-r*
Beliefs	-0.134-a	0.001-a	0.094-r	-0.030-r	-0.163-r	0.163-r	-0.251-a	0.054-a	-0.120-r
Attitude	-0.511-a*	-0.107-a	-0.227-r	-0.476-r*	-0.047-r	-0.173-r	-0.518-a*	-0.101-a	-0.348-r

Note: Controlling for prior exposure to anger control exercises; * significant at $p<0.05$ N=Range of sample size, see chapter 3 and appendix B, C, D for details.

scores for the high school teacher-guided group were greater than only 69% of the control group (Coe, 2000). Thus there is some indication that repeat exposure to the same message with web-based exercises will bring greater incremental learning. Thus, web based prevention may prove to be an efficient way to reinforce knowledge related material presented first by teacher-guided exercises The literature on effective prevention programs suggests that in order for prevention programs to be effective, they must be delivered with adequate intensity and frequency. One shot programs do not produce any lasting behavior changes (Tobler, 1992; Bosworth, 1997; Skiba, Monroe, & Wodarski, 2004).

2. *Is a teacher led web-guided discussion exercise equivalent to a student independently completing the same exercise on the Web in terms of changing, attitudes, normative beliefs and intention to change behavior?*

Neither the teacher-guided nor the homework only group had any significant impact on intention to change future behavior (see tables 35 and 36). The researcher did not expect these groups to have any impact on intention to change future behavior (hypotheses 1c and 2b), thus the model was correctly specified. Based on the results of this study it would seem that the teacher-guided session had slightly greater impact on changing attitudes, normative beliefs, and intention to change behaviors (see table 36). Effect sizes for the teacher-guided group (though not statistically significant) were greater than for the homework only group for the majority of the cells (see table 36). Whether the hypotheses were accepted or rejected were also consistent for both the teacher-guided and the homework only groups.

This study found that normative beliefs, attitudes, and perceived behavioral control were not impacted by exposure to the web exercise in either the teacher-guided or the homework only groups (see tables 35 and 36). The exception was the high school homework

only sample (see table 36). This particular group did have statistically significant changes in perceived behavioral control and attitude (see table 36). A possible explanation for this finding may be that the students answered the questions related to this variable in a random manner. This finding was contrary to the hypothesis and therefore the hypothesis was rejected in these instances.

The study found that students who completed the exercises in a non structured environment did not take the process seriously nor were they diligent in how they completed the pre- and posttests. Observations by the researcher support this conclusion because students were just randomly completing the surveys without really reading the questions completely. This was especially true for the junior high students.

3. Is a teacher led Web-guided exercise supplemented by a student independently completing the exercise significantly more effective in impacting change in knowledge, normative beliefs, perceived behavioral control, attitudes and intention to change behavior than a teacher led web-guided exercise only?

Caution must be used when interpreting the results for this study. The junior high school TG+HW group was very reluctant to complete the survey four times as required by the TG+HW group. The responses to the survey for the TG+HW group, therefore, are highly suspect. According to the hypotheses tested, the TG+HW group did not have an increase in knowledge from the pretest to the posttest administered after the homework phase. For the other dependent variables, the TG+HW junior high group did have significant change in normative beliefs, and perceived behavioral control (see tables 35 and 36).

For the high school group, as stated earlier, comparison of the effect sizes (see table 36) reveals much greater effect sizes for knowledge (hypothesis 1a) and intention to change

behavior (hypothesis 2h) for the TG+HW group compared to the control group than the teacher-guided group. These effect sizes may be interpreted that the high school TG+HW group had higher change knowledge scores than approximately 79% of the control group, whereas the change in knowledge scores for the high school teacher-guided group were greater than only 73% of the control group (Coe, 2000). For change in intention to change future behavior, the TG+HW group scored higher than approximately 69% of the control group, whereas the teacher-guided group scored higher than only 56% of the control group (Coe, 2000). Thus, there is some indication that repeated exposure to the same message with web based exercises will bring greater incremental learning Thus, web based prevention may prove to be an efficient way to reinforce material presented first by teacher-guided exercises.

4. What difference do demographic variables such as grade, gender, age, ethnicity, and environmental variables such as friends' delinquent behavior, and family bonding,, make in learning from a web-guided exercise?

According to the literature, demographic variables are not directly related to increase in knowledge, attitudes, normative beliefs, perceived behavioral control, or intention to change behavior (Svensson, 2003; Yong, 2003). According to Svensson (2003) environmental factors, such as parental monitoring and peer delinquency, were directly linked with age and gender. Younger children and girls were more closely supervised and controlled by parents and therefore tended to have less involvement with delinquent peers. This in turn reduced the likelihood that younger children and girls would get involved in substance abuse and other delinquent behavior. The model proposed for this study was based on these findings in the literature.

According to the findings, the hypothesis that demographic variables would not be directly related to the dependent variables was accepted for the junior high school sample. For the high school sample, age and grade were negatively related to change in knowledge, indicating that the younger students and those in lower grades had higher change scores than the older students. Additionally, the younger students in the high school along with male students also showed significantly higher change scores for attitude. A possible explanation for this finding may be that younger students still have not formed permanent ideas about various issues and are therefore more susceptible to change than older students. The relationship between gender and change in attitude needs further investigation.

One factor to consider is that in the literature, family related "environmental variables" are made up of several constructs measuring the various risk and protective factors that impact youth behavior. Family environmental variables are made up of parental supervision, family bonding, consistency in discipline methods, and parent's own behavior (Brook et al., 1988; Hilarski, 2004; Hilarski, 2004). This study measured just one of these constructs—"family bonding." It is possible that some of the other constructs may be stronger mediating factors that might negate the effect of demographic variable once they are included in the model. Constraints in survey length and complexity prohibited the researcher from including all the environmental variables. Issues related to sampling discussed earlier could also have confounded the results. Further, in the junior high school, the African American students showed higher change scores for attitude while the Hispanic group showed significantly lower change scores in attitude. The findings in this study do support, to some degree, the suggestion in the literature (and proposed in the model for this study) that demographic variables are directly linked to environmental variables. The study did find that

for the high school group being Hispanic was negatively related to friends with delinquent behaviors. Thus, respondents who were Hispanic had more friends who exhibited delinquent behaviors than those teens who were not Hispanic. Although similar relationships were not found to be significant for the junior high sample, this may be because of the careless way in which the junior high sample responded to the survey items. If future studies confirm the relationship of being in the Hispanic group with having friends with delinquent behaviors, then this may be a possible explanation for the finding that the Hispanic group showed significantly lower change scores in attitude. It is suggested that future studies investigate the relationship of demographic variables with environmental variables more closely.

5. Does exposure to web-based exercise impact future behavior?

This question is difficult to answer with the results from this study. This study exposed the students to the web based exercises only one time (twice for the TG+HW group). None of the tests indicated a significant relationship between exposure to the exercise and intention to change behavior. However, for the high school sample with friends who had delinquent behavior, and were in the TG+HW group there was a significant change in intention to change behavior scores. Thus, there is a slight indication that if the web based exercises are provided with sufficient intensity and frequency, there may be some impact on future behavior.

The Proposed Model

The model proposed for this study was sufficient for an exploratory examination into the possible effectiveness of a web based prevention program. This study does support, albeit to a limited extent, the hypothesis that exposure to a web based prevention program, if delivered in a structured environment and with sufficient frequency, would impact change in

knowledge, perceived behavioral control, normative beliefs, and attitudes (see tables 35 and 36). The higher effect sizes for the TG+HW groups compared to the HW and TG only groups may also be said to support the hypothesis (albeit only for the high school sample) that, provided with sufficient frequency, prevention program may impact intention to change future behavior (see table 36). Partial correlation analysis (controlling for prior exposure to anger management messages) of the relationship between change in attitude, change in perceived behavioral control, change in normative beliefs, and intention to change future behavior (junior high and high school data combined) revealed that for this study there was a statistically significant relationship between change in attitude and change in normative beliefs ($r=0.1770$, $p=0.04$), change in attitudes and change in perceived behavioral control ($r=0.4238$, $p=0.00$), and perceived behavioral control and intention to change future behavior ($r=0.1766$, $p=0.04$). This partial correlation analysis did not uphold the relationship between normative beliefs and perceived behavioral control, or the relationship between attitude and intention to change behavior or normative beliefs and intention to change behavior (see appendix F, table F.3).

This study had a major limitation in that it did not include several variables that were found to be relevant in the literature. For example the literature of resiliency and youth development iterates several other environmental variables that impact the probability of youth engaging in risky behavior (see appendix E). Based on the findings in this study the relationships between the variables in the proposed model may be modified (see figure 4).

The proposed relationship between demographic variables and environmental variables was not completely supported by this study. Grade and age were significantly related to family bonding (see appendix F, table F.1). This indicates that older students and

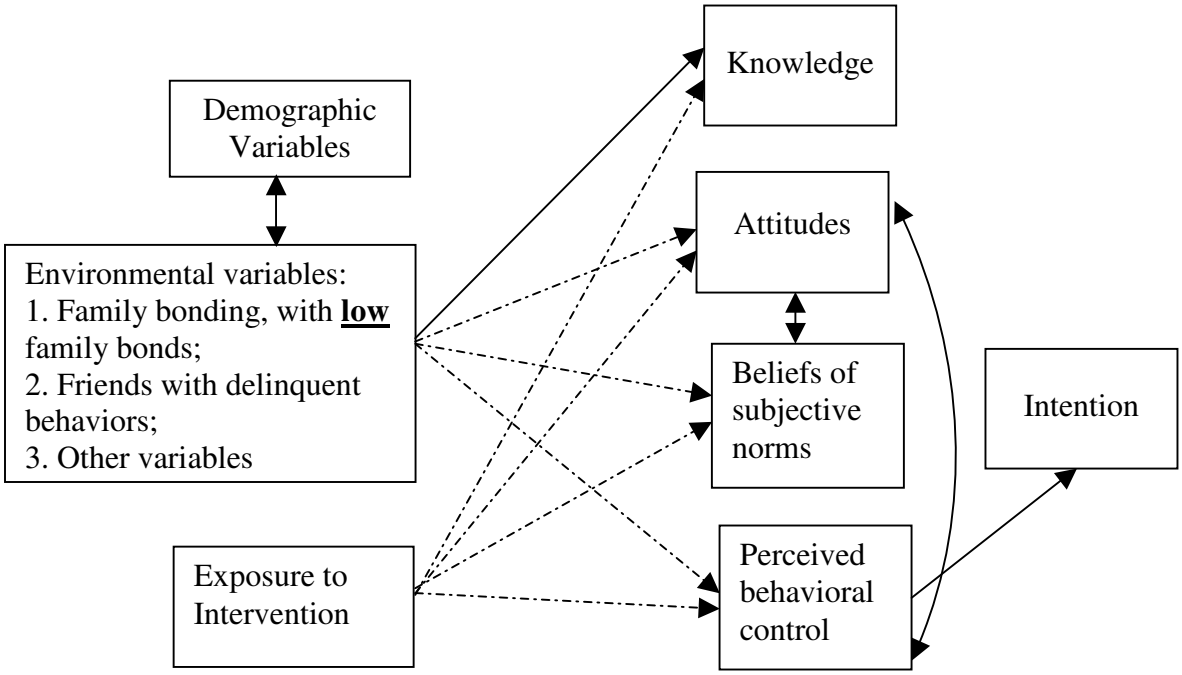

Figure 4. Modified hypothesized model for behavior change.

Note: The relationships depicted with a dotted line need to be investigated further before any meaningful conclusions can be drawn.

those in upper grades reported having stronger family bonds than younger students and those in lower grades. This may be because students in early adolescence are still trying to assert their independence from their parents and tend to report a more acrimonious relationship with their parents compared to older students.

Being in the Hispanic group was also significantly related to whether students had friends who exhibited delinquent behaviors. According to the findings (see appendix F, table F.1), Hispanic students tended to have more friends who exhibited delinquent behaviors than those students who were in other ethnic groups. The reason for this finding may be because the majority of the sample was from the White Plains, New York area. White Plains has a

large Hispanic population that is made up of various sub groups (e.g., Mexican, Puerto Rican, Spanish, Columbian, Cuban). These groups compete for the same resources in the area and tend to frequently clash. White Plains also has seen a rise in the number of Hispanic gangs. These factors may have been a contributing factor to the finding that the Hispanic students reported having more friends with delinquent behaviors than other ethnic groups. The relationship between demographic variables and environmental variables needs further exploration.

Family Bonding was also significantly related to change in knowledge, change in perceived behavioral control and change in attitudes. Here again the partial correlation coefficient was negative, indicating that students who did not have strong family bonds had higher change scores compared to those students who had strong family bonds (see appendix F, table F.2). Again, the possible explanation may be that students who have strong family bonds already have the knowledge of appropriate ways of handling anger compared to those who don not have strong family bonds. Additionally, students who do not have strong family bonds may have less perceived control over their behavior and have more negative attitudes towards anger. These students therefore, have a stronger response to prevention messages than the students who have strong family bonds.

Students who reported having friends with delinquent behaviors also showed a significant change in knowledge scores compared to those students who did not have friends with delinquent behaviors (appendix F, table F.2). A possible explanation for this finding may be that students with friends who have delinquent behaviors do not have the knowledge of appropriate ways to handle negative emotions and are more susceptible to external messages. The environmental factors variable needs to be investigated more thoroughly and

needs to be evaluated after including many of the other constructs suggested in the literature like parental supervision, parent's own behavior, and consistency in discipline practices (Goldstein & Glick, 1987; Hilarski, 2004; Minuchin & Fishman, 1981; Brook et al., 1988).

Implications for Future Research

This study was an exploratory study into the possible impact of web based prevention programs on learning and behavior change. There were many factors that confounded the results—sampling difficulties, problems with implementation, and technical difficulties with the web site. Suggestions for future research encompass:

1. Implementing the study in a more structured environment. One lesson learned from this study is that students are not going to participate in a study like this of their own volition. Students' cooperation will be forthcoming only under three conditions: (a) requiring them to complete the exercise in a structured environment that is monitored by appropriate adults, (b) students are provided with appropriate incentives to take similar research seriously, (c) searching for delivery modalities that would be more interactive and "entertaining" while at the same time allowing for learning to take place. One method that might be worth exploring is the use of interactive games that incorporate prevention lessons and skill building. The anger management exercise evaluated in this study at sapvc.org utilized a "snakes and ladders" game that students were required t o play after listening to the video lessons. The researcher observed that students were eager to play the game see how they scored. They asked if they could play just the game and not have to do all the video lessons, indicating that the game was more interesting than the video based lessons.

The survey used in this study was found to be too long by the students. Especially for students in the TG+HW group who had to complete it four times. Future researchers might

consider breaking up the exercises to focus on one factor such as changing attitudes, and having pre and post tests that measure changes in that construct only. Such a design would allow students to focus on one topic at a time and also allow them to divide the testing process into smaller more manageable parts. Another alternative strategy might be to validate shorter measures for each construct, thus shortening the overall length of the survey

2. The model proposed in this study sought to investigate the interconnectedness of various factors that were suggested in the literature as impacting the likelihood of youth getting involved with illicit substance use and other negative behaviors. Regression analysis allowed the researcher to explore each relationship one at a time. This was appropriate for an exploratory research into the effectiveness of web based prevention programming. The researcher suggests that future research seek to confirm the relationships found relevant in this study by using a structural equation model that would allow the examination of a series of interrelated dependent relationships simultaneously.

Implications

This study revealed that web based delivery of prevention programs can bring about positive outcomes for knowledge gained. This has several implications for both policy and practice.

If the model proposed by this study is supported by future research, prevention programs in general will have to move from simple delivery of knowledge based programs to programs that impact the individual characteristics directly related to behavior change, such as normative beliefs, attitudes and behavioral control. For such programs to be effective, they have to be delivered over a sufficient period of time and with adequate frequency. Research sample size will have to be large to accommodate the complexity of the evaluation model.

Standard scales may need to be modified and reduced in size to reduce the test burnout experienced in this study. Funding agencies will have to provide enough funds to support such complex longitudinal programming structures.

As human services become increasingly web based, the availability and utilization of these services crosses cultural and socioeconomic boundaries. Human services become a truly "global" phenomenon. This means that services and programs will have to become increasingly culturally, ethnically, and socio-economically sensitive. This study found a significant relationship between being in the Hispanic group and reporting whether friends had delinquent behaviors. As society becomes more diverse with conflicting social and economic factors impacting behavior and emotions, there will be a greater need for efficient and culturally sensitive prevention programs. Because of increasing labor costs it may not be financially feasible to deliver face-to-face services that are culturally responsive. Effective online prevention programs could be a viable alternative. Programming may have to be delivered in several languages and encompass the needs of diverse cultures. Program evaluators will have to create culturally sensitive assessment tools and keep in mind the effect that possible different interpretations may have on evaluation data.

Conclusion

Effective delivery of web based prevention programming needs further investigation. Although this study did not provide results that could be projected to the general population, there is some indication that online prevention strategies with no face-to-face component could be an effective alternative strategy. In an environment where schools are increasingly under pressure to deliver on academic outcomes, prevention providers find it more and more difficult to compete for adequate class time to deliver programs. Prevention programs need to

be delivered consistently throughout the developmental years and with adequate frequency that would counter the effects of negative environmental messages and pressures. In this scenario, web based learning strategies can provide an effective “booster” tool to help reinforce messages provided via face-to-face contact. Additional research into effective methods of delivering these lessons is needed so as to facilitate the participation and retention of the interest from youth.

APPENDIX A

HIGH SCHOOL AND JUNIOR HIGH SCHOOL

HISTOGRAMS

HIGH SCHOOL SAMPLES

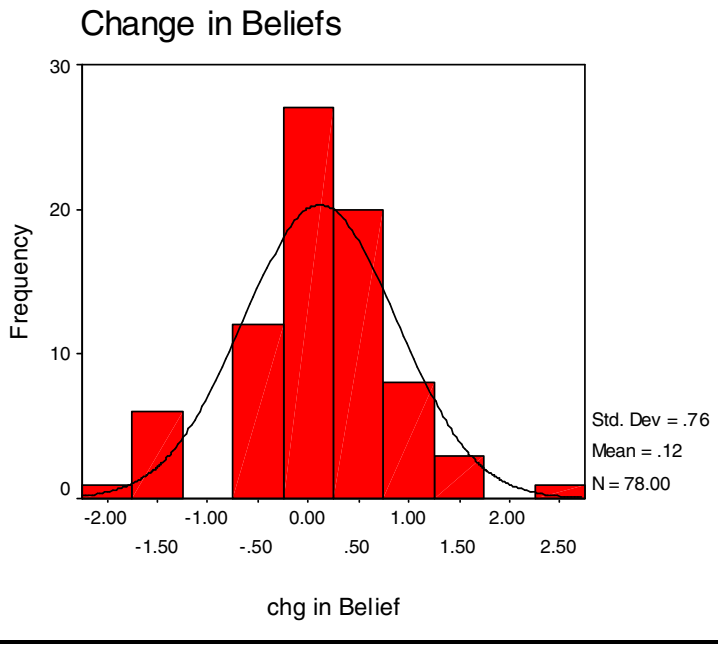

Figure A.1. Histogram for change in normative belief with normal curve.

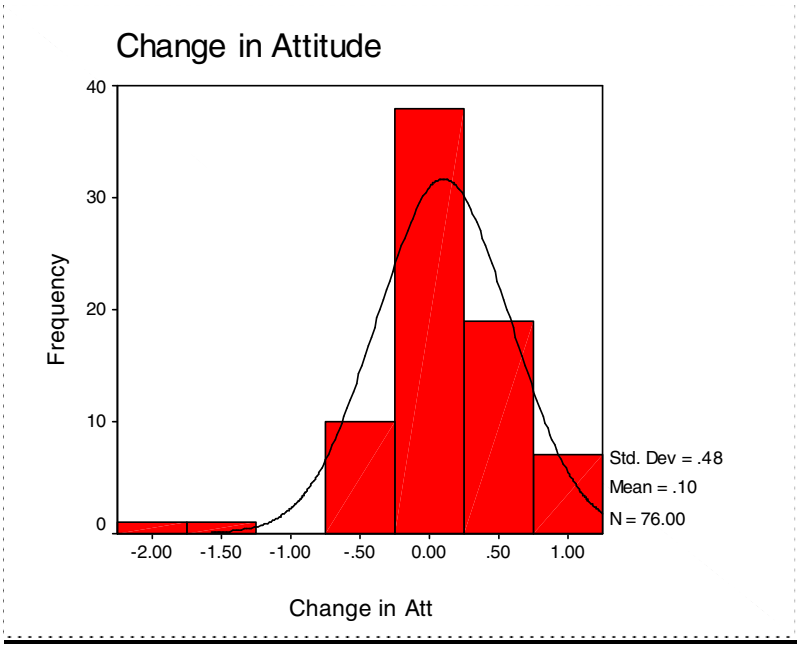

Figure A.2. Histogram for change in attitude with normal curve.

HIGH SCHOOL SAMPLES

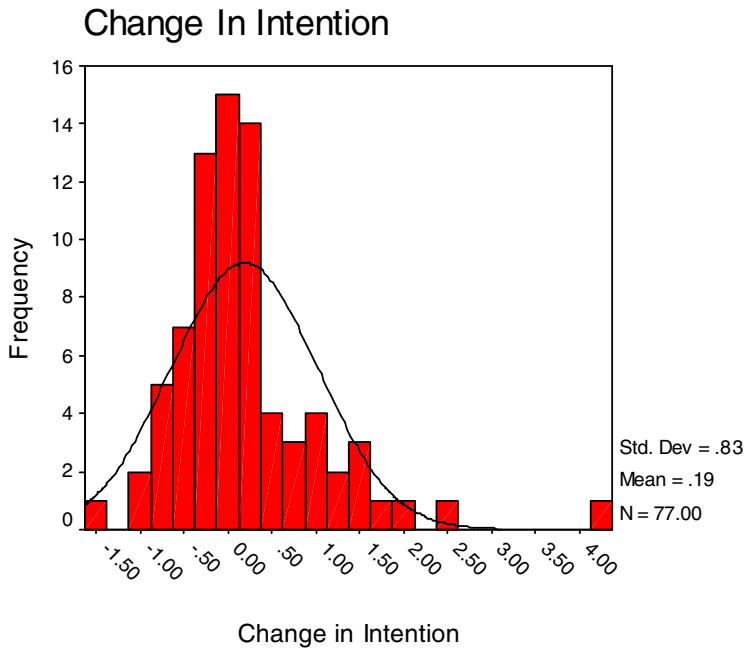

Figure A.3. Histogram for change in intention with normal curve.

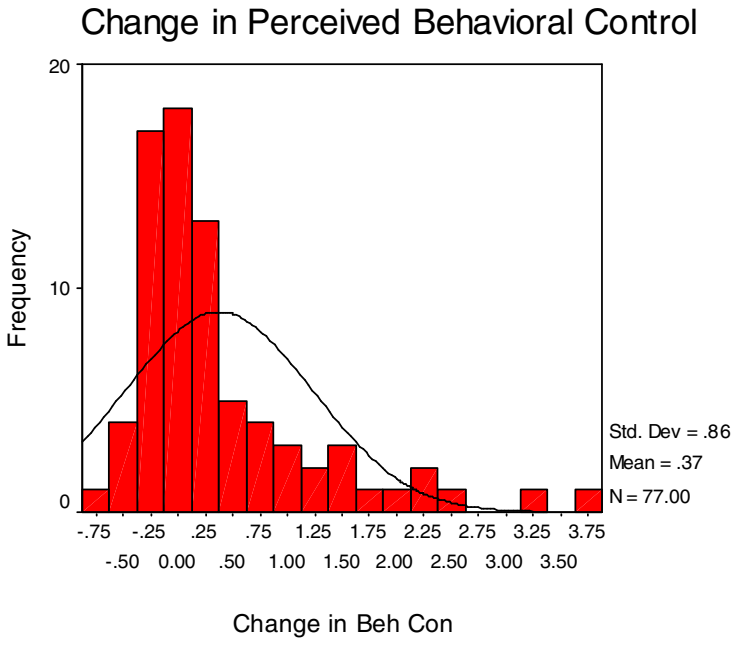

Figure A.4. Histogram for change in perceived behavioral control with normal curve.

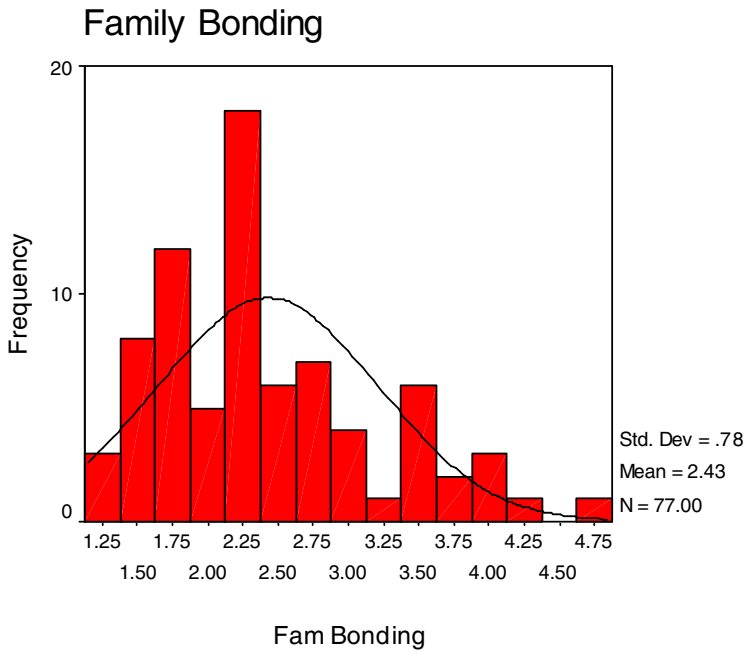

Figure A.5. Histogram for family bonding with normal curve.

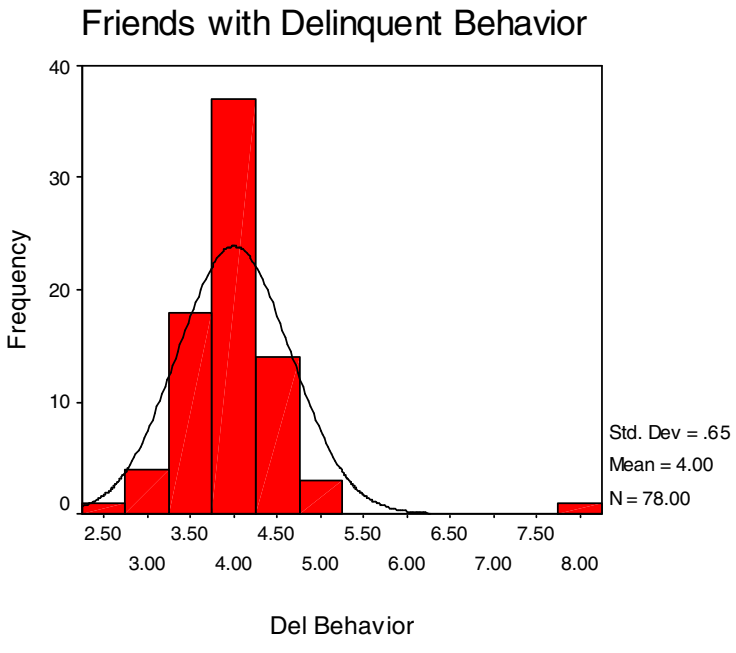

Figure A.6. Histogram for friends with delinquent behavior with normal curve.

HIGH SCHOOL SAMPLES

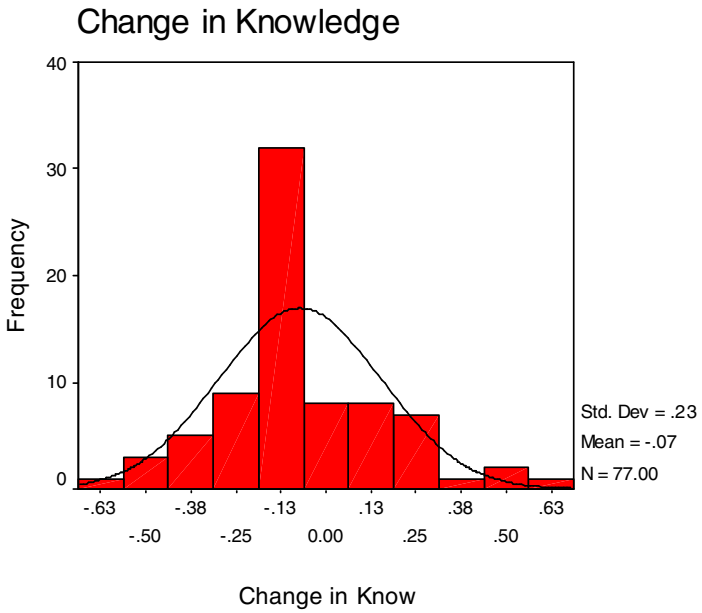

Figure A.7. Histogram for change in knowledge with normal curve.

JUNIOR HIGH SCHOOL SAMPLE

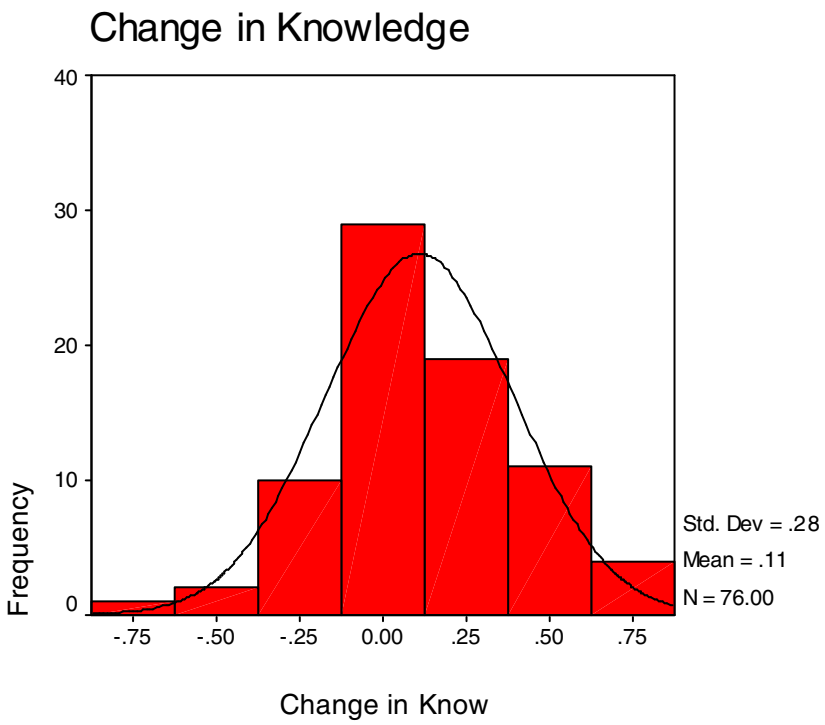

Figure A.8. Histogram for change in knowledge with normal curve.

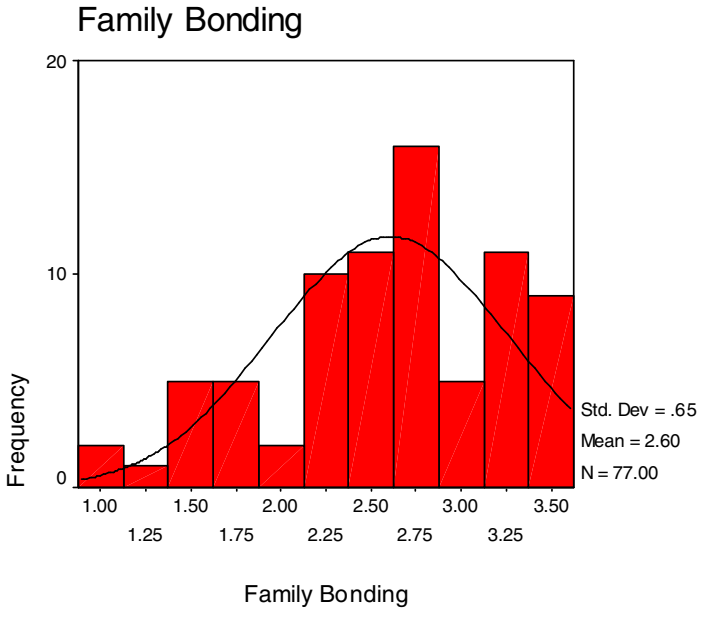

Figure A.9. Histogram for change in knowledge with normal curve.

JUNIOR HIGH SCHOOL SAMPLE

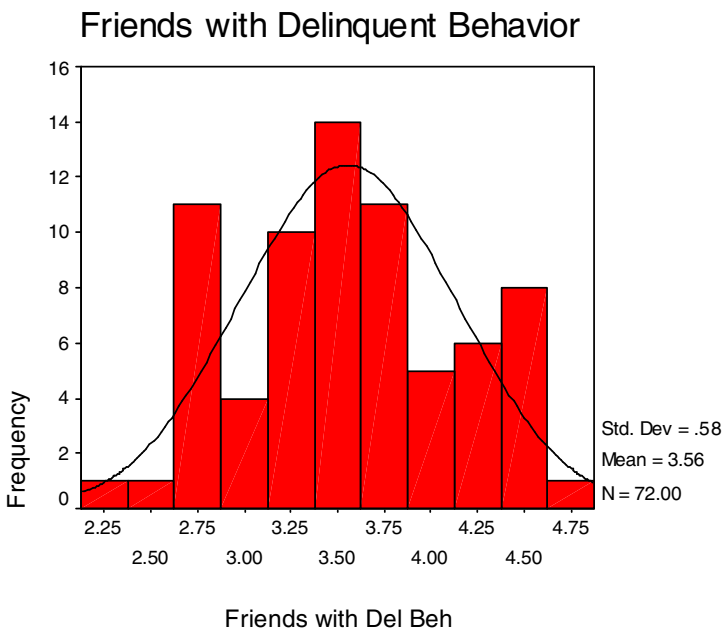

Figure A.10. Histogram for friends with delinquent behaviors with normal curve.

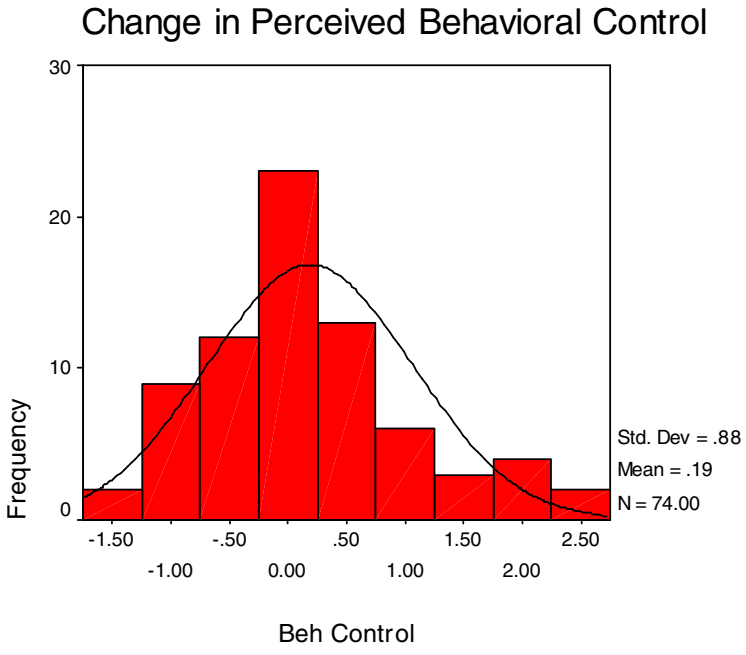

Figure A.11. Histogram for change in perceived behavioral control with normal curve.

JUNIOR HIGH SCHOOL SAMPLE

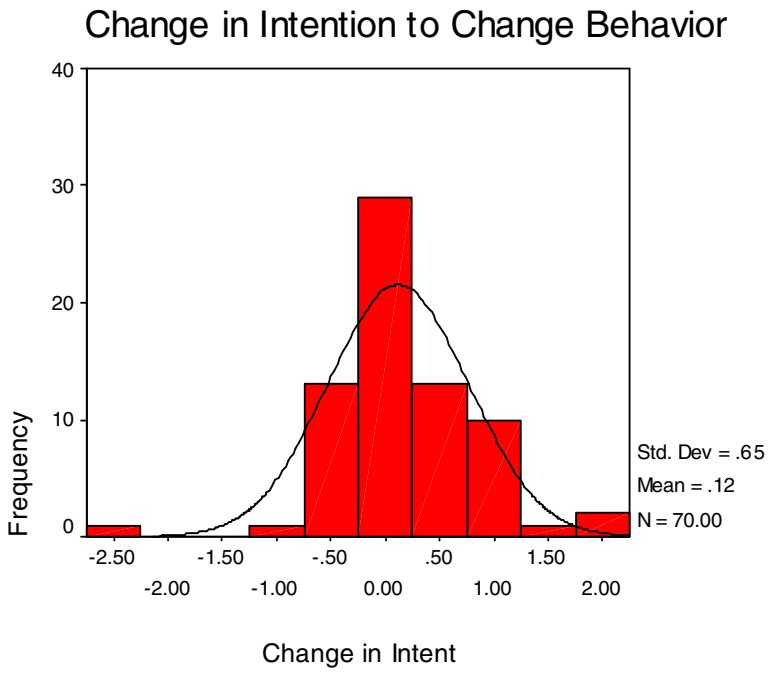

Figure A.12. Histogram for change in intention to change behavior with normal curve.

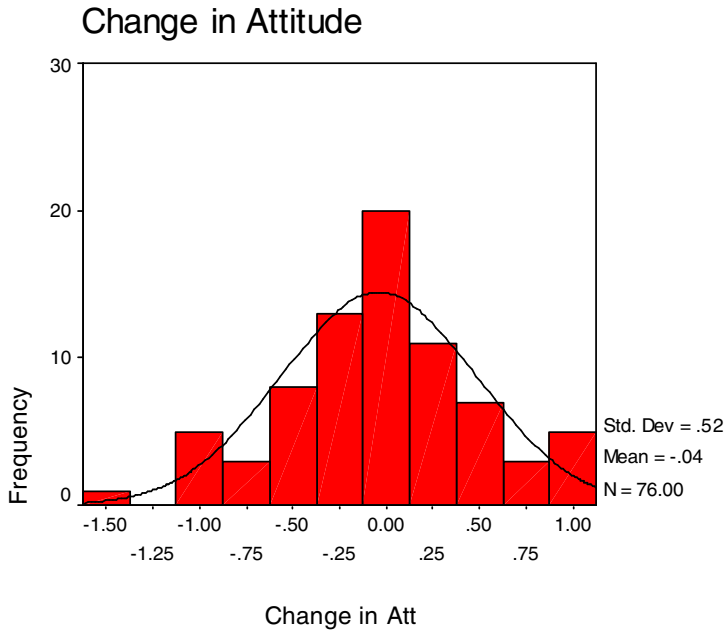

Figure A.13. Histogram for change in attitude with normal curve.

JUNIOR HIGH SCHOOL SAMPLE

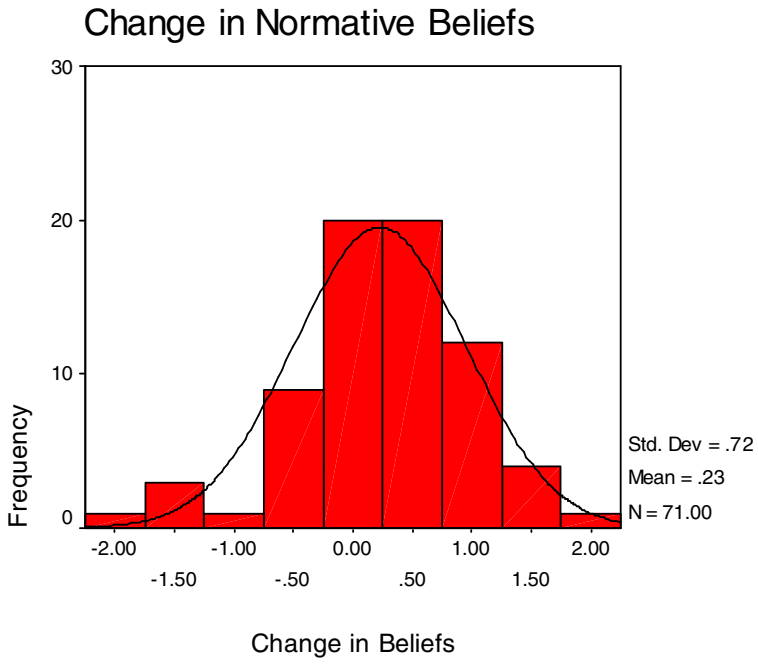

Figure A.14. Histogram for change in normative beliefs with normal curve.

APPENDIX B

CHANGES IN DEPENDENT VARIABLES FOR JUNIOR HIGH AND HIGH SCHOOL

JUNIOR HIGH SAMPLES

Table B.1. Change in Perceived Behavioral Control

Group	n	Pre Mean	Post Mean
Homework Only	21	3.60	3.48
Teacher Guided	22	3.43	3.88
Control	21	3.43	3.45

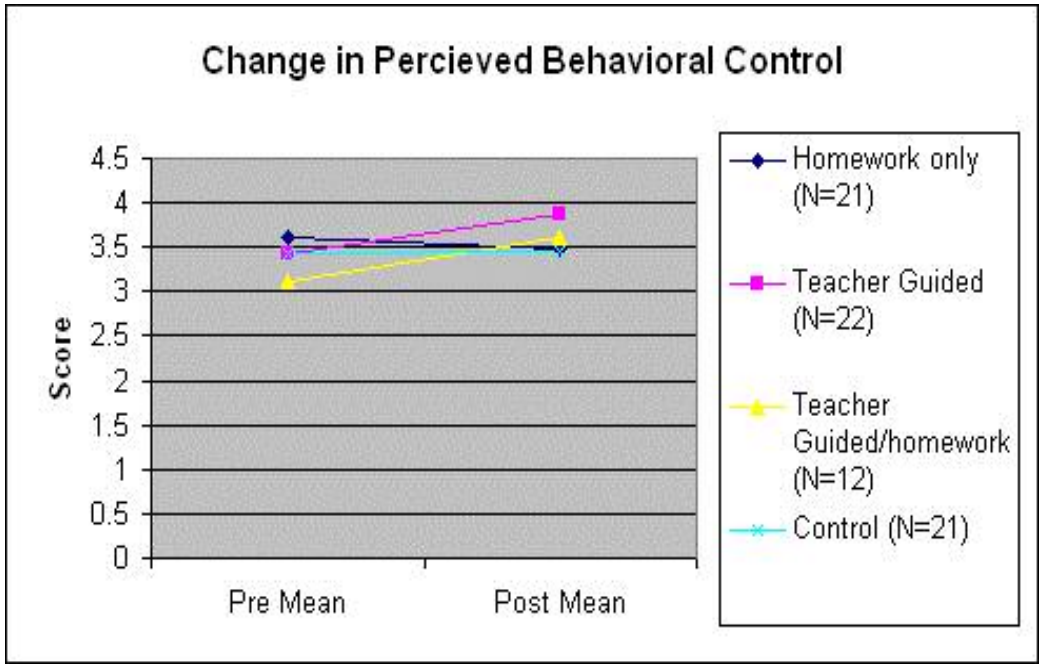

Figure B.1. Pre- post means for change in perceived behavioral control.

JUNIOR HIGH SAMPLES

Table B.2. Change in Knowledge

Group	n	Pre Mean	Post Mean
Homework Only	21	1.61	1.68
Teacher Guided	22	1.53	1.75
Teacher Guided/homework	12	1.48	1.52
Control	22	1.61	1.66

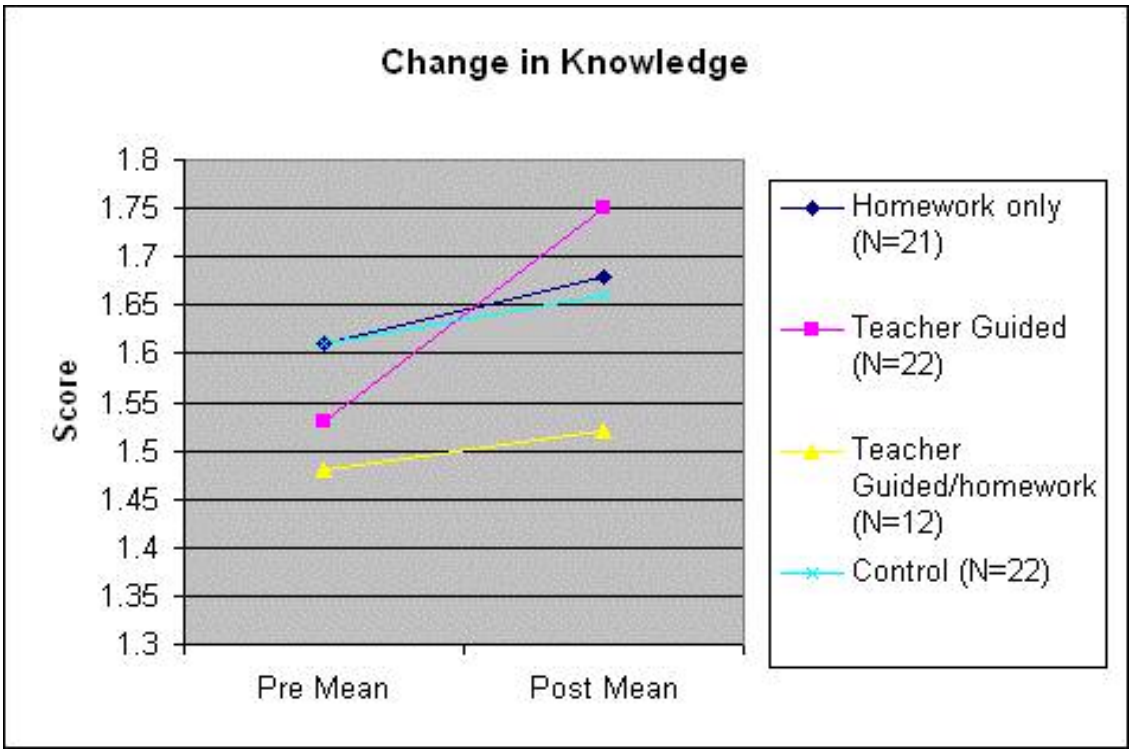

Figure B.2. Pre- post means for change in knowledge.

JUNIOR HIGH SAMPLES

Table B.3. Change in Intention

Group	n	Pre Mean	Post Mean
Homework Only	21	2.46	2.44
Teacher Guided	21	2.18	2.5
Teacher Guided/homework	12	2.09	2.29
Control	20	2.31	2.3

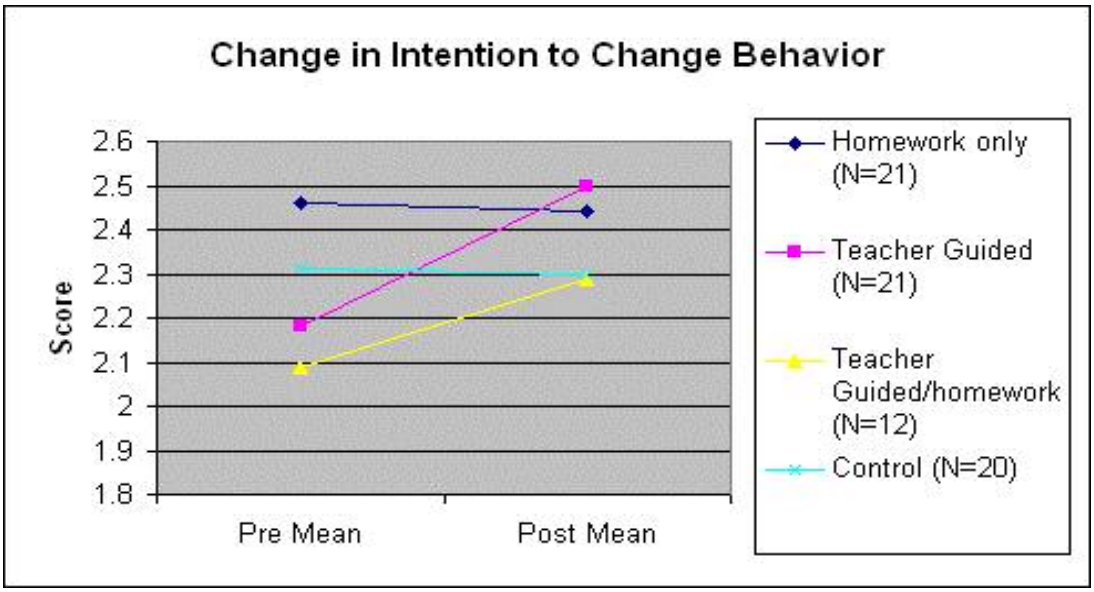

Figure B.3. Pre- post means for change in Intention to change future behavior.

JUNIOR HIGH SAMPLES

Table B.4. Change in Normative Beliefs

Group	n	Pre Mean	Post Mean
Homework Only	21	2.64	2.99
Teacher Guided	20	2.89	2.71
Teacher Guided/homework	12	2.69	3.4
Control	21	2.82	2.99

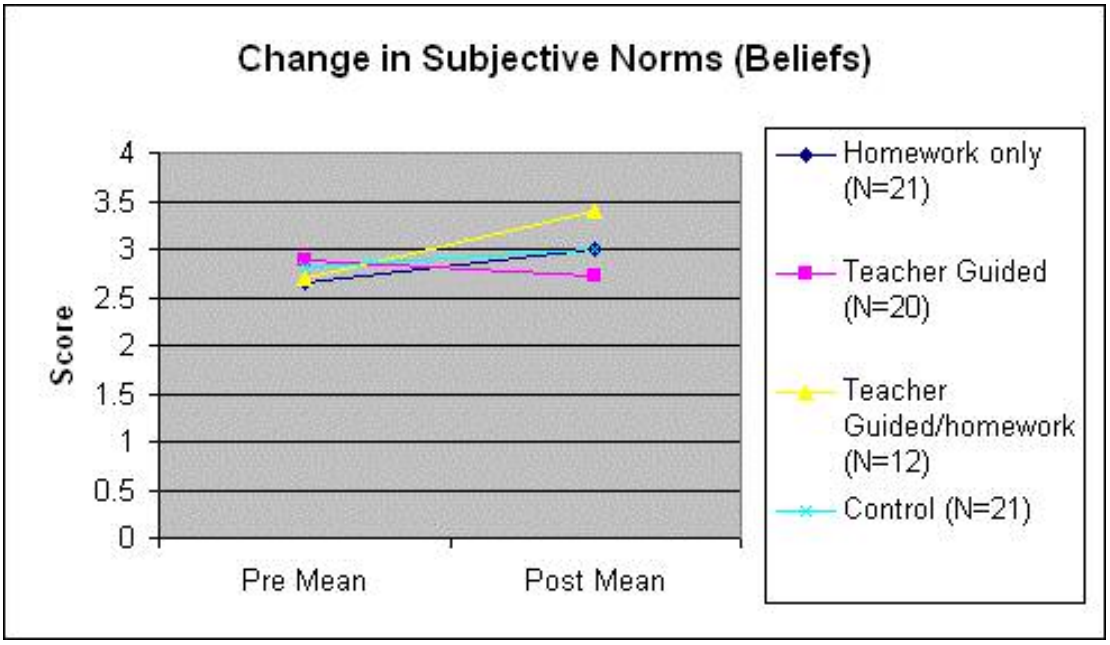

Figure B.4. Pre- post means for change in normative beliefs.

JUNIOR HIGH SAMPLES

Table B.5. Change in Attitude

Group	N	Pre Mean	Post Mean
Homework Only	21	3.07	3.19
Teacher Guided	22	3.63	3.49
Teacher Guided/homework	12	3.44	3.17
Control	21	3.42	3.48

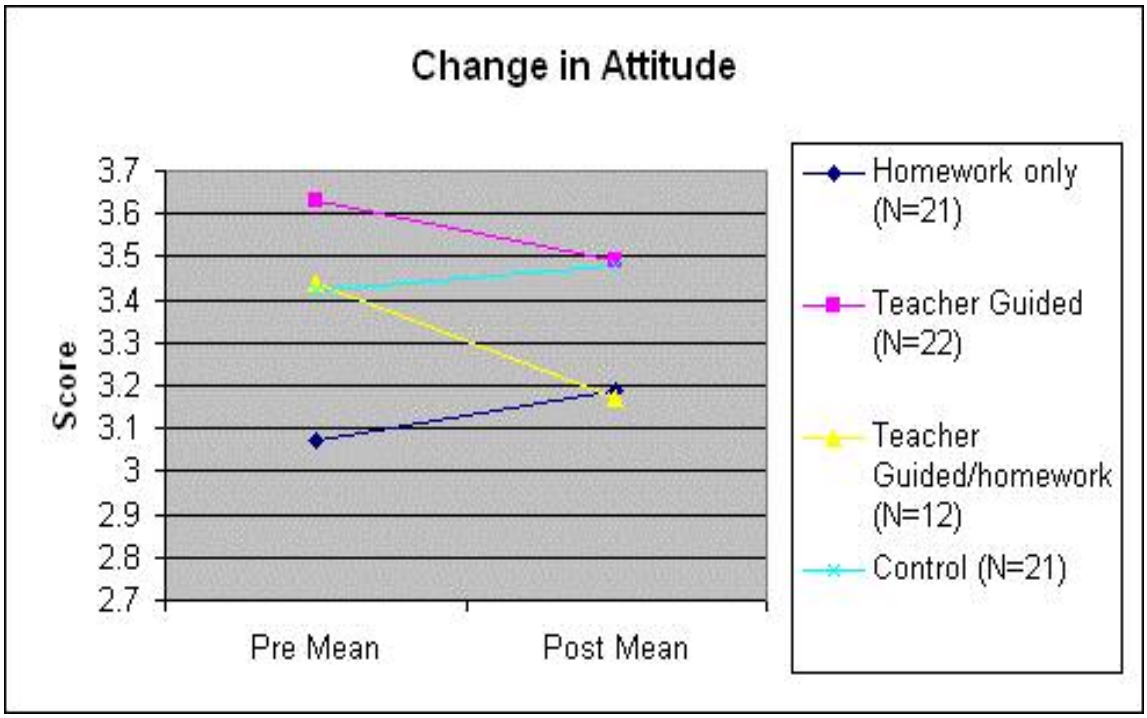

Figure B.5. Pre- post means for change in attitude.

HIGH SCHOOL SAMPLES

Table B.6. Change in Knowledge

Group	n	Pre Mean	Post Mean
Homework Only	22	1.80	1.68
Teacher Guided	21	1.73	1.95
Teacher Guided/homework	17	1.60	1.92
Control	17	1.86	1.86

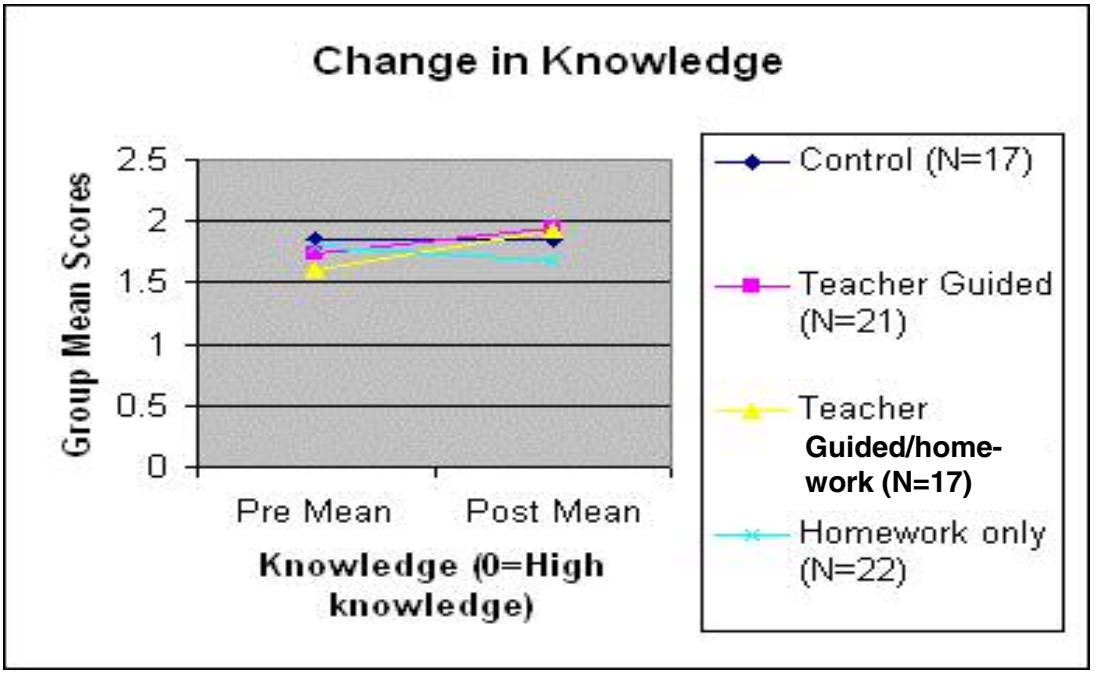

Figure B.6. Pre- post means for change in knowledge.

HIGH SCHOOL SAMPLES

Table B.7. Change in Behavioral Control

Group	n	Pre Mean	Post Mean
Homework Only	22	4.05	2.79
Teacher Guided	21	4.35	4.48
Teacher Guided/homework	17	3.69	2.55
Control	17	4.19	4.16

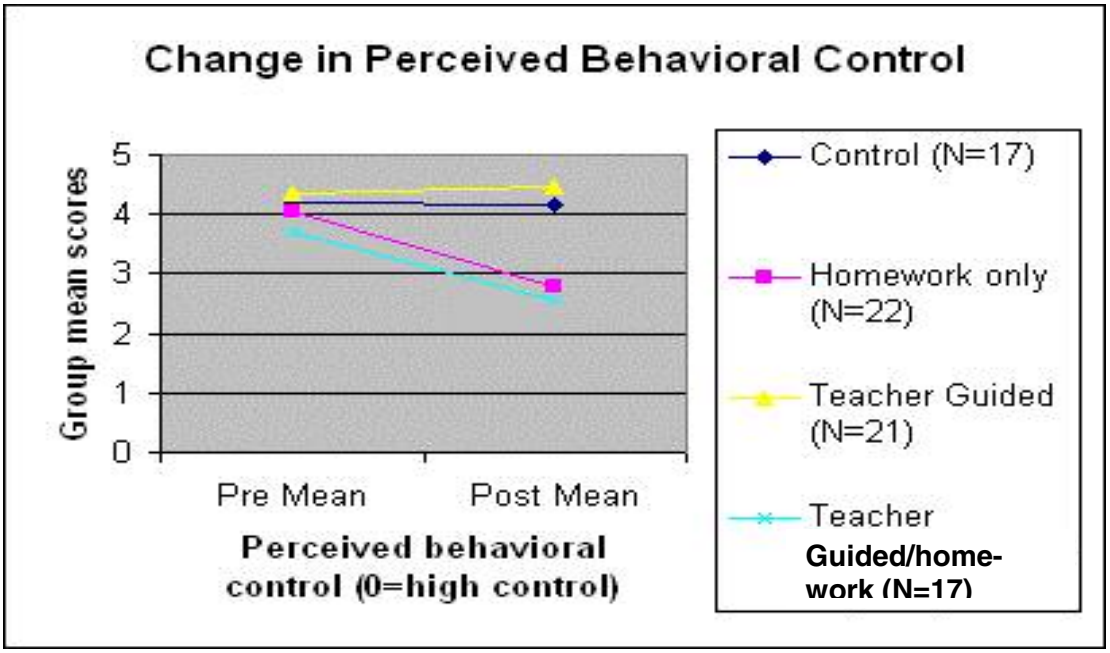

Figure B.7. Pre- post means for change in perceived behavioral control.

HIGH SCHOOL SAMPLES

Table B.8. Change in Intention

Group	n	Pre Mean	Post Mean
Homework Only	22	2.64	2.54
Teacher Guided	21	2.67	2.77
Teacher Guided/homework	17	2.15	2.74
Control	17	2.41	2.49

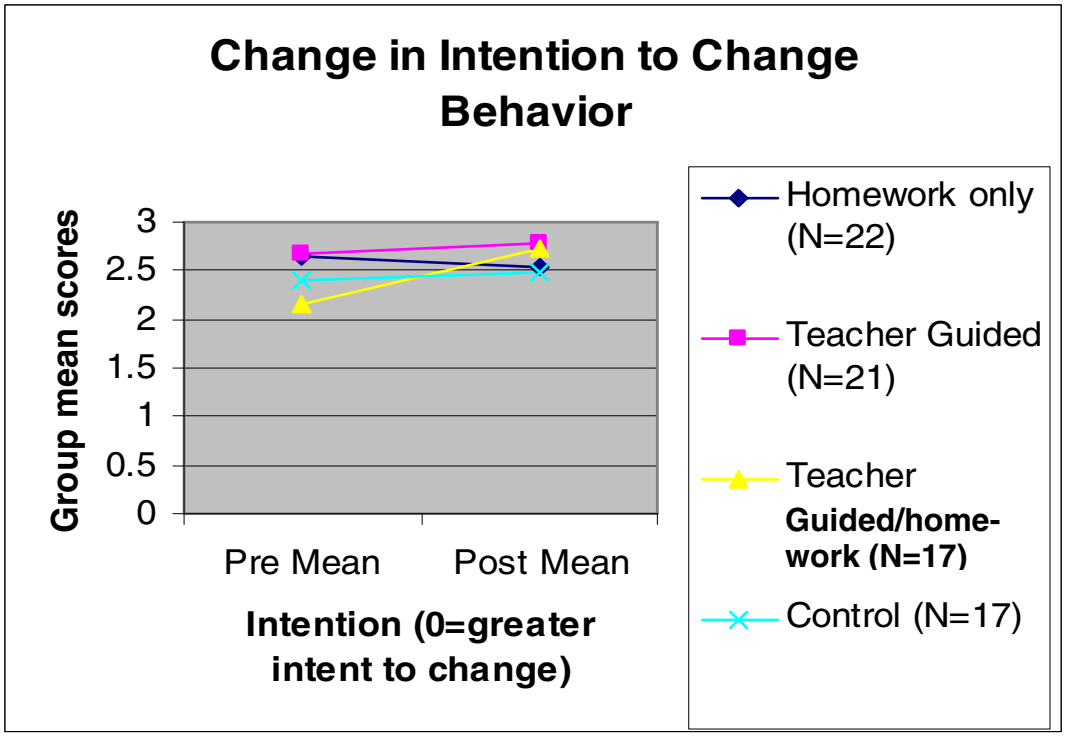

Figure B.8. Pre- post means for change in intention to change behavior.

HIGH SCHOOL SAMPLES

Table B.9. Change in Attitude

Group	n	Pre Mean	Post Mean
Homework only	22	3.75	2.98
Teacher Guided	21	4.02	4.11
Teacher Guided/homework	17	3.40	3.30
Control	17	3.75	3.88

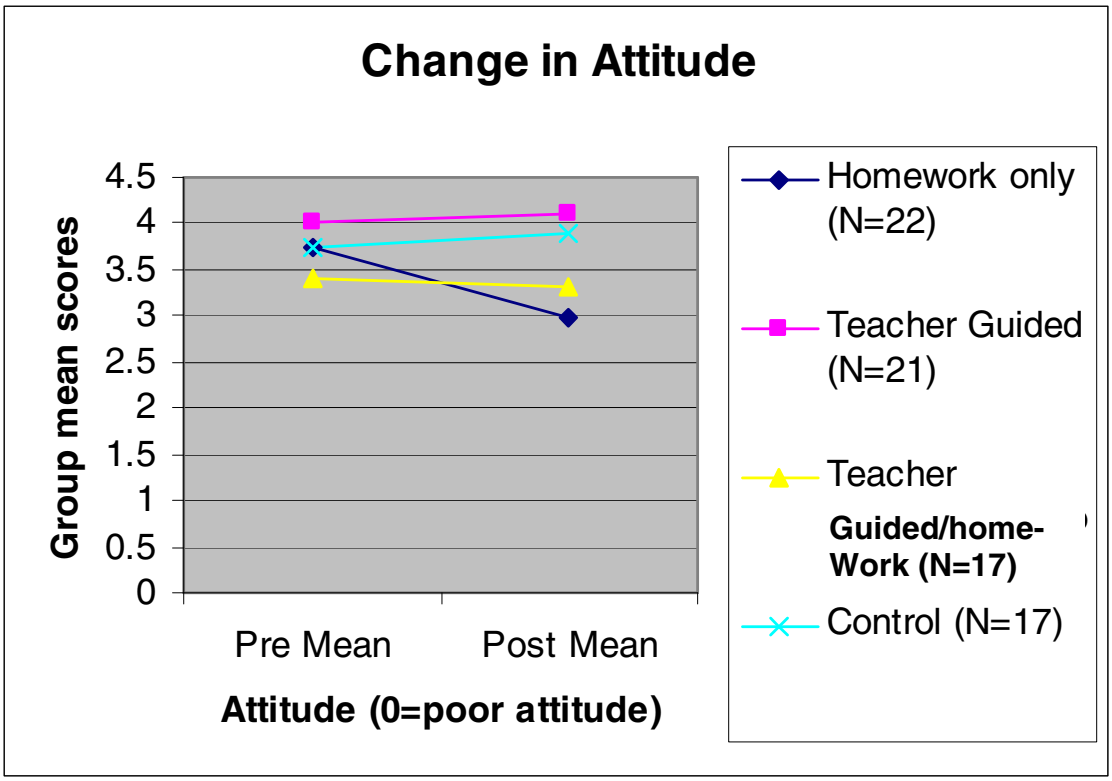

Figure B.9. Pre- post means for change in attitude

HIGH SCHOOL SAMPLES

Table B.10. Change in Beliefs

Group	n	Pre Mean	Post Mean
Homework Only	22	2.95	2.78
Teacher Guided	21	3.10	3.24
Teacher Guided/homework	17	3.16	3.39
Control	17	2.92	3.07

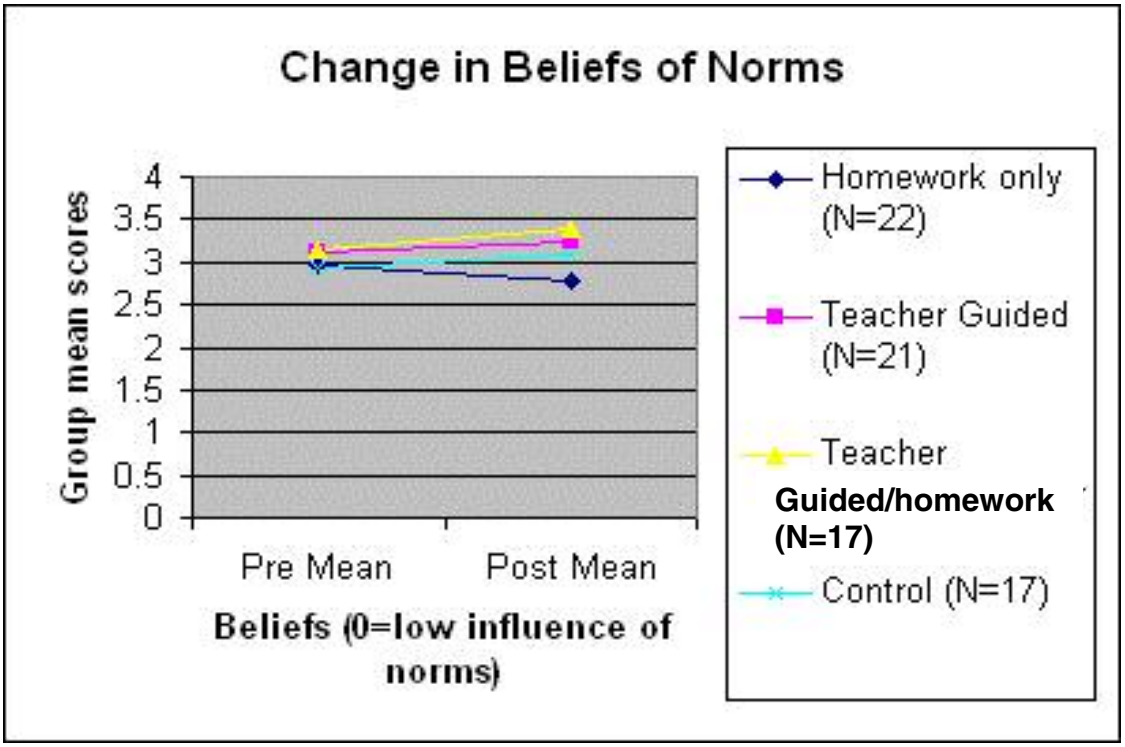

Figure B.10. Pre- post means for change in normative beliefs.

APPENDIX C

SCHOOL SAMPLES WITH STRONG FAMILY BONDS

JUNIOR HIGH SAMPLE

Table C.1. Change in Intention to change behavior

Group	n	Pre Mean	Post Mean
Homework Only	4	2.70	2.00
Teacher Guided	7	2.19	2.80
Teacher Guided/homework	1	2.88	3.63
Control	5	2.98	2.92

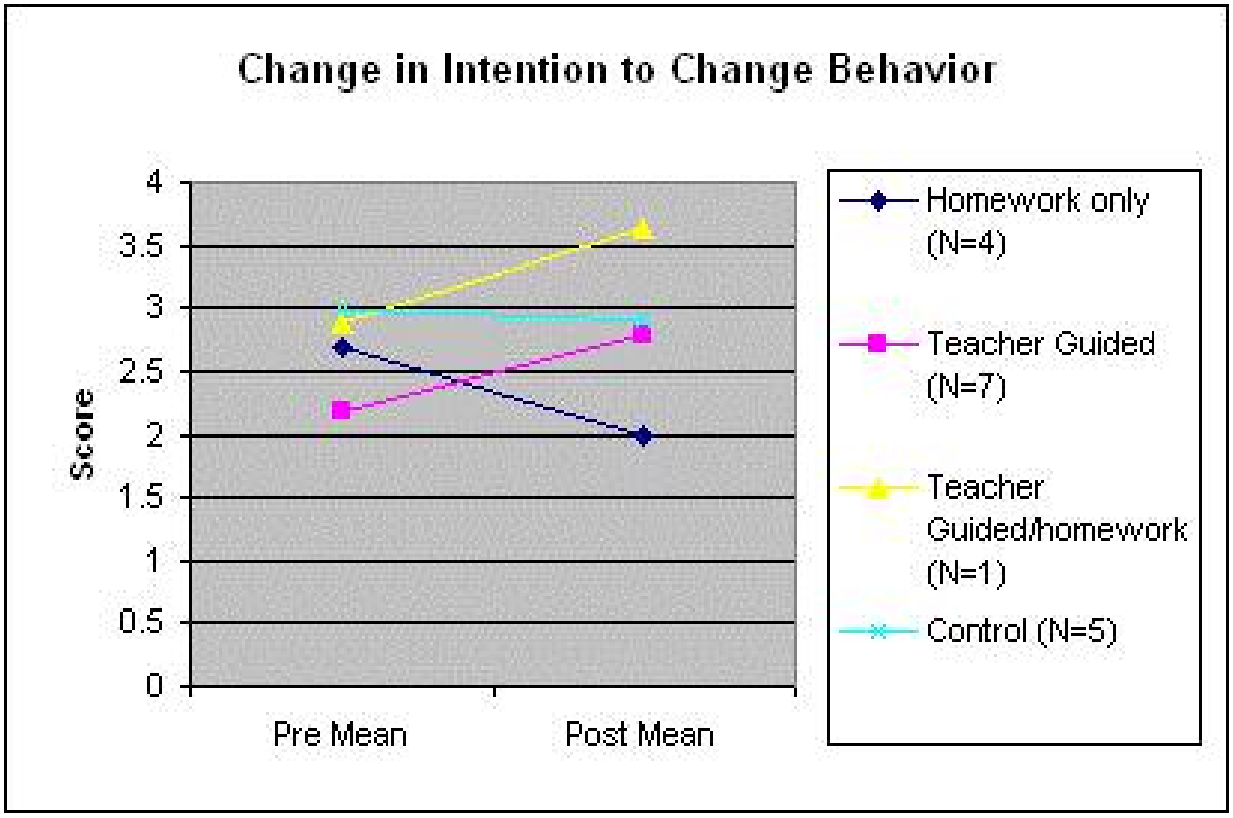

Figure C.1. Pre- post means for change in intention to change behavior.

JUNIOR HIGH SAMPLE

Table C.2. Change in Knowledge

Group	n	Pre Mean	Post Mean
Homework Only	5	1.71	1.75
Teacher Guided	8	1.75	1.75
Teacher Guided/homework	1	1.29	1.29
Control	6	1.57	1.60

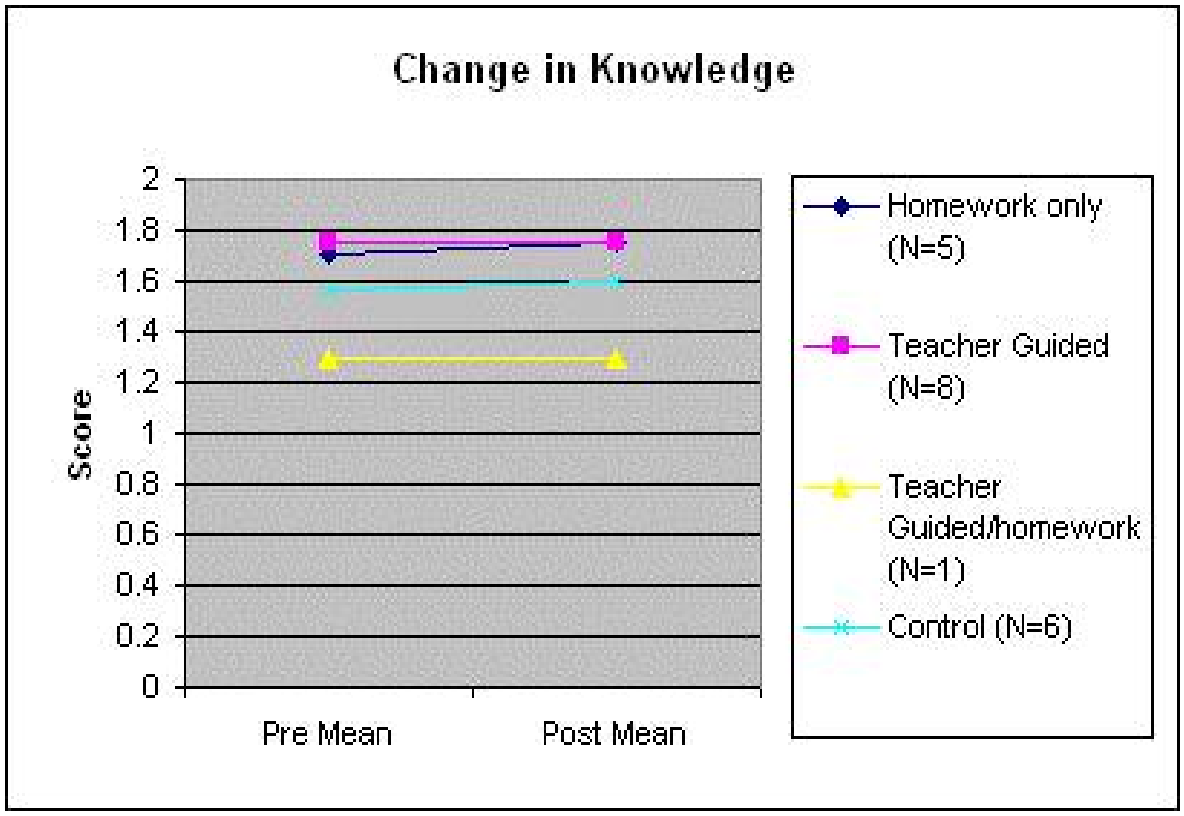

Figure C.2. Pre- post means for change in knowledge.

JUNIOR HIGH SAMPLE

Table C.3. Change in Normative Beliefs

Group	n	Pre Mean	Post Mean
Homework Only	5	2.11	3.06
Teacher Guided	6	2.92	2.24
Teacher Guided/homework	1	2.29	3.86
Control	6	3.00	3.33

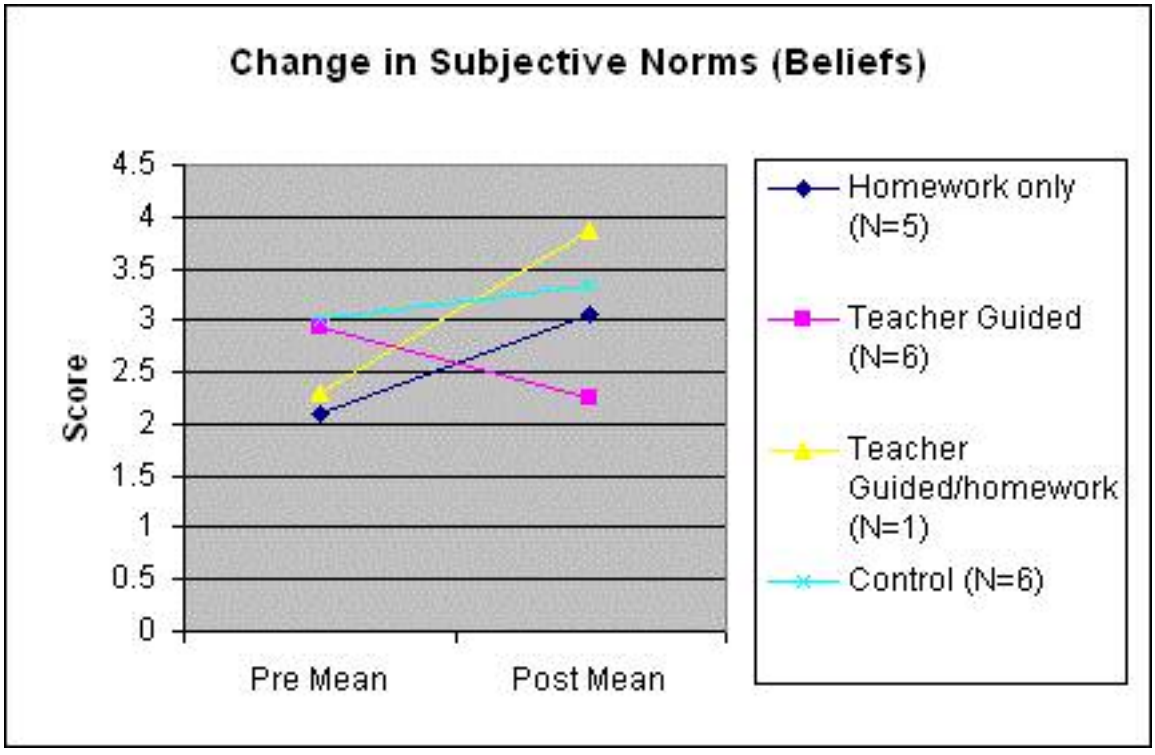

Figure C.3. Pre- post means for change in normative beliefs.

JUNIOR HIGH SAMPLE

Table C.4. Change in Attitude

Group	n	Pre Mean	Post Mean
Homework Only	5	3.27	2.91
Teacher Guided	7	3.86	3.6
Teacher Guided/homework	1	4.89	4.89
Control	6	3.83	3.56

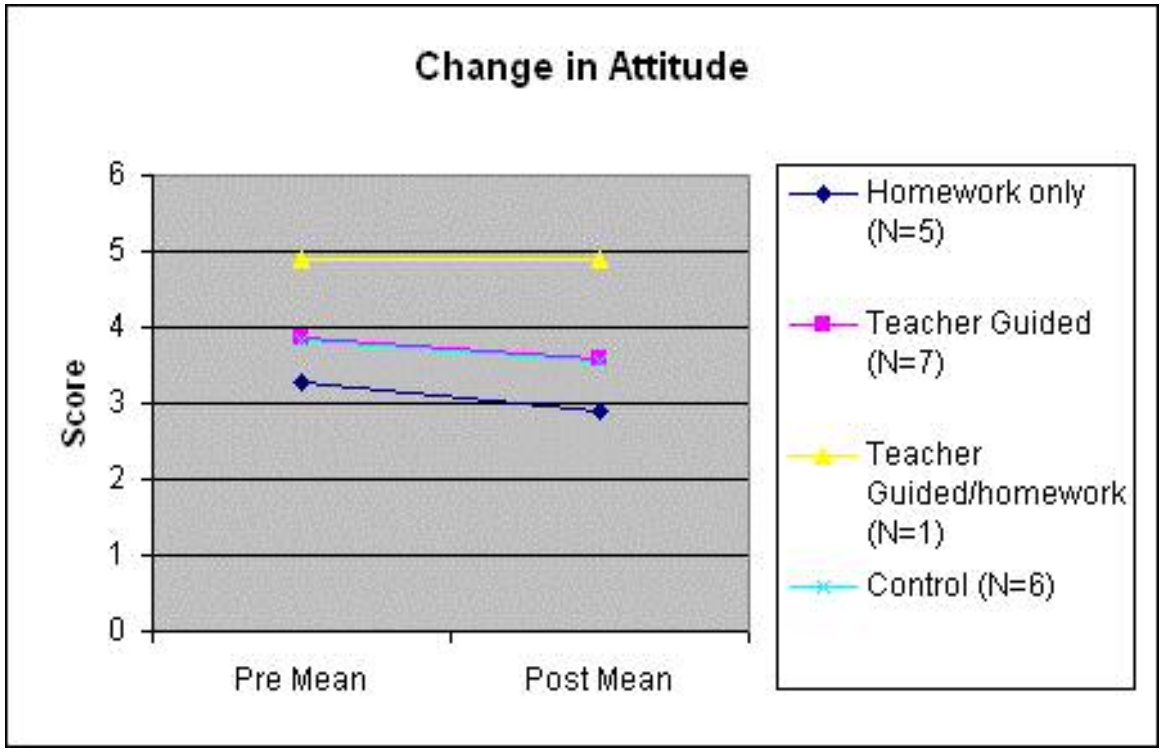

Figure C.4. Pre- post means for change in attitude

JUNIOR HIGH SAMPLE

Table C.5. Change in Perceived Behavioral Control

Group	n	Pre Mean	Post Mean
Homework Only	5	3.88	3.52
Teacher Guided	8	3.80	4.43
Teacher Guided/homework	1	4.60	5.00
Control	6	4.40	4.73

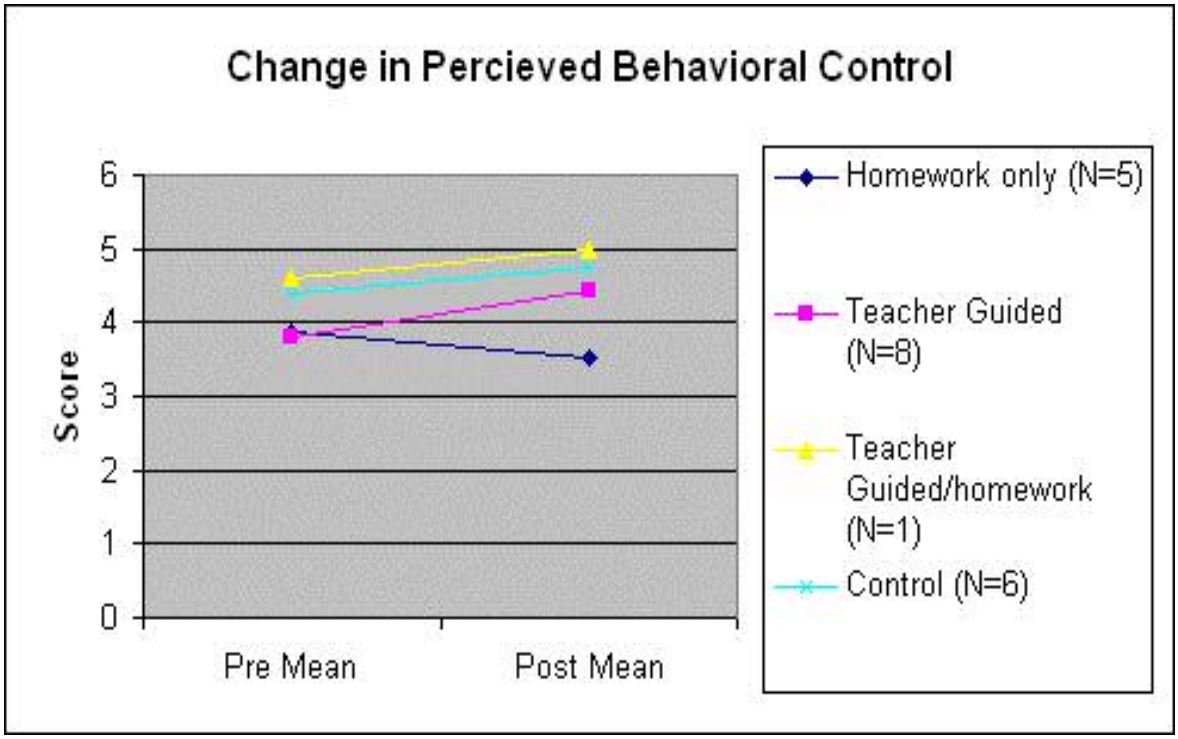

Figure C.5. Pre- post means for change in perceived behavioral control.

HIGH SCHOOL SAMPLES

Table C.6. Change in Knowledge

Group	n	Pre Mean	Post Mean
Homework Only	19	1.80	1.68
Teacher Guided	15	1.74	1.93
Teacher/guided Homework	12	1.59	1.92
Control	14	1.87	1.87

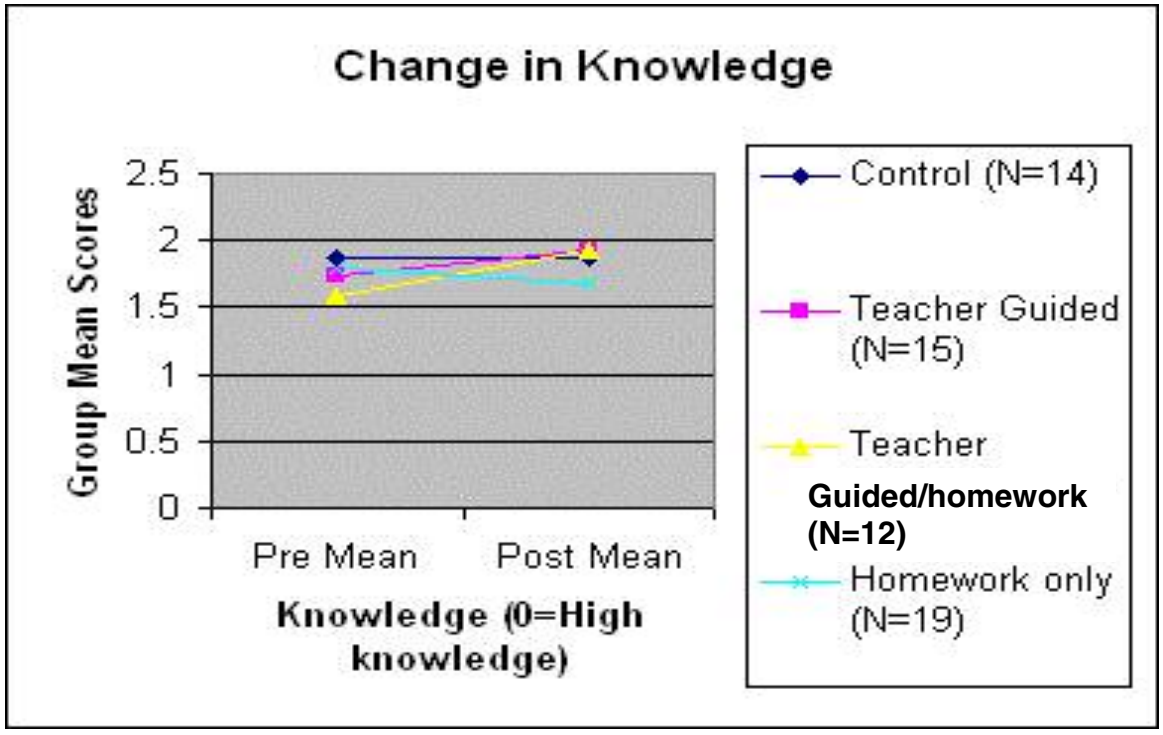

Figure C.6. Pre- post means for change in knowledge.

HIGH SCHOOL SAMPLES

Table C.7. Change in Behavioral Control

Group	n	Pre Mean	Post Mean
Homework Only	19	4.16	2.86
Teacher Guided	15	4.31	4.45
Teacher Guided/homework	12	3.95	2.47
Control	14	4.13	4.10

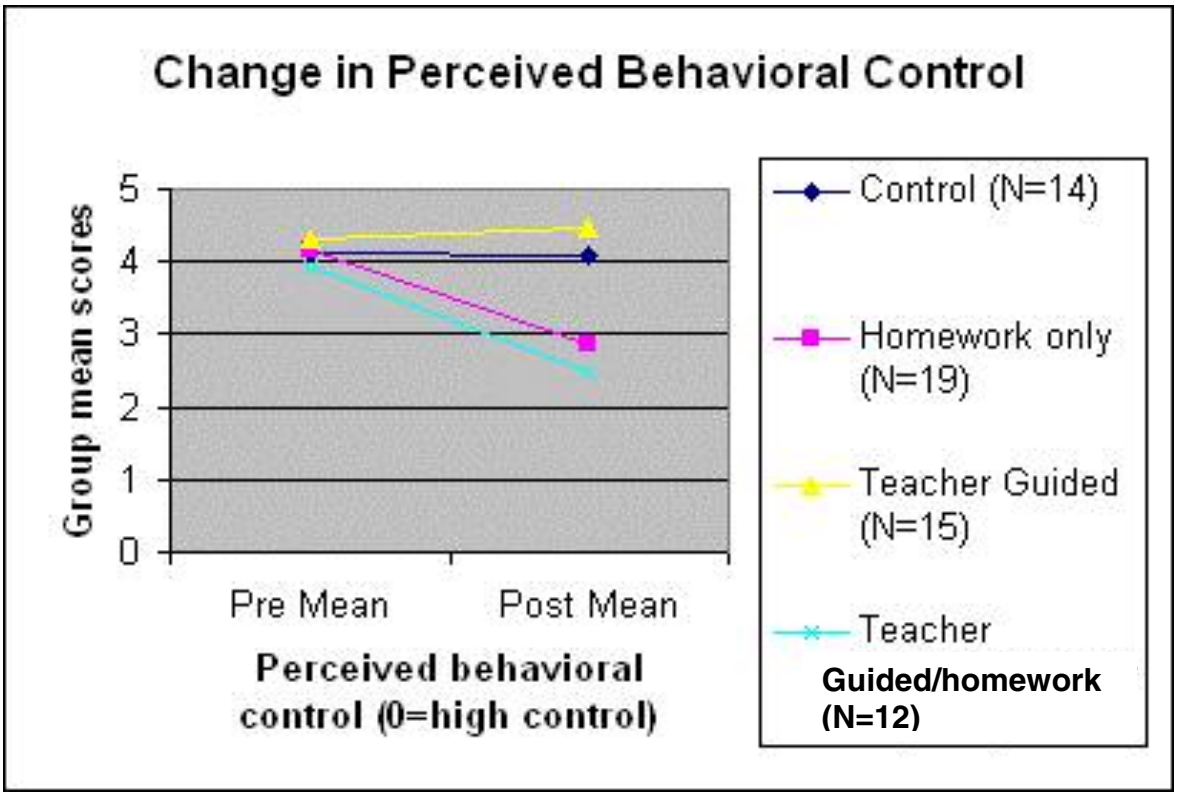

Figure C.7. Pre- post means for change in perceived behavioral control.

HIGH SCHOOL SAMPLES

Table C.8. Change in Intention

Group	n	Pre Mean	Post Mean
Homework Only	18	2.66	2.62
Teacher Guided	15	2.66	2.71
Teacher Guided/homework	12	2.32	2.53
Control	14	2.33	2.42

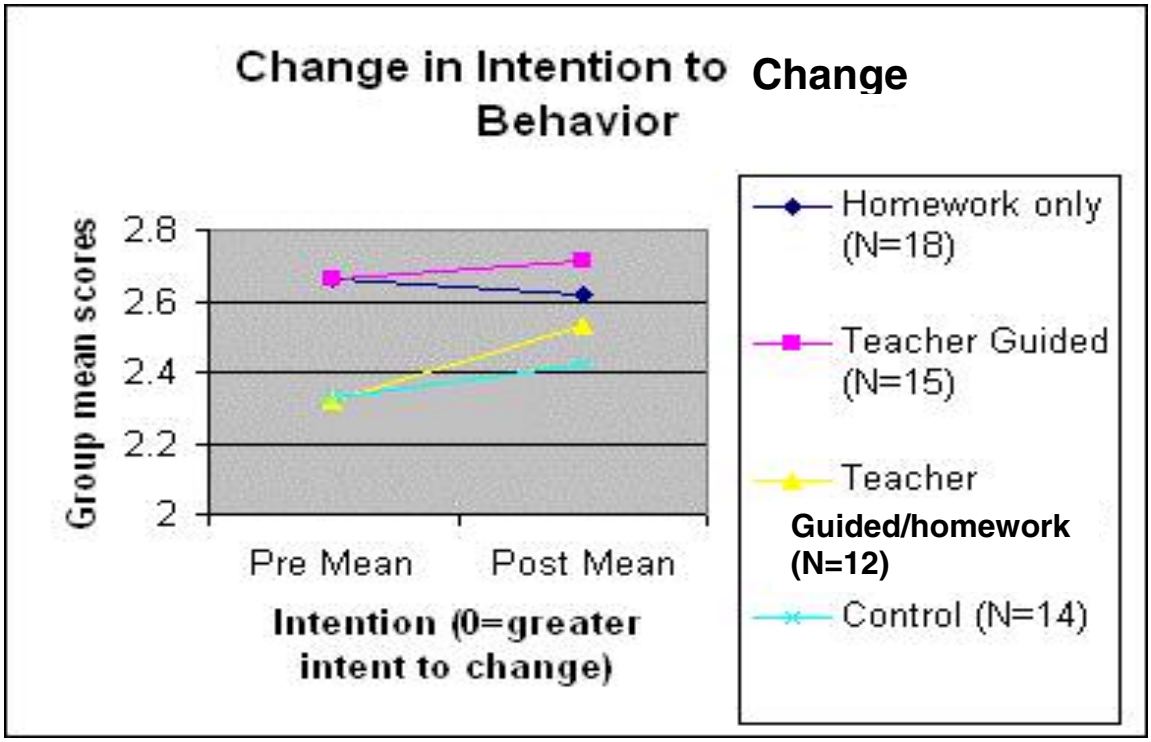

Figure C.8. Pre- post means for change in perceived behavioral control.

HIGH SCHOOL SAMPLES

Table C.9. Change in Attitude

Group	N	Pre Mean	Post Mean
Homework only	19	3.80	2.95
Teacher Guided	15	4.08	4.21
Teacher Guided/homework	12	3.67	3.56
Control	14	3.73	3.83

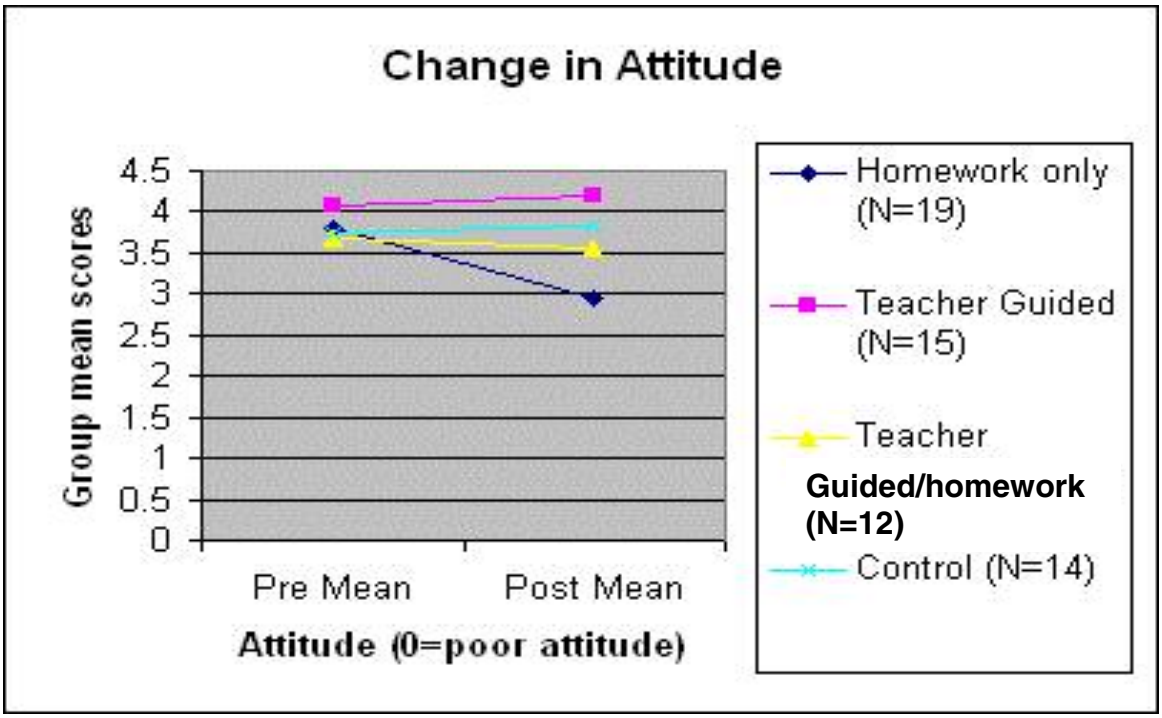

Figure C.9. Pre- post means for change in attitude.

HIGH SCHOOL SAMPLES

Table C.10. Change in Beliefs

Group	n	Pre Mean	Post Mean
Homework Only	19	2.97	2.74
Teacher Guided	15	3.20	3.09
Teacher Guided/homework	12	3.23	3.38
Control	14	3.00	3.01

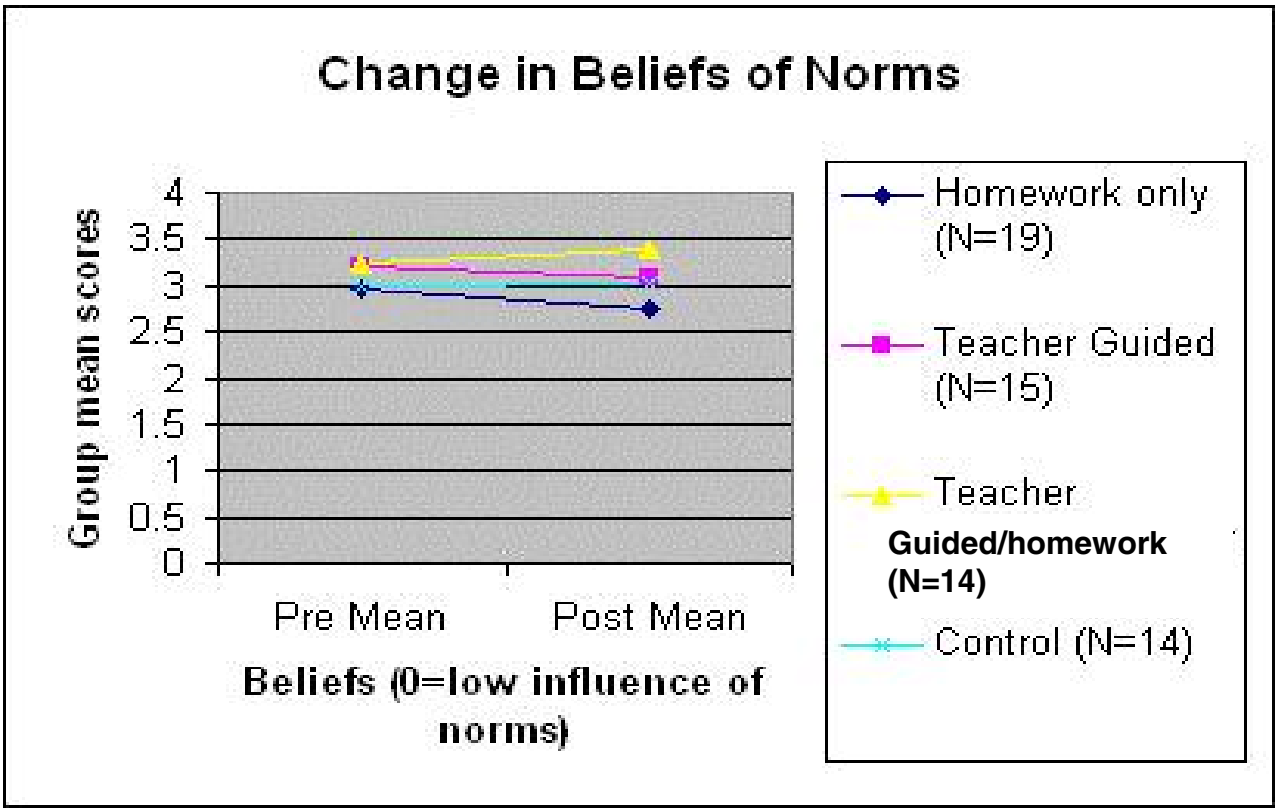

Figure C.10. Pre- post means for change in normative beliefs.

APPENDIX D

SCHOOL SAMPLES WITH DELINQUENT FRIENDS

JUNIOR HIGH SCHOOL

Table D.1. Change in Knowledge

Group	n	Pre Mean	Post Mean
Homework Only	17	1.58	1.69
Teacher Guided	14	1.52	1.74
Teacher Guided/homework	6	1.62	1.57
Control	14	1.67	1.70

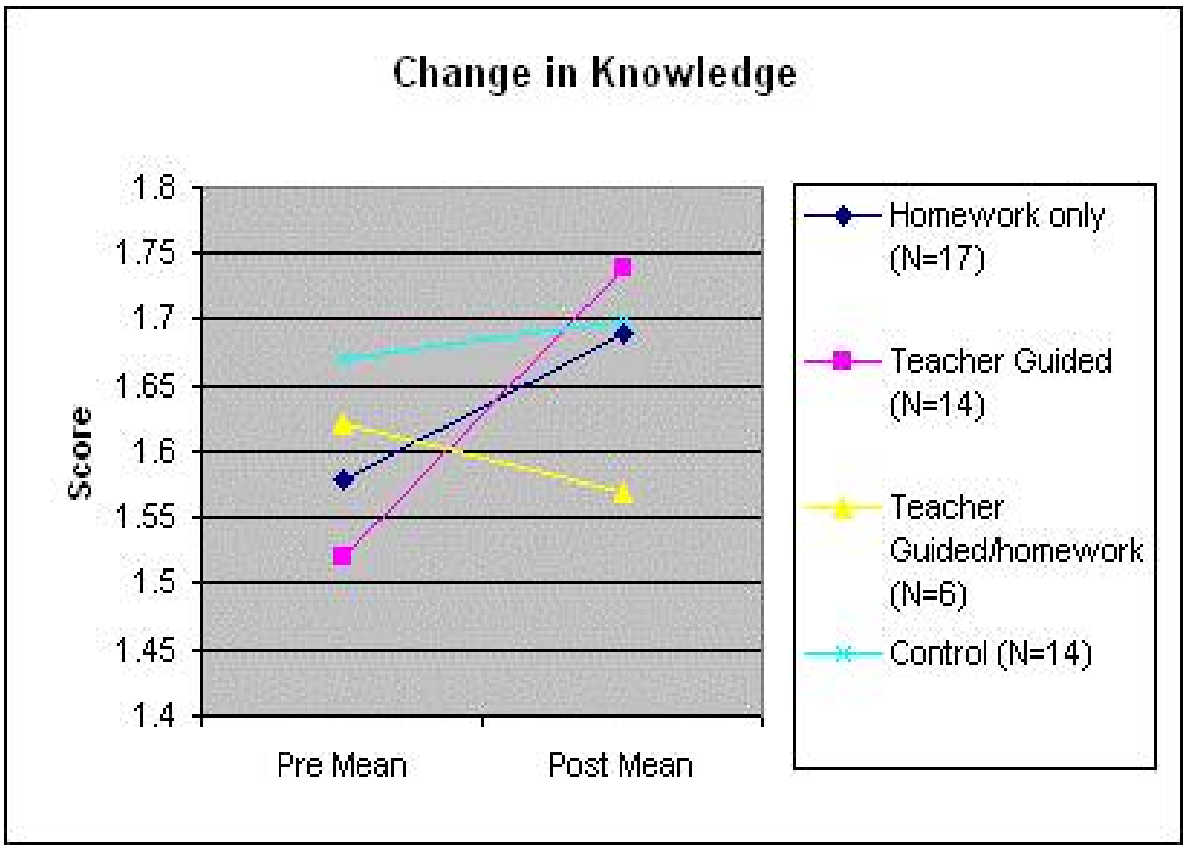

Figure D.1. Pre- post means for change in knowledge.

JUNIOR HIGH SCHOOL

Table D.2. Change in Perceived Behavioral Control

Group	n	Pre Mean	Post Mean
Homework Only	17	3.52	3.35
Teacher Guided	15	3.45	3.72
Teacher Guided/homework	5	2.88	3.67
Control	14	3.34	3.36

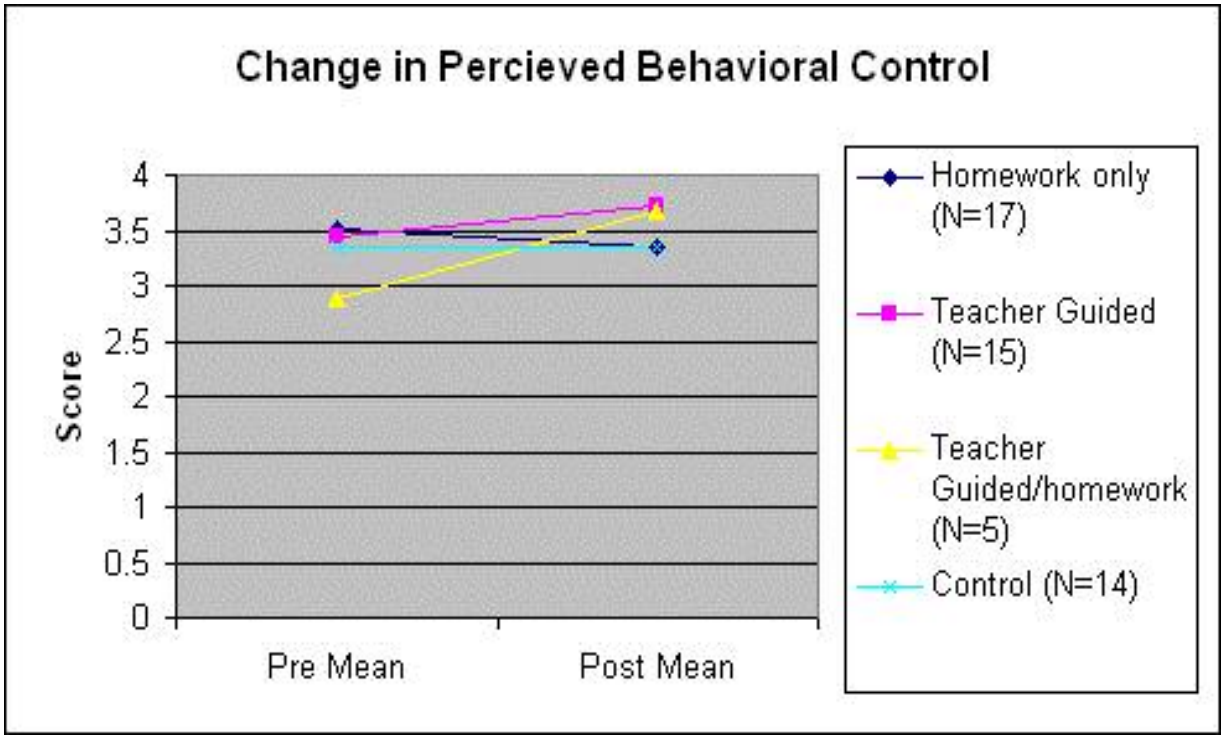

Figure D.2. Pre- post means for change in perceived behavioral control.

JUNIOR HIGH SCHOOL

Table D.3. Change in Intention

Group	n	Pre Mean	Post Mean
Homework only	16	2.44	2.34
Teacher Guided	13	2.19	2.53
Teacher Guided/homework	6	2.17	2.38
Control	12	2.30	2.23

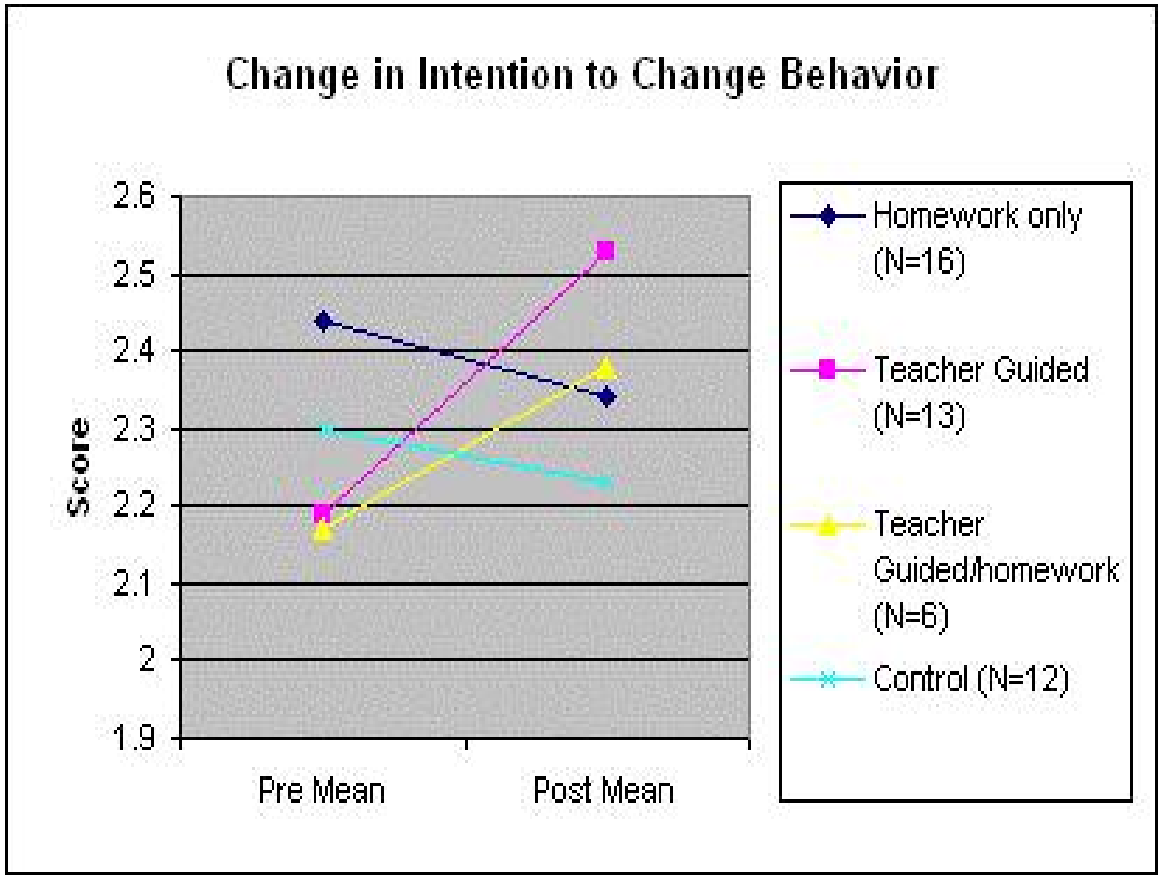

Figure D.3. Pre- post means for change in perceived behavioral control.

JUNIOR HIGH SCHOOL

Table D.4. Change in Attitude

Group	N	Pre Mean	Post Mean
Homework Only	17	3.02	3.06
Teacher Guided	15	3.61	3.42
Teacher Guided/homework	6	3.31	3.04
Control	14	3.30	3.45

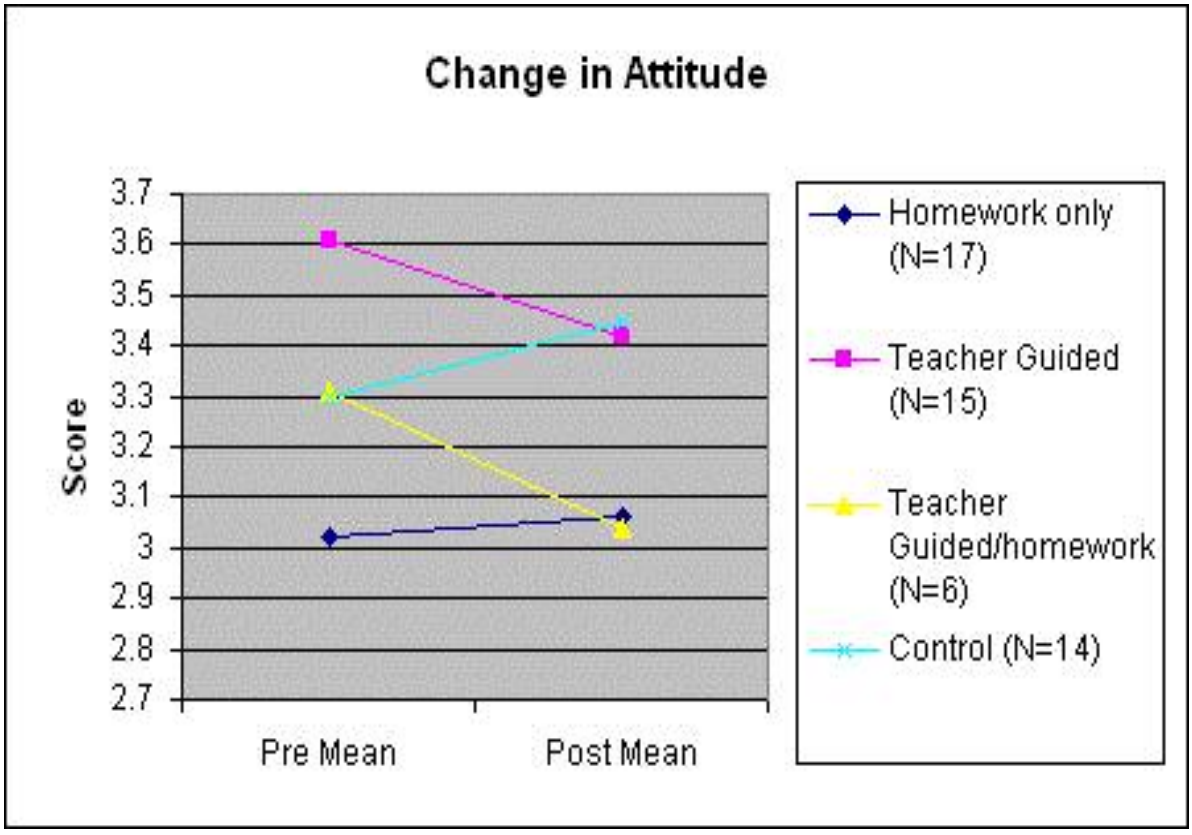

Figure D.4. Pre- post means for change in attitude.

JUNIOR HIGH SCHOOL

Table D.5. Change in Beliefs

Group	n	Pre Mean	Post Mean
Homework only	17	2.49	2.95
Teacher Guided	13	2.73	2.82
Teacher Guided/homework	5	2.40	3.19
Control	13	2.76	2.86

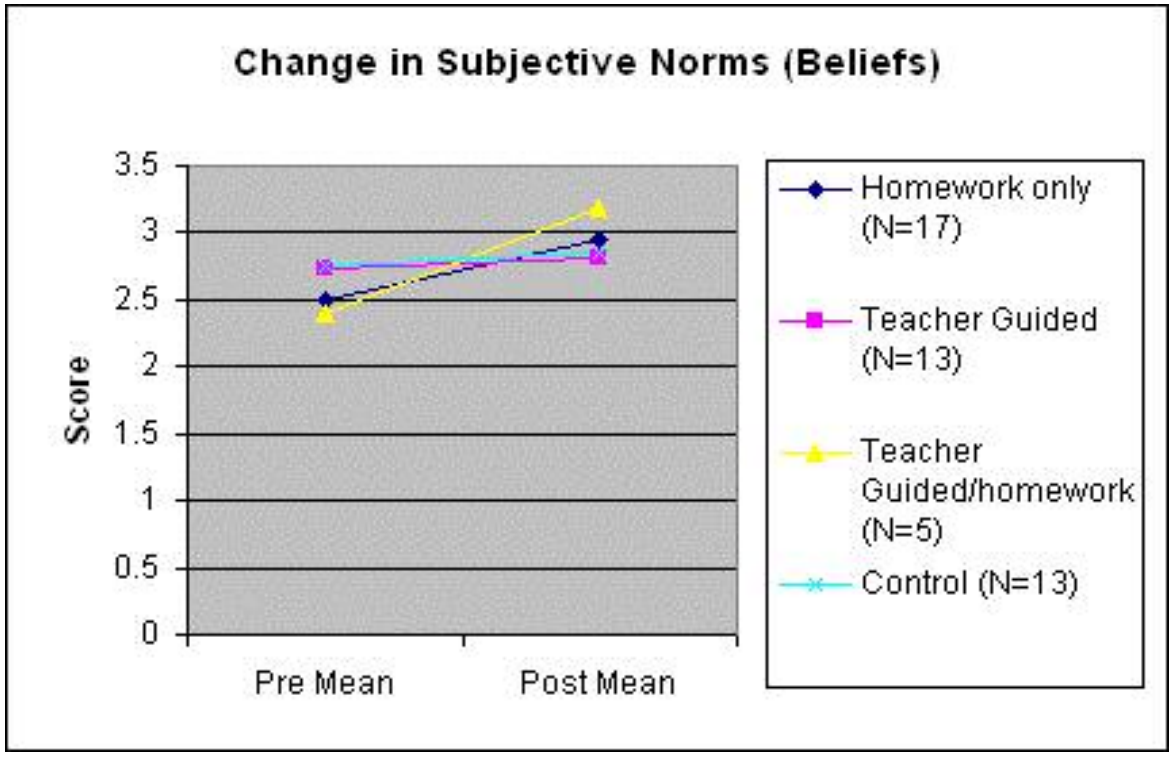

Figure D.5. Pre- post means for change in normative beliefs.

HIGH SCHOOL SAMPLE

Table D.6. Change in Knowledge

Group	n	Pre Mean	Post Mean
Homework Only	17	1.78	1.66
Teacher Guided	11	1.73	1.96
Teacher Guided/homework	15	1.58	1.90
Control	10	1.88	1.90

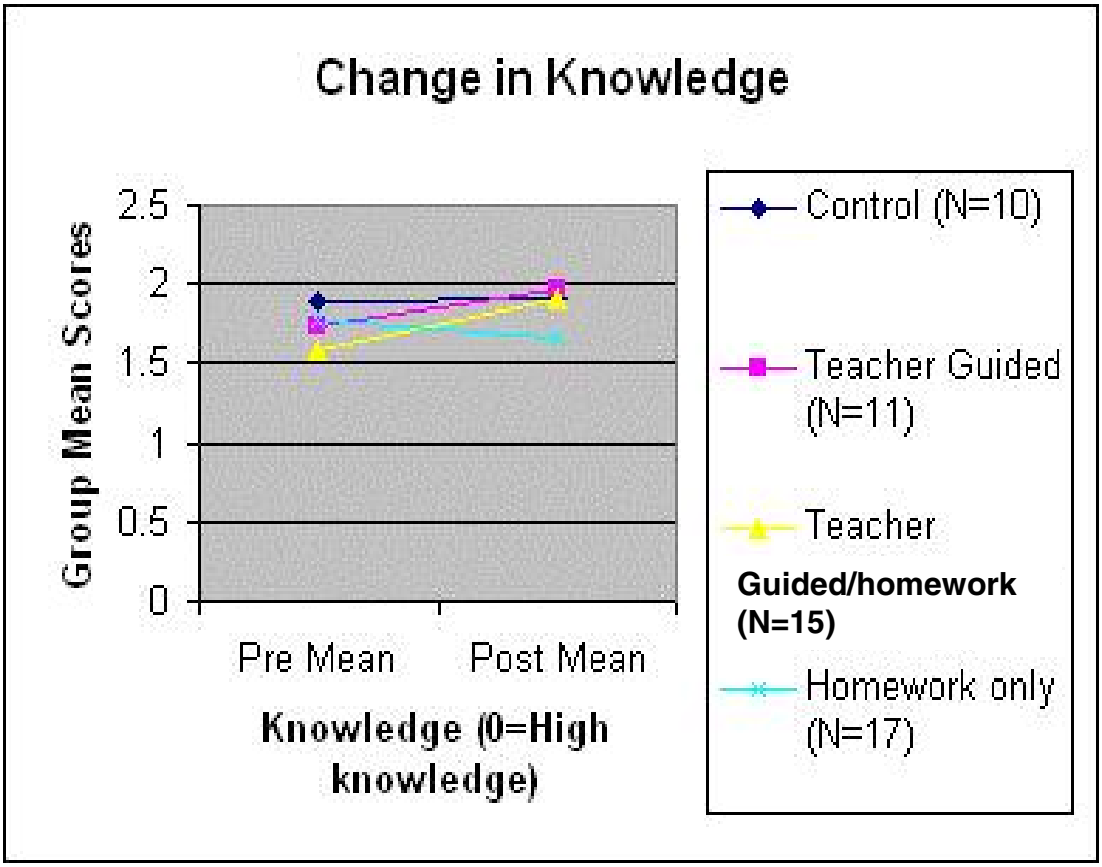

Figure D.6. Pre- post means for change in knowledge.

HIGH SCHOOL SAMPLE

Table D.7. Change in Behavioral Control

Group	n	Pre Mean	Post Mean
Homework Only	17	4.00	2.80
Teacher Guided	10	4.19	4.40
Teacher Guided/homework	15	3.57	2.77
Control	10	4.11	4.06

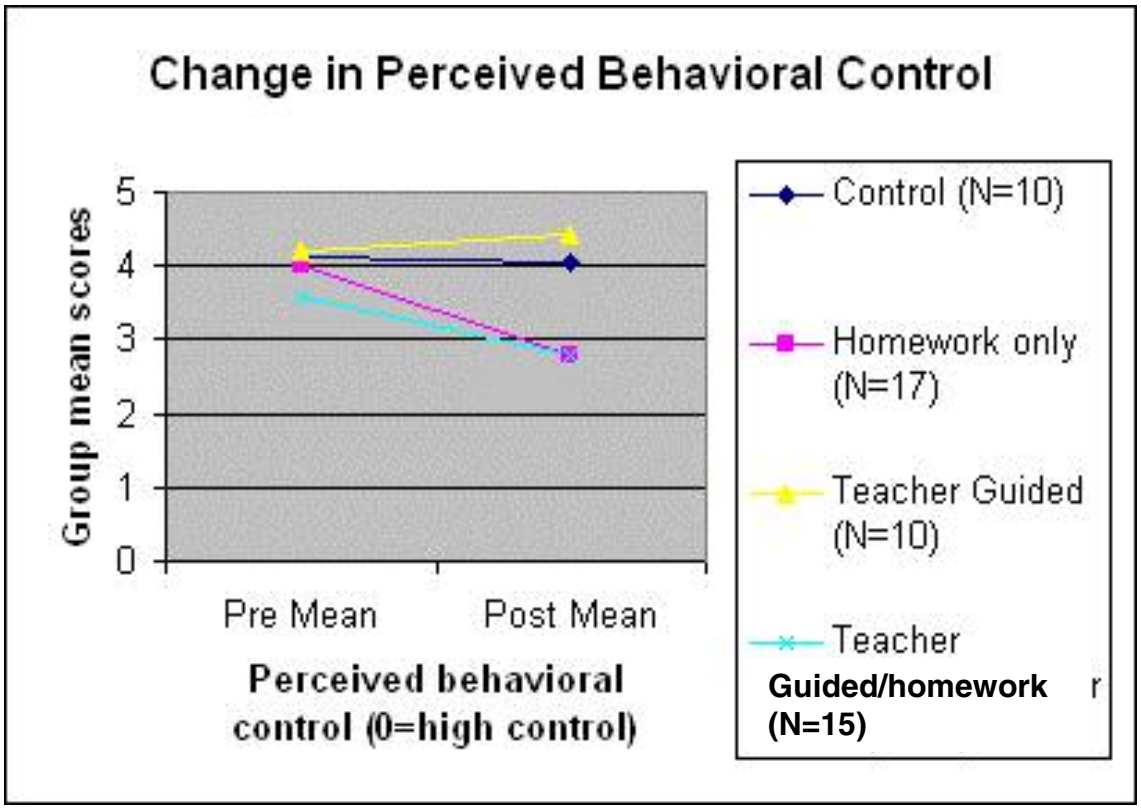

Figure D.7. Pre- post means for change in knowledge.

HIGH SCHOOL SAMPLE

Table D.8. Change in Intention

Group	N	Pre Mean	Post Mean
Homework Only	17	2.56	2.45
Teacher Guided	11	2.63	2.75
Teacher Guided/homework	15	2.03	2.9
Control	10	2.38	2.36

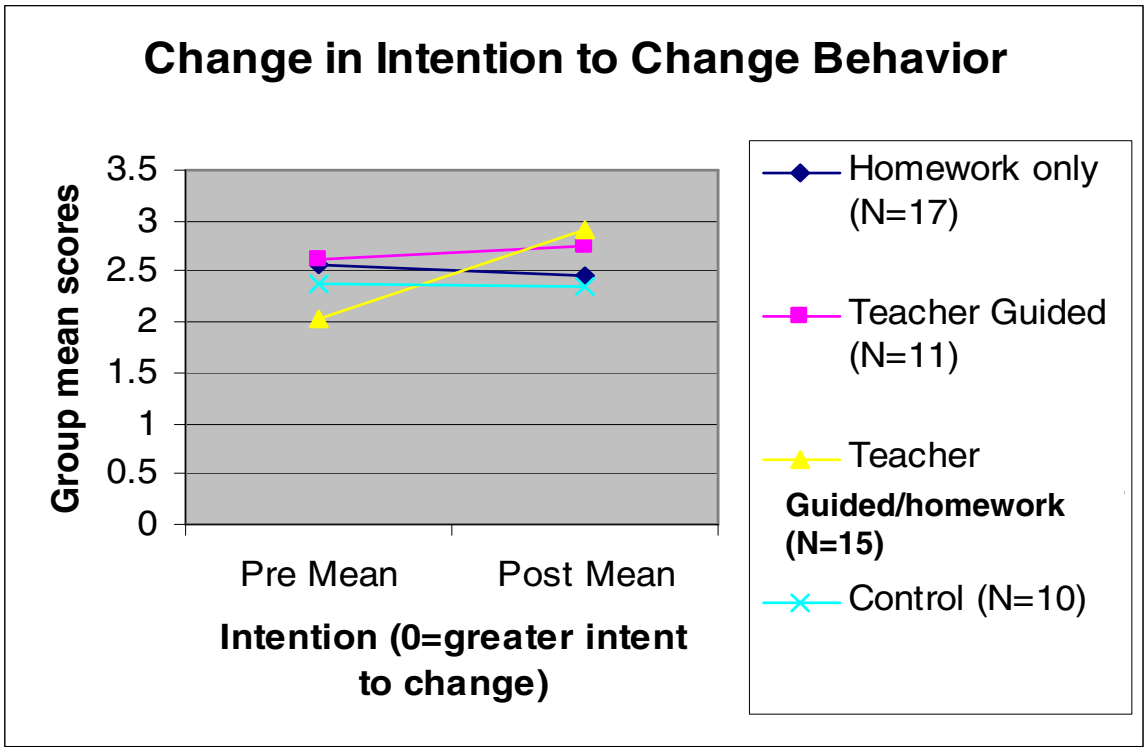

Figure D.8. Pre- post means for change in intention to change behavior.

HIGH SCHOOL SAMPLE

Table D.9. Change in Attitude

Group	n	Pre Mean	Post Mean
Homework Only	17	3.63	2.97
Teacher Guided	10	3.76	3.98
Teacher Guided/homework	15	3.23	3.08
Control	10	3.72	3.97

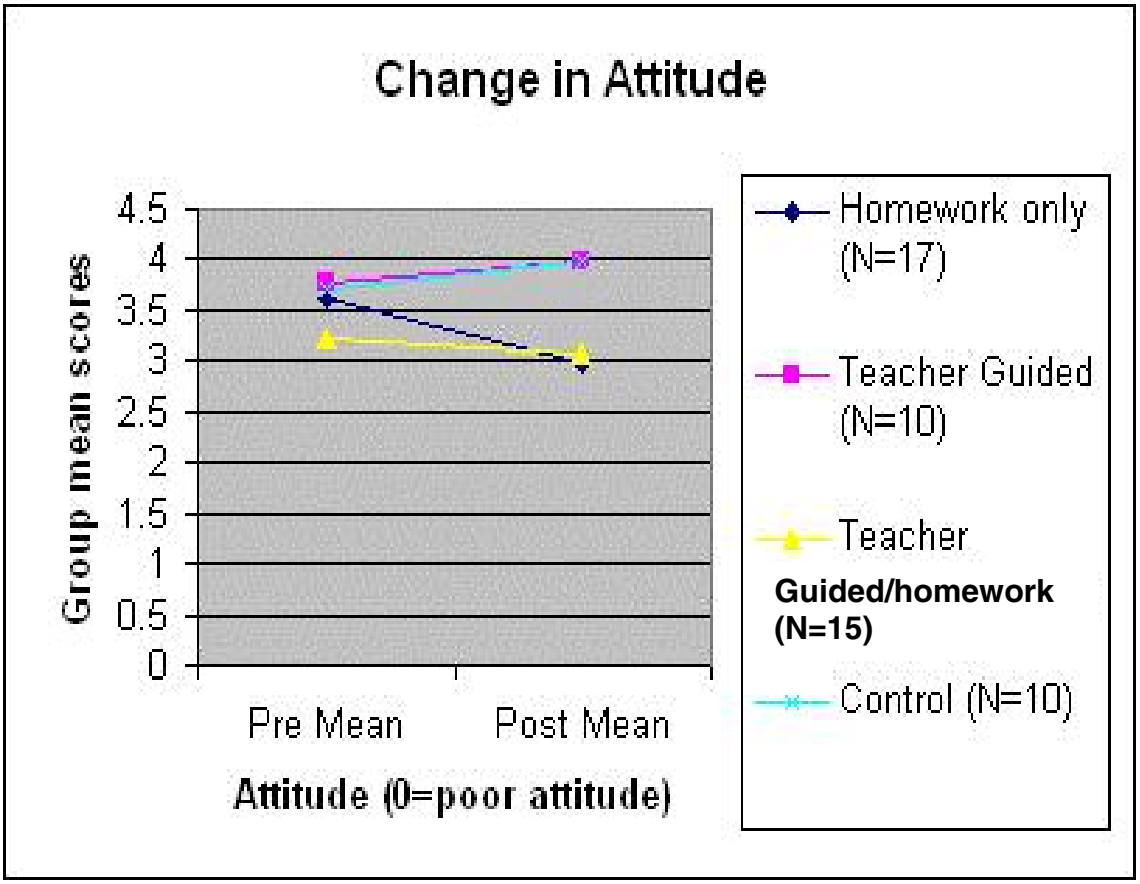

Figure D.9. Pre- post means for change in attitude.

HIGH SCHOOL SAMPLE

Table D.10. Change in Beliefs

Group	n	Pre Mean	Post Mean
Homework Only	17	2.83	2.71
Teacher Guided	11	2.73	3.1
Teacher Guided/homework	15	3.02	3.18
Control	10	2.84	3.14

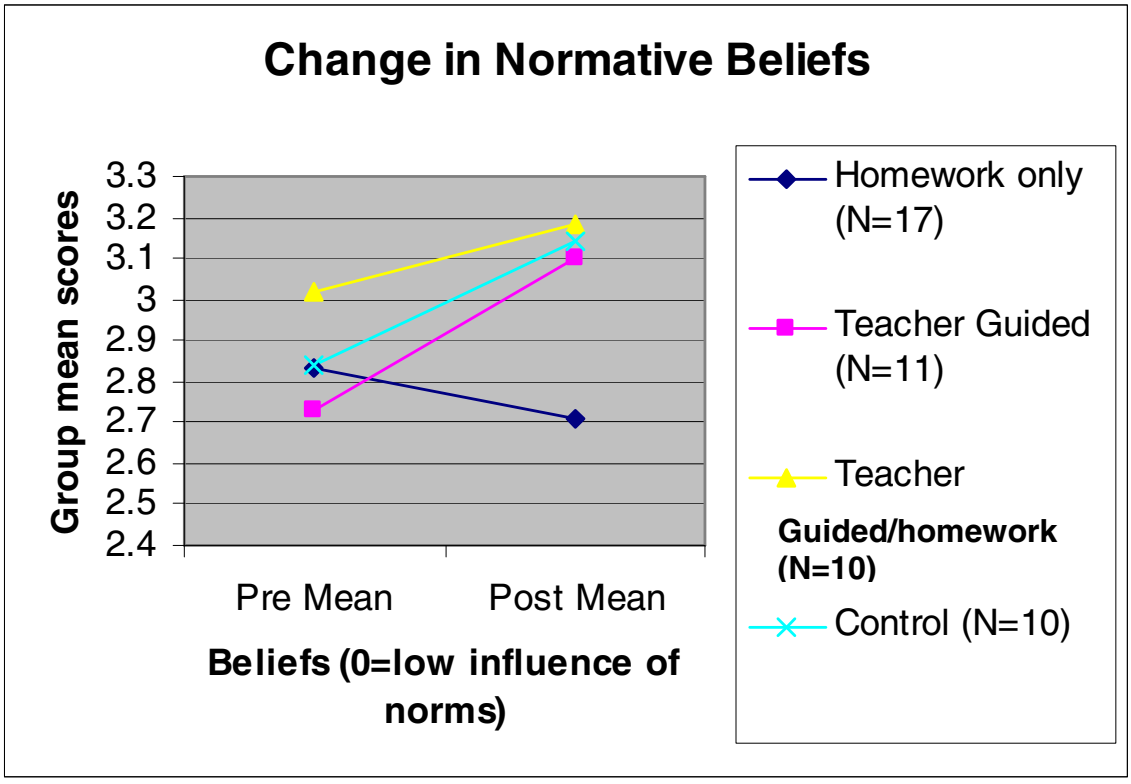

Figure D.10. Pre- post means for change in normative beliefs

APPENDIX E

RISK FACTORS

Risk Factors

Adolescent Problem Behaviors

	Substance Abuse	Delinquency	Teen Pregnancy	School Drop-Out	Violence
Community					
Availability of Drugs	●				●
Availability of Firearms		●			●
Community Laws and Norms Favorable toward Drug Use, Firearms and Crime	●	●			●
Media Portrayals of Violence					●
Transitions and Mobility	●	●		●	
Low Neighborhood Attachment and Community Disorganization	●	●			●
Extreme Economic Deprivation	●	●	●	●	●
Family					
Family History of the Problem Behavior	●	●	●	●	●
Family Management Problems	●	●	●	●	●
Family Conflict	●	●	●	●	●
Favorable Parental Attitudes and Involvement in the Problem Behavior	●	●			●
School					
Academic Failure Beginning in Late Elementary School	●	●	●	●	●
Lack of Commitment to School	●	●	●	●	●
Peer and Individual					
Early and Persistent Antisocial Behavior	●	●	●	●	●
Rebelliousness	●	●		●	
Friends Who Engage in the Problem Behavior	●	●	●	●	●
Gang Involvement	●	●			●
Favorable Attitudes toward the Problem Behavior	●	●	●	●	
Early Initiation of the Problem Behavior	●	●	●	●	●
Constitutional Factors	●	●			●

*Communities that care (2003). Retrieved on 8/21/2005 from http://www.ctcdata.org/?page=risk_factors.html.

PROTECTIVE FACTORS*

Asset Type	Asset Name & Definition	
EXTERNAL ASSETS		
Support	Family support	Family life provides high levels of love and support.
	Positive family communication	Young person and her or his parent(s) communicate positively, and young person is willing to seek advice and counsel from parent(s).
	Other adult relationships	Young person receives support from three or more nonparent adults.
	Caring neighborhood	Young person experiences caring neighbors.
	Caring school climate	School provides a caring, encouraging environment.
	Parent involvement in schooling	Parent(s) are actively involved in helping young person succeed in school.
Empowerment	Community values youth	Young person perceives that adults in the community value youth.
	Youth as resources	Young people are given useful roles in the community.
	Service to others	Young person serves in the community one hour or more per week.
	Safety	Young person feels safe at home, at school, and in the neighborhood.
Boundaries and Expectations	Family boundaries	Family has clear rules and consequences, and monitors the young person's whereabouts.
	School boundaries	School provides clear rules and consequences.
	Neighborhood boundaries	Neighbors take responsibility for monitoring young people's behavior.
	Adult role models	Parent(s) and other adults model positive, responsible behavior.
	Positive peer influence	Young person's best friends model responsible behavior.
	High expectations	Both parent(s) and teachers encourage the young person to do well.
Constructive Use	Creative activities	Young person spends three or more hours per week

of Time	in lessons or practice in music, theater, or other arts.

	Youth programs	Young person spends three or more hours per week in sports, clubs, or organizations at school and/or in community organizations.
	Religious community	Young person spends one hour or more per week in activities in a religious institution.
	Time at home	Young person is out with friends "with nothing special to do" two or fewer nights per week.
INTERNAL ASSETS		
Commitment to Learning	Achievement motivation	Young person is motivated to do well in school.
	School engagement	Young person is actively engaged in learning.
	Homework	Young person reports doing at least one hour of homework every school day.
	Bonding to school	Young person cares about her or his school.
	Reading for pleasure	Young person reads for pleasure three or more hours per week.
Positive Values	Caring	Young person places high value on helping other people.
	Equality and social justice	Young person places high value on promoting equality and reducing hunger and poverty.
	Integrity	Young person acts on convictions and stands up for her or his beliefs.
	Honesty	Young person "tells the truth even when it is not easy."
	Responsibility	Young person accepts and takes personal responsibility.
	Restraint	Young person believes it is important not to be sexually active or to use alcohol or other drugs.
Social Competencies	Planning and decision making	Young person knows how to plan ahead and make choices.
	Interpersonal competence	Young person has empathy, sensitivity, and friendship skills.
	Cultural competence	Young person has knowledge of and comfort with people of different cultural/racial/ethnic backgrounds.
	Resistance skills	Young person can resist negative peer pressure and dangerous situations.

Peaceful conflict resolution	Young person seeks to resolve conflict nonviolently.

Positive Identity	Personal power	Young person feels he or she has control over "things that happen to me."
	Self-esteem	Young person reports having a high self-esteem.
	Sense of purpose	Young person reports that "my life has a purpose."
	Positive view of personal future	Young person is optimistic about her or his personal future

* Search Institute (200). *40 Assets*: Retrieved on 8/21/2005 from http://www.search-institute.org/assets/40Assets.pdf.

APPENDIX F

CORRELATIONS

Table F.1. Correlation between Demographic Variables and Environmental Variables, Controlling for Prior Exposure to Anger Control Messages+

	Gender	Grade	Age	White	Afr. Am.	Hispanic
Family Bonding	0.0599 P=0.4730	0.4771** P=0.0000	0.3755** P=0.0000	-0.0250 P=0.7640	-0.1176 P=0.1570	0.0388 P=0.6420
Friends with Del Behaviors	0.1612 P=0.0520	0.0692 P=0.4060	-0.0329 P=0.6930	0.0737 P=0.3770	0.1500 P=0.0710	-0.2144** P=0.0090

+N=144
Significant at *p<0.05; **p<0.01

Table F.2. Correlation between Environmental Variables and Change in Attitude, Behavioral Control, Beliefs, and Attitude, Controlling for Prior Exposure to Anger Control Messages+

	Change in Knowledge	Change in Behavioral Control	Change in Attitude	Change in Normative Beliefs
Family Bonding	-0.1840* P=0.041	-0.2321* P=0.009	-0.2202* P=0.014	-0.1655 P=0.066
Friends with Del Behaviors	-0.2168* P=0.016	-0.0024 P=0.979	-0.0527 P=0.561	-0.1473 P=0.102

+N=122
Significant at *p<0.05; **p<0.01

Table F.3. Correlation between Change in Knowledge, Attitude, Behavioral Control, Beliefs, and Intention to Change Behavior, Controlling for Prior Exposure to Anger Control Messages+

	Change in Knowledge	Change in Behavioral Control	Change in Intention to Change Behavior	Change in Attitude	Change in Normative Beliefs
Change in Knowledge		0.1666 p=0.0590	0.0470 p=0.5970	0.1591 p=0.0720	0.0464 p=0.6020
Change in Behavioral Control	0.1666 p=0.0590		0.1766* p=0.0440	0.4270** p=0.0000	0.0619 p=0.4860
Change in Intention to change behavior	0.0470 p=0.5970	0.1748* p=0.0480		-0.0244 p=0.7840	-0.1255 p=0.1560
Change in attitude	0.1591 p=0.0720	0.4238* p=0.0000	-0.0244 p=0.7840		0.1770* p=0.0440
Change in normative beliefs	0.0464 p=0.6020	0.0619 p=0.4860	-0.1255 p=0.1560	0.1724 p=0.0510	
Exposure	0.1712* P=0.0450	-0.1180 P=0.1700		-0.1922* P=0.0240	-0.0448 P= .6030

+N=127
Significant at *p<0.05; **p<0.01

REFERENCES

Academy for Educational Development, (2000). Retrieved March 19, 2004, from http://www.aed.org/ToolsandPublications/upload/efarep.pdf.

Aizen, I. (1991a). *Behavioral interventions based on the theory of planned behavior.* Retrieved August 15, 2004, from http://aee6300.ifas.ufl. edu/Aizen.pdf.

Aizen, I. (1991b). *Constructing a TpB Questionnaire: Conceptual and methodological considerations*. Retrieved August 14, 2004, from http://www-unix.oit.umass.edu/~aizen/pdf/tpb.measurement.pdf.

Aizen, I., & Fishbein, M. (1973). Attitudinal and normative variables as predictors of specific behavior. *Journal of Personality and Social Psychology, 27*(1), 41-57.

Ally, M. (2004). Foundations of educational theory for online learning. In T. Anderson & F. Elloumi (Eds), *Theory and practice of online learning*. Creative Commons: Athabasca University, Canada. Retrieved May 20, 2004, from http://cde.athabascau. ca/online_book/contents.html.

America Online/Roper Starch Youth Cyberstudy, (1999). Retrieved March 19, 2004, from http://www. findarticles.com/p/articles/mi_m0EIN/is_1999_Nov_11/ai_57509835/ pg_2.

Ausubel, D. P. (1960). The use of advance organizers in the learning and retention of meaningful verbal material. *Journal of Educational Psychology*, *51*, 267-272.

Berndt & Perry. (2002). Multidimensional family therapy for adolescent cannabis users. In H. A. Liddle (Ed.), *Cannabis youth treatment series*. (Vol. 5). Rockville, MD: U.S. Department of Health & Human Services, Substance Abuse & Mental Health Services Administration, Center for Substance Abuse Treatment. Retrieved May 20, 2004, http:/kap.samhsa.gov/products/manuals/cyt/text/cyt5.txt.

Bosworth, K. (Ed.). (1998). *New directions in drug education programs: Hot topics series*. Phi Delta Kappa International.

Brook, J., Whiteman, M., Nomura, A., Gordon, A., & Cohen, P. (1988). Personality, family and ecological influences on adolescent drug use: A developmental analysis. In R. H. Coombs (Ed.), *The family context of adolescent drug use* (pp. 123-162). New York: Haworth. Retrieved May 22, 2004, from http://kap.samhsa.gov/products/manuals/cyt/ text/cyt5.txt.

Buckley & Toto. (2000). *Assessment techniques for Web based instruction: Lessons learned from teaching a graduate course in instructional technology*. Philadelphia, PA: University of Philadelphia. Retrieved March 3, 2004, from http://www.l2l.org/iclt/2000/papers/166a.pdf.

Bush, Weinfurt, & Ianotti. (2003). In H. A. Liddle (Ed.), *Multidimensional family therapy for early adolescent substance abuse treatment manual*. Miami, FL: Center for Treatment Research on Adolescent Drug Abuse, Department of Epidemiology and Public Health University of Miami School of Medicine. Retrieved July 22, 2004, from http://www.chestnut.org/LI/downloads/Manuals/MDFTManualATM_Study.pdf.

Center for Education Reform. (2004, February 11). Retrieved March 19, 2004, from http://www.edreform.com/index.cfm?fuseAction=document&documentID=1704&sectionID=58.

Christensen, H., & Griffiths, K. (2002). The prevention of depression using the Internet. *Medical Journal of Australia*, 177. Retrieved May 19, 2004, from http://www.mja.com.au/public/issues/177_07_071002/chr10370_fm.html.

Contemporary Issues in Employment and Workplace Policy. (2001). Retrieved May 19, 2004, from http://www.epf.org/ pubs/newsletters/2001/tf20010111.pdf.

Cooper, P. A. (1993). Paradigm shifts in designing instruction: From behaviorism to cognitivism to constructivism. *Educational Technology*, *33*(5), 12-19.

Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal Behavior*, *11*, 671-684.

Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General*, *104*, 268-294.

DeBell & Chapman. (2003).*Computer and internet use by children and adolescents in 2001*. Statistical Analysis Report, Center for Education Statistics, U.S. Department of Education, Institute of Education Sciences, NCES 2004 Retrieved May 22, 2004, from http://nces.ed.gov/pubs2004/2004014.pdf.

Dusenbury, L. (1995). Eleven components of effective drug abuse prevention curricula. *Journal of School Health*, *65*(10).

Ertmer, P. A., & Newby, T. J. (1993). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. *Performance Improvement Quarterly, 6*(4), 50-70. Retrieved April 15, 2004, from http://www.geocities.com/learningenvironments/learningenvironments.html.

Felder, R. M., & Henriques, E. R. (1995). Learning and teaching styles in foreign language education. *Foreign Language Annals, 28,* 21-31. Retrieved June 5, 2004, from http://www.ncsu.edu/felder-public/Papers/FLAnnals.pdf.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley. Retrieved August 14, 2004, from http://www.people.umass.edu/aizen/f&a1975.html.

Goldstein & Glick. (2003). In H. A. Liddle (Ed.), *Multidimensional family therapy for early adolescent substance abuse treatment manual*. Miami, FL: Center for Treatment Research on Adolescent Drug Abuse, Department of Epidemiology and Public Health. University of Miami School of Medicine. Retrieved June 5, 2004, from http://www.chestnut.org/LI/downloads/ Manuals/MDFT_Manual_ATM_Study.pdf.

Gonet. (1994). *Counseling the adolescent substance abuser: School based intervention and prevention*. Pacific Grove, CA: Sage

Harris Interactive and Teenage Research Unlimited (TRU). (2003). *Born to be wired: Understanding the first wired generation*. Retrieved March 19, 2004, from http://docs.yahoo.com/docs/pr/release1107.html.

Hilarski, C. (2004). Child and adolescent alcohol use and abuse: Risk factors, assessment, and treatment. *Social Work, 1*(1). Washington DC: NASW.

Huzinga, Loeber, & Thornberry. (1994). *Urban Delinquency Office of Juvenile Justice and Delinquency Prevention and Substance Abuse initial findings: Research summary*. Office of Juvenile Justice and Delinquency Prevention. Retrieved April 22, 2004, from http://www.ncjrs.org/pdffiles/urdel.pdf http://www.ncjrs.org/pdffiles/urdel.pdf.

Isaac & Michael. (1977). *Handbook in research and evaluation for education and behavioral sciences*. San Diego, CA: EdITS. Retrieved May 19, 2004, from U.S. Public Schools and Classrooms 1994-2002, U.S. Department of Education, http://nces.ed.gov/pubs2004/2004011.pdf.

Jansen, M., Glynn, T., & Howard, J. (2004). Prevention of alcohol, tobacco, and other drug abuse. *American Behavioral Scientist, 39,* 790-807.

Learning Styles Network. (2004). Retrieved June 5, 2004, from http://www. learningstyles.net/.

Media Awareness Network: Children on the Internet. Retrieved June 19, 2004, from http://www.media wareness.ca/english/resources/research_documents/ statistics/ internet/children_internet_world.cfm.

Minuchin & Fishman. (2003). Miami, FL: Center for Treatment Research on Adolescent Drug Abuse, Department of Epidemiology and Public Health. University of Miami School of Medicine. Retrieved June 7, 2004, from http://www.chestnut.org/ LI/downloads/ Manuals/MDFT_Manual_ATM_Study.pdf.

National Institute on Drug Abuse: Monitoring the Future Survey. NIH. Retrieved June 20, 2004, from (http://www.drugabuse.gov/DrugPages/MTF.html).

National Institute of Health. (2004). Twenty-five Years of Discovery to Advance the Health of the Public. Bethesda, MD: National Institute on Drug Abuse. Retrieved May 25, 2004, from http://www.drugabuse.gov/STRC/Report.pdf.

NIDA. *Lessons from prevention research*. Retrieved May 15, 2004, from http://www. drugabuse.gov/pdf/infofacts/Prevention04.pdf.

NIDA. *Prevention research*. (2004). Retrieved May 15, 2004, from http://www. Drugabuse.gov/DrugPages/Prevention.html.

Pavlov, I. P. (1927). *Conditioned reflexes.* London: Clarendon Press

SAHMSA. (2000). *Effective prevention principles and programs*. Retrieved May 20, 2004, from http://modelprograms.samhsa.gov/template_cf.cfm?page=pubs_sub&pubid=6.

SAHMSA. (2004). *CSAP's guides to science-based practices*. Retrieved May 20, 2004, from http://modelprograms.samhsa.gov/template_cf.cfm?page=pubs_sub&pubid=7.

SAHMSA. Retrieved May 20, 2004, from http://www.samhsa.gov/budget/ content/2004/ tables-02.htm--see.

SAHMSA. Retrieved May 21, 2004, from http://www.samhsa.gov/budget/ 2005/ spending/ cj_30.htm.

Schinke, S., Brounstein, P., & Gardner, S. (2002). *Science-based prevention programs and principles, 2002*. DHHS Pub.No. (SMA) 03-3764. Rockville, MD: Center for Substance Abuse Prevention.

Skiba, D., Monroe, J., & Wodarski, J. (2000). Adolescent substance use: Reviewing the effectiveness of prevention strategies. *Social Work, 49*(3). Retrieved June 5, 2004, from Market Data Retrieval, http://www.aed.org/ToolsandPublications/ upload/efarep.pdf.

Skiba, D., Monroe, J., & Wodarski, J. (2004). Adolescent substance use: Reviewing the effectiveness of prevention strategies. *Social Work, 49*(3).

Skiba, D., Monroe, J., & Wodarski, J. (2004). Adolescent substance use: Reviewing the effectiveness of prevention strategies. *Social Work, 49*(3). Retrieved August 26, 2004, from http://www.google.com/search?hl=en&lr=&ie=UTF8&oi=defmore&q=define:knowledge.

Skinner, B. F. (1974). *About behaviorism.* New York: Knopf.

Stockburger, D. W. (2004). *Introductory statistics: Concepts, models, and applications.* Retrieved September 17, 2004, from http://www.psychstat.smsu.edu/introbook/sbk17.htm.

Svensson, R. (2003). Gender differences in adolescent drug use: The impact of parental monitoring and peer deviance. *Youth and Society, 34* (3). Retrieved September 18, 2004, from http://www.pineforge.com/isw4/overviews/pdfs/Svensson.pdf.

Thorndike, E. L. (1913). *Educational psychology: The psychology of learning*. New York: Teachers College Press.

Tobler, N. (1992). Drug prevention programs can work: Research findings. *Journal of Addictive Diseases, 11*(3).

United Nations Office on Drugs and Crime. (2002). *Using the Internet for drug abuse prevention*. New York: United Nations.

Wallack, L., & Corbett, K. (1990). Illicit drug, tobacco, and alcohol use among youth: Trends and promising approaches in prevention. In H. Resnick, S. E. Gardner, R. P. Lorian, & C. E. Marcus (Eds.), *Youth and drugs: Society's mixed messages* (OSAP-Prevention Monograph No. 6, DHHS Publication No. [ADM] 90-1689, pp. 5-29). Washington, DC: U.S. Government Printing Office.

Wilson, B. G. (1997). Reflections on constructivism and instructional design. In C. R. Dills & A. J. Romiszowski (Eds.), *Instructional development paradigms* (pp. 63-80). Englewood Cliffs, NJ: Educational Technology Publications.

Yong, L. (2003). *Yong EQ Inventory: Norms and technical manual*. Retrieved September 9, 2004, http://professoreq.com/pdf/Leonard%20Yong.pdf.

BIOGRAPHICAL STATEMENT

Bhavana A. Pahwa received her Ph.D. in social work from the University of Texas at Arlington in December 2005. She also has a Masters in Social Work from UTA and a Masters in Communications from Texas Tech University. She earned a Bachelor of Commerce degree from the University of Bombay in 1977. Dr. Pahwa is a Rotary International Scholar and the recipient of the Bill I. Ross scholarship from Texas Tech University.

Dr. Pahwa's research interests include substance abuse prevention, anger management, program evaluation, youth development, and school based social work. She has specialized in working with at-risk youth and families. Dr. Pahwa taught as an adjunct faculty member at The University of Texas at Arlington and was instrumental in creating, developing, and teaching a graduate level course in school social work services. She has made presentations at both state and national conferences and was the editor of a special issue of the *Journal of Technology in Human Services* titled, "Technology Assisted Delivery of School Based Mental Health Services."

Dr. Pahwa has been a vocal advocate for effective services for at-risk youth and families. While in Texas, she served on several advisory committees for local and county organizations. She currently lives in New York State with her family and continues her work in the field of prevention with the White Plains Youth Bureau as Program Director of community based prevention services.