To the Graduate Council:

I am submitting herewith a dissertation written by Moses Goldmon entitled "A Meta-Analysis of Selected Adolescent Alcohol Education Studies." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Health Education.

James Neutens, Major Professor

We have read this dissertation
and recommend its acceptance:

Accepted for the Council:

Associate Vice Chancellor
and Dean of The Graduate School

A META-ANALYSIS OF SELECTED ADOLESCENT ALCOHOL EDUCATION STUDIES

A Dissertation

Presented for the

Doctor of Education

Degree

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Moses Goldmon

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ABSTRACT

A meta-analysis was conducted to systematically evaluate, quantify and analyze selected adolescent alcohol education studies in order to determine their overall effects on alcohol knowledge, attitudes, use, interpersonal and affective skills. A secondary analysis was conducted in order to identify those strategies that have been most effective. A study of the various program characteristics and their relationship to study outcomes was also conducted.

Alcohol education studies conducted since 1984 were located through computer database searches, manual searches of selected drug education journals and dissertation abstracts. In addition, letters were written to drug education researchers and the bibliographies of identified articles were also used. In order to be included in the analysis, studies were required to (1) have quantitative outcomes, (2) include a control or comparison group, (3) include a target grade level between 6 and 12, and (4) have primary prevention as the goal. A total of 99 studies were examined, 20 of which met the criteria for selection and were included in the analysis. An effect size total was calculated for each study. These totals were then averaged in order to determine the overall effects of the studies included in the analysis. Effect sizes for five treatment modalities (knowledge, affective, peer, psychomotor/skill, and combined) were also calculated.

Total effect sizes ranged from -.34 to 1.18 with an average effect size of .25. A lack of data within modalities resulted in limited comparisons. No differences in the effectiveness of the various treatment modalities were found.

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CHAPTER I

FORMULATION OF THE PROBLEM

A. INTRODUCTION

A large percentage of the people in American society use alcoholic beverages for a variety of reasons (Goodstadt, 1987; Miller, 1982). In addition, the number of teenagers using alcohol is steadily increasing, and young people are starting to use alcohol at a much earlier age (Horton, 1985; Horton, 1988; Johnston, O'Malley & Bachman, 1986; Perry & Jessor, 1985).

The abuse of alcohol is a major contributing factor in experienced problems for individuals, and society at large. Alcohol abuse leads to increases in property destruction, medical care costs, absence from work, drug and alcohol abuse treatment costs, and insurance rates (Hansen, 1988; Miller, 1982).

To combat these problems a number of alcohol education programs have been developed and implemented. However, evidence with regard to their effectiveness is questionable (Carpenter, Lyons, & Miller, 1985; Elder, Stern, Anderson, Howell, Molgaard, & Seidman, 1987; Goodstadt, 1987; Hansen, 1988). The majority of these programs have targeted adolescents (Carpenter et al., 1985; Elder et al., 1987; Pattison, 1976). The predominant strategy has been to increase knowledge and change attitudes about alcohol use. However, these programs have lacked the incorporation of skills that are

necessary to bring about changes in behavior (Elder et al., 1987; Tobler, 1986).

There are some who suggest there is a need for alcohol and other drug-related studies that emphasize the development of skills that will enable adolescents to resist the pressure to experiment with drugs. Many feel the use of alternative social skills training emphasizing the development of knowledge, attitudes, and behaviors, coupled with the use of peer-models has tremendous potential in preventing substance abuse (Bell & Battjes, 1985; Botvin, 1983; Resnick, 1983; S. W. Roberts, personal communication, August 22, 1990; Tobler, 1986). Though these alternative methods have shown some potential for positively impacting alcohol use and abuse rates among adolescents, empirical evidence regarding their effectiveness is inconclusive (Hansen, 1988).

The literature also suggests that programs designed for a specific target audience may also improve the effectiveness of drug education (Beck & Summons, 1990; Brown & Tooley, 1989; Gaines, 1985; Johnston et al., 1986). According to Beck and Summons (1990) an assessment and understanding of what is considered to be important to a target group is critical in being able to effectively prevent substance abuse. Therefore, the need to carefully evaluate the impact of alcohol education on abuse prevention is evident.

B. PROBLEM STATEMENT

The problem of this study was to systematically evaluate, quantify and analyze selected adolescent alcohol education studies in order to determine their overall effects on alcohol knowledge, attitudes, use, interpersonal and affective skills, as well as to identify the most effective modalities.

C. RESEARCH QUESTIONS

1. What are the overall effects of adolescent alcohol education?
2. What are the most effective treatment modalities?

D. DELIMITATIONS

The study was delimited to:

1. Alcohol abuse prevention studies that met the following criteria:
   A. used quantitative outcome measurements
   B. included a control or comparison group
   C. age level inclusive of grades 6 through 12
   D. had primary prevention as the goal.

E. LIMITATIONS

The study was limited by the following:

1. Those studies that were located by the researcher through the specified search procedures that met the criteria as outlined above.

F. DEFINITION OF TERMS

Modality--the specific type or strategy of the prevention program which is determined by the nature and combination of treatment components.

Primary prevention--intervention methods that seek to stop alcohol use or problem drinking before it begins.

Effect Size--Xe - Xc/SDc where Xe represents the mean of the experimental group, Xc is the mean of the control and SDc is the standard deviation of the control group.

G. SIGNIFICANCE OF THE STUDY

The use of alcohol and other drugs is a significant problem among Americans in general, and youth in particular. The misuse and abuse of alcohol among adolescents has been well documented (Bell & Battjes, 1985; Braucht & Braucht, 1984; Hamilton, 1985; Johnston, O'Malley, & Bachman, 1989; U.S. Dept. of HEW, 1976). This use and abuse is the source of many negative consequences for these individuals. In many instances it affects the academic careers of students, including interference with work, class attendance and exam preparations. It is also considered to be a major contributor to difficulty in relationships with peers, and family members as well as a factor in vandalism, fights, traffic accidents, and health problems (U.S. Dept. of HEW, 1976).

Adolescents have been the focus of many substance use and abuse prevention programs. It is believed by some that the reduction in use and abuse of alcohol is virtually unachievable with adolescents and young adults. Since the late 1960s drug use among teenagers has been a momentous problem and the utilization rates have been relatively stable since 1975, despite the large number of studies that have targeted adolescent drug use (Bell & Battjes, 1985).

The lack of widespread success in alcohol use and abuse prevention may be attributed in part to the failure to provide an appropriate program to which the target audience can or is willing to respond (Bell & Battjes, 1985; Pattison, 1976). Initially drug use prevention interventions were based on the supposition that young people used drugs because they were unaware of the dangers associated with them. Over the years this assumption has proven erroneous. Most young people who use drugs are more aware of the negative consequences of their behavior than those who do not experiment (Hansen, 1988). Since these initial efforts, many other strategies have been attempted. Examples of some of the more widespread strategies are discussed in Chapter II.

Since drug and alcohol prevention programs have largely used knowledge and attitudes rather than behavior change as dependent variables (Elder et al., 1987; Tobler, 1986), it has been suggested that substance use and abuse prevention programs should provide skill development that will enable students to avoid experimentation. Some researchers have found

programs with these characteristics to be an effective behavior change strategy when offered in an educational format (Robinson et al., 1987; Tobler, 1986). However, others have resulted in either negative or neutral effects on behavior (Braucht & Braucht, 1984). Braucht and Braucht (1984) pointed out that the effects of alcohol use prevention efforts are often grouped with those of other drugs. Very few studies have looked at the individual effects of alcohol education on use and abuse prevention.

Since the 1960s, drug education has sought viable strategies for dealing with drug use and abuse among adolescents. However, the success of these efforts are questionable. A variety of outcomes have been shown in the research literature, but no definitive conclusions can be drawn about the specific effects of drug education. In addition, there is great difficulty in objectively reviewing this large body of literature. The fact that many of the studies suffer from inadequate research and evaluation methods further adds to this problem. Therefore, meta-analysis is employed in this study to systematically evaluate, quantify and analyze selected adolescent alcohol education studies in order to determine their overall effects on alcohol knowledge, attitudes, use, interpersonal and affective skills, as well as to distinguish the most effective treatment modalities. The use of meta-analysis allowed the researcher to select and examine alcohol education studies based upon a criterion and to use a quantitative standard statistic for comparison of results. This granted an opportunity to draw theoretical and empirical conclusions rather than a mere narrative summarization.

H. SUMMARY

Chapter I was written to provide general information on the questions surrounding the effectiveness of alcohol education programs. It began by discussing the extent of alcohol use as it exists in society today. Some of the problems that occur as a result of overuse and abuse were also documented. The chapter established the need for appropriate evaluation of alcohol education studies in general and those aimed at skill development that focus on knowledge, attitudes and behaviors in particular. In addition, the chapter explained the significance of this research effort. The research questions, delimitations, limitations, and relevant terms associated with the study were also stated.

CHAPTER II

REVIEW OF LITERATURE

A. INTRODUCTION

A review of the related literature was conducted and is divided into the following areas for discussion: (1) the extent of the alcohol problem, (2) the history of prevention, (3) approaches to alcohol education, (4) alcohol education methodology, (5) meta-analysis, and (6) summary.

B. THE EXTENT OF THE ALCOHOL PROBLEM

The consumption of alcoholic beverages is a widely accepted practice in American society. The abuse of alcohol is often a major source of difficulty for many Americans. Some of the problems people encounter as a result of alcohol use include financial, individual and family stress, legal problems, unintentional injuries, deterioration of personal health, and physical addiction. The use of alcohol has been linked to unhappy marriages, broken homes, desertion, divorce, impoverished families, deprived and displaced children, murders, suicide, and other violent crimes (U.S. Dept. of HEW, 1976). A large proportion of fatal traffic accidents are also alcohol related. Motor vehicle accidents are the main cause of death for adolescents, and over 50% of these accidents involve the use of alcohol (Elder et al., 1987).

The increased utilization rates of teenagers and young adults is a significant problem for which we must find a solution. According to Horton, approximately half of the high school seniors in 1985 were classified as regular drinkers. In addition, 37% indicated that occasional heavy use of alcohol is not unusual (Johnston et al., 1986). Johnston et al. (1989) reported that in 1988 64% of the U.S. high school seniors they interviewed indicated regular use of alcohol.

Johnston et al. (1986) reported that most of adolescents' initial experiences with drugs, including alcohol, actually occurred prior to high school. A national survey of grade 12 students revealed that 56% of those who experimented with alcohol began their use prior to high school. Alcohol abuse also constitutes a major health risk for adolescents, and efforts aimed at preventing adolescent substance use and abuse have increased over the past 10 years (Elder et al., 1987).

There is evidence that there are specific drinking problems among young adults (Hamilton, 1985). The aforementioned high school senior survey, which was conducted by the National Institute of Drug Abuse (NIDA), reported that in 1984, 5% of those surveyed drank daily and 39% reported "having 5 or more drinks in a row at least once in the past 2 weeks" (Bell & Battjes, 1985, p. 3). In 1988, 35% were found to be heavy users (five or more drinks in a row during the past 2 weeks) (Johnston et al., 1989).

Braucht and Braucht (1984) presented the following as "substantial and converging evidence" that there is an alcohol problem among America's youth:

1. Alcohol is the most widely used "drug" among youth aged 12 to 17 in terms of lifetime, annual, or monthly prevalence rates.

2. Prevalence rates of teenage drinking have continued to increase slowly up to the present.

3. More and more young people are having their first drink and starting to drink regularly at progressively younger ages.

4. Drinking not only seems to be a prerequisite for marijuana use, but also drugs such as psychedelics, amphetamines, barbiturates, cocaine, and heroin.

5. The rate of problem drinking among youth aged 12 to 17 now stands at about the 20% level (defined by a self-report criterion involving having been drunk at least six times during the past year or having experienced significant drinking-related negative consequences at least six times during the past year).

6. Among these young problem drinkers, alcohol use seems to be part of a general or progressive involvement in problem behaviors--a syndrome in which marijuana use, other illicit drug use, precocious sexual behavior, delinquent behavior, and other forms of antisocial behavior are component parts (pg. 254).

A number of theoretical hypotheses have been offered to explain why adolescents experiment with drugs. Psychosocial variables such as low self-esteem, depression and poor coping skills have all been cited. The decline in parental influence coupled with increased peer influence as well as the low perceived susceptibility to the dangers of substance abuse during adolescence has also been cited (Botvin & Willis, 1985).

C. THE HISTORY OF PREVENTION

There are some who question the concept of preventing alcohol use and abuse, especially since evidence regarding the effectiveness of prevention

strategies is questionable at best. However, Braucht and Braucht (1984) cite two major reasons that prevention is essential. First is the fact that once patterns of problem drinking have been established it is difficult to manage them. Alcoholism is progressive, and the earlier intervention occurs, the more successful it will become (U.S. Dept. of HEW, 1976). Evidence of this can be demonstrated by observing the great expenditures of treatment interventions coupled with their relative ineffectiveness for the majority of clients. Second is the fact that regular drinking continues to be a tremendous problem among the youth of this country.

In addressing the history of alcohol prevention, the author found to be accurate Braucht and Braucht's (1984) observation that the effects of alcohol use prevention efforts are often grouped with those of other drugs. Therefore, some of the strategies and outcomes identified in this section refer to "drugs" in general rather than specifically to alcohol.

As previously mentioned, drug abuse prevention for adolescents was established in the 1960s on the theory that people used drugs because they were not aware of the dangers associated with them (Bell & Battjes, 1985; Hansen, 1988). However, there is evidence this is false. This helps to explain why programs focusing on knowledge alone have largely been unsuccessful (Elder et al., 1987; Tobler, 1986). In addition, the majority of these studies failed to specifically state the goal(s) of their programs (reduction in use, abstinence, prevention of experimentation etc.) (Braucht & Braucht, 1984). This is a problem that continues to exist in the literature. Braucht and Braucht

(1984) suggest that regardless of what goals and objectives are stated (directly or indirectly), the ultimate aim appears to be the reduction of problem drinking.

The second wave of programs focused on providing information. Many of them relied on the use of fear/scare tactics as a strategy to deter experimentation with drugs (Bell & Battjes, 1985; Braucht & Braucht, 1984). Another primary informational strategy was the presentation of facts (usually one way communication) with little if any opportunity for discussion and feedback (Braucht & Braucht, 1984).

During the 1970s, etiological research began to identify a variety of psychosocial variables that gave insight to why adolescents experimented with drugs. As a result, researchers began taking an affective approach to drug education (Bell & Battjes, 1985; Braucht & Braucht, 1984). Some of the specific techniques used focused on the clarification of values, decision making skills, consequence components, alternatives to drug use, problem solving, beliefs, attitudes, and self-concept (Bell & Battjes, 1985). These programs are delivered under the premise that they allow each student an opportunity to make an informed decision with respect to his/her attitudes, beliefs and behavior regarding substance use. Though many of these studies show methodological weaknesses (see section E of this chapter), there is evidence that when properly developed, implemented, and evaluated they can impact knowledge, attitudes and drug use behavior (Bell & Battjes, 1985; Braucht, & Braucht, 1984; Hansen, 1988; Tobler, 1986). For a more in-depth discussion

see the section "APPROACHES TO ALCOHOL EDUCATION" in this chapter. The major weakness of these non-traditional approaches is that the majority of them fail to specifically explore the impact on use and other related behaviors.

Though research conducted by Johnston (1988) shows a decline in drug use among adolescents and young adults, the drop cannot be attributed solely to drug education. A collective look at the literature reveals inconclusive evidence of the direct effects of alcohol and other drug abuse prevention efforts. The inadequacy of research and evaluation methods leaves us with incomplete knowledge of the actual potential and effects of drug education programs (Braucht & Braucht, 1984). Therefore, the effectiveness of drug use and abuse prevention studies need to be further explored.

D. APPROACHES TO ALCOHOL EDUCATION

Failures associated with traditional approaches that primarily focused on knowledge and attitudes have led researchers to seek more effective methods. The results of studies based on "psychosocial models of behavior" appear to be more successful at impacting behavior. This has led to the use of various strategies that seek to prevent or delay experimentation with drugs (Bell & Battjes, 1985). Non-traditional educational interventions aimed at the reduction of use and abuse are identified in the literature by a variety of names. Examples include socio-cultural approaches, social-psychological approaches, decision-making and social skills programs (Bell & Battjes, 1985; Braucht & Braucht, 1984; Carpenter et al., 1985; Tobler, 1986).

A more recent approach focuses on the development of specific skills that will assist persons to resist the pressure to experiment with drugs (Braucht, & Braucht, 1984; Hansen, 1988; Tobler, 1986; Wittman, 1981). In this approach information is presented that focus on both the positive and negative aspects of alcohol use, encouraging the development of positive attitudes. According to Wittman (1981), this strategy represents an active approach to education that emphasizes both cognitive and behavioral development.

Tobler (1986) conducted a meta-analysis of "143 adolescent drug prevention programs to identify the most effective program modalities for reducing teenage drug use" (p. 537). Specific attention was given to the type of treatment, and the affects they had on program outcomes. Using a six-step approach to identify type(s) of treatment, she identified five major treatment modalities that exist in adolescent drug prevention programs. Knowledge only programs seek to increase subjects knowledge of drug use with the hope that this would influence behavior.

> Affective only . . . programs . . . made no reference to drugs, but aimed at producing intrapersonal and social growth. Peer programs . . . have their foundation in the adolescent's susceptibility to peer influence. . . . Peer refusal skills, one subdivision of . . ., concentrates on the ability to "Say no" when pressured. The second subgroup is based on the assumption that drug use is a complex interplay of peer pressure to gain popularity and acceptance, and the self-imposed pressures created by the youngster himself. The additional component, Basic Life Skills, is designed to enhance the general competence level of the individual. . . .
>
> Knowledge plus affective . . . are combinations of the single modalities. . . . The alternatives programs aimed at the correlates of drug use have two distinctly different approaches. One is designed for the average young person, and encompasses community activities with

> opportunities for recognition and non-drug leisure activities; the second is tailored to meet the needs of "at risk" youngsters both in intensity and programming. The emphasis on special remedial tutoring, one-on-one relationships, job skills, and physical adventure (as offered by the outward bound programs) hopefully compensated for the many deficits operating in their lives (pp. 539, 542).

The programs included in this evaluation were examined with specific emphasis being placed on "participant variables" to determine their "contribution to the success or failure of the modality" (p. 542). Program success was determined by the degree to which the outcome measure tested the programs goals. Studies were chosen according to a criterion, thus eliminating researcher bias regarding the worth of a particular program. This meant that only comparable studies were examined. The analysis included both published and unpublished studies. The results of each study were separately coded into one of five outcome categories (knowledge, attitudes, use, skills or behavior). This allowed the effects of each measurement to be estimated independently. Additionally, subgroups were coded within each of the major outcome categories to further define separate effects. For example, the use outcome measure included separate codings for type of drug (cigarettes only, alcohol only, soft drugs, etc.).

There were several methodological concerns that could have possibly affected the results. The researcher failed to code and analyze any information regarding follow-up in any of the studies. Therefore, the long-term effects of the program outcome measures are unknown. There was an under-representation of doctoral dissertations included in the analysis. This under-

representation is magnified by the fact that those included produced significantly higher effects than non-dissertation studies. However, the author pointed out that this deviates from the findings of other researchers who made such comparisons (Rosenthal & Rubin, 1980; Smith, 1980). Tobler (1986) felt that these differences may have been linked to the small number of dissertations included (n = 12).

Several terms that appeared to be unique to this study were not defined, thus increasing the difficulty in interpreting the results. Though Tobler provided a reference for those interested in further reading, only a brief description was given for the practical meaning of effect size. Considering the infrequent use of meta-analysis, combined with the large amount of unexplained variance (89%) for her overall effect size in the regression analysis, it would have been helpful if the effect size statistic had been discussed in more detail.

In order to answer the research questions, the findings of each outcome measure was given a numerical (effect size) value using the technique described by Glass, McGraw, & Smith (1981). The formula for calculating the Glassian effect size statistic (ES) is: ES = Xe - Xc/SDc where Xe is the mean of the experimental group, Xc is the mean of the control and SDc is the standard deviation of the control group. A further discussion of meta-analysis can be found in section F of Chapter II. A total of 475 effects were reported. These effects resulted from analyzing 143 programs and 98 research studies. Using the nature of the experimental design, outcome measures and treatment modality as blocks, a regression analysis was conducted to determine the

percent variance accounted for, and to control for interaction. Though only 11.5% of the variance was accounted for, the author reported that the relationship between predictors was small; therefore, multicollinearity was not a problem. However, she failed to address the large proportion of unexplained variance associated with the overall effect sizes.

A number of statistical analyses produced the following results. Programs that focused on skill development (models 3 and 5) produced superior outcome measures to all other approaches (Tobler, 1986). These results show that the success of social skill approaches that have been demonstrated with smoking (Bell & Battjes, 1985; Elder et al., 1987; Resnick, 1983) may also prove useful with other drugs, including alcohol (Tobler, 1986). However, it should also be pointed out that the reduction of use and abuse of alcohol may be more difficult to achieve than other drugs. Though not statistically significant, the effect size statistic for alcohol (.33) within the more successful peer programs was lower than all other drug categories (cigarettes .38; soft drugs .45; and all drugs including hard drugs .47).

The most unexpected finding was that the overall effect size for use outcome measures (.24) was higher than that of attitude (.18). This was also true for both of the treatment modalities (peer and alternatives) that included skill development as a major program component. It is hypothesized that changes in knowledge and attitudes preclude changes in drug use (Tobler, 1986). These findings oppose this assumption. As pointed out by the researcher, it may be possible to change drug use patterns in the absence of a

corresponding change in attitudes. Peer programs also showed a high effect size statistic (.56) for the skill outcome measure. However, a negative effect size (.-39) was shown for behavior outcomes for peer programs. In many of the programs improved skills occurred over a relatively short time period (1 - 9 hours). This is extremely important when one considers a cost-benefit analysis (Tobler, 1986). According to Tobler, this may enhance the ability of adolescents to "do their own thing" and not surrender to peer pressure. Other researchers have pointed out that even though programs focusing on skill development have tremendous potential, in order to obtain maximum effectiveness, facilitators should receive adequate training to deliver such programs (Hansen, 1988; S. W. Roberts, personal communication, August 22, 1990).

It was predictable that the knowledge outcome variable produced the highest effect size of all the outcome measures. In fact, knowledge outcome measures (.52) were 52% higher than the next highest (behavior .27) measure. However, with the exception of the aforementioned peer and alternative modalities, negligible effects were shown for all other outcome measures by treatment modality. Therefore the traditional assumption that changes in knowledge will result in behavioral changes is seriously challenged (Tobler, 1986). The results of this study also suggest that a true determinant of program success is the ability to positively influence the social determinants, skills, utilization rates and behavior of subjects (Tobler, 1986).

Gonzalez (1982) provides evidence that combined strategies which focus on knowledge, attitudes, and behavior can be effective in reducing alcohol problems. However, Gonzalez believes that in order to accomplish the desired behavior change, it is essential to clearly identify what those changes are. It appears that the lack of behavior change following alcohol and other drug education programs may be due to the focus/approach of the program implemented. "It is true that changing well-established patterns of behavior, which are supported by social forces and are likely to be congruent with existing sets of attitudes, will require more than just the provision of information" (Gonzalez, 1982).

Gonzalez (1982) also stated that in order for alcohol education to be effective in changing behaviors, the program must meet the following minimum criteria; 1) there should be agreement on what behavior is to be promoted among a specific population, thus allowing the educators to take a health promotion approach; 2) the education should be presented over an extended period of time, allowing students to check newly acquired attitudes and knowledge against actual drinking practices and 3) students should be involved in the presentation of this education to other students to implement a peer-approach to the prevention of alcohol related problems among youth. Gonzalez is supported in his emphasis on a peer approach. Some researchers believe the use of peer groups may provide the foundation for effective abuse prevention, and be more cost-effective than programs that do not include

peers (Botvin & Willis, 1985; Carpenter et al., 1985; Horton, 1988; Tobler, 1986).

Some programs have used peer opinion leaders in an attempt to reach more rebellious youth. These individuals are believed to be more likely to pay attention to intervention that is presented by respected peers (Hansen, 1988). Carpenter et al. (1985) conducted a pilot study designed to test a peer-managed self-control training program aimed at teaching responsible drinking. Thirty teenage American Indian students perceived to be at high risk for problem drinking were included in the study. Subjects were randomly assigned to one of three intervention groups, all of which were assisted by two peer counselors. Subjects in Group A attended weekly meetings of an alcohol education class dealing with information on controlled drinking, alcohol abuse, and alcoholism. In addition, they met with peer counselors three times per week to submit self monitoring data based on self-contracts and to receive self-control information. Group B received the same interventions as Group A, except that the alcohol education classes were not provided. Group C also met three times per week with peer counselors to turn in self-monitoring data, but did not participate in self-contracting, nor were they provided alcohol education.

All three groups significantly decreased the quantity of weekly alcohol drinking over an 11 week period. These improvements in alcohol use were maintained at follow-ups of 4, 9, and 12 months for all three groups. Estimates of maximum blood alcohol content reached during heaviest drinking

over a 3 month period obtained from analysis of weekly interview data also showed significant decreases for all groups, and these differences were maintained at each follow-up.

Though the study contained several methodological shortcomings (based on participants self-report, small sample size, and no control) and contained a controversial approach (controlled drinking in adolescents), the results suggest that the use of peers in alcohol education interventions may be an appropriate way to reduce adolescent alcohol use. With the exception of the self-control training and peer components, no differences were found between groups. However, this may be influenced by the small sample size (N = 30).

The focus of this section was the general approaches to alcohol education programs that were designed to prevent the use and/or abuse of alcohol among youth. Non-traditional approaches that focus on the development of skills aimed at assisting adolescents to avoid use and abuse of alcohol were given special attention due to their perceived potential for impacting alcohol-related behavior.

E. ALCOHOL EDUCATION METHODOLOGY

Upon reviewing the various approaches aimed at reducing alcohol use and abuse as well as providing a historical overview of prevention, the need to explore drug education from a methodological perspective emerged.

Much of the ineffectiveness of drug education programs can be attributed to inadequate research design, implementation and analysis. These

weaknesses include, but are not limited to, inadequate follow-up, inadequate sampling techniques including non-random assignment of subjects, untrained or inadequately trained change agents/program implementers, the lack of a specified target audience and tailored program (age, race, level of use, psychosocial correlates etc.), poor experimental designs resulting in failure to provide adequate control of extraneous variables and identification of interactions, as well as poor instrumentation and data collection methods.

In many instances, characteristics related to how well the program is implemented are not given any consideration. In her meta-analysis, Tobler (1986) attempted to code six factors related to "how well the program was delivered" (p. 550). For the majority of the studies she was only able to identify factors related to the variable curriculum. Training of facilitators was offered in only 45% of the programs, and over 65% of them failed to provide texts or other written materials to program participants. Whether the programs were successfully or unsuccessfully delivered was reported in only 42% of the programs. Of those who reported on this factor, 29.3% showed improper delivery. A comparison of similar programs that reported on this factor revealed a .34 greater effect size for those programs indicating proper implementation. Though these results were based on a small comparison size ($n = 11$), it does suggest that researchers should pay more attention to the effects that proper or improper program implementation has on program outcomes.

Schaps, DiBartolo, Moskowitz, Palley, and Churgin (1981) study (cited in Braucht & Braucht, 1984) examined 127 abuse prevention programs. The majority of these studies were school based and focused on alcohol and marijuana use. Schaps et al. concluded that the "127 programs were . . . only slightly effective on the average in influencing drug use behavior and attitudes" (pg. 2). Of these 127 primary prevention programs Schaps et al. (1981) observed the following methodological problems: only 13% administered a posttest; only 14% specified a target audience based on risk categories or patterns of drug use; the majority (57%) were short-duration, one time experiments; only 31% used a randomized control comparison group and another 9% used a non-random comparison with adequate control of confounding variables; and 85% used self-report questionnaires as the only method of data collection (Braucht & Braucht, 1984).

Schaps et al. (1981) also rated the studies regarding evaluation (instrumentation, analysis, experimental design, sample selection etc.) and program intensity. These ratings showed that only 1 of the 127 programs was viewed as strong in both areas. Actually, a relatively strong "inverse relationship" was revealed through these ratings. The vast majority (22 of 26) of those studies that were rated as strong in evaluation criteria were shown to have the weakest program characteristics (intensity and quality).

A more recent literature review addressed some of the methodological limitations of adolescent substance use and abuse prevention studies that have been reported (Elder et al., 1987). There was no attempt to compare the

outcomes of the various approaches used, but instead general categories of independent variables were used to classify existing techniques in terms of their common strengths and weaknesses. The primary scheme used by the authors to describe the efforts aimed at prevention include whether the program contained the following components; antecedent, behavioral skills training, and consequence.

> Antecedent components are defined as those that focus on the modification of knowledge and attitudes related to substance use. This component is directed at developing stimulus control for not using substances through teaching participants to recognize threats to their health and to avoid such substances before or during the opportunity to experiment with them. The behavioral skills training component attempts to accelerate the acquisition of skills related to resisting peer pressure to experiment with substances. Finally, the consequence component provides either positive or negative reinforcement for behaviors related to the nonuse of substances or punishment for substance use (Elder et al., 1987).

Seven of nine studies reported for 1984 and 1985, used health education approaches to change knowledge or attitudes as the only intervention component. The other two incorporated a decision-making/problem solving component. Only one study was conducted to limit the use of alcohol among students using direct contingency management procedures (direct approaches aimed at modifying the use of substances in the future). Three studies used indirect contingency management approaches to reinforce participation in alternative activities (Elder et al., 1987). The majority of the programs were aimed at early adolescents, using teachers and other adults as change agents. Many of the studies based their findings upon the use of data gathered

through self-report measures only. The writers suggest that this may be a reflection of the difficulty in obtaining physiological corroboration. When data are gathered through self-report, there is no way to objectively verify the accuracy of the data. Room's study (cited in Rockett & Putnam, 1990) found self-report consumption rates of alcohol to be underestimated by 50% when compared with "beverage tax data" (Rockett & Putnam, 1990). Surveys of drug use for high school studies are soliciting information about illegal acts (Johnston, O'Malley, & Bachman, 1977), which may increase the possibility of under-representation. In addition, those who abuse drugs may consciously or subconsciously give inaccurate data.

The key dependent variables were often knowledge and attitude change, excluding any attempt to measure the effects that the intervention may have had on behavior change. Three of the nine studies reported failed to provide any measurement of alcohol or other drug use, and five studies included little or no follow-up to indicate the long term effects of the intervention.

F. META-ANALYSIS

The use and importance of meta-analysis is rapidly increasing in behavioral and social science research (Hunter & Schmidt, 1990). This has stimulated a great deal of interest in the procedure and has resulted in the development of several types of meta-analysis. However, many social and behavioral scientists remain unfamiliar with the technique. According to Hunter and Schmidt (1990), Glass published the first article and book on meta-

analysis in 1976 and 1981, respectively. These publications laid the foundation and outlined the basic features for the various types of meta-analysis that exist today. Glass coined the term meta-analysis in order to distinguish his approach from secondary analysis. It represents an "analysis of analyses" rather than a re-analysis of original data and is a quantitative evaluation of effect size and other descriptors across studies that usually lead to clarification of inconclusive or confusing outcomes (Hunter & Schmidt, 1990).

Louis, Fineberg, and Mosteller (1985) described meta-analysis as a technique that "uses the results of collections of research papers to answer specific questions, usually in a quantitative manner" (p. 1). Thomas, Nelson, and Magill (1986) defined it as "a quantitative literature review that synthesizes previous research by analyzing results of many studies by specified statistical methods" (p. 123). Thus a meta-analysis allows a researcher to study a series of primary research studies while reducing his/her personal bias about the design and procedure. The meta-analyst has no control over the study outcome once the studies to be evaluated have been selected (Louis et al., 1985).

A meta-analysis is different from a traditional narrative review because it allows one to draw theoretical and empirical conclusions from an existing body of literature, rather than comprising a summarization of it. Because the entire study is an examination of the literature, all of the procedures that were carried out are explained thus eliminating any speculation that the reader may have

regarding the basis for the decisions made by the meta-analyst. This also allows the reader to objectively evaluate those decisions (Thomas & Nelson, 1985).

Meta-analysis has an advantage over narrative reviews because it ensures that at least a quantitative summary is provided for every study that is included in the review (Louis et al., 1985). This also assists the meta-analyst in decreasing the difficulty associated with reviewing large numbers of studies because it statistically reduces the data to an understandable outcome (Thomas & Nelson, 1985), thus allowing the researcher to look at the combined results of the studies as well as make objective quantitative comparisons of various treatments across studies. The results of individual primary studies are used as "data points" to analyze across studies (Louis et al., 1985; Thomas & Nelson, 1985). Therefore, the meta-analyst can provide much more specific answers than narrative reviews. If the technique is conducted and interpreted appropriately these answers could lead to effective program development, recommendations for future research, as well as the testing and development of theory (Thomas & Nelson, 1985). This makes meta-analysis an excellent alternative to narrative reviews when looking at the effects of alcohol education programs.

Despite the large number of published and unpublished alcohol education studies our current knowledge regarding their effectiveness is inadequate, due in part to the inadequacy of research procedures coupled with the unstable results and anecdotal interpretations of narrative reviewers. According to

Braucht and Braucht, (1984) "standardized measures of important outcome variables would be of significant value for comparing program effectiveness across studies" (pg. 272).

In addition to making comparisons across studies, a meta-analyst can also determine the effects of differential variables such as research design, sample size, study intensity, and type of treatment (Louis et al., 1984). This enables a researcher to not only identify the most effective types of treatment, but also determine which treatments are most appropriate for specific types of subjects.

It is also believed by some that graduate students and researchers in education and the social sciences should become familiar with the technique of meta-analysis because of its increasing popularity (Celluci, 1984; Hunter & Schmidt, 1990; Thomas & Nelson, 1985). Thomas and Nelson (1985) even suggest that traditional narrative reviews will become obsolete.

Though meta-analysis is increasing in popularity and has a great deal to offer education, social and behavioral science researchers, the procedure is not without criticisms. Some have stated that meta-analysis research presents availability bias because only published studies that show statistical significance are available for analysis. However, if an availability bias exist, it would hold true for any type of research that seeks to interpret the literature unless the researcher takes specific steps to guard against it (Hunter & Schmidt, 1990). An effort was made in this evaluation to include both published and

unpublished research. When possible, comparisons of the two sources were made.

Using the above criticism as a hypothesis, it has also been argued that a sample bias also occurs in meta-analysis research. This hypothesis is based upon the assumption that unpublished studies have smaller effect sizes and that they are less frequently available. According to Hunter and Schmidt (1990), Rosenthal (1984) examined meta-analysis research in order to determine the influence that sources of data had on mean effect sizes. "Based on hundreds of effect sizes, he found there was virtually no difference on the average between those published in journals and those from unpublished reports (Hunter & Schmidt, p. 507). Hunter and Schmidt (1990) pointed out that even if published research produced larger effect sizes it may be a result of more sound methodological research. The "methodological expertise" that journal reviewers possess should produce published articles from well done research, thus greater effect sizes. On the contrary, studies that have methodological flaws contain artifacts that are expected to reduce effect sizes. Sampling error, unreliable instruments, difference in the characteristics of comparison groups, computational, typographical and transcriptural errors reduce the study effect size (Hunter & Schmidt, 1990). Journal reviewers that focus on the methodological quality of the studies are likely to identify these problems. Therefore, the appearance of availability bias may be falsely produced by "differences in methodological quality" (p. 515).

Another major criticism of meta-analysis is the collaboration of multiple estimates of effect size into one statistic, thus violating "the assumption of statistical independence" (Hunter & Schmidt, 1990, p. 480). However, if the purpose of the analysis is to provide descriptive information (that is, to answer broad questions) this violation is of little significance. In addition, individual estimates only produce small effects on meta-analysis results. Similarly, it is argued that a meta-analysis combining differential variables (independent and/or dependent) makes it impossible to distinguish those factors that produce greater effects from those that bring about lesser effects. Though this is a valid criticism, there is nothing that prevents the meta-analyst from conducting a separate secondary analysis on each variable of interest. Therefore, if the purpose of the meta-analysis is to answer specific questions related to the effects of different types of variables, it is possible (Glass et al., 1981).

Criticisms of making comparisons across studies is sometimes made when the variables from different studies are the same (Glass et al., 1981; Hunter & Schmidt, 1990). This criticism is made on the grounds that all studies are unique and thus incomparable, rendering any comparisons across studies meaningless. However, meta-analysis analyzes study results that are reported as opposed to analyzing the studies (Hunter & Schmidt, 1990). The results are converted to meaningful numbers. Therefore, the comparisons are not of the studies but rather of the numerical values that the studies produce (Glass et al., 1981). Glass et al. (1981) argues that these results are no more

different from each other than data collected from individuals. The persons used as subjects in the primary research are as unique in their ways as the studies used in meta-analysis. The pooling of standardized study results are no less meaningful than the pooling of scores produced by persons.

Meta-analysis has also been criticized for including studies in the analysis that are perceived to be of poor methodological quality (Hunter & Schmidt, 1990). However, the judgement of methodological quality is subjective and varies across individual evaluators (Glass et al., 1981). No research study is without some type of methodological inadequacy (Hunter & Schmidt, 1990). The greater question appears to be whether or not these problems caused bias in the study results. Both Hunter and Schmidt (1990) and Glass et al. (1981) conclude that the question of whether studies should be included or excluded should be decided empirically. They suggest that methodological characteristics should be coded and then analyzed to determine their effects on study outcomes. If the analysis produces superior results for those studies that were identified as being done well, it lends credibility to their results and they should be focused on in the review. However, if no differences are found, all studies should be used. When differences do not exist, the perceived weaker studies include variations in methodologies that may be useful in solving the research problem (Cooper, 1984).

G. SUMMARY

The literature review was conducted to examine the existing related literature and to discuss meta-analysis as a review technique. It began with a general discussion of the extent of the alcohol problem, and its implications for both individuals and society. A general discussion of alcohol use among adolescents was provided. A brief historical overview regarding the evolvement and development of alcohol prevention was also included. Various approaches that have been used to prevent alcohol use and abuse were then explored. The section identified concepts that are important in improving the knowledge, attitudes, and more importantly behaviors as they relate to the development of skills that will enable adolescents to deal effectively with pressure to experiment with substances. This was followed by an examination of alcohol abuse prevention studies from a methodological perspective.

The final section was a discussion of the technique of meta-analysis. Meta-analysis was discussed as a viable alternative to narrative reviews. Its strengths, criticisms and relevance to this research effort in particular, and social science and education in general, were also discussed.

CHAPTER III

METHODOLOGY

A. INTRODUCTION

This chapter describes the research methodology. It begins with an overview of the problem, followed by a description of the procedures for the (1) literature search, (2) selection criteria, (3) identification and coding, and (4) analysis of data.

A meta-analysis was conducted to systematically evaluate, quantify and analyze selected adolescent alcohol education studies in order to determine their overall effects on alcohol knowledge, attitudes, use, interpersonal and affective skills. A secondary analysis was conducted in order to identify those strategies that have been most effective. A study of the various program characteristics and their relationship to study outcomes was also conducted. The following steps, adapted from Tobler (1986), were used as guidelines:

> (1) the location and assembly of both published and unpublished research reports of experimentally controlled outcome evaluations, (2) the study of descriptive variables associated with the meta-analytic procedure which may influence the effect size, (3) aggregation of programs into categories representative of the five major modalities through systematic examination of their treatment components, (4) computation of an overall effect size on all outcome measures for the entire body of programs, and (5) computation of the effect size for the different modalities.

B. LITERATURE SEARCH

Due to limitations of time and available resources for completion of this dissertation, adolescent alcohol abuse prevention studies that have been completed since 1984 were identified from a variety of sources. Studies were primarily found through computer data base searches using appropriately identified keywords. Three CD-ROM searches available through Reference and Information services of Hodges Library at The University of Tennessee, Knoxville were conducted. Those searched by this method were Literature in Psychology and related Disciplines (Psychlit), the Educational Resources Information Center (ERIC), and the Monthly Catalog of United States Government Publications (Marcive). Three ON-LINE computer searches were also conducted. The databases searched were Alcohol and Alcohol Problems Science (ETOH) Alcohol Information for Clinicians and Educators (CORK), and MEDLINE.

In addition to the computer searches, manual searches were conducted of Dissertation Abstracts and a selected list of key journals including The Journal of Drug Education, Journal of Drug Issues, Journal of Studies on Alcohol and the Journal of Alcohol and Drug Education.

Community, state and national contacts were also made by writing letters to researchers in order to identify programs with unpublished outcomes. Studies that were listed in the bibliographies of already identified articles were also used.

C. SELECTION CRITERIA

As recommended by Glass et al. (1981), studies were not excluded based on the opinion of the investigator regarding the research quality. Characteristics of each study were coded and inclusion or exclusion was determined by the success or failure of a study in meeting the baseline selection criteria. The criterion for selection was patterned after Tobler (1986). In order to be included in this meta-analysis, a study had to exhibit all of the following criteria:

> (1) Quantitative measurements on outcome data, (2) A control or comparison group, (3) Grade level inclusive of 6 through 12, and (4) primary prevention as the goal.

The primary results of some studies were reported in more than one place. In order to reduce data dependence and unequal weighting, such studies were only included in the analysis once (Hembree, 1984). Studies reported in more than one place will have a greater influence on outcomes when effect sizes are averaged across studies.

D. IDENTIFICATION AND CODING

Based on a narrative review and the interest of the investigator in developing an alcohol education program, a meta-analysis was conducted on the effects of adolescent alcohol education programs. Those programs that used modalities identified as the most prevalent in the substance abuse

literature were explored. In discussing the history of substance abuse prevention, Tobler (1986) identified five predominant modalities, three of which were used in this analysis. Those were (1) knowledge only--these programs placed an emphasis on the negative consequences of substance use, (2) affective only--programs that focused on "producing intrapersonal and social growth" (pg. 539), and (3) peer programs--programs based on the concept that adolescent behavior is greatly influenced by their peers. During the process of studying program characteristics two other modalities were identified. They were (1) psychomotor/skill models--those that measured the skill of the participants to cope with pressure to use alcohol and to make appropriate decisions (refusal skills, social and life skills, decision-making, job skills, coping skills etc.) and (2) combined models--a combination of the previously mentioned models. Eleven different combinations were coded as follows: (1) Combined model #1 = knowledge + affective, (2) Combined model #2 = knowledge + peer, (3) Combined model #3 = knowledge + psychomotor, (4) Combined model #4 = affective + peer, (5) Combined model #5 = affective + psychomotor, (6) Combined model #6 = peer + psychomotor, (7) Combined model #7 = knowledge + affective + peer, (8) Combined model #8 = knowledge + peer + psychomotor, (9) Combined model #9 = knowledge + affective + psychomotor, (10) Combined model #10 = affective + peer + psychomotor, and (11) Combined model #11 = knowledge + affective + peer + psychomotor. Many programs currently are

combinations of previously identified single modality programs (Schaps et al., 1981; Tobler, 1986).

Program characteristics within each study were also coded in order to further delineate and analyze them (Appendix A: Codebook). Two variables (1-2) associated with the publication status were coded. One variable (3) explored the publication source. Five sources were identified and coded. Twenty-three (4-26) variables describing the characteristics of the subjects were coded. Twenty variables (27-45 & 51) pertained to the design, implementation and evaluation strategies of each study. Another seven variables (52-58) identified program outcome measures. Ten effect size variables were calculated and coded as follows: (1) Effect size knowledge, (2) Effect size attitude, (3) Effect size use, (4) Effect size decision making, (5) Effect size coping, (6) Effect size assertiveness/refusal, (7) Effect size direct behavior, (8) Effect size indirect behavior, (9) Effect size affective, and (10) Effect size total.

E. ANALYSIS OF DATA

Once the studies to be reviewed were selected, a numerical conclusion [effect size (ES)] was calculated for each study. In instances where studies reported multiple follow-up periods (3, 6, 9 months etc.), effect size measures were calculated using data from the longest time period.

The formula created by Glass et al. (1981) was used to calculate individual effect size statistics (ES):

$$ES = \frac{Xe - Xc}{SDc}$$

where Xe is the mean of the experimental group, Xc is the mean of the control and SDc is the standard deviation of the control group. The control group standard deviation was estimated for studies that reported incomplete ANOVA summary data using Glass's technique:

$$SD_c \frac{|SSb + SSab + SSw|}{DFb + DFab + DFw}$$

where SSb is the sum of squares between, SSab is the sum of squares interaction and SSw is the sum of squares within. DFb is the degrees of freedom between, DFab is the total degrees of freedom and DFw is the degrees of freedom within. Some incomplete ANOVA and ANCOVA results were converted to effect sizes using Hembree's formula:

$$ES = Xe - Xc/Sw$$

where Sw is the within group variance (Hembree, 1984).

Glass et al. (1981), Hembree (1984) as well as Hunter and Schmidt (1990) have produced a number of formulae for converting statistics that are presented in studies to estimates of effect size. Based upon the available data, the most appropriate formula was used to calculate the effect size statistic. An effect size measure for studies that reported t-statistics was calculated using Glass's formula:

$$ES = t\sqrt{(1/Ne) + (1/Nc)}$$

Percentages were converted to effect sizes using probit transformations (Glass 1981, pp. 136-139).

The results of the effect size scores were combined to create a grand mean that allowed the researcher to answer the primary research question:

1. What are the overall effects of adolescent alcohol education?

This involved averaging the effect size statistics of all studies. To avoid the problem of non-independence, multiple effects from each study were averaged, making studies the unit of analysis (Tobler, 1986; Wortman & Bryant, 1985).

In addition, effect sizes for each of the five modalities were examined. This allowed the researcher to address the second research question:

2. What are the most effective treatment modalities? Each study was evaluated and a determination was made regarding the modalities and coded accordingly. Multiple effects reported for the same outcome measure were averaged and collapsed into a single effect size statistic. For example, Baer, McLaughlin, Burnside, and Pokorny (1988) reported use outcome measures on "quantity of use" and "use last year." An effect size was computed for each of the two measures and the average was reported as one effect on the use outcome measure.

Studies that reported separate outcomes by grade level were separated. Each study was coded and effect size measures were calculated independently. For clarification, I will again use Baer et al. (1988) as an example. This study reported outcome measures for each modality for both grades 7 and 9. A separate codebook was completed for each study and the

results were treated as two distinct outcomes. Given the fact that the outcome measures were derived from students of different classes and grade levels, these data were independent (Giaconia & Hedges, 1982). Selected program characteristics were also examined in order to describe their relationship to program outcomes. All reported analysis of program characteristics are for the effect size total variable unless otherwise specified. If used appropriately, the results of this study could lead to the development of an effective alcohol education strategy for adolescents.

F. SUMMARY

In order to determine the overall impact of adolescent alcohol education a meta-analysis of selected studies was conducted. The decision regarding the inclusion or exclusion of a particular study was based upon a criterion.

Studies were located by database computer searches using appropriately identified key words. Selected journals were manually searched for related articles. To ensure the inclusion of unpublished research, a manual search of dissertation abstracts was performed. Personal contacts with researchers in the field of drug education were also made in an attempt to procure additional unpublished studies.

After selecting the studies, a total effect size was calculated for each study. These totals were then averaged in order to determine the overall effects of the studies included in the analysis.

In addition, the studies were coded and placed into one of five treatment modalities. An effect size was calculated for each. Effect sizes for selected treatment modalities were examined in order to determine those that were most effective. Major characteristics of each program were also coded and an examination of the relationship between these characteristics and program results were conducted.

CHAPTER IV

RESULTS AND DISCUSSION

A. INTRODUCTION

The purpose of this chapter was to present and discuss the results of the meta-analysis. The chapter was divided into the following areas for discussion: (1) selected studies, (2) excluded studies, (3) research questions, (4) overall effects, (5) program characteristics, (6) design, implementation and evaluation status, (7) discussion, and (8) summary.

B. SELECTED STUDIES

A total of 99 studies was examined of which 20 (20%) met the criteria for selection and were included in the analysis. The analysis of these studies resulted in a total of 48 effect sizes. As previously mentioned, 10 effect size variables were calculated. After a preliminary analysis, it was deemed appropriate to combine the decision-making, coping and assertiveness/refusal categories into a single "skill" effect size measure. Similarly, the direct and indirect behavioral categories were combined into a single "behavior" effect size category.

C. EXCLUDED STUDIES

Seventy-nine (80%) studies were excluded from the analysis. Thirty-six (46%) of them were descriptive in nature. Seventeen (22%) met the selection criteria but yielded insufficient data to calculate an effect size statistic. Letters written to the authors in an attempt to obtain the missing information were unsuccessful. In only one instance did an author respond with sufficient data to calculate an effect size statistic. Seven (9%) studies failed to include a control or comparison group and one study was excluded as a result of the primary results being reported in more than one place (Table 1). Eighteen (23%) unpublished manuscripts were obtained by writing letters to researchers, none of which included sufficient data to be included in the analysis.

Table 1

Major Criteria of Excluded Studies

Reason	n	% of total
No quantitative outcome measures	36	46
Insufficient data to calculate effect size	35	44
No control/comparison group	7	9
Primary analysis included in more than one place	1	1
TOTAL	79	100

D. RESEARCH QUESTIONS

The research questions addressed were:

1. What are the overall effects of adolescent alcohol education?
2. What are the most effective treatment modalities?

E. OVERALL EFFECTS

In order to answer the first research question, multiple effect sizes from single studies were averaged into a single statistic, making studies the unit of analysis (Wortman & Bryant, 1985). Total effect sizes ranged from -.34 to 1.18. The average effect for the twenty studies was .25 with a variance of .15 and a standard deviation of .39. Therefore, the average difference between the experimental and control group was .25 standard deviations. This represents the magnitude or size of the effect rather than a test of significance. A normal probability plot and the Shapiro-Wilks test revealed that the data are from a normal distribution.

Outcome Measures

The most frequently occurring outcome measure was use of alcohol (n = 17), followed by knowledge (n = 14), attitudes (n = 10), skills (n = 9), and behavior (n = 8) with affective/self-esteem (n = 4) being the least frequently measured. The affective outcome measure category (effect size = .61) had the highest effect size average. The skill outcome measure category was next (effect size = .40), followed by knowledge (effect size = .35), which was

nearly twice as large as the next category (attitude = .20). Behavior (effect size = .18) closely followed attitude, while effect size use (.08) represented the lowest of all outcome measure categories. As with effect size total, a normal probability plot and the Shapiro-Wilks revealed that all effect sizes were from a normal distribution.

Modalities

In order to answer the second research question, the relationships between the various modalities by effect size total were examined. Due to a lack of data within the modalities, only limited comparisons were possible. The vast majority of the programs (n = 17) used a combination of the single modalities. The most frequently used modality (n = 7) was combined model #9 (knowledge, affective and psychomotor). Four studies used combined model #8 (knowledge, peer and psychomotor). Combined model #3 (knowledge and psychomotor) was used on three occasions. Three programs used a single modality approach. The single approaches used included knowledge only, psychomotor only and affective only. Combined model #8 yielded the highest effect size average (.21), followed by combined model #9 (effect size - .13) with combined model #3 (effect size = -.02) yielding the lowest. An analysis of variance revealed no significant differences between the modalities for effect size total (Table 2).

Table 2

ANOVA Summary Results, Combined Models (3, 8, and 9) by ESTOT

Source of variation	D.F.	Sum of squares	Mean squares	F ratio	F prob
Between	2	.09	.04	.57	.58
Within	11	.89	.08		
Total	13	.98			

Effect Size Use

The true impact of any preventive alcohol education program may be most accurately reflected in the utilization patterns. Therefore, an analysis of the effects on the combined modalities by effect size use and selected program characteristics was conducted. The order of the effect size averages for the "use" variable was identical to those for "total." Combined model #8 (knowledge, peer, and psychomotor) produced an average of .16, followed by .08 for combined model #9 (knowledge, affective, and psychomotor) and -.11 for combined model #3 (knowledge and psychomotor). Though the difference between combined models 8 and 3 appeared large (.27), ANOVA results revealed no significant differences between the modalities (Table 3).

Table 3

ANOVA Summary Results: Combined Models 3 and 8 by Effect Size Use

Source of variation	D.F.	Sum of squares	Mean squares	F ratio	F prob
Between	2	.11	.06	.37	.70
Within	7	1.05	.15		
Total	9	1.17			

Peer Modality by Effect Size Total and Effect Size Use

Results of previous drug education evaluation studies have shown that peer modalities enhance program success (Bangert-Drowns, 1986; Botvin & Willis, 1985; Carpenter et al., 1985; Gonzalez, 1982; Horton, 1988; Tobler, 1986). Peer modalities in this meta-analysis refer to programs that are designed to address adolescent vulnerability to peer pressure and/or the use of peers to assist in the program delivery. Of the 20 programs included in this analysis, five (25%) included a peer approach. In all five instances the peer model was included in a combined format. A t-test comparing programs including a peer approach with those that did not revealed no significant differences for effect size total ($t = -.21$, two-tailed $p = .83$), or effect size use ($t = .67$, two-tailed $p = .51$).

F. PROGRAM CHARACTERISTICS

Publication Source

Of the 20 studies included in the analysis, 17 (85%) were from journals and 3 (15%) were unpublished doctoral dissertations. The average effect size total for the dissertations was .96, while the average of the 17 journal articles was .12. Although it was based on a small number of cases ($n = 3$), a t-test showed that dissertations resulted in significantly greater effects ($t = 5.44$, two-tailed $p < .01$). The relationship between this variable and effect size needs to be further explored.

Subject characteristics

Eleven (55%) of the studies failed to report data related to the gender of program participants. Of the nine remaining studies, the average percent of female and male subjects were 53% and 47%, respectively.

Fourteen (70%) of the studies failed to report data regarding the number of black and "other" ethnic minority program participants. Of the six remaining studies, five (25%) included a small percentage of Blacks ($\bar{X} = 7$) and one study reported that no Blacks were included. Five studies (25%) reported the inclusion of "other" ethnic minorities ($\bar{X} = 7$). However, one program was comprised exclusively of Native Americans. The average percent was reduced to 20 when this study was excluded.

Thirteen was the average age of participants, and 8 was the average grade. However, only four (20%) of the programs included information on the

age of subjects. Eight hundred thirty-nine was the average number of participants for all of the programs.

G. DESIGN, IMPLEMENTATION AND EVALUATION STATUS

Twenty variables related to the quality of the program design, implementation and evaluation were coded. Using these variables, the relationship between program quality and effect size was analyzed.

The majority of the programs (65%) included participants that were assigned or referred to the program. Thirty percent of the programs were comprised of volunteer subjects. A t-test showed no significant difference ($t = 1.03$, two-tailed $p = .32$) between the two.

An analysis of the program presenters revealed that the majority of the studies ($n = 11$) used regular classroom teachers as the primary change agents. Four (20%) studies used the researcher(s) and the remaining studies used some other program presenter ($n = 2$) or a combination ($n = 2$) of the above. A two-tailed t-test ($t = .78$, two-tailed $p = .45$) comparing those studies that used researchers with those using classroom teachers revealed no significant differences.

Fifty percent of the programs reported that training was provided for the program presenters. A t-test ($t = -1.22$, two-tailed $p = .24$) found the differences between those programs that provided training and those that did not to be insignificant.

The majority of the studies (70%) used a pretest posttest control group experimental design. Four studies (20%) used a non-equivalent control group design, while two studies (10%) used a posttest only control group design. Seven (35%) of the studies reported that subjects were randomly assigned to either the treatment or control group. Four (20%) of the studies matched the groups while 9 (45%) reported non-random assignment of students. Analysis of variance for effect size total by nature of control/assignment revealed that no two groups were significantly different from each other (Table 4).

Fourteen (75%) of the studies reported data on the duration of programs. Program duration ranged from 1 to 4 weeks. The mode (n = 6) was 2 weeks, followed by 4 (n = 4) and 3 (n = 3) weeks, respectively. The average for all programs was 2 1/2 weeks. A correlational analysis (r = .25) of duration in weeks and effect size total showed a positive relationship between the two variables.

Table 4

ANOVA Summary Table for effect size total by Nature of Control

Source of variation	D.F.	Sum of squares	Mean squares	F ratio	F prob
Between	2	.40	.20	1.34	.28
Within	17	2.50	.14		
Total	19	2.90			

Seventeen (85%) of the studies reported data regarding the length of follow-up in weeks. Follow-up periods ranged from 0 to 265 weeks (approximately 5 years) with an average follow-up period of 63 weeks (1.3 year). Correlational analysis for both effect size total ($r = -.40$) and effect size use ($r = -.22$) showed negative relationships.

Sixteen (80%) of the programs failed to report whether the intervention was implemented as intended. Only three (18%) of the studies reported that a pilot-test was conducted while 10 (50%) stated that no pilot-assessment was included in the program design with 7 (35%) failing to report information.

Only one study reported that a needs assessment was conducted prior to program development and implementation. Eight studies (40%) reported that a needs assessment was not conducted while 11 (55%) failed to report on this variable. Fourteen (70%) of the studies included sufficient data to determine whether a process evaluation was carried out. Seven of these studies conducted such an evaluation while seven did not.

Fifty-five percent of the studies failed to identify a specific program goal. Of the nine studies that included stated goals, three programs identified abstinence, two sought to reduce utilization rates and four stated abuse prevention as the program goal.

Thirteen studies (65%) failed to report data regarding the validity of the instrument used for data collection. Six of the 7 reporting on this variable stated that the instrument was valid. Eight studies failed to reveal information regarding the reliability of the instrument. Ten of the 12 studies reporting on

this variable indicated that the instrument was reliable. Nineteen (95%) of the 20 studies used self-report data.

Sixteen studies reported data regarding the mode of delivery. Ten of these studies reported using a combination of lecture, discussion and role play. Three used a lecture only teaching method, and two programs combined lecture with discussion. A t-test ($t = 1.31$, two-tailed $p = .22$) comparing those programs using a combined format with those using a lecture only method yielded no significant differences.

H. DISCUSSION

Since the 1960s, many strategies aimed at the reduction of use and abuse of alcohol and other drugs have been used. Attempts to describe the effects of these programs have shown mixed results. In addition, the majority of drug education evaluation studies have grouped the results of alcohol education with other drugs in a narrative format. This meta-analysis exclusively examines the impact of alcohol education studies conducted between 1985 and the present.

There have been many criticisms levied against alcohol education research and the results of this meta-analysis suggest that some of them may be valid. In this study, 99 alcohol education studies were examined. The fact that 79 of these studies were excluded from the final analysis confirms the contention that alcohol education research largely suffers from inadequate research design, implementation and evaluation methodology. Both the overall

quality of alcohol education research and the manner in which results are reported is insufficient.

Only 45% of the studies included information on gender, 30% on race, and 20% on age. Of those studies containing information relative to gender, the percent male and female subjects appeared to be evenly distributed. However, this did not hold true for race. Blacks and "other" ethnic minorities were under-represented. This appears to be a common problem in social and behavioral science research. More minorities need to be included in alcohol and other drug education research. It may be that the impact of program modalities on outcomes could vary by race.

The fact that only 20% of the programs provided information relative to the age of the subjects also reduced the quality of the analysis. Because of the differences in the developmental levels of adolescents, alcohol education studies should include the age of participants. This would allow evaluators in general, and meta-analysts in particular, to determine which program characteristics are best for the various age groups.

Given the prevalence of alcohol use among adolescents in society and the difficulty in achieving positive results, it is imperative that research methodology be improved. This meta-analysis found few significant differences for effect size total and effect size use by the treatment modalities, outcome measures and program characteristics. This may be partially due to the fact that this study explored the effects of prevention programs on alcohol only. Researchers in drug education have indicated that the use of peer,

affective and skill modalities significantly enhance the effectiveness of drug education programs (Bell & Battjes, 1985; Botvin, 1983; Botvin & Willis, 1985; Resnick, 1983; Tobler, 1986). However, these efforts have either excluded alcohol from the analysis or combined their results with other drugs. The use of alcoholic beverages (even among adolescents) is an established, socially accepted and often expected behavior that is much more difficult to change than other less socially accepted drugs.

The majority of the studies failed to report data regarding the validity of the instrument used. Only 50% of the studies indicated that the instrument used was reliable. However, accuracy of some of the reliability data is questionable at best. In some instances, researchers eluded to reliability coefficients that had been established with other studies. Several researchers adopted portions of previously existing instruments but failed to establish coefficients for the revised instruments.

Alcohol education studies should increase the use of true experimental designs. Only 35% of the programs randomly assigned students to the respective groups. There is also a need to conduct more process evaluations and pilot-assessments. This will help to assure proper implementation and to refine program content.

Of the 20 studies included in this meta-analysis, only one study indicated that a needs assessment was conducted. Though the need for alcohol education is generally prevalent for all adolescents, a specific needs assessment should be conducted in order to identify a specific program focus

and scope based upon the pre-program knowledge, attitudes, practices and interests of the target audience. These characteristics of subjects may vary by both demography and geography. Comprehensive needs assessments should be conducted in order to determine the needs as perceived by the students, and to identify existing resources. This will enable researchers to overcome barriers associated with communicating with adolescents and help to reduce unnecessary efforts.

The lack of goal directed interventions in alcohol education is an ongoing problem that was also present in this analysis. Fifty-five percent of the programs in this study failed to specifically identify a program goal. Improvement in the areas of needs assessment and pilot-testing could help to address the lack of goal directed research in drug education. Though it is not necessarily a methodological problem, only 3 of the 20 studies in this meta-analysis specifically identified abstinence as the program goal. All studies included in this analysis were targeted at adolescents with the average age and grade of subjects being 13 and 8, respectively. Given the fact that the use of alcoholic beverages for persons under the age of 21 is illegal in most states, it is apparent that researchers in alcohol education should re-examine the scope of their programs and consider the message that non-abstinence approaches send to adolescents. Efforts should also be made to augment self-report data with physiological measures that detect alcohol use such as breathalyzer, blood sampling and the dip-stick method where possible (Rockett & Putnam, 1990).

The faulty quality of alcohol education research make it extremely difficult to accurately evaluate and determine its true effectiveness. A subsequent problem in objectively evaluating this research using meta-analysis is that many studies lack sufficient data to comprehensively code study characteristics and/or calculate effect size statistics. Similarly, studies that produce negative or non-significant findings are often difficult to retrieve because they are not frequently published. It may be that many of these studies could make positive contributions if examined meta-analytically. The subjection of such studies to meta-analysis would allow them to be compared on a standardized basis with other alcohol education research. In addition, the quality of the research design, implementation and evaluation procedures can be carefully examined. This may help to reduce needless repetition of excellent research (Gordis, 1988).

In this meta-analysis, data for statistically insignificant or negative findings within studies was often missing. Given the complexity of the alcohol problem and the social acceptance of alcohol use within the American culture along with the volume of research being conducted, it is imperative that results of alcohol education research be available for analysis.

Though this meta-analysis provides support for the criticisms levied against alcohol education research it also has provided empirical evidence to suggest that alcohol education research conducted between 1985 and the present have had positive effects. All calculated effect size total measures were in a positive direction.

As previously mentioned meta-analysis allows one to quantitatively evaluate research studies and make standardized comparisons using the effect size statistic. An effect size refers to the magnitude of the effect rather than its statistical significance. It represents the average difference between the treatment and control groups in standard deviation units.

The overall effect size statistic for this study was .25. Practically, this means that .25 standard deviations separate the average student in the experimental group from the average student in the control group. Another way of explaining it is through the use of percentiles based on the normal distribution. Explaining it this way, the overall effect size for this meta-analysis shows that the average subject in the experimental group has a score that exceeds 59% of the subjects in the control group.

The overall effect size (grand mean) is similar to that obtained by Tobler (1986) in her meta-analysis (effect size = .33, n = 13) of 143 drug education programs. Though several other meta-analytic studies in drug education have been conducted, they did not calculate a grand mean and/or combined the results of alcohol education research with those of other drugs (Bangert-Drowns, 1986, 1988; Bruvold, 1990; Bruvold & Rundall, 1988).

Though all effect size statistics (total and across outcome categories) for this meta-analysis were positive, effect size statistics varied greatly. The studies included in this meta-analysis produced the largest changes (effect size = .61) in the affective domain. The programs were more successful in improving subjects skills (effect size = .40) than they were for both knowledge

(effect size = .35) and attitudes (effect size = .20). Behavior (effect size = .18) and use (effect size = .08) were the most difficult variables to influence. More recently, it has been hypothesized that the enhancement of intrapersonal and social skills will result in positive behavior and decreased utilization rates of alcohol. This supposition is challenged by the results of this meta-analysis.

Historically drug prevention efforts have measured knowledge and attitudes without exploring the subsequent effects on use and other related behaviors. In addition, many criticisms have been levied regarding the inability of alcohol and other drug education programs to develop skills in adolescents that are necessary to bring about behavioral changes. Primary prevention for adolescents cannot be accomplished in the absence of reduced utilization rates and other related behaviors.

Though the majority of the studies failed to specifically identify a program goal, nearly all of the studies implied that a reduction in utilization rates was the main objective. Results across effect size categories showed the average scores for the affective and skill categories to be .53 and .32 standard deviations higher than effect size use, respectively. This means that the average effect size for affective outcomes exceeded 70% of the use outcome scores while the average effect size for skill exceeded 63%.

Average effect sizes for affective (effect size = .61) and skill (effect size = .40) were also higher than behavior (effect size = .18) scores. These represent differences of .43 and .22, respectively. Therefore, the average affective scores exceeded 66% of the behavior scores, with the average skill

score exceeding 59% of those for behavior. This suggests that enhanced intrapersonal and social skills may not necessarily change use patterns and other related behavior. However, it may be that follow-up for these studies was conducted before the opportunity to utilize the attained skills could occur. Alcohol education researchers should conduct more longitudinal analysis in the future, especially as it relates to the relationship between skill development and utilization patterns.

The fact that dissertations were found to have significantly higher effects than journal articles is consistent with the findings of Tobler (1986). However, these findings run counter to those of other researchers (Rosenthal & Rubin, 1980; Smith, 1980). This may be due in part to the fact that only three dissertations were included in the analysis.

It has been suggested that program presenters should receive adequate training in order to increase the chances of maximum effectiveness (Hansen, 1988). Though this hypothesis seems plausible, the results of this meta-analysis does not support it. Those studies indicating that training for the change agent was provided did not produce effect sizes that were significantly larger than those that did not provide training.

A closer examination of the data revealed that the program quality and evaluation procedures may have contributed to these findings. A total of 10 studies indicated that training was provided for change agents. Of these 10 studies, three produced negative findings. One of these studies indicated that the duration of training was one day. A second study included an effect size

use value of -.28 that contributed to the effect size total. This study was also one of three studies that stated abstinence as the program goal. The effect size total for a third study with negative findings contributing to these results was calculated for a follow-up period of 265 weeks (5 years). This represented the single longest follow-up period for the entire data set.

A correlational analysis for duration of follow-up by effect size total and effect size use resulted in negative relationships for both variables. Along with the ability to change behavior and use patterns, the long term effects of alcohol education is most important. These data suggest that positive outcomes may be reversed over time. Given the negative relationship between program effects and duration of follow-up, alcohol education researchers should include "booster" units as a follow-up to full program implementation. These units should be a shortened version of the major program components and be administered periodically.

I. SUMMARY

This chapter presented and discussed the results of the meta-analysis. It began with a brief description of the studies selected (n = 20) and excluded (n = 99) from the analysis. The 20 studies included in the analysis produced effect size totals ranging from -.34 to 1.18. The average of these resulted in a grand mean of .25. Average effect size statistics were also computed across five outcome measure categories. They were use of alcohol, knowledge, attitudes, skills, behavior and affective. The highest effect size average

occurred in the affective domain (effect size = .61), followed by skill (effect size = .40), knowledge (effect size = .35), attitude (effect size = .20), behavior (effect size = .18) and use (effect size = .08).

An analysis of the relationship between treatment modalities and effect size total found no significant differences between the various models analyzed. A comparison of programs using a peer modality with those that did not showed no significant differences between the two for effect size total or effect size use. A comparison between those studies appearing in journals (n = 17) with those from doctoral dissertations (n = 3) showed the latter to produce significantly higher effects.

Sixty-five percent of the programs included participants that were assigned while 30% used volunteers. Fifty percent of the programs used classroom teachers as the primary change agent while 20% used the researcher(s). Fifty percent of the programs provided training for these agents. The majority of the programs (45%) used non-random methods of assigning students, followed by random assignment (35%) and matching (20%), respectively. Ten studies used some combination of lecture, discussion and role play in the delivery of the program with three using a lecture only format. Conventional statistical tests using ANOVAs and t-tests found none of the above comparisons to be statistically significant.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

A. SUMMARY

The problem of this study was to systematically evaluate, quantify and analyze selected adolescent alcohol education studies in order to determine their effects on alcohol knowledge, attitudes, use, and skills, as well as to identify the most effective treatment modalities. In order to address the problem, a meta-analysis of selected adolescent alcohol education studies was conducted. Specifically, the study sought to answer the following research questions:

1. What are the overall effects of adolescent alcohol education?
2. What are the most effective treatment modalities?

An examination of the relationship between selected program characteristics and outcomes was also conducted.

The sampling frame in this project was alcohol education studies that have been completed since 1984 that met the following criteria:

1. contain quantitative outcome measurements on outcome data
2. used a control or comparison group,
3. grade level inclusive of 6 through 12, and
4. primary prevention as the goal.

The following steps were used as guidelines:

> (1) The location and assembly of both published and unpublished research reports of experimentally controlled outcome evaluations, (2) the study of descriptive variables associated with the meta-analytic procedure which may influence the effect size, (3) aggregation of programs into categories representative of the five major modalities through systematic examination of their treatment components, (4) computation of an overall effect size on all outcome measures for the entire body of programs, and (5) computation of the effect size for the different modalities (Tobler, 1986).

The above procedures resulted in the examination of 99 studies, 20 of which were included in the analysis. These 20 studies produced 48 effect sizes. A total of seven effect size categories were calculated. They were use of alcohol, knowledge, attitudes, skills, behavior, affective, and total. The total effect size category represents the average of all other categories from each study. Therefore, studies were the unit of analysis. Total effect sizes across the 20 studies were then averaged to determine the grand mean. This grand mean was used to answer the first research question. The second research question was answered by examining the relationship between the various treatment modalities and program outcomes.

No investigation is completed without weaknesses, and the meta-analyst for this study would be negligent if the major problems were not discussed. One problem was that all of the study characteristics were coded by the primary investigator. The inclusion of one or more coder and a check for interrater reliability would have strengthened the process. However, the instrument used in the analysis coded the majority of the information from direct statements as they appeared in the studies, thus reducing the need for

interpretation by the meta-analyst. In addition, all of the variables coded except the effect size statistics were pilot-tested using the first 20 studies examined (Cooper, 1984). After the pilot-test, appropriate revisions were made and the instrument was reviewed by two experts in the field.

Another weakness was the inability to locate unpublished studies. The only unpublished studies included in the analysis were those obtained from the manual search of dissertation abstracts. Similarly, the lack of sufficient data to calculate effect size statistics was problematic. Seventeen of the 79 studies excluded from the analysis met the selection criteria but lacked sufficient data to calculate effect sizes. Another 18 unpublished manuscripts were obtained by writing letters to primary researcher(s), none of which included sufficient data to be included in the analysis.

B. FINDINGS

The data analysis produced the following findings:

1. The average effect size total for the twenty studies was .25.
2. The most frequently measured outcome variable was use of alcohol followed by knowledge, attitudes, skills, behavior and affective, respectively.
3. The order of effect sizes for the outcome measure categories was affective, skill, knowledge, attitude, behavior and use.

4. The majority of the programs (85%) used a combination of the single modalities. No significant differences were found between any of the combined modalities.
5. Five of the studies included a peer approach in the modality. A comparison of those programs using a peer approach with those that did not revealed no significant differences for effect size total or effect size use.
6. Dissertations (n = 3) represented the only unpublished studies included in the analysis. They resulted in significantly larger values for effect size total than published journal articles (n = 17).
7. The availability of information relative to subject characteristics for the variables gender, race, and age was inadequate.
8. Blacks and "other" ethnic minorities represented 7% and 25% of the total program participants for those studies reporting on the variable race.
9. Sixty-five percent of the programs included subjects that were assigned while 30% used volunteers. No significant differences were found between the two methods of assignment.
10. Fifty-five percent of the programs used the regular classroom teachers as the primary change agent while 20% used the researcher(s). No significant differences were found between the two.

11. Fifty percent of the programs reported that training was provided for the change agent. A comparison of those that provided training with those that did not revealed no significant differences.
12. A slight majority of the programs used non-random (45%) methods of assigning students. The percentage of studies using random (35%) assignment exceeded those matching subjects (20%). No significant differences were found between any of the methods.
13. There was a positive relationship between the length of programs and effect size total.
14. There was a negative relationship between length of follow-up and effect size for both the total and use categories.
15. The availability of information relative to the program characteristics was inadequate.
16. Studies reporting information relative to research methodology revealed that the majority of the studies were poorly designed, and evaluated.
17. Fifty percent of the studies used some combination of lecture, discussion and role play in the delivery of the program while 15% used a lecture only format. There were no significant differences between the two modes of delivery.

C. CONCLUSIONS

Based upon the findings related to the research questions of the meta-analysis, the following conclusions were formulated:

1. Both the overall quality and methods of reporting results for alcohol education research are inadequate.
2. Alcohol education programs included in this meta-analysis have had slightly positive effects.
3. Alcohol education programs included in this analysis revealed no significant differences in the effectiveness of the various treatment modalities.

D. RECOMMENDATIONS

Based upon the results, findings, and conclusions of this study, the following recommendations were made:

1. Alcohol education researchers should strive to improve the overall research quality and present the results in a more comprehensive manner. There is a need to include more program and subject characteristics in final reports. Specific areas for improvement include length of programs, duration of follow-up, whether or not the program was implemented as intended, instrumentation (reliability and validity), age, gender and race.

2. Future alcohol education studies should include sufficient data to calculate effect size statistics. This data should be available for both significant and non-significant findings.
3. More alcohol education studies with negative findings should be published and an effective method for retrieving unpublished research should be developed. There is a need to include more unpublished studies in evaluation research in general and meta-analytic studies in particular.
4. The effects of peer modalities on study outcomes need to be further explored.
5. The relationship between program duration and outcome need to be further explored in order to identify an appropriate range for program length.
6. Alcohol education researchers should examine the effectiveness of using "booster" units as a follow-up to full program implementation.
7. More alcohol education studies should be conducted using Black and "other" ethnic minority subjects.

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APPENDICES

APPENDIX A

CODEBOOK

Column	Column Width	Value	Variable Number and Name
1-3	3		1. Study I.D. number (001-00N)
4-5	2		2. Pub. date in year
6-7	2		3. Publication source 1 = journal 2 = book 3 = published thesis/diss. 4 = unpub. thesis/diss. 5 = unpub. manuscript
8-10	3		4. % of female subjects/treat
11-13	3		5. % of female subjects/cont
14-16	3		6. % of female subjects/total
17-19	3		7. % of male subjects/treat
20-22	3		8. % of male subjects/cont
23.25	3		9. % of male subjects/total
26-28	3		10. % of Black subjects/treat
29-31	3		11. % of Black subjects/cont
32-34	3		12. % of Black subjects/total
35-37	3		13. % of White subjects/treat
38-40	3		14. % of White subjects/cont
41-43	3		15. % of White subjects/total
44-46	3		16. % of subjects (other)/treat
47-49	3		17. % of subjects (other)/cont
50-52	3		18. % of subjects (other)/total

Column	Column Width	Value	Variable Number and Name
53-54	2		19. Minimum age of subjects in yrs.
55-56	2		20. Maximum age of subjects in yrs.
57-58	2		21. Avg. age of subjects in yrs.
59-62	4		22. Number of subjects/treat
63-66	4		23. Number of subjects/cont
67-70	4		24. Number of subjects/total
71-72	2		25. Minimum grade of subjects
73-74	2		26. Maximum grade of subjects
75	1		27. Solicitation of subjects 1 = referred/assigned 2 = volunteer 3 = combination
1	1		28. Use of incentive/rewards 1 = yes 2 = no 3 = not reported
2	1		29. Change agent 1 = researchers 2 = classroom teacher 3 = peers 4 = combination 5 = other
3	1		30. Training of change agent 1 = yes 2 = no
4	1		31. Experimental design 1 = posttest only 2 = pre-post 3 = factorial 4 = non-equivalent control group

Column	Column Width	Value	Variable Number and Name
5	1		32. Nature of control 1 = random assignment 2 = matching 3 = non-random
6	1		33. Treatment of control group 1 = second treatment 2 = no treatment
7-8	2		34. Duration of program in weeks
9-11	3		35. Duration of follow-up in weeks
12	1		36. Proper implementation 1 = yes 2 = no 3 = not reported
13	1		37. Conducted pilot-test 1 = yes 2 = no 3 = not reported
14	1		38. Conducted needs assessment 1 = yes 2 = no 3 = not reported
15	1		39. Conducted process eval 1 = yes 2 = no 3 = not reported
16	1		40. Stated goal 1 = none 2 = abstinence 3 = reduction in use 4 = abuse prevention
17	1		41. Instrumentation 1 = standard 2 = non-standard
18-20	3		42. # of items on instrument

Column	Column Width	Value	Variable Number and Name
21	1		43. Valid instrument 1 = yes 2 = no 3 = not reported
22	1		44. Reliable instrument 1 = yes 2 = no 3 = not reported
23	1		45. Nature of data 1 = self-report 2 = physical measures 3 = combination
24	1		46. Knowledge treatment models 1 = yes 2 = no
25	1		47. Affective treatment models (self-esteem, self-awareness, feelings, values clarification, humanistic psychology) 1 = yes 2 = no
26	1		48. Peer treatment models 1 = yes 2 = no
27	1		49. Psychomotor/skill models (refusal, social and life, decision-making) 1 = yes 2 = no

Column	Column Width	Value	Variable Number and Name
28-29	2		50. Combined models 1 = knowledge + affective 2 = knowledge + peer 3 = knowledge + psychomotor 4 = affective + peer 5 = affective + 6 = peer + psychomotor 7 = knowledge + affective + peer 8 = knowledge + peer + psychomotor 9 = knowledge + affective + psychomotor 10 = affective + peer + psychomotor 11 = knowledge + affective + peer + psychomotor
30	1		51. Program delivery 1 = lecture only 2 = discussion only 3 = role play only 4 = lecture + discussion 5 = lecture + role play 6 = discussion + role play 7 = lecture + discussion + role play
31	1		52. Knowledge outcome measure 1 = yes 2 = no
32	1		53. Attitudes outcome measure 1 = yes 2 = no
33	1		54. Use outcome measure 1 = yes 2 = no
34	1		55. Skill outcome measure (decision-making) 1 = yes 2 = no

Column	Column Width	Value	Variable Number and Name
35	1		56. Skill outcome measure (coping) 1 = yes 2 = no
36	1		57. Skill outcome measure (assertiveness/refusal) 1 = yes 2 = no
37	1		58. Behavior outcome measure 1 = direct measures (principal, parental, and police incident reports; arrests; hospitalizations) 2 = indirect measures (school grades, attendance, comprehensive tests 3 = both 4 = none
1-4	4		59. Effect size (knowledge)
5-8	4		60. Effect size (attitudes)
9-12	4		61. Effect size (use)
13-16	4		62. Effect size (decision-making)
17-20	4		63. Effect size (coping)
21-24	4		64. Effect size (assertiveness/refusal)
25-28	4		65. Effect size (direct behavior)
29-32	4		66. Effect size (indirect behavior)
33-36	4		67. Effective size (affective)
37-40	4		68. Effect size (total/overall)

APPENDIX B

SAMPLE LETTERS WRITTEN IN AN ATTEMPT TO OBTAIN UNPUBLISHED STUDIES OR MISSING DATA

February 12, 1991

Dear staff member

I am a doctoral student in the Department of Health, Leisure and Safety at The University of Tennessee, Knoxville. My dissertation is a meta-analysis of selected adolescent alcohol education studies. In searching the literature for relevant studies the research conducted by your institute entitled "Evaluation of a Tobacco and Alcohol Abuse Prevention Curriculum for Adolescents" appears to meet the established selection criteria. Therefore, this letter is a request for a copy of the manuscript.

According to the printout obtained from the ERIC database the research was done by Hansen, W. B. and others. It is a 38 pg. document that was presented at the annual meeting of the American Public Health Association (114th, Las Vegas, NV, September 28-October 2, 1986).

I look forward to your prompt response regarding this matter. Please mail the manuscript to me at 5915 Loice Lane, Knoxville, TN 37924. The phone number where I am most readily available is (615) 971-5228. Thank you for taking the time to read and respond to this letter.

Appreciatively,

Moses Goldmon

February 27, 1991

Dear Ms. Clayton

I am a doctoral student in the Department of Health, Leisure and Safety at The University of Tennessee, Knoxville. My dissertation is a meta-analysis of selected adolescent alcohol education studies. In searching the literature for relevant studies the research conducted by your center entitled "Early Intervention to Counter Drug Abuse Among Youth" appears to meet the established selection criteria. I learned of the program from the description in the U.S. Department of Health and Human Services publication "Breaking New Ground for Youth at risk: Program Summaries." Therefore, this letter is a request for information about the program.

Please provide specifics about the program components, goals, methodology, data collection instruments, outcome measures, implementation and evaluation procedures as well as how the program was developed. In addition the reference citation to any publication(s) that relate to the program will be greatly appreciated. Finally, results regarding the impact of the program will prove invaluable. Specifics on subject characteristics (age, grade level, gender, ethnicity, selection, etc), pretest and posttest results, and statistical techniques are desired.

I look forward to your prompt response regarding this matter. Please mail the information to me at 5915 Loice Lane, Knoxville, TN 37924. The phone number where I am most readily available is (615) 971-5228. Thank you for taking the time to read and respond to this letter.

Appreciatively,

Moses Goldmon

April 1, 1991

Dear M. Martinez

I would like to thank you for responding to my previous request for a copy of the manuscript entitled "From Research to Intervention: Substance Abuse Prevention Among Hispanic Adolescents" Report No. 3. However, after reviewing the manuscript, I find that additional information is needed before it can be integrated into my research effort.

If possible, could you please provide additional information about the program. A more thorough description of program components, goals, methodology, data collection instruments, outcome measures, implementation and evaluation procedures would be helpful. In addition copies of, or reference citation(s) to any publication(s) that relate to the program will be greatly appreciated. Finally, specific results (actual means, variances, and standard deviations of the two groups) regarding the impact of the program will prove invaluable. Specifics on subject characteristics (age, grade level, gender, ethnicity, selection, etc), pretest and posttest results, as well as statistical techniques are also desired.

I look forward to your prompt response regarding this matter. Please mail the information to me at 5915 Loice Lane, Knoxville, TN 37924. The phone number where I am most readily available is (615) 971-5228. Thank you for taking the time to read and respond to this letter.

Appreciatively,

Moses Goldmon

May 15, 1991

Dear Staff Member

I am a doctoral student at The University of Tennessee, Knoxville. My dissertation is "A meta-analysis of selected adolescent alcohol education studies." In searching the literature for relevant studies the article that appeared in Vol. 30 of the 1985 Journal of Alcohol and Drug Education entitled "Evaluation of two school-based alternatives programs" met the established selection criteria. I would like to include the results of the study in my analysis. However, in order to do so some additional information is needed.

This letter is the second effort to obtain such information. Please find enclosed a letter that was written to Dr. Janet Malvin. It was returned to me on 5-14-91. The complete citation as it appeared in the article is as follows: Evaluation of two school-based alternatives programs. Malvin, Janet H., Moskowitz, Joel M., Schaps, Eric, and Schaeffer, Gary A. Pacific Institute for Research and Evaluation. Napa, California.

If any of the cited authors are still a part of your staff or have left a forwarding address, please forward this information to them. If not, any information regarding their present place of employment would be greatly appreciated.

I look forward to your prompt response regarding this matter. Please mail the information to me at 5915 Loice Lane, Knoxville, TN 37924. The phone number where I am most readily available is (615) 971-5228. Thank you for taking the time to read and respond to this letter.

Appreciatively,

Moses Goldmon

APPENDIX C

BIBLIOGRAPHY OF STUDIES INCLUDED IN THE ANALYSIS

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VITA

Moses Goldmon was born in Pine Bluff, Arkansas on November 26, 1961. Upon graduation from Pine Bluff High School in 1980, he enrolled at the University of Arkansas at Monticello. He obtained a B.S. in Health and Physical Education in December of 1984.

In January of 1985 he began attending the Iowa State University where he obtained an M.S. in Physical Education with an emphasis in sport management in May 1987. As a graduate teaching assistant at Iowa State, he had an opportunity to teach undergraduate level health courses which stimulated an interest in health education. As a result, he began the pursuit toward a Doctoral degree in Health Education at The University of Tennessee, Knoxville. He obtained the Ed.D. in December 1991.

He is currently employed by the East Tennessee Area Health Education Center, Inc. where he works as an Educational Coordinator. His research interests are in the areas of evaluation, health promotion among underserved populations as well as substance use and abuse.