

## Characteristics of Effective Substance Abuse Prevention Programs for High-Risk Youth<sup>1</sup>

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*The last two decades have witnessed a rapid development of substance abuse prevention programs. Most efforts to evaluate these programs have been limited to single program studies, and nearly all studies involving multiple drug prevention programs have involved school-based programs for general youth populations. In 1995, the Center for Substance Abuse Prevention (CSAP), with the Substance Abuse and Mental Health Administration (SAMHSA), funded the CSAP National Cross-site Evaluation of High Risk Youth Programs, a five-year, multi-site evaluation study involving 46 programs<sup>6</sup> and over 10,500 youth at high risk for substance use (CSAP, 2002(a))<sup>7</sup>. This article reports findings from this evaluation, focusing on program characteristics that help explain reductions in 30-day substance use among program participants. Programs found to be most effective in reducing substance use were those that offered strong behavioral life skills development content, emphasized team-building and interpersonal delivery methods, emphasized introspective learning approaches focusing on self-reflection, were based*

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<sup>6</sup>Forty-eight programs participated in the overall study. When analyzing substance use outcomes, the number of programs is reduced to 46 because two programs were implemented in controlled environments that prevented access to alcohol and other drugs.

<sup>7</sup>Grantees by definition were required to select only youth at risk for substance use into their programs, therefore all study youth are considered to be at risk for substance use. Comparisons of this population with the general youth population as reflected in the National Household Survey on Drug Abuse (NHSDA) show that substance use rates for study youth are significantly higher than the NHSDA sample (CSAP, 2002(b)).

*upon a clearly articulated and coherent program theory, and provided intense contact with youth. Programs utilizing these positive program components produced consistent and lasting reductions in substance use. These findings provide a solid basis for the adoption of positive program characteristics in the development of future prevention programming for high-risk youth.*

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**KEY WORDS:** at-risk youth; substance abuse prevention; effective program characteristics; multi-site evaluation.

## INTRODUCTION

In the last several decades, public agencies and private foundations have supported research that has produced information about the initiation and prevalence of substance use among youth and associated behavioral, social and educational outcomes. Practitioners and researchers have tested strategies and programs that allay the use of substances and support positive youth development. Recognizing the need for prevention programs, they have become concerned about how to make prevention activities as effective as possible for the specific populations that are served. For programs that serve high-risk youth, this is a particularly important point. Most of the available research, especially recent multi-program analyses of effective programs, has focused on programs that target a general youth population, typically in school settings (Tobler et al., 1998; Schaps, 1981; Hansen, 1996; Botvin et al., 1995). Less prevention research has been conducted about the strategies and programs that are effective for reaching youth who are identified as being at risk of becoming substance abusers. More information is needed about prevention programs and strategies that target high-risk youth, and that are implemented in a variety of settings in both schools and the community.

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The National Cross-Site Evaluation of High Risk Youth Programs, conducted by the Center for Substance Abuse Prevention (CSAP) within the Substance Abuse and Mental Health Services Administration (SAMHSA), begins to meet this need for systematic data on effective design and implementation of substance abuse prevention programs serving youth identified as being at high risk for substance use. The findings reported here use information on the relative effectiveness of 46 study programs in preventing substance use among participating youth relative to comparison youth within each site, and detailed information on the prevention strategies delivered to participating youth in each site. The analyses produce statistical findings concerning those program characteristics that are associated with greater prevention effectiveness for youth at risk.

## DEVELOPMENT OF KNOWLEDGE ABOUT EFFECTIVE PREVENTION PROGRAMS

Hansen (1997) suggests that the history of development of prevention program interventions has involved three phases in which the focus of prevention was

increasingly refined. Initially, well-intended efforts by individuals and groups were driven by “common sense, ideology, or intuition.” This phase was followed by a period characterized as “theory-driven” programming, in which program design expressed more clearly articulated and widely shared understandings of how substance use develops in youth and how it may be prevented. The third and current phase is “data-driven” by findings from etiologic research on risk and protective factors for substance use, and increasingly by systematic research on interventions and their effectiveness in preventing substance use. Most programs now focus on producing statistically meaningful changes in two types of variables—mediating variables (e.g., risk and protective factors) that help account for drug use, and drug use outcomes (e.g., delaying drug use initiation and reducing the level of use).

In this data-driven phase, evaluations of individual prevention programs, particularly those with rigorous outcome designs, have supported efforts to identify effective prevention programs and the program characteristics and contextual conditions that contribute to achieving intended outcomes. However, applying the information from one program to another is problematic. Each individual study captures a unique program implemented in a unique set of circumstances. Typically, individual studies do not use similar evaluation designs, do not document the same mediating or final outcomes, do not use consistent categorization of program components, and do not look for similar implementation and design characteristics as explanations of program effectiveness. Researchers and program directors are understandably cautious when it comes to applying findings from an individual program evaluation to another program.

Over the past 15 years, researchers have more effectively synthesized findings of individual program evaluations by conducting multi-program analyses, using advanced methodological procedures such as meta-analysis (Tobler, 2000) and multilevel modeling (Kreft and De Leeuw, 1998). Several findings about effective prevention program characteristics have emerged from these studies. For example, Tobler and her colleagues have conducted three meta-analyses of prevention programs, using individual program evaluations as the primary data source (Tobler, 1986; Tobler and Stratton, 1997; Tobler et al., 2000). Each of the studies found that programs using interactive methods of delivery were more likely to produce intended outcomes than programs using non-interactive methods (i.e., didactic instruction with little student interaction). One of the studies found smaller programs to be more effective than large programs (Tobler and Stratton, 1997). Programs that had system-wide interventions—targeting students, peers, family, schools, and community—were more effective than those targeting only youth. Programs that emphasized comprehensive behavioral life skills and social influences (i.e., peer and social pressures and development of resistance skills) were more effective than others. Hansen (1992), in his review of 45 evaluations of school-based prevention programs, reported that programs emphasizing social influences had positive findings, as did, although to a lesser extent, programs

that used diverse activities and approaches. Both Hansen and Tobler found the least effective programs were knowledge-only programs (programs whose focus was only on teaching youth about substances), affective-only programs (programs that emphasized self-esteem, decision making, values clarification) or combinations of knowledge plus affective strategies (Tobler et al., 2000, Hansen, 1992).

Some studies of multiple school-based drug prevention programs have produced contrary results—findings indicating that even the most successful programs produce fairly small effects. A meta-analysis of smoking prevention programs by Rooney and Murray (1996) found that the average effect size for successful programs reduced student smoking by only 5 percent. In a longitudinal study of programs implemented in 19 school districts, Silvia and Thorne (1997) found that overall the programs had little or no effect on drug use among students. Even the best programs produced only modest positive effects.

P1 Despite the contributions these studies have made to prevention programming, application of the findings is constrained by the homogeneity of setting, and limited application to youth at high-risk. Nearly all multi-site analyses of youth substance abuse prevention programs have used data from school-based programs. Universal school-based programs are not designed for high-risk youth, and effective programming for the general student population may not work for youth who are at risk for developing drug abuse behaviors. Moreover, little has been published on effective characteristics of drug prevention programs for at-risk youth. Based on a review of individual program studies, Kumpfer (1997) suggests that effective selective programs are those that provide longer and more intense interventions than universal programs, and that include activities directly designed to address the identified risk factors and protective factors of the targeted group. Two cross-site evaluations were conducted by CSAP involving the early cohorts of the HRY demonstration programs. However, both of these studies were largely qualitative in nature (Sambrano, Springer, & Hermann, 1997), and neither study assessed program effectiveness using outcome data.

P1 Only a few quantitative multiple program studies have been published that included selected prevention programs for at-risk subgroups. Some selected programs were included in Tobler's initial meta-analysis (1986). These were largely "alternative" programs that provided activities in a drug-free environment (e.g., sports, outdoor activities, theater groups) or developed competence, such as ROPES courses. The analysis found that these alternative programs were highly effective with at-risk adolescents such as juvenile delinquents or students having school problems. One multi-site evaluation of selective in-school programs that used a standard curriculum to enhance social and personal skills through group activities found promising, but mixed results (DeWit et al., 1998). While some positive changes in alcohol use and attitudes toward drug use were realized, the hypothesized mediating variables were not affected by the programs

and the researchers could not attribute the positive outcomes to the program design.

## DATA AND METHOD

Given the lack of information on characteristics of effective programs for high-risk youth, the current CSAP cross-site evaluation of HRY programs provides a unique opportunity to advance our understanding of what works for these youth. In 1995, CSAP initiated this third national evaluation of the HRY demonstrations to assess the projects that were funded in 1994 and 1995 (Sambrano, Springer, & Hermann, 1997). The original pool from which the cross-site programs were selected included 94 funded projects. Projects were excluded from the cross-site sample if they served children primarily under the age of 9 (to help ensure valid and reliable measurement), or, in a few instances, had other program features that precluded conformity to the common cross-site research design. Within these parameters, projects were selected to ensure coverage of all regions of the country and different target populations (e.g., age, gender, and race/ethnic membership). Importantly, no criteria related to quality of intervention design or of implementation plan were applied. The program sample was selected to be representative of the full range of program strategies and capabilities. One of the selected projects was implemented in two distant and distinct locations within a state, and differences in implementation warranted treating each site as separate program. Two programs were implemented in locked facilities so that measurement of substance use at program exit was not a valid measure of program effects. This selection process resulted in a final cross-site sample size of 46 programs.

### Characteristics of Sample Youth

Youth in these programs ranged between the ages of 9 and 18 when they entered the study, reflecting the fact that the prevention programs recruited and served predominantly children of middle school age. This concentration of effort in the middle school years reflects a planned response to the perception that these youth are at a transition point that puts them at particular risk for starting to use substances. Because 19 (40%) of the programs targeted female adolescents, there are many more females (66%) than males (34%) in the total sample. Females are slightly older than males (mean female age = 12.84; male = 12.76). The programs served a diversity of racial/ethnic groups. More than 33% of the youth were African-American, 25% were Hispanic, 10% were Native American, 10% were Asian/Pacific-Islander, and 10% were non-Hispanic White.

## Study Design

The cross-site evaluation design includes several important features: 1) a *common instrument*, the CSAP National Youth Survey<sup>8</sup>, used to collect individual outcome data across all study sites; 2) a viable *comparison group* constituted in each study site to help assess program effects; 3) data collected from 6,031 treatment and 4,579 comparison youth at *four points in time*, including two follow-up points after program exit, allowing identification of longer term program effects; 4) data on *exposure to prevention services* collected for each program participant, and totaling more than 217,000 intervention exposures, that allows assessment of the effects of differential exposure to prevention activities; and 5) data systematically collected on *program-level variables* to assess program characteristics that contribute to effective prevention. The design allows for the effectiveness of programs to be tested through measurement of changes in substance use over time compared to changes in similar youth who did not receive program services. While overall study findings are reported elsewhere (CSAP, 2002a, 2002b, 2002c), this article focuses on determining which program characteristics were most effective in producing positive effects. Findings reported in this paper therefore provide important practical tools for prevention practitioners in the design and implementation of future prevention programs.

## Analytic Procedures

### *Program Level Measures*

**P1** The multi-site evaluation was designed to support the objective of identifying effective program practices. To that end, study methods included systematic collection of information on program organization, content, and implementation. Measurement of program-level variables was guided by a conceptual framework developed early in the design stages of the study. The framework articulated major programmatic areas that have established theoretical relevance for understanding the structure of programs and the strength and quality of implementation (Scheirer, 1987). This framework guided the creation of several data sources that were used to create the summary measures and categorizations of program characteristics used in the analyses for this study.

- *Site Visits.* Standardized site visit data collection instruments focused on four large domains: program strategy, program implementation capacity of the grantee, program dynamics, and the prevention environment in which

<sup>8</sup>The instrument includes measures of risk and protection factors, perceived normative environment, attitudes toward drug use, and self-reported substance use (i.e., lifetime, 30-day, daily), including the use of alcohol, tobacco, inhalants, marijuana, and other drugs.

the program was located. Two- to three-day site visits were conducted with interviews of program directors, grantee administrators, and service staff, as well as observations of program activities. Data for more than 200 indicators were entered into a program-level data base that contained common information on all 46 study sites.

- *Service Dosage Data and Coding Plans.* In addition to data collected on site visits, service dosage data were collected for participants by local data collectors hired at each program site. Data were collected for each intervention in which a youth participated. Each program contact for each participating youth was coded into one of six categories of program content (prevention strategies) and one of four categories of delivery method. These same categories appeared on dosage coding plans developed for each site. The plans described the schedule of services, described the program components, and provided guidelines for coding the content of each program session within the categories of content and the delivery methods.
- *Case Narratives.* Following site visits and a review of the summary protocols, a summary case narrative was developed for each of the sample programs. The narratives used a common outline to systematically and concisely describe the program, including its organizational arrangements, program theory, strategies, methods of service delivery, unique program features, and any implementation issues that might have impacted program delivery (i.e., staff turnover).

The process of reviewing and summarizing these data revealed certain programmatic characteristics that allowed the programs to be grouped or categorized. Program-level measures fell into four areas: program content, program delivery method, service contact, and program structure.

*Program content* is the material substance of the program, or what is sometimes referred to as program strategy. The professional literature suggests that behavioral life skills training (Botvin, et al., 1995; DeWit et al., 1998; Hansen, 1992; Kumpfer, 1997; Tobler, 2000), and competency- building courses (Tobler, 1986) are effective in preventing or reducing substance use. Programs that emphasize anti-drug information/knowledge and affective education (e.g., emotional awareness and self-esteem building) have been found to be less effective (Botvin, 1995; Hansen, 1992; Tobler, 1992). To explore the effects of program content of substance use, the following four program content measures were developed. Each measure differentiates between those programs that emphasized certain content areas and those programs that did not.<sup>9</sup>

<sup>9</sup>Programs were placed in these four measurement categories through the review of data on program interventions and data on the relative amount of contact youth had with each of the intervention types. The measures described the dominant category of programming offered to youth. Behavioral life skills dominant programs are those that focused primarily on targeted skill development, academic

- *Behavioral-life-skills-focused* programs gave emphasis to developing behavioral and social skills thought to protect against substance use, including refusal skills, anger management, conflict resolution, decision making, social skills, and academic enrichment interventions;
- *Knowledge-focused* programs emphasized learning about alcohol, other drugs, and related topics including teen pregnancy, gangs, and HIV/AIDS;
- *Affective-perception-focused* programs stressed self-esteem building; and
- *Recreation-focused* programs devoted substantial time to substance-free leisure and enrichment activities;

*Program delivery method* is the way a program is delivered to youth. Previous research has shown that program that involve active youth participation are more effective than ones in which youth are not interactive (Tobler, 1986; Tobler & Stratton, 1997; Tobler et al., 2000). For this reason, we looked closely at the 31 program with high active participation to see if certain types of program delivery methods contribute to program effectiveness. While many programs offered a mix of both didactic and interactive programming, this measure describes the dominant method used at each program. Programs identified as having *active participation* used methods to encourage youth to play an active role in the intervention services as apposed to didactic instruction. Among the active program, the following two types of delivery methods were identified:

- *Introspective learning* method used self-reflection in the delivery of services; and
- *Connection building* method involved techniques such as team building to help youth connect with others versus individualistic learning approaches.

*Service contact* is the amount of service provided to youth. Service contact, or dosage, is a fundamental program implementation dimension. Very little information is reported in the prevention literature regarding the effects of program dosage on substance abuse behaviors. Kumpfer (1997) argues that intense programs are the most effective, but no data are provided to support the argument. For this study, service contact data were gathered for all participant group youth. Two measures of service contact were developed, including:

- *Amount of contact* is the average number of days that youth received prevention services at each program; and
- *Intensity of contact* is the average number of hours of services per week received by youth at each program.

and vocational support, or positive recreation and enrichment that focused on skill-development (e.g., wilderness adventures, ROPES courses). The exception to this coding decision was in the area of affective self-esteem building programming, which became a new strategy type, in combination with programs that focused on emotional/social support. Knowledge-dominant programming combines the two informational strategy types. Recreational programming then included all non-structured recreation-focused programming.



For each of these measures, the program sample was divided in half using the median score to reflect those programs that were high and low on the measure.

*Program structure* measures describe the degree to which programs are clearly and consistently structured. Two variables were constructed to assess program structure :

- *Program coherence* is the degree to which program implementation was guided by a clear theoretical framework, and
- *Program consistency* is the degree to which programs were implemented at regular and consistent times during the week.

The program sample was split into two groups for each of these measures using the median score to identify programs that were high and low on the variable. The reader is cautioned that these dichotomous categorizations simplify the multidimensional aspects of most of the cross-site programs. However, these simplifications were necessary to understand the major program emphases, and do not change the overall findings or conclusion.

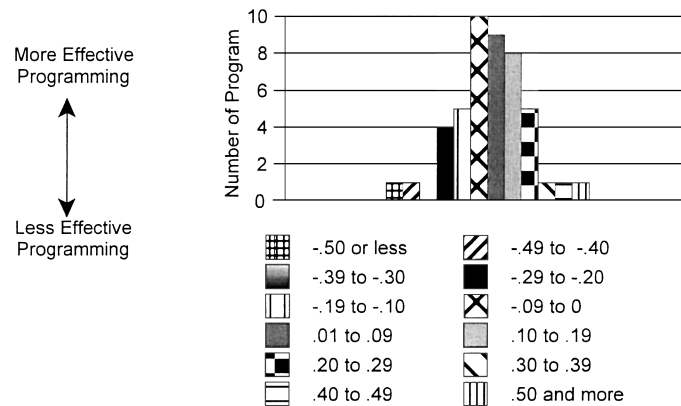
### Outcomes Measures

As with nearly all prevention research, this study relied on a self-report questionnaire to collect outcome data. Among the substance use questions are items that ask about three substances used within the previous 30 days. Youth were asked "How many days in the last 30 days did you smoke a cigarette / have a drink of alcohol / use marijuana?" Responses ranged from 0 to 5 (six response categories). Possible responses included (0) none, (1) 1 or 2, (2) 3 to 5, (3) 6 to 9, (4) 10 to 19, and (5) 20 to 31. Question wording was identical to that used in SAMHSA's National Household Survey on Drug Abuse (NHSDA) and Monitoring the Future, two national surveys of youth that annually assess substance use and other behavioral characteristics. Table I shows that compared to 12–17 year old respondents in the 1998 NHSDA (SAMHSA, 1999), the study sample reported higher rates of 30-day use for each drug at program entry, confirming that the

**Table I.** Comparison of NHSDA and Cross-Site Substance Use for 12- to 17-Year-Old Respondents

Age	30-day cigarette use (%)		30-day alcohol use (%)		30-day marijuana use (%)	
	NHSDA	Cross-site	NHSDA	Cross-site	NHSDA	Cross-site
12–13	8.0	9.6	4.9	11.3	1.7	5.8
14–15	18.2	32.8	20.9	31.2	8.8	27.0
16–17	29.3	51.4	32.0	46.4	14.7	46.7

*Note.* National Household Survey on Drug Abuse (NHSDA) sample size for 12- to 17-year-olds ( $n = 6,778$ ); Cross-site sample size for 12- to 17-year-olds ( $n = 7,245$ ).



**Fig. 1.** Distribution of effect sizes for 30-day substance use across substance abuse prevention programs ( $n = 46$ ).

study programs served youth who were at greater risk for initiating and escalating substance use than youth in the general population.

**30-day use.** A composite 30-day substance use measure was calculated using responses to the cigarette, alcohol, and marijuana questions<sup>10</sup>. The three individual 30-day substance use measures are highly correlated indicating that use of one tends to go with use of the others for adolescents at risk. The reliability of the total 30-day use measure was confirmed through inter-item consistency checks using coefficient alpha ( $\alpha = .72$ ) and confirmatory factor analysis, which showed strong fits between the individual substance use items and the latent 30-day use variable.

For the analyses presented here, meta-analytic procedures were used to measure differences among programs. Meta-analysis is a tool often used in cross-site studies (Tobler et al., 2000) that captures average change over time in a standardized method to allow comparisons across programs. In typical meta-analytic studies, an “effect size” is calculated to measure this change. In this analysis, an effect size was calculated for each program using data collected at baseline and exit measurement points. The effect sizes measured the standardized difference between treatment group change and comparison group change between program entry and exit. Effect sizes were adjusted to account for differential sample size outlined by Becker (1988). For the analyses presented here, effect sizes equal to or greater than .20 were considered to be “meaningful” effect sizes (Cohen, 1988). Fig. 1 shows that the distribution of the effect sizes across programs was fairly normal, ranging from  $-0.70$  to  $1.54$ . The data indicate that there was extreme variability in program outcomes providing an ideal opportunity to examine the

<sup>10</sup>Responses to the three 30-day use questions were summed and divided by three to bring them back to the original scale range. Actual values ranged from 0 to 5.

relationship between program characteristics and effect sizes for this sample of 46 programs.

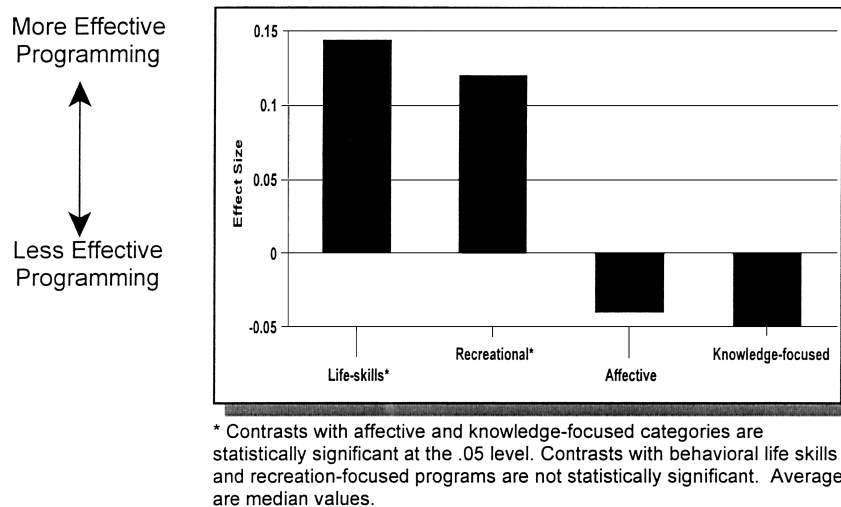
## FINDINGS

The prevention programs in this study varied widely in terms of their organizational setting, service setting, intervention strategies and methods of delivery, and intensity. Two-thirds of the program were held after-school, the remainder during school hours. They ranged in duration between eight week to three-year-long programs, and the focus of their programming ranged from highly didactic to highly interactive programming, with interventions varying in focus from substance use information, social skills building, mentoring, recreation, and academic and vocational support. This variance, coupled with a very substantial sample size of programs, provides an excellent opportunity to explore those program characteristics that were most effective in reducing substance use among high-risk adolescents.

### Effects of Program Content

The participating study sites used an array of program designs with different emphases and learning methods. Programs were clustered according to four groups; behavioral life skills dominant, affective, recreational, and knowledge-focused programming. Comparisons between the effect sizes for each of these clusters are presented in Fig. 2. The figure clearly indicates that the primary content strategies of programs did make a difference. Programs that focused on delivering behavioral life skills programming ( $n = 14$ ) were significantly more effective than affective ( $n = 12$ ) and knowledge-focused ( $n = 17$ ) programs, with recreation programs ( $n = 5$ ) the second most effective.<sup>11</sup> Differences in effectiveness of behavioral life-skills programs and recreation programs were not statistically significant. These findings support prior meta-analytic research on prevention strategies for youth (Tobler et al., 2000) that showed that behavioral life-skills-oriented programs were more effective than affectively-oriented programs and those that focused on providing substance use information only. Importantly, this study has confirmed these findings for a large number of programs targeting *high-risk youth*.

<sup>11</sup> Conducting statistical tests of differences between program effects required us to make decisions between the use of parametric and non-parametric tests to assess differences in outcomes across programs. Given the presence of two outliers ( $-0.70$  and  $1.54$ ), the uncertainty in the level of measurement warranted by the effect size, and the fact that parallel non-parametric and parametric analyses yielded no differences in the pattern of significant effects, the more conservative Wilcoxon non-parametric test is reported. The median is reported as a non-parametric measure of central tendency.

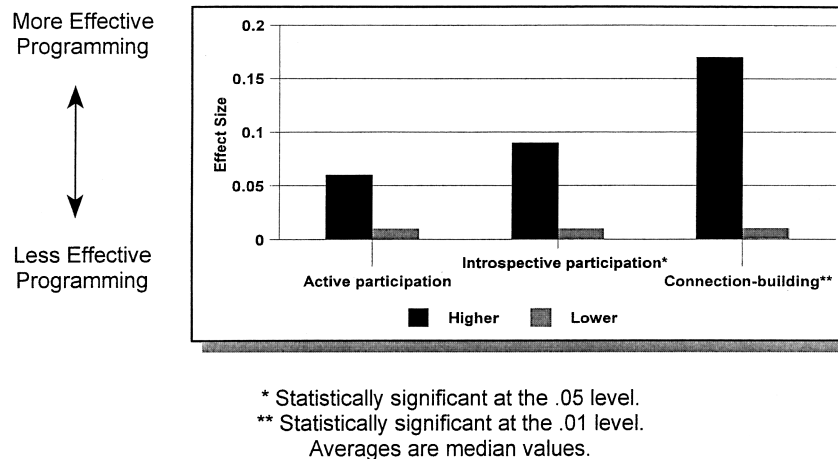


**Fig. 2.** Average effects on 30-day use by program content ( $N = 46$ ).

### Effects of Delivery Method

Information about the cross-site evaluation programs showed that the same program content may be delivered in different ways. Messages about how to resolve conflict, for example may be delivered through lectures in which the participant is largely a passive recipient, or in more experiential methods such as role plays. Past studies have pointed to the method of service delivery as an important factor in the effectiveness of prevention programming. In particular, delivery methods that are more experiential have been shown to be more effective than didactic teaching or adult-led techniques (Hansen, 1992; Tobler, 1986; Tobler & Stratton, 1997; Tobler et al., 2000).

The study programs ranged in delivery method from primarily classroom-style, didactic programming in which youth received information through lectures, videos or other similar means, to interactive and experiential programming where youth were required to actively participate, reflect on the subject at hand, and act upon it. Typically, experiential programming included role play activities, team-building projects, outdoor wilderness experiences, or other activities that require youth to be actively engaged. While the desirability of experiential programming as a prevention tool has been consistently supported in recent prevention research, the understanding of exactly what constitutes effective experiential programming, or why it is more effective, has not been clearly developed. The richness of the information on the National Cross-Site Evaluation program interventions allows a more in-depth exploration of the nature of experiential programming and why it is effective. Specifically, three dimensions of experiential delivery methods were



**Fig. 3.** Average effects on 30-day use for delivery method measures ( $N = 46$ ).

identified. These measures include (1) the degree of active participation required; (2) the degree of introspection (self-examination) required; and (3) the amount of emphasis placed on connection-building. These three concepts help to elaborate experiential programming, and to understand why it is an important component of effective prevention programs.

Each of the dimensions articulated above represents an elaboration of the ways in which youth may interact with peers and leaders within their programs. Figure 3 presents median effect sizes for 30-day substance use within programs that are higher and lower on each of these dimensions. The programs that emphasized connection-building ( $n = 13$ ) had significantly higher effect sizes than programs that focused on individually-oriented strategies and activities ( $n = 18$ ). The extent to which programs helped youth understand their own orientations and behaviors was also important, with significantly higher effects for programs that were oriented toward introspective activities. Active participation was less influential, although patterns of effect sizes for youth in programs with active rather than passive activities suggests that these programs were more effective than programs with a more passive orientation. In sum, programs that actively engage youth in thought-provoking and meaningful activities that encourage building positive connections to peers or adults are most likely to produce positive effects.

The analysis also explored the degree to which the elements of positive program design reinforce each other. For this analysis, a combined measure of all three types of interactive programming was used.<sup>12</sup> When both program content

<sup>12</sup>Interitem consistency analysis of these three measures yielded an alpha coefficient of .79.

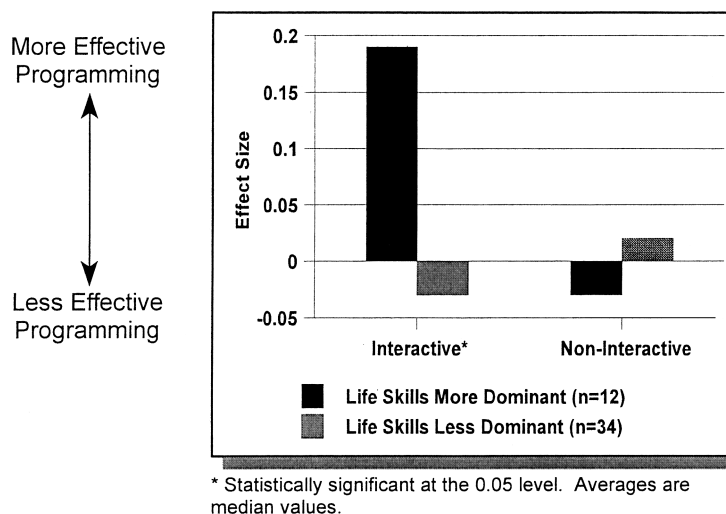
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and method of delivery are considered, programs with both a behavioral life skills orientation and interactive methods are significantly more effective than other programs. The median effect sizes for programs characterized by both behavioral life skills programming and interactive delivery are significantly higher than those for programs that combine non-interactive methods with behavioral life skills development (see Fig. 4). In short, programs that engage at-risk youth experientially in skills-development activities have the greatest impact on reducing substance use.

### Effects of Service Contact

If program activities are to make a difference in the lives of youth, they must be organized and delivered so that youth participate sufficiently to benefit. Programs that do not provide a sufficient dose of service presumably cannot influence youth. For the following analyses, three measures of contact that youth had with their program are used. First, is the total amount of contact (number of hours), next is the length of time in the program, and last is the intensity of contact, or the number of hours per week.

The study collected individual program contact data on each participating youth. For each of the program interventions, the amount of service received was recorded for every day that the youth participated. Data were then aggregated to compare the amount of service provided, the length of time in program and the

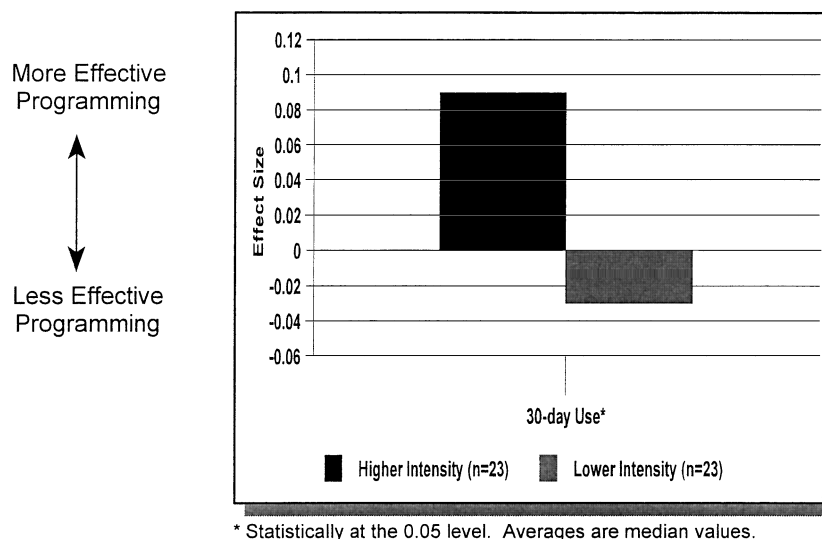


**Fig. 4.** Average effects on 30-day substance use by interactive and behavioral life skills focus ( $N = 46$ ).

average intensity (measured in hours per week) across programs. Analyses of the amount of program contact and program length showed no statistically significant results. However, program intensity, as measured by the number of hours of contact per week of programming, had a significant relationship with reduced substance use. The diversity of programming in the cross-site sample produced programs ranging from those offering an average of less than one hour of service per week, to those offering 15 hours of service. Figure 5 displays the differences in effect sizes at program sites with high and low amounts of intensity by the major outcome variables. Programs were divided into two equal groups, higher intensity (3.3 hours per week or more) and lower intensity (less than 3.3 hours per week). More intense programs were significantly more effective in changing 30-day substance use patterns.

### Effects of Program Structure

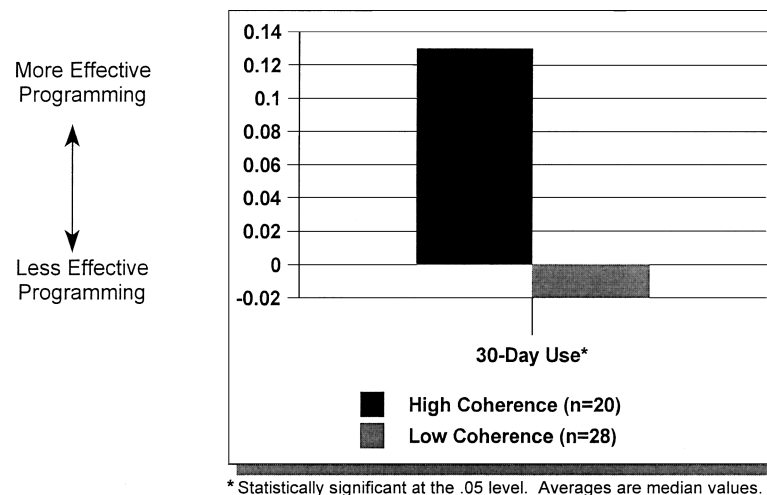
Prevention programs vary in their degree of explicit rationale and organization to accomplish defined outcomes. Indeed, one of the objectives of CSAP grant funding procedures has been to increase this explicit program structuring through the use of logic models and similar tools. Next, we consider the impact of two types of structuring on program effectiveness—coherence and consistency. Coherence relates to conceptual organization and rationale, and consistency relates to the clear structuring of program time and schedule.



**Fig. 5.** Average effects on 30-day substance use by program intensity ( $N = 46$ ).

As noted by Hansen (1997), most prevention programs are fashioned by practitioners who construct “bundles” of programming that are pulled into programs for a variety of reasons based on preference, availability, or belief, as well as positive merit. Here, the measure of program coherence refers to the extent to which program theory was explicit, articulated, and used to focus multiple activities on program objectives. Some programs had a concrete theoretical framework and guiding principles that were understood and followed by all service deliverers. Other programs were more loosely structured where staff work independently from one another with no central guiding theory or method. Analysis of the site visit data allowed us to categorize the programs as exhibiting higher ( $n = 20$ ) or lower ( $n = 28$ ) coherence in their program rationale and activities. As shown in Fig. 6, programs structured by a clear purpose and strategy were more effective in changing substance use patterns than less coherent programs.

Consistency and the degree of clarity in program structure varied widely across the study programs. A number of the programs met after school on a regular basis, and were organized with consistent activities that included skill development, homework assistance or tutoring, and/or recreational activities. In-school programs often included weekly or biweekly programming during class hours. Other programs, however, were more loosely structured. For example, they might have been organized around services with a loose case management format, where youth would meet with staff on a periodic basis, but in an unstructured format with less consistency than regularly-scheduled after-school or in-school programs. The



**Fig. 6.** Average effects on 30-day substance use for programs with high and low coherence ( $N = 46$ ).



analysis showed that there were no statistically significant differences between the more and less consistent programs for any of the outcome variables.

Although program consistency by itself does not contribute to program success, an interesting pattern emerges when consistency and coherence are combined. As shown in Fig. 7, programs that were both more coherent *and* more consistent were more likely to be effective than other programs, particularly compared to programs with both minimal coherence and consistency.

The pattern of program effects displayed in Fig. 7 has two implications. First, coherence of program theory and activities is not the same as consistency in organization and schedule. Programs high on one dimension are often low in the other. Second, each quality contributes to effectiveness. When both are present, programs are most effective.

### Analysis of Programs With Multiple Positive Program Components

This evaluation has identified five program characteristics that produced statistically significant improvements in the degree to which programs achieved reductions in the rate of substance use by participants relative to comparison youth in each site. These five program characteristics include: 1) programming emphasizing the promotion of behavioral life skills; 2) programs emphasizing strengthening connectedness to positive peers and adults through team and interpersonal activities; 3) programs with a clearly articulated and coherent prevention

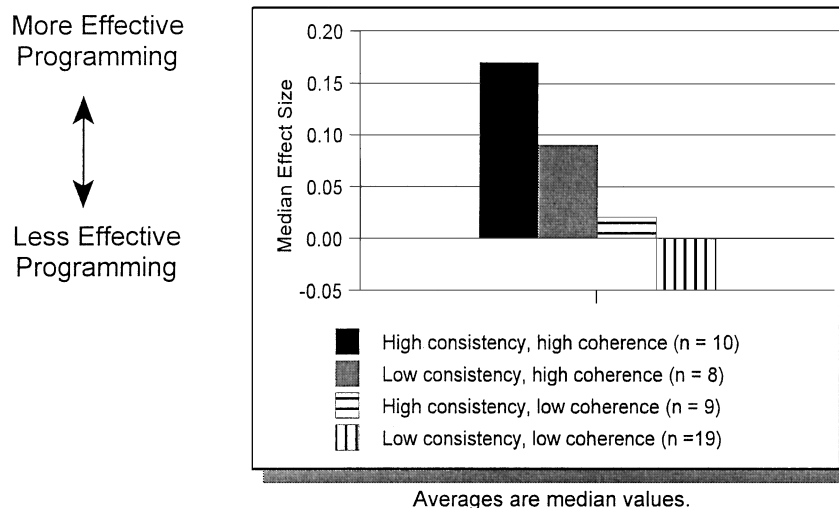


Fig. 7. Average effects on 30-day use measures by consistency and coherence ( $N = 46$ ).

**Table II.** Correlation of Program-Level Measures (Phi coefficient) ( $N = 46$ )

	Life skills	Intensity	Connection-building	Introspection	Coherence
Life skills	1.0				
Intensity	0.183	1.0			
Connection-building	0.228	0.234	1.0		
Introspection	0.260	0.086	0.690**	1.0	
Coherence	0.266	0.042	0.219	0.531**	1.0

\*\*Correlation is significant at the 0.01 level (two-tailed).

theory; 4) programs emphasizing introspective learning approaches that encourage youth to use self-reflection in examining their behaviors; and 5) programs with intense contact. Table II displays the correlations of these measures, summarizing the degree to which a program implementing one characteristic also implements the others.

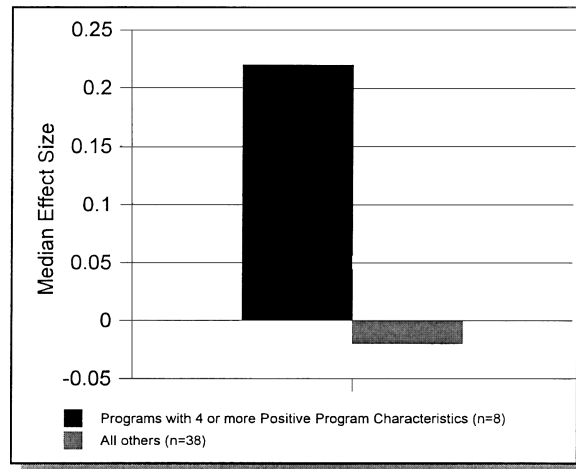
Correlations between most program-level measures were low to moderate, indicating that for the most part positive characteristics do not cluster in the same programs. The use of introspective learning is the major exception. Of the 18 programs characterized by introspective learning, twelve were also characterized by a team-building orientation, and 14 were classified as coherent. This co-occurrence would make it difficult to establish the independent contribution of these variables to program effectiveness. However, additional analyses were conducted to determine whether programs that implemented combinations of more than one positive characteristic realized further increases in effectiveness. These analyses identified a clear increment in effectiveness when programs implemented four or five of the positive program characteristics. The exact combination did not make a significant difference. Eight of the 46 programs were identified as comprehensively strong programs implementing at least four of the five positive characteristics. Figure 8 compares the median effect sizes for these eight programs with the remaining 38 programs. The difference in effect size is 0.24, with positive programs yielding a "meaningful" average effect size of .22 and all others yielding an average effect size of  $-0.02$ . This difference is highly statistically significant.

To this point, the analysis of program effectiveness has been based on program effect sizes calculated for the period between program entry and exit. These findings are comparable to meta-analytic studies based on program effect sizes. An advantage of the National Cross-Site Evaluation of High-Risk Youth Programs data set is that it allows the determining of whether the effectiveness of the eight comprehensively strong programs is maintained after program exit. The study includes six and 18-month follow up data points.

Figure 9 presents growth curves contrasting trends in substance use for HRY program participants and comparison youth in the total program sample and in the eight comprehensively strong programs. The curves were generated through hierarchical linear modeling analysis which is appropriate to these multisite data

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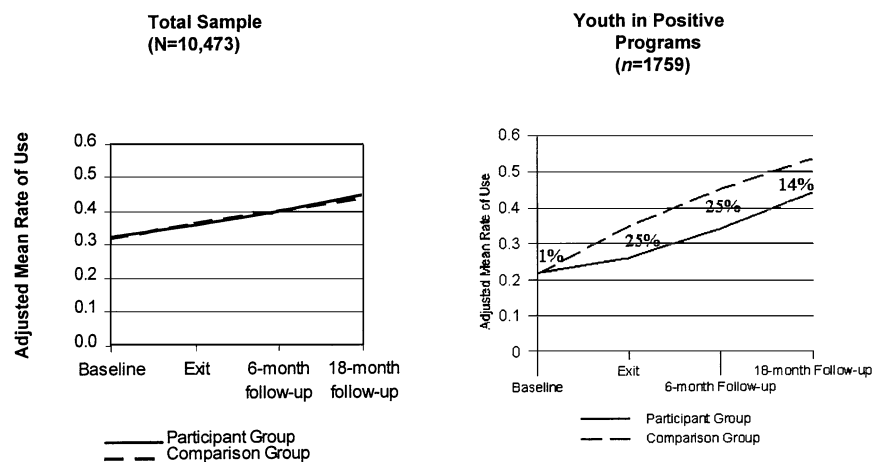
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\* Statistically significant at the .001 level. Averages are median values.

**Fig. 8.** Average effects for comprehensively strong programs and all other programs ( $N = 46$ ).

(Bryk and Raudenbush, 2000). These longitudinal findings support and extend the effect size analysis reported above. The figure demonstrates there are dramatic differences between the findings for the total sample and findings for the eight programs with at least four positive program characteristics. While over-time differences in substance use change between intervention and comparison group



**Fig. 9.** Trends in 30-day substance use.

youth were negligible in the full sample, differences between the intervention and comparison youth in the eight program cluster were pronounced and statistically significant. Even 18 months after program exit, use rates for the intervention youth were significantly lower than use rates of comparison youth, demonstrating enduring prevention effectiveness.

## DISCUSSION

The findings from the CSAP National Cross-Site Evaluation of High-Risk Youth Programs has generated valuable knowledge for the design and implementation of effective prevention for youth at high risk. The following points highlight major findings and implications for prevention programming for selected populations.

- *Program Content.* Program content is critical to improving adolescent behaviors. Programs with strong *behavioral life skills* programming were clearly more effective than programs emphasizing other content in changing substance use and school connectedness. Recreation-focused programs also demonstrated patterns of positive effect, though the number of programs was small. Programs that focused on providing information about cigarette, alcohol, and other drugs were significantly less effective. Research on the effectiveness of the information-only approach has demonstrated that while these programs may improve knowledge related to alcohol and drug use and have slight effects on attitudes toward use, they have little effect on actual behaviors. (Berberian et al., 1976; Botvin, 1986; Braucht et al., 1973; Brown & Caston, 1995; Dielman, 1994; Goodstadt, 1974; Schap et al., 1981; Swisher and Hoffman, 1975; Tobler, 1986) Despite an abundance of research indicating that this approach is ineffective, many prevention programs continue to provide ATOD information to youth, and many of the programs in the cross-site evaluation utilize this approach as part of their service delivery. However, its effectiveness when combined with other intervention strategies has not been assessed. The weakness of knowledge-only and affective programming has been long recognized in prevention research (Tobler et al., 2000), and is confirmed again in this study of programs serving youth at high risk.

Future program development must focus on behavioral life skills and positive alternative approaches. Prevention program designers and implementors should de-emphasize activities that focus on information about drugs and their harmful effects, or on attitudes toward substance use. Programs should be designed to include activities that develop and strengthen behavioral life skills, such as refusal skill-building, anger management, conflict resolution, social skills, and academics.

- *Program Delivery Method.* The findings confirm and elaborate the importance of the way in which prevention messages and lessons are conveyed in programs. Clearly, as demonstrated in other research and reiterated here, effective programming must use *interactive* rather than passive, classroom style learning methods (Tobler, 1986; Tobler & Stratton, 1997; Tobler et al., 2000). Furthermore, techniques that focus on building positive connectedness with peers or supportive adults, and methods that encourage youth to think through their own positions and circumstances are promising.

Effective interactive activities should be a focus of future program development. Programs should be designed to actively engage youth in thought provoking and meaningful activities that encourage team-building. Program planners should avoid didactic activities in which youth “receive” information through lectures, videos or other similar means. Classroom style approaches where youth work individually on activities should be de-emphasized.

- *Program Coherence.* Programs with *coherent program theory* that includes clear links between outcome objectives and program activities are more effective than programs with less clearly articulated theory. The positive outcomes of coherent programming are enhanced by consistent well-organized schedules of activity. These findings suggest that CSAP’s emphasis on positive programming has improved program effectiveness and should be a continuing focus in planning and implementing prevention programs.
- *Contact with Youth.* Programs with more *intense contact* (i.e., more hours per week) achieved more positive outcomes. Program planners should design programs that provide at least four or more hours of service per week.
- *Analyses of Positive Programs.* The influence of the positive program characteristics on outcomes was substantiated in a comparison of findings between the more positive programs and other programs. Programs with more positive program components were significantly more likely to positively impact substance use patterns than other programs. Not only were these findings supported in an analysis of change between program entry and exit, but they were also extended to the 18-month follow-up period of the study.

## CONCLUSION

Through identifying the design and implementation features that characterize more effective prevention programming in real community settings, these findings begin to unravel the complex knot of interconnected influences of setting,

organization, and program design that can strengthen or diminish program effects. They also begin to provide important concrete guidance concerning what elements of design or implementation are important to achieve intended effects within a particular setting. Furthermore, they substantiate research on positive programming with a large sample of high-risk youth. There are clearly programmatic approaches to addressing substance abuse among high-risk adolescents that are more effective than others. Programs that adopt positive prevention principles are significantly more likely to have been effective in reducing substance use than other programs among high-risk youth and these effects are long lasting. For practitioners and policy makers seeking guidance as to how to design and implement effective prevention programs, these findings provide an important resource to the practice of positive prevention.

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