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Results of a 3-Year Study of Two Methods of Delivery of Life Skills Training

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Model programs and standards for substance abuse prevention have been identified by a number of federal agencies. The study reported here assessed two methods of delivery of one such program, Life Skills Training (LST), implemented in nine rural disadvantaged school districts. The results indicate that neither standard LST nor an infused LST delivery method was found effective for the entire sample, although some encouraging results were found for the females in the study. This study, conducted by researchers independent of the LST program, is useful for school decision makers in determining what programs are most effective with which groups. It included all students with parental permission, controlling for prior use levels, unlike some previous LST studies. The results of the program, as implemented by regular classroom teachers, reflect many issues relevant to recruitment, training, implementation, adaptation, and institutionalization of prevention programming.

Keywords: prevention results; Life Skills Training; evaluation

Despite federal expenditures in excess of $2.5 billion per year in the past 2 years for drug abuse prevention and prevention research, substance use by children and adolescents continues to be a major concern in the United States (U.S. Department of Justice, 2003). In recent years, prevention funding has focused its efforts on “model” programs, as defined by agencies such as the National Institute on Drug Abuse (2003) and the Substance Abuse and Mental Health Services Administration (SAMHSA, 2003), to ensure that the funding is spent on programs that are proven effective. SAMHSA, for example, highlights “science-based” prevention programs, such as “conceptually sound and internally consistent, program activities related to conceptualization, [and] reasonably well implemented and evaluated,” and places them into three categories: promising, effective,
and model (SAMHSA, 2003). For a prevention program to achieve model status, the National Registry of Effective Programs (NREP) must evaluate them and developers must agree to provide SAMHSA with materials, training, and technical assistance for nationwide implementation (SAMHSA, 2003).

The U.S. Department of Education strongly suggests that school districts that receive Safe and Drug Free Schools and Communities federal funding implement proven effective curricula (U.S. Department of Education, 2003). Several additional federal- or foundation-sponsored registries recommend effective programming, including the Centers for Disease Control and Prevention (CDC, 1994) and Drug Strategies (1999).

One of the best known of the recommended model programs is Life Skills Training (LST; Botvin, Baker, Dusenbury, Botvin, & Diaz, 1995), which targets the risk and protective factors of drug use by promoting social skills, personal self-management skills, and drug resistance skills. Botvin’s research team has studied the effectiveness of LST for more than 20 years. Because LST first began as a tobacco prevention program and, therefore, initial studies focused on this particular issue, the most commonly reported effect has been the reduction of cigarette use (Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990). Botvin and Tortu (1988) noted lower rates of cigarette use within LST samples as compared to control groups among varied populations (White, Hispanic, and African American youth; suburban and urban), and with different treatment conditions (traditional LST, LST taught by peer leaders, LST with and without booster sessions, and implementation with different time schedules) (Botvin & Kantor, 2000).

Several studies found a reduction in alcohol use among both White and minority youth (Botvin & Kantor, 2000). Two studies found stronger alcohol prevention effects for youth who received LST from older peer leaders (Botvin, Baker, Botvin, Filazzola, & Millman, 1984) and for those in a high implementation fidelity group (Botvin, Dusenbury, et al., 1992). In addition, Botvin, Schinke, Epstein, and Diaz (1994) found, in a 2-year follow-up with minority youth, that both those who received the traditional LST or a culturally focused LST had lower alcohol use rates than youth in the control group. LST also lowered marijuana use rates in two studies, but only for those students who received the program from peers (Botvin, Baker, Renick, Filazzola, & Botvin, 1984) or in a high implementation fidelity group (Botvin et al., 1995). A subsample follow-up of a study by Botvin, Botvin, Baker, Dusenbury, and Goldberg (1992), conducted 6 ½ years after the baseline survey, found less illicit drug use in the LST group than in the control group, and Botvin, Baker, Dusenbury, Botvin, and Diaz (1995) reported that minority youth in the LST group indicated a lower intention to use illicit drugs than those in the control group.

Some of these research findings have faced criticism. First, the research team’s choice to eliminate participants from their analysis based on fidelity of program implementation has been questioned (Gorman, 2002). Gorman argues that this practice may introduce bias, as those adolescents in the high fidelity group may differ in salient ways from the rest of the sample. In addition, one of the longitudinal studies that found LST effects 6 ½ years after program implementation (Botvin et al., 2000) only surveyed 7.5% of the original sample. LST also has been criticized for not being evaluated by independent researchers (although one other independent study from Spoth, Randall, Shin, & Redmond [2005] has been recently published).

In addition to the adoption of model programs, a further issue related to substance use prevention programming concerns institutionalization of the programs over time. Purchased program materials are often adapted and not used in the time frame and design demonstrated as effective. Thus, fidelity of implementation poses a major concern when using model programs. In addition, schools are frequently asked to purchase updated ver-
sions of the materials, an ongoing expense often eliminated in tight budget times. Therefore, as a method of assuring widespread program implementation and institutionalization, it has been suggested that more of the teaching staff should participate in prevention efforts. This would eliminate the perception of these programs being seen as a “time-out for prevention” by a selected health teacher. In effect, life skills should be seen as part of the entire educational process and, thus, shared in their implementation across the curriculum and teaching staff.

The study reported here, the Adoption of Drug Abuse Prevention Training (ADAPT), was designed to compare the effectiveness of two methods of delivery of LST while addressing several of the concerns and criticisms with regard to LST. First, an independent team of researchers evaluated the results of the standard 3-year LST program implemented in three randomly assigned rural, low-income small school districts. In addition, an alternate program delivery method was evaluated—an infused-LST (I-LST) approach that was conducted in three additional randomly assigned school districts, from a pool of similar schools. I-LST included the same content components but was integrated by the teachers into the regular middle/junior high school subjects’ curricula. Three additional districts were assigned to a no-treatment control condition. Finally, the analyses included all students with parental permission in the study schools; no students in the treatment conditions were dropped for fidelity/dosage reasons. In addition, the analyses did not exclude students based on their initial levels of substance use. Rather, initial substance use levels were included as covariates in relevant analyses.

**METHOD**

The ADAPT Project was a prospective, group-randomized prevention trial at the middle-school level, using two LST program delivery methods (National Institute on Drug Abuse Grant #DA11254). The participating districts reflect many rural areas in the United States, with students at high risk for problem behaviors but lacking many community protective factors (Center on Addiction and Substance Abuse, 2000; Spoth, Goldberg, Neppl, Trudeau, & Ramisetty-Mikler, 2001). Substance use in such areas is increasingly recognized as a serious problem and this study attempted to determine if a model program would be effective in such a setting, and through which delivery method. These districts were unique in the literature relative to their size, location, and economic status.

School district selection criteria for the study focused on two main characteristics: low socioeconomic status, as indicated by a minimum of one third of the student body in the school district qualifying to receive free or reduced lunch; and relatively small size, as indicated by a school district enrollment of less than 1,000, and only one middle school per district. After selecting very similar districts based on these characteristics, these schools were then randomly assigned to one of three conditions: standard LST, I-LST, or no treatment control.

**Intervention Description**

This study tested the effectiveness of both the standard LST curriculum and an infused approach to teaching the constructs included in LST. In contrast to LST, which is usually taught by one or two teachers in classes dedicated to substance use prevention, the I-LST condition integrates LST and alcohol, tobacco, and other drug (ATOD) information into
the existing grade-level subject curricula, taught by the regular teachers for these subject areas. This format achieves disparate learning objectives simultaneously, that of the subject and that of Life Skills. In this way, more teachers can provide the LST lessons, allowing for repeated exposure to the constructs in a variety of topics and eliminating the necessity for time set aside for prevention in an already overburdened curriculum.

In the LST schools, teachers received training in the approach by a trainer from Princeton Health Press, the commercial enterprise responsible for supporting the LST curriculum. In the I-LST schools, teachers received training by members of the ADAPT staff who were prepared in these methods by the Princeton Health Press LST staff.

During the I-LST teacher training sessions, the participating teachers were assisted in developing a matrix of LST principles that was then mapped onto curricular content areas. This exercise assured the exposure of the I-LST students to all the program components (see Swisher, Bechtel, Henry, Vicary, & Smith, 2001, and Karshin, Henry, Luppino, et al., 2001, for further discussion of the training procedures). I-LST teachers then generated subject-specific lessons that integrated the LST principals and methods. In the LST condition, health teachers learned how to use Botvin’s materials and methods, without modifications.

The intervention process and dosage are thus different for the two program conditions. The standard LST curriculum includes 15 lessons in the 1st year (7th grade), 10 in the 2nd year (8th grade), and 5 to 7 in the 3rd year (9th grade). Although the focus of these lessons changes across the 3 years, the core components (listed in order of curriculum presentation) include self-image and self-improvement; decision making; smoking, marijuana, and alcohol myths and realities; smoking and biofeedback; advertising awareness; coping with anxiety; communication skills; social skills; and assertiveness. The I-LST curriculum had no set number of lessons but instead assisted teachers in seeing that all LST core components were taught to each student in at least one subject area in each school year. In the schools in the LST condition, an average of 90% of the lessons were delivered. In the I-LST condition, there was an average of 48 lessons delivered per school, covering 95% of the LST topics. In both conditions, the LST curriculum was considered part of the school curriculum, hence mandating student participation. Comparison schools did not receive any project programming (LST or I-LST) until after the 7th-grade cohort reached 10th grade, although their general health curriculum included some drug and alcohol information. Interviews with control school administrators indicated that there were no special prevention programs being offered in those schools.

Teacher self-rating forms, completed after each lesson, helped monitor implementation fidelity and student “dosage.” On average, students participated in 81% of the lessons in the LST schools and 84% of the lessons in the I-LST schools, reflecting the average attendance pattern of approximately 93% attendance per day.

Sample

The analyses examined questionnaire data over the course of the study from the 234 students in the LST condition (108 females, 126 males), the 297 students in the I-LST condition (128 females, 169 males), and the 201 students in the control condition (98 females, 103 males) who gave active parental and student permission. Sixty-eight percent of LST students, 71% of I-LST students, and 72% of control students completed the questionnaires. The sample was 54.4% male and 96.6% White.

Twenty-seven percent of students did not have parental permission to participate in the questionnaire. Based on prior analyses, it is evident that the sample obtained with active
parental consent represents students less at-risk for problem behaviors than would have been obtained under passive consent procedures (Henry, Smith, & Hopkins, 2002). However, they are not disproportionate across conditions, and therefore, this does not affect our ability to detect differences across the groups with consent.

At baseline (T1), 32.5% of the total sample qualified for free or reduced lunch; however, this percentage differed significantly across treatment condition. There were also some baseline differences in substance use, incidence of problem behaviors, and several prevention skills. By the time these differences were known, the schools had already been assigned to their respective conditions and programming had begun. Analyses therefore control for these variables where relevant, along with baseline values of all variables examined in the models.

Test Occasions

Participating students in the nine school districts were surveyed a total of four times: T1 represents the preintervention questionnaire at the beginning of seventh grade; researchers administered the second questionnaire (T2) at the end of seventh grade, the third questionnaire (T3) at the end of eighth grade, and the final questionnaire (T4) at the end of the participants’ ninth-grade year.

The University Institutional Review Board and the respective school districts approved the protocol for the study. Trained project staff members administered the questionnaires during one regular 40-minute class period. They stressed the confidential nature of the questionnaires to the participants both in writing and orally at the time of data collection. No classroom teachers were present during the questionnaire administration, and students who did not have parental consent were excused to a study hall during this time. The paper-and-pencil questionnaires assessed students’ behavior, skills, beliefs, attitudes, and knowledge, as well as background characteristics.

Fidelity

ADAPT made every effort in this project to ensure the LST program was delivered as designed. The initial LST training was provided by LST-trained Princeton Health Press staff, and ADAPT staff also participated in that cycle to provide training in subsequent years. In addition, the design of the I-LST teacher training assured the inclusion of all program components in the regular school curricula for all students. It became clear, however, that without constant staff monitoring, other priorities, school processes, individual attitudes, and lack of administration support could derail the most well-planned program implementation. Program fidelity was more easily assured with the standard, well-planned LST lessons, yet even with those teachers, other issues could intervene.

The ADAPT research team made extensive efforts to provide assistance and resources to the teachers in both programs, including a dedicated list service to assist when questions or concerns arose. No teachers chose to use this service, making it clear that such help would not be used and the service was discontinued. The ADAPT teacher coordinator, himself a former principal in the same geographic area, called or stopped by each school on a regular basis. However, he spent the majority of his time with teachers on logistics issues, such as arranging classroom observations and asking for the completed lesson plans, rather than being asked to provide technical assistance or discuss student reactions and teachers’ experiences. The project also collected lesson plans and, after
review, made suggestions to the teachers when necessary to help them better achieve the dual objectives, an additional effort to assure program fidelity.

**Measures**

All outcome measures were designed to replicate the measures used in previous research on LST to assure comparability of results (Botvin, Batson, Witts-Vitale, et al., 1989; Epstein, Botvin, Diaz, Baker, et al., 1997).

**Substance Use.** Students self-reported their cigarette, alcohol (including frequency of use, frequency of drunkenness, and frequency of binge drinking), and marijuana use. The item responses included 1 (*never*), 2 (*a few times, but not in the past year*), 3 (*a few times per year*), 4 (*once per month*), 5 (*a few times per month*), 6 (*once per week*), 7 (*a few times per week*), 8 (*once per day*), and 9 (*more than once per day*). Students’ scores on the analyzed variables combined responses of 1 and 2, and subtracted 1 from each participant’s response to allow the intercept of the tested models to be more meaningful (i.e., to have 0 represent no use).

The answer categories 1 and 2 were combined due to the inconsistent responses that students gave across the three time points. For example, a few students indicated at the end of the eighth grade that they had “never” drunk alcohol, but at the beginning of the seventh grade indicated “a few times but not in the past year.” Similarly, a few students indicated at the end of eighth grade that they had drunk alcohol “a few times but not in the past year,” but at the end of the ninth grade indicated “never.” In both instances, these answers, if interpreted literally, are illegal responses. These inconsistent responses had to be reconciled by either recoding one of the responses or combining the two answer categories. By combining the two answer categories, these analyses effectively define users of all substances to be those who have used in the past year. The number of students recoded in this manner was 17; analyses conducted without these students did not change the results.

**Skills.** The communication skills measure was made up of six items assessing the adolescent’s ability to communicate effectively, including items such as, “When I want people to understand me I talk in a way that is clear and specific.” The items were measured on a scale from 1 (*never*) to 5 (*always*) and had a Cronbach’s alpha of .81 (T1), .85 (T2), .86 (T3), and .89 (T4). The decision-making skills measure used five items assessing the adolescent’s ability to follow a logical decision-making strategy (get the information needed to make the best choice, make the best choice, and then do it, etc.). The items were measured on a scale from 1 (*never*) to 5 (*always*) and had a Cronbach’s alpha of .86 (T1), .87 (T2), .87 (T3), and .92 (T4). Refusal skills assessed the likelihood of declining an ATOD offer using five items scaled from 1 (*definitely would not*) to 5 (*definitely would*). Cronbach’s alpha for the scale was .76 (T1), .82 (T2), .86 (T3), and .88 (T4). Five items assessed media awareness and resistance skills by representing the student’s ability to rationalize media messages and avoid undue influence. These items were measured on a scale from 1 (*never*) to 5 (*always*) and examples included, “When I see or hear an advertisement I tell myself that advertisements aren’t always truthful.” Cronbach’s alpha for the scale was .79 (T1), .80 (T2), .81 (T3), and .88 (T4). The assertiveness skills measure was made up of five items assessing the adolescent’s likelihood of demonstrating assertive behavior in various common situations. The items were measured on a scale from 1 (*definitely would*) to 5 (*definitely would not*) and the scale demonstrated a Cronbach’s al-
pha of .76 (T1), .82 (T2), .83 (T3), and .81 (T4). The coping with anxiety construct employed an index score that represented the number of coping skills that an adolescent uses to deal with anxiety (relax the muscles in my body, tell myself to feel calm and confident, etc.). The items were originally taken from a scale developed by Botvin et al.; however, due to an extremely low Cronbach’s alpha in the sample, the items needed to be used as an index rather than a scale.

Norms, Attitudes, and Knowledge. The normative beliefs of peer substance use measure used five items and allowed the adolescents to indicate the number of people their age they believe use various substances. The items were scaled from 1 (none) to 5 (all or almost all), and the measure demonstrated a Cronbach’s alpha of .86 (T1), .81 (T2), .82 (T3), and .81 (T4). The attitude toward ATOD use measure included 10 items that explored the adolescent’s perception of the benefits of ATOD (fun, coping strategy, more friends). The items were measured on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Cronbach’s alpha for the scale across the four measurement waves was .92 (T1), .94 (T2), .95 (T3), and .95 (T4). Knowledge about ATOD represented 14 questions assessing the adolescent’s knowledge of ATOD (e.g., correct adult and peer use levels, myths about ATOD, physiological effects of ATOD). Students answered all questions as either true or false. The score represents the percentage answered correctly.

All of the aforementioned measures other than the coping with anxiety index and the knowledge about ATOD score were created by standardizing the items to a mean of zero and a standard deviation of one, then taking the mean of all items.

Missing Data

The majority of the missing data resulted from attrition or absence, with little within questionnaire missing data. Collins, Schafer, and Kam (2001) recommend including variables of nonsubstantive interest to the missing data model to increase the likelihood that data meet the assumption of MAR and reduce bias due to nonignorable missing data patterns. Therefore, this technique was used to best estimate the missing data. In addition, the responses of 19 students at T3 and 2 students at T4 were eliminated from the data set due to their demonstration of multiple suspicious answering patterns, including self-report of a nonexistent drug (alowan), patterned responses (creating zig-zag patterns with response bubbles), and inconsistent answering (i.e., reports regular alcohol intoxication on one item, yet reports having never tried alcohol on another item within the same questionnaire). Of the 733 students who consented to participate in the study, 578 (78.9%) completed all four questionnaires, 95 (13.0%) completed three questionnaires, 39 (5.3%) completed two questionnaires, and 21 (2.9%) completed only one questionnaire, with no differential attrition across the three conditions.

To obtain unbiased and efficient parameter estimates, NORM version 2.03 (Schafer, 1997) was used to create the 20 multiply imputed data sets used in the analyses of program effects. To better predict the missing values, the imputation models included T1 academic performance and religious participation in addition to the variables of substantive interest (Collins & Sayer, 2001). To account for differences by schools and the interaction between gender and condition, the imputation models included dummy variables to represent the nine schools and the interaction of the nine schools with gender. The EM algorithm took 59 iterations to converge, and the data augmentation step allowed 100 iterations between each imputation. Data augmentation diagnostics indicated no problems
with the imputation procedure. The parameter estimates resulting from the analysis of each of the 20 data sets were combined using procedures outlined by Rubin (1987).

Analyses

Whereas the assignment of schools to conditions encouraged the consideration of a random coefficients approach, the inadequate number of schools in this study ($N = 9$) would not allow for an assessment of level 2 variance (Smith et al., 2004). Therefore, the data in this study were assessed with a fixed effects analysis of covariance regression model with maximum likelihood estimation procedures. Path models specified using Mplus (Muthen & Muthen, 1998) represented (a) the main effect of LST and I-LST on ninth-grade substance use controlling for baseline substance use, SES, and problem behaviors, (b) the main effect of LST and I-LST on seventh- through ninth-grade skills controlling for baseline skills, SES, and problem behaviors, and (c) the main effect of LST and I-LST on seventh- through ninth-grade ATOD norms, attitudes, and knowledge, controlling for baseline norms, attitudes, and knowledge, SES, and problem behaviors. The nonnormal distribution of the substance use variables supported the decision to use robust standard errors. Based on analyses of the seventh- through eighth-grade data (Smith et al., 2004; Vicary et al., in press), and the literature that suggests differential risk and treatment effects by gender (Amaro, Blake, Schwartz, & Flinchbaugh, 2001), the decision was made to test the models separately by gender. In the past, gender differences have usually been overlooked when designing and evaluating prevention programs, although research suggests that risk factors may vary by gender (Blake, Amaro, Schwartz, & Flinchbaugh, 2001). A logical extension of such findings is an expectation that there may be differential treatment effects as well as those found, for example, in another study by Botvin of LST (Botvin, Baker, Filazzola, & Botvin, 1990). Therefore, we chose to conduct the analyses separately for boys and girls to ensure that any differential effects of gender were clearly assessed. In addition, a second set of path models specified for each set of the dependent variables included two interaction terms representing the differential effects of the treatment programs by gender. The analyses of the earlier data also supported the inclusion of baseline problem behaviors, which differed significantly by gender, and low SES, because more of the control participants indicated low SES than the participants in either of the treatment conditions.

RESULTS

Substance Use

The first set of analyses focused on separate path models for males and females to assess the effect of each of the treatment groups, compared to the comparison group, on substance use at the end of the 3rd year of the study (ninth grade), while controlling for initial substance use levels. These findings are presented in Table 1. Similar analyses on the seventh- and eighth-grade data demonstrated significant beneficial effects of both the LST and I-LST programs on binge drinking and marijuana use for girls at the end of seventh grade. In addition, the LST program had a significant effect on alcohol use in general for girls at the end of seventh grade and the I-LST program had a significant effect on smoking for girls at the end of seventh grade (Smith et al., 2004). However, all of these effects, except the I-LST effect on cigarette smoking, had deteriorated by the end of
eighth grade. In addition, no significant effects at the end of either seventh grade or eighth grade were observed among boys. As Table 1 demonstrates, neither the LST nor the I-LST programs appear to have significantly affected the students by the end of ninth grade. For the girls, the only significant predictors of ninth-grade substance use was low SES for smoking ($b = 1.20, SE = .47$) and pretest problem behaviors for alcohol use ($b = 1.08, SE = .55$). For the boys, the only significant predictor of ninth-grade substance use (smoking, drinking, and drunkenness) was pretest problem behaviors ($b = 1.20, SE = .56$ for smoking; $b = .87, SE = .31$ for alcohol use; and $b = .60, SE = .26$ for drunkenness). In a separate set of analyses, the treatment by gender interaction terms did not reach significance for any of the substance use outcome variables at the end of ninth grade.

Targeted Skills, Beliefs, Attitudes, and Knowledge

Because the potential mediating variables (i.e., skills, behavior/attitudes, and knowledge) had not been previously reported for any of the measurement occasions, a second set of analyses focused on separate path models for males and females at each time point to assess the effect of the programs on these skills (e.g., decision making, communication, refusal, media resistance, assertiveness, and coping with anxiety skills), normative beliefs about peer ATOD use, attitudes toward ATOD, and knowledge of ATOD. Table 2 presents the coefficients associated with these analyses.

First, neither program exhibited any significant effects for boys, although one effect in the unexpected direction was observed among I-LST boys for normative beliefs. More promising effects were observed for the girls. Specifically, the LST program improved decision making, communication skills, coping skills, normative beliefs, attitudes, and knowledge at the end of seventh grade; coping and assertiveness skills at the end of eighth grade; and communication and coping skills at the end of ninth grade. The LST girls demonstrated one program effect in the unexpected direction, reporting significantly lower media resistance skills than the comparison students at the end of eighth grade. The I-LST program positively affected girls’ knowledge at the end of seventh grade, coping with anxiety and norms at the end of eighth grade, and knowledge at the end of ninth grade. A separate set of analysis models examined the treatment by gender interaction terms for

Table 1. Life Skills Training (LST) and Infused-LST (I-LST) Treatment Effects on Substance Use

|               | Cigarettes | | Alcohol | | Drunkenness | | Binge | | Marijuana |
|---------------|------------|--------------|----------|--------------|----------------|------------|----------------|----------------|
|               | Est.       | SE           | Est.     | SE           | Est.         | SE          | Est.         | SE             |
| Females       |            |              |          |              |              |             |              |                |
| Time 4        |            |              |          |              |              |             |              |                |
| LST           | -.34       | .52          | -.02     | .24          | -.09         | .19         | -.09         | .17            |
| I-LST         | -.18       | .47          | .02      | .22          | .08          | .18         | .08          | .16            |
| Males         |            |              |          |              |              |             |              |                |
| Time 4        |            |              |          |              |              |             |              |                |
| LST           | .19        | .40          | .36      | .24          | .28          | .22         | .31          | .21            |
| I-LST         | .20        | .38          | .28      | .22          | .07          | .18         | .08          | .18            |

NOTE: Covariates for all equations included baseline use of substances, baseline problem behavior, and SES. LST and I-LST are dummy-coded variables that compare each condition to the control group.
### Table 2. Life Skills Training (LST) and Infused-LST (I-LST) Treatment Effects on Targeted Skills, Beliefs, Attitude, and Knowledge

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<th>Communication Skill</th>
<th>Refusal Resistance</th>
<th>Media Assertiveness</th>
<th>Coping Norms</th>
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**NOTE:** Covariates for all skills outcomes included baseline level of all skills, baseline problem behavior, and SES. Covariates for norms, attitudes, and knowledge included baseline level of norms, attitudes, and knowledge, baseline problem behavior, and SES. LST and I-LST are dummy-coded variables that compare each condition to the control group.

*p ≤ .05; **p ≤ .01; ***p ≤ .001.
these variables. Although boys and girls demonstrated significant differences in their levels of some skills, and the programs demonstrated significant effects on only the girls’ skill levels, the treatment by gender interaction terms did not reach significance for any of the skills variables at any of the follow-up time points. However, the interaction of gender with both LST and I-LST on ATOD normative beliefs at the end of seventh grade \( (b = .41, \ SE = .12, p < .001 \) for LST, and \( b = .36, \ SE = .12, p < .01 \) for I-LST) and for the interaction of gender with I-LST on normative beliefs at the end of eighth grade \( (b = .34, \ SE = .13, p < .01) \) was statistically significant. This indicates that the LST program influenced the norms of girls to a significantly greater extent than the norms of boys at the end of the seventh grade, whereas the I-LST program influenced the norms of girls to a significantly greater extent than the norms of boys at the end of the seventh grade and eighth grade.

**DISCUSSION**

Recognizing the ongoing need to develop the most effective prevention programs and ensure their adoption and utilization by school districts, research must continue to assess not only program effectiveness, and in what settings, but also the most effective program delivery methods. The ADAPT project compared a standard LST program delivery with an infused approach whereby the content components were integrated into regular middle school curricula. The study also used independent evaluators with no association with the LST program to assure unbiased results.

Despite encouraging initial results on the substance use variables at T2 and T3, these results had dissipated by T4, that is, there were no treatment results for either LST or I-LST on the substance use variables by the end of ninth grade. For both boys and girls, it appears that SES and early problem behaviors (i.e., beginning of seventh grade) act as the only significant predictors of ninth-grade substance use. This does not represent a unique or new finding (Jessor, 1987), of course, but it is disappointing that neither treatment method maintained a significant effect over time. The skills analyses also did not show any effects for the boys in either treatment group and the girls in the I-LST program demonstrated only one significant skills effect, a higher level of a coping with anxiety skill. However, the LST approach, for girls, did result in significantly higher levels of coping with anxiety skills and communication skills at the end of the program (T4), with decision-making skills higher at T2, and assertiveness skills at T3.

Finally, neither approach significantly influenced the ATOD beliefs, attitudes, and knowledge of the boys in the study. Girls in both programs showed some effects: for LST, lower normative beliefs and attitudes supporting ATOD use, and greater knowledge at the end of seventh grade (T2); for I-LST, lower normative beliefs at the end of eighth grade (T3), and greater knowledge at the end of seventh grade (T2) and at the end of ninth grade (T4). These effects are modest at best and would not be a strong “sell” for either approach to school principals.

Neither method produced the results desired for the entire treatment sample, in contrast to some previous studies. However, the standard LST delivery does seem somewhat more effective, especially initially. It is also interesting to note that the only encouraging treatment effects were for the girls in the study. One of the possible explanations for this effect is that these school districts typically had school buildings with grades K-12 in one building. It is probable that younger girls were more accessible to older boys and these girls would have more opportunity to apply their LST skills due to early exposure to social pressures. Another possible explanation for the weak results is that these rural
areas may have higher normative use of alcohol and tobacco and this context may be harder to affect by any prevention program (Center on Addiction and Substance Abuse, 2000).

The ADAPT study included all students who had parental permission to participate in the questionnaire in these analyses and controlled for prior use levels. Although this was a rigorous evaluation study, the actual recruitment, training, and monitoring of teacher participation was more “real world” than in many controlled studies. District superintendents approved their schools’ participation and then asked principals to facilitate this. In a few cases, the middle school principals did not make this a priority, as evidenced by their assignment of teachers to the program. Often, the newest teachers received “assignment” to the task with little input on their part. In a number of cases in both models, the school principals agreed to participate in the project but the ADAPT staff were not always able to speak to and get the consent of the participating (assigned) teachers independently.

A few schools enabled the recruitment of volunteers, but in others, teachers expressed clear reluctance, especially those in the I-LST model. During the initial training, upon learning that they had to develop their own infused lesson plans and implement these into their regular lessons, many teachers indicated hesitance in developing the lessons and did not promptly submit the lessons or arrange observations. However, the only marginally better effects of LST, occurring when teachers followed a well-prepared program, suggest that the added effort required of I-LST teachers may not explain the student results.

Currently, much debate exists about program fidelity and its implications for prevention research. It can be argued that prevention programs are not really effective unless they are effective in a real-world setting. The inevitable modification of program components to fit the particular needs of a site poses a specific challenge. Some researchers discourage this adaptation, believing that this change lowers program effects (Dane & Schneider, 1998). Others take the opposing view and argue that allowing program sites to adapt the program to their particular needs will improve program effectiveness (Rogers, 1995). A third perspective suggests the necessity and inevitability of program adaptations, encouraging an approach that provides the sites with the components essential to effective implementation and allows them to teach those components as they wish (Bauman, Stein, & Ireys, 1991; Meyer, Miller, & Herman, 1993). The diminishing results over the 3 years of the ADAPT study reinforce the need for ongoing assessment of program fidelity and adaptation with any prevention approach. It is interesting to note, however, that program fidelity can be challenged by the continuing revisions and modifications of program materials by their publishers/originators, necessitating the purchase of new materials and training—or materials purchased without further training. One of the participating schools wanted to continue using LST after the ADAPT project ended but would have had to buy all new materials and discard a large number of unused materials (e.g., student workbooks) in order for all participants to have the same materials, because the publisher had issued a revised edition of the materials.

A final concern in prevention research revolves around the adoption and diffusion of programs over time. It was somewhat interesting to find, therefore, that in the school year after the completion of the ADAPT project, 69% of the ninth-grade teachers, 29% of the eighth-grade teachers, and 52% of the seventh-grade teachers reported continuing to teach the LST components on their own. Whereas ninth-grade teachers used the LST model more, in the seventh and eighth grades, where more time had elapsed since the program ended, more teachers continued to use the I-LST model in their own subject areas. In the school districts in the I-LST condition, teachers in the seventh and eighth grades were generally more familiar with the notion of curriculum integration/infusion than
teachers in the ninth grade. It was more common to find teams of teachers who integrated the curriculum in the middle/junior high school than in the high school, and in some of the districts, the ninth grade was a part of the high school. In schools where teachers were already accustomed to working in teams to integrate/infuse the curriculum (i.e., typically in seventh and eighth grades), perhaps it is not surprising that they were more likely to continue to use the I-LST model in their own subject areas. Teacher ownership also appeared to be an outcome of this approach, in part, because of the ongoing curriculum changes that occur in most schools. The self-developed I-LST lesson plans allow teachers to adapt prevention principles to their own teaching styles, resulting in a greater likelihood that they will become part of the individual teaching repertoires. When teachers invest their own personal thought, time, and creativity in preparing infused lessons that incorporate prevention principles, they are more likely to take ownership of these lessons and continue their implementation. Thus, using an infused approach may augment program institutionalization, regardless of competing factors such as budget cuts and increased demands on teachers.

Implications for Practice

It is important that school administrators, in concert with their teachers, consider a variety of prevention programs and delivery methods before choosing what they believe is likely to be the best approach for their students, staff, and community. Certainly, assessing programs identified as “effective” is a first step, noting the latest and most relevant research findings. Costs must also be considered as well as availability of teacher training and support. Continuity of programming, the adoption of prevention concepts by a district, requires support from all levels with ongoing funding, training, implementation, and evaluation. And finally, no single program, however well integrated into a school curriculum, should be seen as the only prevention effort needed.

Because no major differences were found between a standard program (LST) implementation and the infused model, I-LST, school district decision makers should consider their own school teaching structure, that is, whether teachers already work in teams or are isolated by subject area. An infused model, regardless of program, appears more successful when implemented through a team approach. It is likely, too, that teachers in an infused model where they develop their own lessons and materials will adopt and continue to use these prevention efforts, even without team support, thereby further enriching prevention across the curriculum.

It is important to note that the study reported here reflects a number of limitations, including the demographics of small, poor, rural, all-White school districts in areas with limited resources. However, it is important to determine how model prevention programs can be effective in such settings and by what delivery mechanisms. A further limitation is the inability to test for multilevel effects due to the small number of participating schools (districts). Finally, the sample obtained with parental consent represents students less at-risk for problem behaviors than would have been obtained under passive consent procedures (Henry et al., 2002). However, the nonparticipants are not disproportionate across conditions and, therefore, this does not affect the ability to detect differences across the groups with consent.

As competing concerns attract the attention and budgets of school administrators, as well as the time of teachers, it is important that independent evaluators continually evaluate model programs. These programs must also be matched with the delivery mechanisms that are most cost- and outcome-effective for both the immediate time of program
adoption and the continued utilization in the following years, using the best methods for Adoption of Drug Abuse Prevention Training.

References


