

Going the distance: Delivery of high school drug prevention via distance education.

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Abstract:

The purpose of this project was to develop a technology that can be used in schools where there are insufficient resources to implement a quality drug prevention program. The specific technology—distance education via teleconferencing—allows a highly qualified teacher to deliver programs in such settings with increased quality. A promising high school drug prevention program, All Stars, Sr., was modified to be delivered using the latest technological advances in distance education. Student-level effects are reported across six mediating variables as well as past thirty-day and lifetime use of alcohol, tobacco, marijuana, ecstasy, and other illicit drugs.

Keywords: distance education | high school education | drug prevention | adolescents | drug prevention programs

Article:

Although the use of some substances among young Americans is on the decline, drug use continues to be a major public health concern. The 2007 Monitoring the Future study revealed little change in eighth-, tenth-, and twelfth-grade use of LSD, psilocybin (mushrooms), crack cocaine, powder cocaine, heroin, and crystal methamphetamine (Johnston et al. 2008).

Most prevention programming that has been developed and tested in school settings has addressed prevention in the fifth, sixth, and seventh grades (Tobler and Stratton 1997). The rationale has been that this is the single greatest period of risk for initial experimentation with drug use. This stands in contrast to the relative lack of attention given to primary prevention among high school students. Instead, most high school-based efforts to date have emphasized interventions primarily targeted at individuals who have demonstrated wide-ranging behavioral problems including problematic substance use (Tobler and Stratton 1997).

Despite the success of some prevention programs, school-based prevention is not without its challenges. In fact, researchers have attempted to overcome barriers to successful school-based

prevention for quite some time (e.g., Keeve 1967). Much of this research has to do with the lack of training and qualifications of teachers who most often implement programs. The School Health Policies and Programs Study reported that over 90% of all schools sampled (607) included alcohol and other drug use prevention in their school health curricula (Collins et al. 1995). However, only 33.4% of the lead health education teachers and only 29.6% of the classroom health education teachers had received training on this topic anytime during the previous two years. Not only do health education teachers lack training in prevention but also most (94.6%) majored in subjects other than health education (Collins et al. 1995). The lack of training of health education teachers reduces program fidelity and presents serious barriers to the success of prevention efforts.

This article describes a project that used the latest technology in telecommunications to provide schools with an additional method of overcoming barriers to school-based prevention.

DISTANCE EDUCATION VIA TELECONFERENCING

Technological advances within teleconferencing can be used to address the barriers to school-based drug prevention that were discussed earlier. This mode of technology has been used successfully to bring educational health programs to rural communities (Richardson-Nassif, Swartz, and Reardon 2002). Additionally, teleconferencing allows instructors to reach students in rural areas and provides students with qualified instructors (Ludlow 1994). Barriers to teacher training, program fidelity, time and resources, and teacher shortages can be reduced by training individuals in effective drug prevention and the use of teleconferencing technologies. Individuals such as district-level safe and drug-free school coordinators, school guidance counselors, school nurses, physical education teachers, and health teachers can fill the role of a drug prevention specialist. The critical element is that the individual receive specialized training in the underlying processes and technologies upon which the program is based. Once trained, the implementation of the program by a specialist can be broadcast to large numbers of students. Teleconferencing eliminates the need for drug prevention specialists to be present at each high school. Teacher time and money spent on training large numbers of teachers can be reduced. This same system of training and delivery also has the potential to increase the likelihood that the activities will be implemented as intended (i.e., with fidelity). Teleconferencing offers the possibility of receiving instruction from a highly skilled and knowledgeable individual. Given the deficits often seen among teachers in their understanding of the concepts that underlie prevention as well as methods that are effective, the ability to allow an expert into the classroom has considerable appeal.

Teleconferencing has the potential to reduce the amount of money needed for program training and delivery. A three-year comparative study of distance education in Utah revealed that the cost of delivery per student was reduced over a three-year period and suggests that distance education can be more cost-effective than conventional instruction when given enough time (Rule, Dewulf, and Stowitschek 1988). As stated earlier, one specialist can broadcast the curriculum to several

high schools. This approach can make a significant impact on the problem of teacher shortages in urban and rural areas. The use of teleconferencing makes programs and services available for educators, administrators, and students in urban and isolated rural school districts. It can help put these disadvantaged areas on the cutting edge of technology and prevention practice.

METHODS

To demonstrate the feasibility of using distance education as a mode for delivering drug prevention to high school students, the Alcohol, Tobacco, and Other Drug (ATOD) unit of All Stars, Sr., was adapted for distance delivery via teleconferencing. All Stars, Sr., is a promising high school health supplement that targets eight research-based mediators: commitment, normative beliefs, lifestyle incongruence, resistance skills, beliefs about consequences, goal-setting skills, stress-management skills, and decision-making skills. The program includes small group activities, structured class discussions and debates, role plays, class surveys and feedback sessions, and other techniques that produce involvement and allow for the open expression of ideas and opinions. The full curriculum addresses the same major content areas that are included within a comprehensive school health education program and typically covered by the texts. Those content areas include mental health; family life; alcohol, tobacco, and other drugs; personal health; environmental health; communicable and chronic diseases; consumer health; growth and development; nutrition; and injury prevention and safety.

The distance version of All Stars, Sr. (ATOD unit), uses both technology (e.g., Internet, chromakey, graphics tablet, and flex cam) and interactive instructional methods (e.g., games, small group discussions) to deliver important information regarding substance use and target mediating variables (i.e., normative beliefs, resistance skills, decision-making skills, lifestyle incongruence, and beliefs about consequences). Table 1 summarizes the activities included in each session as well as the targeted mediators, instructional methods, and technologies used.

Table 1 is omitted from this formatted document.

Participants

Students in four health classes participated in an evaluation of the distance version of All Stars, Sr. The treatment group consisted of 26 students. Students' ages ranged from 13 to 16 years. There were 17 males and 9 females. Ethnicity for the treatment group was roughly evenly split between White (15; 57.7%) and African American (10; 38.5%) students with one Hispanic student (3.8%). The comparison group consisted of 28 students. Students' ages ranged from 13 to 16 years. There were 4 males and 24 females. The ethnicity of the comparison group was represented by White students (11; 39.3%), African Americans (13; 46.4%), Asians (1; 3.6%), Hispanics (1; 3.6%), or others (2; 7.1%).

Study Design

A small pilot study was conducted to assess the feasibility of offering effective drug prevention using distance education technologies. The goal was to determine if offering All Stars, Sr., activities via distance education is feasible and effective. Health classes in two high schools received the broadcast sessions. Within-school comparison groups were chosen; therefore, one health class was assigned as a treatment class and one was assigned as a comparison class within each school (both classes within a school had the same health teacher). Each teacher agreed to serve as the classroom facilitator during implementation of the distance program. Within-school designs have the inherent problem of contamination. However, we minimized this problem by limiting the instructor's access to program content and materials. Furthermore, the Web-based components were unavailable to comparison students. Assignment of classes was random, although it must be noted that with only two classes per condition, the benefits of random assignment in terms of achieving pretest equivalence cannot be fully realized. The treatment classes were taught eight modified All Stars, Sr., activities using distance technologies. Each participating school was paid a \$500 stipend and each teacher was paid a \$250 stipend to participate. A pre/posttest survey design was used to measure the impact of the intervention on student attitudes and behaviors. Participants in both groups completed surveys at the initiation of the study (prior to the first class session) and then again at the conclusion of the intervention (one week from the last classroom session).

Program Training and Delivery

Classroom facilitators were provided one day of training prior to program implementation. The content of the program and methods of implementation were discussed. Materials explaining the theory behind All Stars, Sr.; its goals and objectives; the definitions of the targeted mediating variables; and several sample activities were provided. However, the majority of the one-day training was spent clarifying the importance of classroom management and making sure that the facilitator was familiar with the distance technologies used in each lesson.

Delivery of the six sessions was conducted by two experts trained in substance abuse prevention. The sessions were broadcast from a teleconferencing studio at one school to the two remote high schools. The remote high schools had classrooms equipped to support two-way broadcasting and Internet access. Broadcasts were sent to the high schools one at a time.

Measures

The effects of the program on student attitudes, intentions, and behaviors were evaluated using a twenty-three-item pre/posttest survey. In addition, teacher interviews, student focus groups, and videotaped sessions were used to provide further evaluative data concerning fidelity, level of classroom facilitator involvement, level of student engagement, level of studio manager involvement, overall satisfaction with the program as implemented, and suggestions for improvement.

Students completed the survey prior to program implementation and again after the completion of the program. Surveys were coded with numeric identifiers, instead of names, to assure confidentiality. The survey assessed the following six mediators: (1) lifestyle incongruence, (2) normative beliefs, (3) commitment, (4) resistance skills, (5) beliefs about consequences, and (6) decision-making skills. In addition, items were included that assessed recent (past thirty days) and lifetime use of alcohol, tobacco, marijuana, ecstasy, and other illicit drugs. The survey also measured next-thirty-day and lifetime drug use intentions.

Both classroom facilitators participated in interviews. A standard protocol was used and the interviewer took notes throughout the interview. A standard observation form was used for quantitative and qualitative assessment of program fidelity, level of involvement of the classroom facilitators and studio managers, and level of student engagement. Four student focus groups were completed. The focus group protocol consisted of eleven questions. Each focus group was audiotaped and the focus group facilitator took notes.

Internal consistency of scales was assessed by calculating Cronbach's alpha coefficients, summarized in Table 2.

Table 2. Cronbach's Alpha Coefficients for Mediating Variable Scales

| Mediating variable | # of items | Pretest alpha | Posttest alpha |
|----------------------------|------------|---------------|----------------|
| Impulsive decision making | 9 | .64 | .82 |
| Lifestyle incongruence | 4 | .66 | .76 |
| Normative beliefs | 12 | .68 | .69 |
| Commitment | 4 | .80 | .72 |
| Resistance skills | 10 | .82 | .86 |
| Beliefs about consequences | 6 | .68 | .64 |

Overall, Cronbach's coefficients are in the acceptable range. Resistance skills had the highest average consistency ($\alpha = .84$) and beliefs about consequences had the lowest ($\alpha = .66$). Average overall internal consistency rose slightly between pretest ($\alpha = .71$) and posttest ($\alpha = .75$), suggesting a better understanding of items at posttest.

Analyses are based on students present at both pretest and posttest surveys. The attrition rate for the treatment group from pretest to posttest was 7%. The attrition rate for the comparison group from pretest to posttest was 7%.

Analysis

The purpose of this study was to test the feasibility of offering a modified version of the All Stars, Sr., program via distance education and its potential to impact mediating variables and behavioral outcomes. The design allowed for within-school comparison groups; however, the resources available for this pilot study restricted the overall sample size (N = 54). Hoyle (1999) recommends a strategy for evaluating small sample studies. He offers the following equation as an explanation:

$$\text{Test of Significance} = \text{Size of Effect} \times \text{Size of Study}$$

As the equation illustrates, the effect size of a study is not affected by the sample size. However, significance tests are affected by sample size. Hoyle suggests that an appropriate effect size indicator be used to assess group differences when sample sizes are small and power is low. A post hoc power analysis revealed that with N = 54 the power for this study was 0.183 to detect an effect size of .20, at $p \leq .05$, thus severely limiting what can be concluded from the results of significance testing. Therefore, in addition to calculating and reporting p values we follow the recommendation of Hoyle and report group differences for this study in terms of effect sizes (Cohen's d).

RESULTS

Pretest to posttest change scores were created to examine program effects on each mediating variable. Independent samples t tests were performed on the change scores. Although not statistically significant, treatment group differences were observed for impulsive decision making ($p = .250$), beliefs about consequences ($p = .429$), and normative beliefs ($p = .378$); (see Figure 1). There were no program differences for lifestyle incongruence ($p = .600$) or resistance skills ($p = .488$). As can be seen in Figure 2, effect sizes for each of these mediators meet or exceed the program effects that Tobler and Stratton (1997) observed for Social Influence, Life Skills, and Other drug prevention programs included in their 1997 meta-analysis.

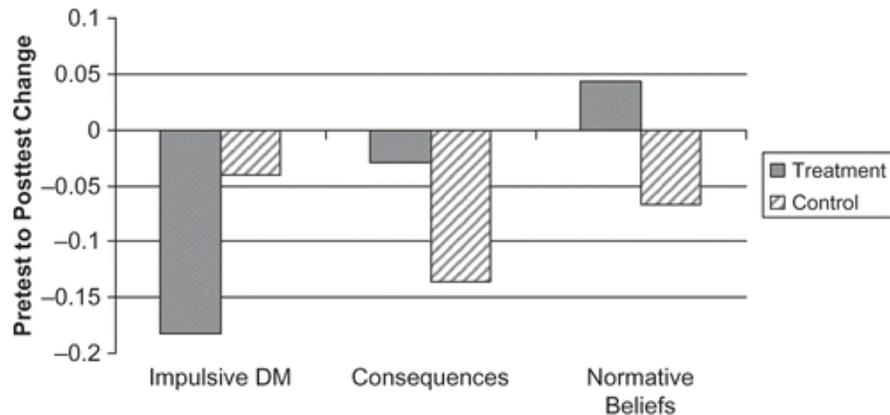


Figure 1. Program effects on mediators.

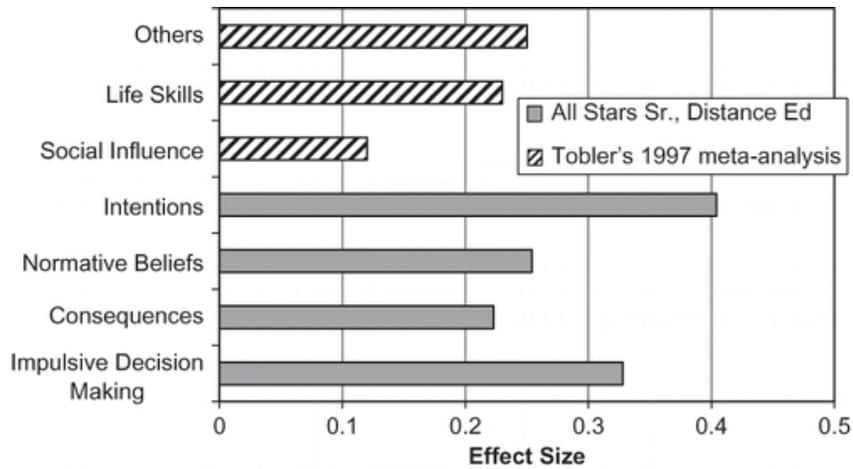


Figure 2. Effect sizes for mediating variables.

Program effects were observed for intentions to use cigarettes ($p = .233$), marijuana ($p = .142$), and ecstasy ($p = .106$) in the next thirty days (see Figure 3). The average effect size for drug use intentions was .40.

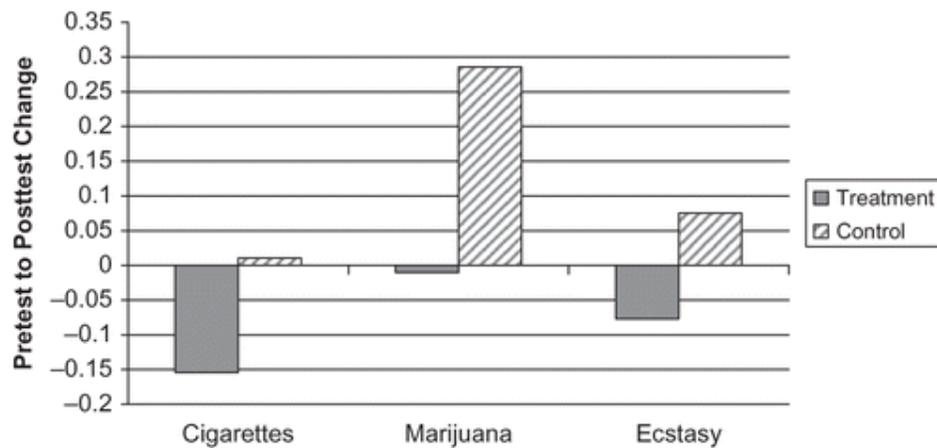


Figure 3. Program effects on drug use intentions.

Figure 4 presents program effects for the past thirty-day use of wine ($p = .190$), smokeless tobacco ($p = .155$), and marijuana ($p = .489$). Group differences in pretest-to-posttest changes for other forms of alcohol ($p > .470$), as well as cigarettes ($p = 1.00$) and cocaine ($p = .322$), were not observed. The effect sizes observed exceed those reported by Tobler and Stratton (1997); (see Figure 5).

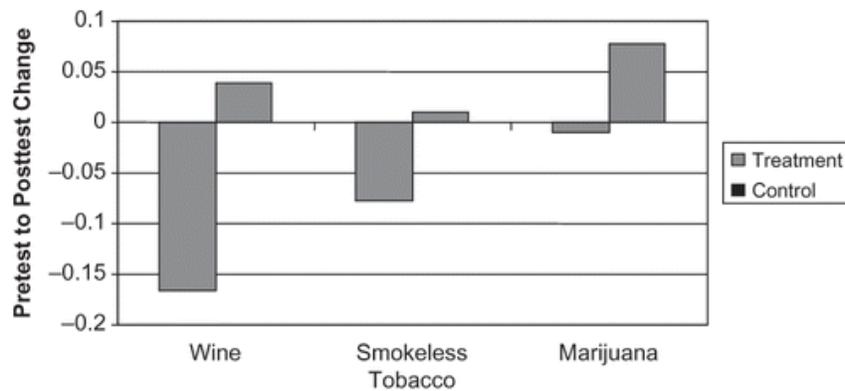


Figure 4. Program effects on individual drugs.

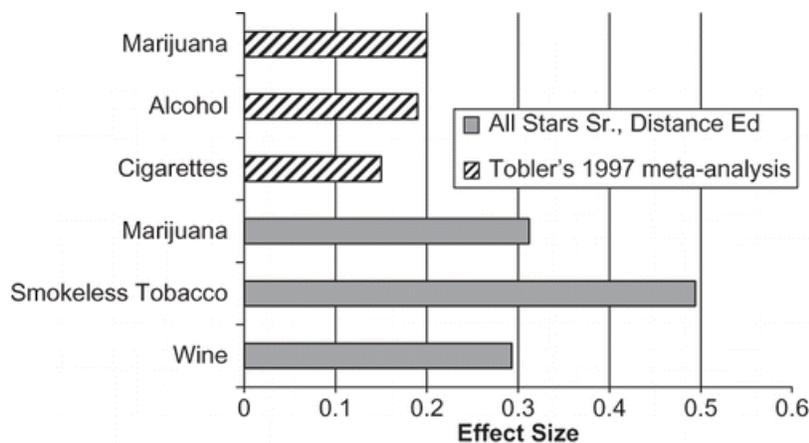


Figure 5. Effects sizes by substance.

Student Focus Groups

Student focus groups were completed at the conclusion of the four-week period to gather opinions on the distance delivery of All Stars, Sr. Each focus group consisted of eight to ten students and was led by trained facilitators. Two focus groups were conducted from each high school. Several themes emerged.

First, students found the distance education class more interesting and fun than their traditional health class because (1) the distance instructor and distance delivery held their attention better than classroom delivery by their regular health teacher; (2) they were able to participate in online activities that they thought did an excellent job of facilitating learning; (3) the All Stars, Sr., activities encouraged them to get to know their classmates better; (4) they competed with the other distance class (high school) on a daily basis (activities designed to promote bonding among classmates); and (5) they felt less intimidated to be honest with an instructor who is separated by distance.

Second, students reported high satisfaction with the distance technologies. The Web-based activities were especially appealing to students because feedback (i.e., individualized and classroom) was quickly received. The videoconferencing technologies enhanced the presentation of content. One student shared, “I liked it when she was standing up teaching from her PowerPoint. She looked like a meteorologist ... she could walk in front of the screen (like a weather map).” Another student commented that getting to use the different pieces of technology (e.g., flex cam and computer) made learning more fun.

Third, there were some challenges to the distance education approach. Students reported occasional delays in video and audio with teleconferencing. These delays made communication difficult at times. However, with advancements in teleconferencing technologies, these delays will be minimized. Students reported difficulty remembering usernames and passwords needed for computer access and Web site login procedures. Strategies for helping students maintain this information should be developed.

Teacher Interviews

Teachers reported being very pleased with all program materials. They enjoyed the role of facilitator and were intrigued with the technology used. Teachers thought that the technologies (e.g., PowerPoint and Internet site) improved instruction. They enjoyed seeing students respond positively to someone new, supporting the use of an outside specialist to deliver the prevention curriculum.

Challenges faced by classroom facilitators include keeping students from “surfing” the Internet, assisting students with log-in procedures, scheduling computer lab time, and lack of assistance from distance classroom managers. These challenges will be taken into consideration when designing the facilitator guides and program training.

Observations of Program Delivery

Although program delivery by the distance instructors remained consistent across the two high schools, facilitator (regular health teacher) involvement varied greatly. One classroom facilitator was very involved in program implementation by participating in class discussion, asking questions, and challenging his students. He also maintained order in the classroom without stifling student participation. The other classroom facilitator was primarily an observer. This made implementation more difficult because classroom management became the responsibility of the distance instructors. In addition, hard-to-reach students were allowed to stay uninvolved in classroom activities. Involvement of the studio managers was also split. The involved studio manager controlled the classroom camera so that all students could be viewed. When a single student was speaking, the studio manager focused on that student allowing for more personable conversation. Finally, when appropriate, the studio manager would place the classroom microphones on mute so that students could discuss topics in private. The uninvolved studio manager left the classroom with the camera positioned on the center of the classroom and fully

retracted. Clear expectations should be provided and the importance of this role stressed in future deliveries.

DISCUSSION

This research demonstrates the feasibility and preliminary effectiveness of offering high school drug prevention via distance education technologies. Feasibility was demonstrated by the successful delivery of eight broadcast sessions to two remote high schools. Distance technologies such as the Internet, chromakey (technique for compositing two images together such as a weatherperson appearing to stand in front of a large map), PowerPoint, and flex cam were used to enhance the program and facilitate interaction between the instructors and the students. The program was well received by teachers, studio managers, and students.

This preliminary study also suggests that the distance delivery of All Stars, Sr., did not result in diminished effects. Although the nonsignificant findings cannot eliminate the possibility that results were due to chance or sampling bias, program effects were observed for important prevention mediators such as normative beliefs, beliefs about consequences (expectancies), and decision making. These mediators have been instrumental in the success of All Stars, Sr., and other school-based drug prevention programs. The program's effects on these mediators meet or exceed the magnitude of effects observed by Tobler and Stratton (1997) in their meta-analysis of 120 drug prevention programs. Drug use intentions and the use of several specific drugs were also successfully reduced among students who received the program. Although caution should be used in interpreting nonsignificant findings, the results provide preliminary support for the use of distance education as an alternative mode of delivery for high school drug prevention.

Improvements can be made in the training of classroom facilitators, technical support for students, and speed of transmission for audio and video broadcasts. These limitations notwithstanding, this research provides strong support for the use of distance technologies to overcome the challenges of high school drug prevention. This model can be applied to elementary and middle school drug prevention as well as violence prevention and other health education efforts. In essence, distance technology can place a research-based program and an expert teacher/facilitator into the classrooms of rural and urban schools that may not otherwise have access to these resources.

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