Health Psychology
2012, Vol. 31, No. 4, 476–485

0278-6133/11/$12.00 DOI: 10.1037/a0025756

One-Year Outcomes of a Drug Abuse Prevention Program for Older Teens and Emerging Adults: Evaluating a Motivational Interviewing Booster Component

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Objective: The present study tested the efficacy of motivational interviewing-based booster sessions for Project Toward No Drug Abuse (TND), a 12-session school-based curriculum targeting youth at risk for drug abuse. In addition, generalization of effects to risky sexual behavior was assessed. The 1-year outcomes evaluation of the project is presented. ***Method:*** A total of 24 schools were randomized to one of three conditions: standard care control (SCC), TND classroom program only (TND-only), and TND plus motivational interviewing booster (TND + MI). A total of 1186 participants completed baseline and 1-year follow-up surveys. Following the classroom program, youth in the TND + MI condition received up to 3 sessions of MI in person or by telephone. Effects were examined on 30-day cigarette, alcohol, marijuana, and hard drug use, as well as measures of risky sexual behavior (number of sex partners, condom use, having sex while using drugs or alcohol). ***Results:*** Collapsed across the 2 program conditions, results showed significant reductions in alcohol use, hard drug use, and cigarette smoking relative to controls. These effects held for an overall substance use index. The MI booster component failed to achieve significant incremental effects above and beyond the TND classroom program. No effects were found on risky sexual behavior. ***Conclusions:*** While the program effects of previous studies were replicated, the study failed to demonstrate that an adequately implemented MI booster was of incremental value at 1-year follow-up.

Keywords: 1-year follow-up, drug prevention, continuation high schools, motivational interviewing, boosters

Substance misuse is among the most prevalent causes of adolescent morbidity and mortality in the United States, and approximately 5–8% of adolescents qualify for a diagnosis of substance abuse disorder (Brannigan, Schackman, Falco, & Millman, 2004; Sussman, Skara, & Ames, 2008). Project Toward No Drug Abuse (TND) is a 12-session school-based substance abuse prevention program developed for older, at-risk teens, based on a motivation, skills, and decision-making model (Sussman et al., 2004). Project TND has been evaluated in six clustered-randomized controlled trials, which have demonstrated the impact of the program on 30-day substance use at a 1-year follow-up or longer (Dent, Sussman, McCuller, & Stacy, 2001; Rohrbach, Sun, & Sussman, 2010; Sun, Sussman, Dent, & Rohrbach, 2008; Sun, Skara, Sun, Dent, & Sussman, 2006; Sussman, Dent, Simon, Stacy, & Craig, 1998; Sussman, Dent, & Stacy, 2002; Sussman, Sun, McCuller, & Dent, 2003; Valente et al., 2007). Effects on "hard" drug use (a summary index of use of cocaine, hallucinogens, stimulants, inhalants, ecstasy, pain killers, tranquilizers, and other drugs [i.e., PCP, steroids, GHB, and K]) have been found in all six trials at 1-year follow-up. In addition, hard drug use effects were demonstrated in the two trials that assessed effects at 2-year follow-up and the one trial that assessed effects at 5-year follow-up. However, the impact on other substances has been less consistent across trials, with effects on alcohol use shown in three trials (Sussman et al., 1998; Sussman et al., 2002; Sussman, Sun, et al., 2003; Valente et al., 2007), effects on marijuana shown in two trials (Rohrbach, Sun, et al., 2010; Sussman et al., 2002; Sussman, Sun, et al., 2003), and effects on cigarettes shown in one trial (Sussman, Sun, et al., 2002; Sussman et al., 2003), at 1- or 2-year follow-up.

Previous research suggests that school-based drug abuse prevention programs have a greater chance of long-term success if youth are exposed to additional contacts with program providers of some type after delivery of the core program (Skara & Sussman, 2003). However, most of the support for booster programming has been obtained from meta-analyses that show programs containing booster sessions are relatively more likely to obtain effects (Rooney & Murray, 1996; White & Pitts, 1998). According to Cuijpers (2002), very few studies have provided a direct test of the relative effects of adding booster programs within an experimental

This article was published Online First October 10, 2011.

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This research was supported a grant from the National Institute on Drug Abuse #DA020138. We thank Gaylene Gunning, Monica Pattarroyo, Liz Barnett, and Mary Beth Abella for their hard work in project coordination, MI implementation, and data collection.

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or quasi-experimental trial. Therefore, systematic research on the importance of booster programming is greatly needed in the drug abuse prevention field. To date, no study has tested the efficacy of booster sessions with Project TND.

Telephone boosters are feasible and promising for high-risk youth populations, and may be one of the only ways to reach participants after high school (McCuller, Sussman, Holiday, Craig, & Dent, 2002; Mermelstein, Hedeker, & Wong, 2003; Míguez, Vazquez, & Becona, 2002). Furthermore, telephone counseling has become a popular modality to deliver information to teens and adults, and has achieved significant effects in tobacco prevention and cessation (e.g., (Boyle, Pronk, & Enstad, 2004; Elder, Woodruff, & Eckhardt, 1994; Leed-Kelly, Russell, Bobo, & McIlvain, 1996; Mermelstein et al., 2003; Míguez et al., 2002; Skara & Sussman, 2003; Whelan, McBride, & Colby, 1993; Zhu et al., 2000), prevention of at-risk drinking (Curry, Ludman, Grothaus, Donovan, & Kim, 2003), and prenatal substance abuse treatment (Laken & Ager, 1996).

Motivational interviewing (MI) was chosen as the booster component because the development of motivation to change is the core objective of MI (Miller & Rollnick, 2002). Motivation to change is created by developing discrepancy between current behavior and future goals, and occurs when people perceive a discrepancy between where they are and where they want to be (Smedslund et al., 2011). MI may be of importance as a vehicle of delivering drug abuse prevention booster programming through a telephone-based modality (Kypri, Sitharthan, Cunningham, Kavanagh, & Dean, 2005). The type of one-on-one support provided via MI can encourage participants to identify self-perceived problems, respects their need for autonomy and decision making, and provides adequate flexibility to the counselor to follow whatever behavior or issue the participant identifies. Thus, because the main goal of MI is to develop discrepancy, and because it has been shown to be effective in some studies of drug using youth (Grenard, Ames, Pentz, & Sussman, 2006), MI was selected as an appropriate modality for a booster to the TND classroom program.

Little is known about whether the effects of drug abuse prevention programs are generalizable to risky sexual behaviors. Risky sexual behaviors among teens include failing to use condoms while having sex, having sex with multiple partners, and having sex while using drugs, and risky sexual behavior is associated with drug use (Sussman, 2007). One school-based drug abuse prevention study among general population young teens found a generalization effect on unsafe sexual behavior an average of 12 years after implementation of the program (Life Skills Training; Griffin, Botvin, & Nicols, 2006). However, additional replication studies are needed, as well as studies with other populations of youth, to establish greater credence to the findings of that one study. An economic function of programming would be served if, in general, drug abuse prevention programs that are successful in reducing substance use could also have an impact on risky sexual behaviors (MacDonald, Zanna, & Fong, 1998).

Successful prevention of drug abuse and risky sexual behavior is especially important for young people at relatively higher risk for engaging in health-compromising behaviors. The participant population for the present study was comprised of continuation high school youth. In California, when reaching high school age, those youth who are unable to remain in the regular school system for functional reasons, including lack of credits and consistent use of substances, are transferred to continuation high school (CHS). Similar types of schools exist nationally (sometimes called "alternative" high schools in other states). In California, every school district that has an enrollment of over 100 students in twelfth grade must have a CHS program; there are approximately 600 CHSs in the state. These youth, compared to general high school youth, are at relatively high risk for drug abuse and risky sexual behavior (Black, Sun, Rohrbach, & Sussman, 2011). CHS youth are more likely to begin assuming adult roles during the high school years, such as working full time, getting married, and having children, making them resemble emerging adults rather than adolescents (Rohrbach, Sussman, Dent, & Sun, 2005).

Goals of the Present Paper

The present paper had three main goals: (a) to assess the 1-year impact of Project TND, the school-based classroom program, on substance use, (b) to assess whether an MI booster component enhanced the effects of the school-based TND program, and (c) to test for generalization effects to risky sexual behaviors. Participating schools were randomly assigned to one of three conditions: standard care control (SCC), TND classroom program only (TND-only), or TND plus motivational interviewing (TND + MI). We examined the effects of the two program conditions, both separately and as an aggregated program condition (TND-only and TND + MI combined; i.e., Any TND) on substance use and unsafe sexual behavior outcomes.

Method

School Selection and Experimental Design

Continuation high schools in four counties in Southern California were recruited. In order to be eligible for the study, schools had to meet the following criteria: (a) at least 5% of enrolled students had to be of non-Hispanic White ethnicity (to try to reflect the ethnic composition of samples in previous TND studies), (b) the location of the school had to be within 75 miles of the project headquarters (to maximize feasibility of implementation), (c) the school had to include only grades 9 through 12 (to fit the grade range targeted by TND materials), and (d) schools had to offer at least two classes, with a minimum of 60 students per school (to achieve a sufficient sample size per school). A total of 61 schools met these four criteria (these schools were considered to be on a "waiting list" for potential recruitment).

We then calculated a linear composite score of "drug use risk" for each of the 61 candidate schools (e.g., Graham, Flay, Johnson, Hansen, & Collins, 1984). To do this, we engaged in a principal factor analysis with promax rotation on eight archival-level variables for each school (percent Hispanic, non-Hispanic White, African American, and Asian ethnicity; percent free lunch; mean English standardized test score; mean math standardized test score; and school enrollment number). Three factors were found (high Hispanic/low non-Hispanic White; low math and English test scores; and high African American/high Asian) and combined. Derived from a previous study that predicted adolescent tobacco, alcohol, and marijuana use from California Department of Education archival data (Dent, Sussman, & Flay, 1993), and replicating the same findings with newer CHS data from a recent study

(Sussman, Miyano, Rohrbach, Dent, & Sun, 2007), we calculated a linear composite score for each school on "drug use risk," where the highest score reflected highest risk for future drug use.

Next, schools were aligned by the composite score of "drug use risk." We began recruitment by approaching the schools with the highest score for drug use risk. If recruitment for a specific school was not achieved, we approached the school with the next highest score. After we recruited sets of three schools with similar drug use risk scores, we randomly assigned them to the three conditions using computer-generated random numbers. We did this until we were able to assign 24 schools to the three conditions. As described in the CONSORT diagram (see Figure 1), of the 61 candidate schools that met the selection criteria, 37 schools were not recruited (22 were unable to participate and 15 were still on the "waiting list" and never approached for potential recruitment).

Project TND School-Based Curriculum Delivery

The Project TND curriculum is comprised of 12 classroom sessions, approximately 45 min each, and has been described at length elsewhere (Lisha et al., 2011; Sussman et al., 2002). In the two program conditions (TND-only and TND + MI), the class-

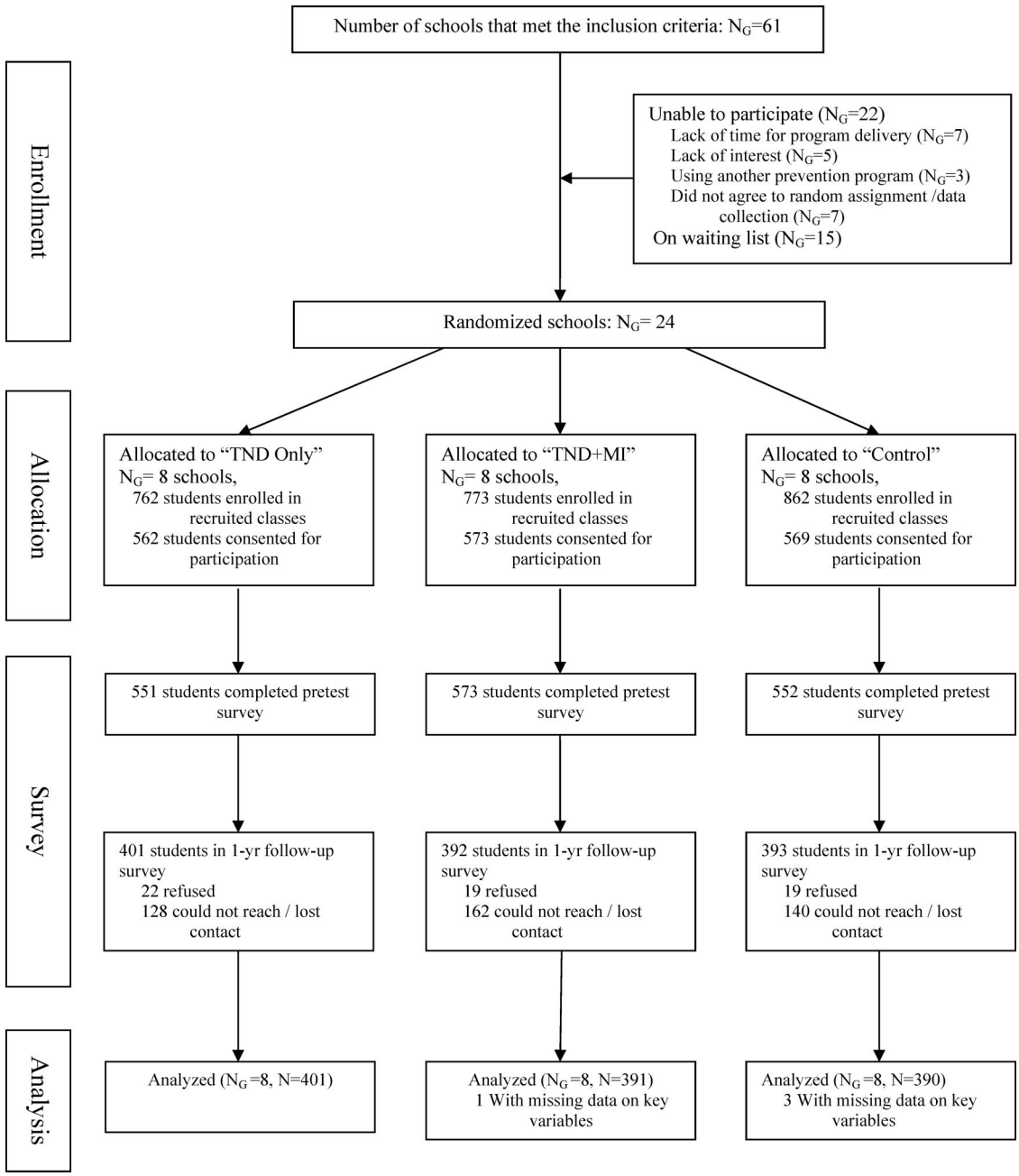

Figure 1. TND-7 CONSORT diagram.

room sessions were delivered by trained health educators in selected classrooms over a 4-week period. In the control condition (SCC), participants received only the drug use prevention activities, if any, that were provided directly by their school.

Process evaluation data showed that for the first program session, average attendance among participants was 73%. The average attendance for each day after the first was 66%. Participants attended an average of 67% of the sessions overall. Health-educator-reported implementation fidelity data showed that for 86.1% of the sessions that were delivered, health educators did not omit any of the material specified in the manual (Lisha et al., 2011). Using an index that averaged participants' ratings of how much they liked each classroom session on 10-point Likert scales (1 = *not at all* to 10 = *very much*), we found that the average likeability of the sessions was 6.6 (*SD* = 2.8). We failed to find a statistically significant difference between the two program conditions on program likeability ($F = 1.349$, *ns*; Lisha et al., 2011). In addition, program likeability was not related to any drug use outcomes at 1-year follow-up (all *p*s $> .1$, two-tailed).

MI Booster Implementation

The MI booster component was comprised of contacts between trained MI interventionists and the youth in the TND + MI condition (Barnett et al., 2011). The target number of MI sessions was three, each lasting approximately 20 min. The first MI contact was conducted in-person within 1 to 3 days after completion of the classroom-based instruction and immediate posttest. The second and third contacts were conducted via the telephone in 3- to 4-month intervals. In cases where we were unable to meet the youth in person for the first contact, participants were contacted by telephone, and the second contact was attempted in person if they were still attending the same school. Overall, we reached 93% of students for at least one contact. Of those reached, 32% ($n = 180$) of students were reached once, 37% ($n = 209$) were reached twice, and 24% ($n = 139$) were reached 3 times (see Barnett et al., 2011). MI telephone sessions were audio taped and coded.

On average, the MI sessions met the proficiency standard indicated in the Motivational Interviewing Treatment Integrity (MITI) guidelines (Moyers, Martin, Manual, & Miller, n.d.), exceeding the standard for all global measures and behavioral counts (Barnett et al., 2011). For example, global measures of proficiency included evocation (ability to draw out participants' ideas about change), collaboration (viewing participant as a partner), support for participant autonomy, ability to remain focused on a behavioral change target, and empathy (demonstrating understanding of participant's perspective). Each of these measures was rated higher than the proficiency standard of 3.5 on 5-point scales (1 = low to 5 = high; all standard deviations <1.0). Further, 88% of the contacts exceeded proficiency in MI-consistent behaviors, with 68%, 62%, and 64%, respectively, exceeding proficiency in percent complex reflection, percent open questions, and percent reflection-to-question ratio (Barnett et al., 2011).

Data Collection Procedures

In order to participate in the study, signed (or verbal) parental informed consent and participant written assent were required for youth under age 18. Signed informed consent was obtained from participants aged 18 and older. At least two classrooms in each school were selected to participate in the study. Of the enrolled students in these classes, 1704 (71.1%) were consented to participate in the study (see Figure 1). Reasons for participant-level decline were parent decline of consent (0.8%), student decline of consent or assent (5.1%), or parental nonresponse (23.4%). Of the 1704 consented participants, 1676 completed the pretest survey. Of the 1676 participants who completed pretest surveys, 1186 (70.8%) completed 1-year follow-up surveys.

Those who completed both pretest and 1-year follow-up surveys, and had nonmissing data for the key variables ($N = 1182$), constitute the present sample. The required number of participants was calculated before the study, so that the study would have adequate statistical power ($>.80$) to detect a small main effect (i.e., a net effect between the intervention groups as small as 0.30 standard deviations [*SD*], or an odds ratio [*OR*] between the intervention groups as small as 0.58, as defined by Cohen, 1977).

A closed-ended, self-report questionnaire was administered to participants at pretest, immediately following implementation of the school program (to assess quality of implementation of the classroom program; Lisha et al., 2011), and approximately 1 year after the immediate posttest. If a student was absent during a data collection day, an absentee packet was left with instructions. The surveys took approximately 20 to 30 min to complete. All study procedures, including informed consent, were approved by the University of Southern California's Institutional Review Board. All pretest surveys were administered on-site. At the 1-year follow-up, participants who were no longer enrolled at the high school or who failed to return the absentee questionnaire were contacted by telephone for survey administration. The phone survey accounted for 60.5% of the 1-year follow-up survey administration. The pretest (baseline) and 1-year follow-up survey responses were examined in the present study.

Measures

Demographic characteristics. These items included age (years), gender, ethnicity (indicator coded as non-Hispanic White, Hispanic, African American, mixed ethnicity, or other [Asian, American Indian/Native American, or "other"]), and whom the student lived with (both parents, only mother, only father, sometimes mother and sometimes father, other, or alone; coded as living with both parents or not). Socioeconomic status was assessed by parent education and rooms-per-person in the home. Parent education was measured as the single highest value considered across both parents, as a six-level variable ranging from "did not complete eighth grade" to "attended or completed graduate school." Rooms-per-person was calculated as the quotient of total number of rooms (except kitchen, bathrooms, closets, or laundry rooms) divided by the number of people living in the home.

Substance use behavior. The primary dependent variable in this study was current (30-day) substance use, measured at pretest and 1-year follow-up. At each time point, participants were asked, "How many times in the last month have you used. . ." each of 12 different substance categories. Frequency of cigarette and alcohol use, getting drunk on alcohol, marijuana, and hard drug use (cocaine, hallucinogens, stimulants, inhalants, ecstasy, pain killers, tranquilizers, or other hard drugs) were assessed. The responses to the last eight drug categories (cocaine through other drugs) were

summed to form a hard drug use index ($\alpha = .82$). On all substance use items, responses were reported on 12-point scales, starting at "0 times" and increasing in intervals of 10 (e.g., "1–10 times," "11–20 times"), with the last (12th) category being "over 100 times." Finally, an overall substance use index was calculated by combining 30-day use of cigarettes, alcohol, marijuana, and hard drugs (coded as log transformed use levels). The reliability of the drug-use item format used herein has been previously established (Graham, Flay, Johnson, Hansen, Grossman, et al., 1984; Needle, McCubbin, Lorence, & Hochhauser, 1983; Stacy et al., 1990).

Risky sexual behavior. Participants were also asked about risky sexual behavior (as in Griffin et al., 2006). Two three-category nominal variables and two ordinal variables were selected as risky sexual behavioral outcomes. Participants were asked, "Was a condom used the *last time* you had sexual intercourse?" This item was coded as "yes," "no," or "I have not had sexual intercourse." A second nominal variable was created for sexual intercourse while using alcohol or other drugs. Specifically, participants were asked, "During the past 30 days, how many times did you have sexual intercourse while using alcohol or other drugs?" (in increments of 5, from "0 times," "1–5 times," "6–10 times," to "more than 30 times," or "I did not have sexual intercourse"). This item was coded as "0 times," "1 or more times," or "I have not had sexual intercourse." For the two ordinal variables, participants were asked two items pertaining to the "last 30 days" and "last 12 months": "With how many people have you had sexual intercourse?" Responses were "0," "1," "2," in increasing increments of one up to "more than 10 people."

Perceived quality of the classroom program. In the immediate posttest survey, administered just following the implementation of the 12-session classroom program (and prior to MI administration in the TND + MI condition), participants were asked to report how much they liked each of the program sessions. There were 12 questions, one for each session, on 10-point Likert scales (1 = "I did not like it at all" to 10 = "I liked it very much"). These items were averaged.

Data Analysis

To assess the program's effect on drug use, three different types of models were conducted by treating the drug use outcomes as either dichotomous, ordinal count measures, or continuous measures. The dichotomous outcome was defined as "true" if a specific drug was used one or more times in the last 30 days. The dichotomous outcome analysis was completed by using a generalized mixed-linear model (Murray & Hannan, 1990; SAS Institute, 2008), which reports the odds ratio (*OR*) of substance use status between conditions. A 12-level ordinal count measure from "0" to "over 100" was defined to assess the number of times of drug use in the last 30 days. The second type of analysis, with ordinal count measures, was completed by using zero-inflated negative binomial (ZINB) distribution modeling (Lewsey & Thomson, 2004). The Incident Rate Ratio (IRR) between conditions in average number of times of drug use is calculated in ZINB modeling. Two continuous outcomes were addressed in the third type of analysis, a hard drug use index and an overall substance-use index. These were examined with mixed linear regression assuming two levels of normally distributed disturbances. The analysis with continuous outcomes reports the differences in log of number of times of drug use between conditions. Similar to the analysis of drug use outcomes, we evaluated the generalization effects on risky sexual behaviors using two-level random effects models for the two three-category nominal outcome variables and ZINB models for the two ordinal count outcome measures.

In all models, program effects were fixed at school level. School was considered as a random factor. This specification allows for both the statistical accounting of the intraclass correlation within clustered units (school) on computed significance levels and for the logical generalization of findings beyond the specific sample. Other variables adjusted for in the analyses included the outcome variable measured at baseline (Aickin, 2009), age, gender, ethnicity (non-Hispanic White, Hispanic, African American, mixed ethnicity, and other; coded as four dummy variables), 1-year follow-up survey method (on-site written vs. telephone), and a propensity score for attrition at follow-up (see Assessment of Attrition Bias in Results section). In addition, when incremental effects of MI were evaluated, the perceived quality of classroom program was also adjusted for as a covariate.

Potential moderators of program effects on Any TND (i.e., TND-only and TND + MI combined) versus SCC, or TND + MI versus TND-only, were explored. The potential moderators examined were baseline behavior, age, gender, and ethnicity. All 12 drug use outcomes listed in Table 2, and the four risky sexual behavior outcomes, were examined. Interaction terms between program conditions and the potential moderators were constructed and added to each model as predictors.

In our previous TND trials, the program effects were evaluated using one-tailed tests with a .05 level for statistical significance. The one-tailed tests were conducted because the a priori hypotheses were directional and no iatrogenic effects were found (cf., Ringwalt, Paschall, Gorman, Derzon, & Kinlaw, 2011). To be consistent with our previous work, we made use of one-tailed tests, $p < .05$.

Results

Participants

At baseline (pretest), participants varied from 14 to 21 years of age (mean age = 16.8 years, *SD* = 0.93 years). The sample was 56.6% male, 11.7% non-Hispanic White, 64.9% Hispanic, 4.3% African American, 13.0% mixed ethnicity, and 6.1% other ethnicity (including Asian, Native American, and "other"). About half (51.3%) of the participants reported living with both parents, and approximately 49.2% of youths' fathers and 55.9% of youths' mothers had completed high school. At pretest, 70.1% of the participants self-reported use of cigarettes, alcohol, marijuana, and/or hard drugs in the last 30 days (41.0%, 58.3%, 45.5%, and 26.7% reported use of cigarettes, alcohol, marijuana, and hard drugs, respectively).

Assessment of Attrition Bias

To assess the potential sample bias introduced by attrition at 1-year follow-up, a comparison was made of the current analysis sample ($n = 1186$) to the lost-to-follow-up sample ($n = 494$) on 11 key baseline (pretest) measures. Measures included age; gender; ethnicity (non-Hispanic White, Hispanic, African American,

mixed, and other); living with both parents or not; parents' education; rooms per person; 30-day cigarette, alcohol, marijuana, and hard-drug use; and 30-day drunkenness on alcohol. The comparisons utilized chi-square or *t* test models to indicate statistically significant differences between the two samples (*p* value at the .05 level, two-tailed). Of the 11 comparisons, three statistically significant differences were detected. The retained sample was slightly younger (16.7 vs. 16.9 years of age), more likely to live with both parents (51.3% vs. 44.4%), and less likely to smoke marijuana (45.5% vs. 53.0%) compared with the lost-to-follow-up sample. The attrition rate was not statistically different across program conditions (32.6% in SCC, 30.6% in TND-only, and 36.8% in TND + MI, $p = .58$).

This pattern of results indicates that comparability between the retained and lost-to-follow-up samples was, in general, achieved; but caution is still needed to extrapolate the findings generated from the retained sample to the overall recruited sample. Because there is no drug-use or demographic characteristics information on those participants not measured at pretest, the extent of study generalizability is limited to a population with pretest measurement access restrictions like those experienced in this study (i.e., similar administrative access, absentee and refusal mechanisms).

To statistically adjust for possible bias induced by nonrandom attrition at 1-year follow-up, a "propensity-to-attrition" score was calculated for each participant retained at the 1-year follow-up. This score is calculated by associating the difference in the 11 baseline measures to the actual attrition status in a multiple regression analysis and assuming the association is also maintained among the participants retained at 1-year follow-up (Berger, 2005).

Baseline Measures Across Program Conditions

Table 1 presents a summary of variables of interest at baseline by program condition. Cross-condition comparability was achieved for age, ethnicity, follow-up survey method, propensity-to-attrition score, and the six substance use and four risky sexual behavior outcome measures. However, there were a relatively lower proportion of male participants in the TND-only condition. To statistically adjust for possible confounding induced by the incomparability across program conditions, participants' gender was one of the covariates included in the models.

Program Effects at One-Year Follow-Up

The results for the three types of program effects evaluation models (dichotomous, ordinal, and continuous) for each substance use outcome are summarized in Table 2. The data indicate that any TND programming (i.e., received TND-only or TND + MI) showed significant positive effects on lowering the proportion (status) of substance users ($OR < 1.0$) and reducing the number of times of substance use (IRR < 1.0); however, there were no statistically significant differences between the TND + MI and TND-only groups. Looking at any TND versus the SCC, there were one-tailed effects ($p < .05$) on 30-day alcohol use ($p < .011$), drunk on alcohol ($p < .039$), and hard drug use ($p < .035$). There were also effects on number of times for use of cigarettes ($p < .035$), alcohol ($p < .046$), and hard drugs ($p < .026$). Further analysis with the two index indicators revealed that any TND programming generated a statistically significant effect on both the hard drug use index ($\beta = -0.14 \pm 0.06$ *SD*, $p = .023$) and on the substance use index ($\beta = -0.28 \pm 0.12$ *SD*, $p = .014$). The TND + MI programming did not significantly enhance the effect on the hard drug use index ($\beta = -0.05 \pm 0.08$ *SD*, $p = .27$) or the substance use index ($\beta = 0.05 \pm 0.15$ *SD*, $p = .38$) over TND-only programming. Additional analyses showed that the program effects were not statistically different across substance users or nonusers at pretest (all *p*s $> .05$).

TND programming did not exhibit generalization effects to risky sexual behaviors. For the two risky sexual behaviors defined as three-category nominal outcomes (condom use, sex under the influence of alcohol or drugs), the ORs for the test of any TND versus SCC were between 0.9 and 1.0 (all *p*s >0.05). The analysis on the two ordinal outcomes revealed that TND programming failed to reduce the number of sex partners in the last year and last month (both IRRs were between 0.9 and 1.0; all *p*s > 0.05). Further, the comparison between the TND + MI and TND-only conditions failed to show statistically significant differences on any of the four measures of risky sexual behaviors (all ORs or IRRs were between 0.85 and 1.0; all *p*s > 0.05).

We explored the data to see if there was an incremental effect of MI among demographically delineated subgroups (age, gender, or ethnicity). Among all analyses conducted, only one significant subgroup program effect was found. There was a difference in number of times of marijuana use between the TND + MI and TND-only conditions comparing non-Hispanic Whites and other ethnicities (i.e., non-Whites; $p = .01$). The TND + MI condition failed to significantly reduce the number of times of marijuana use in the last 30 days among non-Hispanic Whites (IRR = 1.20, $p = .33$) but reduced the number of times of marijuana use in the last 30 days among non-White participants (IRR = 0.84, $p = .04$). However, subsequent analysis revealed that number of times of marijuana use in either non-Hispanic Whites or non-Whites was not significantly reduced by either program condition versus the SCC condition (all four IRRs were between 0.84 and 1.30, *p*s > 0.05, for TND + MI or TND-only vs. SCC, for non-Hispanic Whites or non-Whites).

Discussion

This was the seventh clustered-randomized controlled trial of Project TND. Effects on drug use were similar to previous trials, the first of which was implemented in 1994–1995, showing that the TND program appears to withstand the test of time and remains an effective program for reducing drug use among older teens. The classroom program had effects on hard drug use in all six previous trials, and showed effects on alcohol, marijuana, and cigarette use in three, two, and one trial, respectively. In the present trial, effects were achieved on use of hard drugs, alcohol, and cigarettes. However, an effect failed to be achieved on marijuana use.

While implemented with fidelity (Barnett et al., 2011), the MI booster component did not provide incremental effects on drug use. The failure to find a significant difference in effect between the two program conditions was not due to a difference in perceived quality of the classroom program, which was controlled for in the analysis. MI has been shown to be effective in approximately 30% of the trials in which it has been utilized with teens ($n = 17$ trials, reviewed by Grenard et al., 2006). However, booster programming with MI following a classroom-based drug prevention program for youth had not been tested to date. It is possible

Table 1
Summary of Variables of Interest at Baseline by Program Condition

	Program condition[a]						
	TND-only (n = 401)		TND + MI (n = 391)		SCC (n = 390)		
	Mean	*SD*	Mean	*SD*	Mean	*SD*	p[b]
Age (yr)	16.6	0.93	16.7	0.99	16.8	0.8	0.70
Gender (% male)	51.1		59.1		59.5		0.03
Ethnicity (%)							
Non-Hispanic White	15.0		8.6		11.3		0.30
Hispanic	55.3		69.6		79.3		0.24
African American	5.9		4.5		2.6		0.58
Mixed	15.0		11.8		12.1		0.74
Other	8.8		5.5		3.7		0.24
Follow-up survey method (% phone-based)	62.1		53.8		65.6		0.28
Propensity-to-attrition score[c]	73.7	0.07	68.8	0.07	72.1	0.7	0.95
Cigarette use in past 30 days							
Status (% used)	41.0		40.8		41.4		0.97
Times of use[d]	2.63	3.12	2.20	2.55	2.50	3.02	0.51
Alcohol use in last 30 days							
Status (% used)	55.6		56.7		63.0		0.17
Times of use[d]	1.94	1.51	2.05	1.82	2.05	1.52	0.60
Drunk on alcohol in past 30 days							
Status (% drunk)	44.1		39.9		46.6		0.32
Times drunk[d]	1.69	1.29	1.74	1.63	1.75	1.35	0.70
Marijuana use in past 30 days							
Status (% used)	42.2		44.3		50.1		0.40
Times of use[d]	2.72	3.19	2.59	2.96	2.79	3.02	0.87
Hard drug use in past 30 days							
Status (% used)	28.5		23.5		28.1		0.65
Times of use[d]	1.88	2.12	1.60	1.71	1.79	1.82	0.42
Hard drug use index (*SD*)[e]	0.06	1.07	−0.08	0.94	0.02	0.98	0.48
Overall substance use index (*SD*)[f]	0.02	1.07	−0.07	0.96	0.05	0.97	0.13
Number of sex partners							
During the past 12 months	1.93	2.40	1.73	2.30	2.13	2.53	0.25
During the past 30 days	0.74	1.18	0.72	1.33	0.85	1.37	0.47
Condom used during the last sex intercourse (%)							
Yes	36.1		41.5		44.7		0.16
No	35.9		33.0		32.8		
No sex	28.0		25.5		22.5		
Had sexual intercourse while using alcohol or other drugs during past 30 days (%)							
Yes	27.3		28.9		25.8		0.15
No	23.6		18.5		24.7		
No sex	49.1		52.6		49.5		

[a] Program Condition: SCC = standard care control; TND-only = TND Classroom Program Only; TND + MI = TND plus motivational interviewing (MI). [b] Two-tailed significance for difference across program conditions, since differences are nondirectional, with school-level random effect modeled. [c] Propensity for attrition at 1-year follow-up survey, predicted by factors assessed at baseline survey. [d] Times of use in last 30 days, assessed with an 12-level categorical score: 0, 1–10, 11–20, 21–30, 31–40, 41–50, 51–60, 61–70, 71–80, 81–90, 91–100, or 100 + times. [e] An index of hard drug use was constructed by taking the log value of the average number of times of use of different types of hard drugs in the last 30 days, including cocaine, hallucinogens, stimulants, inhalants, ecstasy, pain killers, tranquilizers, and other hard drugs. [f] An index of overall substance use was constructed with the Z scores of the 12-level times of use in last 30 days for cigarettes, alcohol, marijuana, and hard drug use. The index was standardized to $M = 0$ and $SD = 1$.

that booster programming is not an essential feature of drug use prevention interventions with older teens that simply may not have the time or inclination to participate extensively in such programming, particularly without voluntarily approaching a treatment agent with a presenting drug use difficulty. Future studies using our project data will examine the contents of the audio taped MI sessions and attempt to discern what components of the interactions, if any, might have impacted on drug use positively or negatively.

One may speculate that variation in the delivery of MI somehow contributed to this component's failure to achieve an effect. For example, engaging in a telephone version of MI may have led to a lesser impact than might an in-person version. Participants in the TND + MI condition received up to three MI sessions (one in person and up to two on the telephone). This design introduced variability into the outcome data through a variable number of sessions and variations in delivery modality. Furthermore, although the MI facilitators were all proficient at MI and delivered

Table 2
Program Effects on Substance Use Outcomes at One-Year Follow-Up

	Any TND versus SCC[a]				TND + MI versus TND-only[a]			
	At One-year Follow-up		Net effect		At One-year Follow-up		Net effect	
	Any TND (%)	SCC (%)	*OR* (95% CI)[b]	p[c]	TND + MI (%)	TND-only (%)	*OR* (95% CI)[b]	p[c]
Substance use status[b]								
Cigarette use	35.0	40.0	0.80 (0.61–1.04)	0.079	36.1	35.9	1.01 (0.73–1.41)	0.481
Alcohol use	43.8	53.3	0.68 (0.51–0.91)	0.011	42.4	46.0	0.86 (0.61–1.22)	0.243
Drunk on alcohol	27.5	36.07	0.67 (0.46–1.98)	0.039	27.1	30.1	0.86 (0.54–1.36)	0.289
Marijuana use	37.0	41.1	0.84 (0.60–1.18)	0.190	32.6	41.5	0.68 (0.45–1.02)	0.058
Hard drug use	15.4	21.1	0.68 (0.48–0.96)	0.035	13.8	18.3	0.71 (0.46–1.09)	0.103
	Any TND	SCC	IRR (95%CI)[d]	p[c]	TND + MI	TND-only	IRR (95%CI)[d]	p[c]
Times of substance use[d]								
Cigarette use	2.63	2.97	0.87 (0.77–0.99)	0.035	2.47	2.79	0.88 (0.77–1.01)	0.065
Alcohol use	1.72	1.91	0.91 (0.83–1.00)	0.046	1.70	1.74	1.00 (0.89–1.12)	0.481
Drunk on alcohol	1.44	1.58	0.91 (0.82–1.01)	0.068	1.37	1.51	0.94 (0.83–1.06)	0.193
Marijuana use	2.36	2.52	0.95 (0.84–1.07)	0.247	2.22	2.51	0.92 (0.83–1.02)	0.073
Hard drug use	1.48	1.70	0.87 (0.77–0.98)	0.026	1.41	1.55	0.92 (0.80–1.05)	0.147
	Any TND	SCC	$\beta \pm$ se (*SD*)	p[c]	TND + MI	TND-only	$\beta \pm$ se (*SD*)	p[c]
Index indicators of substance use								
Substance use index[e]	−0.09	0.19	-0.28 ± 0.12	0.014	−0.07	−0.12	0.05 ± 0.15	0.38
Hard drug use index[f]	−0.05	0.09	-0.14 ± 0.06	0.023	−0.08	−0.03	-0.05 ± 0.08	0.27

[a] Program Condition: SCC = Standard Care Control; TND-only = TND Classroom Program Only; TND + MI = TND plus motivational interviewing (MI). Any TND: TND-only combined with TND + MI (i.e., received either program condition). All models were adjusted for the corresponding substance use at baseline, age, gender, ethnicity, propensity-to-attrition score, and survey method at follow-up. In addition, perceived quality of classroom program was added as a covariate for the evaluation regarding TND + MI versus TND-only. [b] The outcomes were coded as binary indicators of substance use. Evaluation was conducted with two-level random coefficients modeling; program effects were assumed to be fixed and school effects were assumed to be random. Binary outcomes for each type of substance use were linked to the linear combinations of predictors with a logit link function. Exp(beta) is thus the odd ratio (*OR*) for the substance use variable at 1-year follow-up. Analysis was adjusted for the corresponding substance use at baseline, age, gender, ethnicity, propensity-to-attrition score, and survey method at follow-up. [c] p for one-tailed hypothesis test generated from t test for evaluations on both types of outcomes. [d] The outcomes were coded as 12-level count (times) of substance use. Evaluation was conducted with two-level random coefficients modeling; program effects were assumed to be fixed and school effects were assumed to be random. A zero-inflated negative binomial (ZINB) distribution was applied to model the number of times of substance use. The mean for the ZINB distribution was linked to the linear combinations of predictors with a log link function. The incident rate ratio (IRR) is thus the relative increase of the average number of times of substance use. Analysis was adjusted for the corresponding substance use at baseline, age, gender, ethnicity, propensity-to-attrition score, and survey method at follow-up. [e] Continuous index of overall substance use, coded as the log of an equally weighted sum of the log-transformed 12-level indicators of cigarette use, alcohol use, marijuana use, and hard drug use. Evaluation was conducted with two-level random coefficients modeling; program effects were assumed to be fixed and school effects were assumed to be random. The outcome was standardized to $SD = 1$; thus, the metric for beta is "*SD*," or can be interpreted as the "effect size" for means comparison. [f] An index that is the log of the average number of times of different types of hard drug use in the last 30 days. Hard drugs measured included cocaine, hallucinogens, stimulants, inhalants, ecstasy, pain killers, tranquilizers, and "other" hard drugs.

the MI sessions with fidelity (Barnett et al., 2011), the fact that several facilitators were used also introduces variability in the outcome measures. It is possible that these several sources of variability underlie the lack of significant effects for the MI booster component. Future research should consider the impact of variation in MI delivery on drug use outcomes among teens. The one significant TND + MI incremental effect on number of times of marijuana use among non-White participants was found between the two program conditions but not between the program conditions and the SCC condition; thus, it failed to indicate a preventive program effect.

The effects of the classroom program also failed to generalize to unsafe sexual behavior. While a previous trial did obtain these effects (Life Skills Training; Griffin et al., 2006), that trial was completed with general population young teens who were followed up 12 years later, and some of the contents of that program may have tangentially targeted sexual behavior (e.g., dating skills). In comparison, the current trial was completed with older teens that were relatively sexually active. For example, approximately 40% reported more than one sex partner during the last 12 months (also see Black et al., 2011). It is possible that for programming to be effective in reducing risky sexual behavior among teens, it needs to address sexual behavior directly.

Practical Implications

There are several practical implications of these findings, as pertaining to older adolescents who are at risk for substance abuse and other risky behaviors. First, one may infer that the Project TND program can be delivered without use of booster sessions, with no loss of efficacy at least at 1-year follow-up. Of course it is possible that more directive booster programming could be relatively efficacious. For example, Sussman, Skara, and Pumpuang (2008) demonstrated high receptivity of a proactive telephone booster involving provision of social service resources in CHS students' communities. Conversely, an MI intervention may be most useful when a psychological

issue has been established prior to engaging in the protocol. In addition, implementation of MI programming in school settings would be difficult without a commitment of counseling staff on the part of school districts or third parties.

The provision of three 1-hr classroom program sessions per week for 4 weeks would seem reasonably manageable in most school settings. Nevertheless, institutionalization of the classroom program in high schools has not been an easy task. Recent work suggests that nonschool organizations may be better able than schools to achieve funding that permits continued implementation of evidence-based programming (Rohrbach, Gunning, Grana, Gunning, & Sussman, 2010). Another issue in implementation of Project TND relates to the program provider. The current implementation was completed by trained health educators. Our recent work suggests that classroom teachers can deliver TND as well as health educators (Rohrbach, Sun, et al., 2010; Sun et al., 2008), given provision of a 2-day workshop-type training. Thus, with the availability of funding or certified trainers within school districts, this aspect of implementation can be readily institutionalized. The fact that Project TND has been efficacious utilizing the same type of material for the last 15 years with no apparent diminished effects suggests that such programming can be incorporated into high-school-based drug education and implemented with adequate fidelity.

Second, it appears that to affect a decrease in the prevalence of risky sexual behavior, separate or additional programming is needed. The fact that 6.2% of this sample of CHS youth were already parents at the baseline assessment, and that 42% of CHS youth are parents by 5 years thereafter (Sussman, 2010), suggests that sex-education-type of material is a priority for this target group even prior to attendance at CHS. While at the CHS, a more comprehensive package of education on family planning, safe sexual behavior, and child-parent roles may be needed to assist these youth through a truncated adolescent developmental period (Sussman, 2010).

Conclusions

The achievement of consistent effects of Project TND on hard drug use and somewhat consistent effects on alcohol use among a high-risk population of youth is an important finding. Whereas some programs may fail to achieve effects across the spectrum of drug use behavior (Skara & Sussman, 2003), in the present study we found that program effects did not vary as a function of use status at pretest. This finding further highlights the applicability of TND to older teens and emerging adults. Continuation high school participants are quite amenable to a certain type of limited-length prevention programming, and drug use behaviors can be influenced and effects maintained for 1 year or longer among these participants. Two- and 3-year outcome data are being collected, which will further help to understand the results obtained in the present study. Future studies, however, are needed to better identify why Project TND works. Sussman, Rohrbach, Patel, and Holiday (2003) suggested that explicit, structured action on the part of the teacher to have students make statements and ask questions of one another (classroom group change talk) may be the essence of effective drug education program delivery, apart from specific program contents. Possibly, a comprehensive process analysis of the TND classroom will reveal the conditions in which the program best operates.

References

Aickin, M. (2009). Dealing with change: Using the conditional change model for clinical research. *The Permanente Journal, 13,* 80–84.

Barnett, L., Spruijt-Metz, D., Unger, J., Sun, P., Rohrbach, L. A., & Sussman, S. (2011). *A brief motivational interviewing booster for adolescents in a substance use prevention context.* Manuscript submitted for publication.

Berger, V. W. (2005). The reverse propensity score to detect selection bias and correct for baseline imbalances. *Statistics in Medicine, 24,* 2777–2787. doi:10.1002/sim.2141

Black, D. S., Sun, P., Rohrbach, L. A., & Sussman, S. (2011). Decision-making style and gender moderation of the self-efficacy–condom use link among adolescents and young adults. *Archives of Pediatrics & Adolescent Medicine, 165,* 320–325. doi:10.1001/archpediatrics.2011.17

Boyle, R. G., Pronk, N. P., & Enstad, C. J. (2004). A randomized trial of telephone counseling with adult moist snuff users. *American Journal of Health Behavior, 28,* 347–351.

Brannigan, R., Schackman, B. R., Falco, M., & Millman, R. B. (2004). The quality of highly regarded adolescent substance abuse treatment programs: Results of an in-depth national survey. *Archives of Pediatrics & Adolescent Medicine, 158,* 904–909. doi:10.1001/archpedi.158.9.904

Cohen, J. (1977). *Statistical power for the behavioral sciences.* New York, NY: Academic Press.

Cuijpers, P. (2002). Effective ingredients of school-based drug prevention programs: A systematic review. *Addictive Behaviors, 27,* 1009–1023. doi:10.1016/S0306-4603(02)00295-2

Curry, S. J., Ludman, E. J., Grothaus, L. C., Donovan, D., & Kim, E. (2003). A randomized trial of a brief primary-care-based intervention for reducing at-risk drinking practices. *Health Psychology, 22,* 156–165. doi:10.1037/0278-6133.22.2.156

Dent, C. W., Sussman, S., & Flay, B. R. (1993). The use of archival data to select and assign schools in a drug prevention trial. *Evaluation Review, 17,* 159–181. doi:10.1177/0193841X9301700203

Dent, C. W., Sussman, S., McCuller, W. J., & Stacy, A. W. (2001). Project Towards No Drug Abuse: Generalizability to a general high school sample. *Preventive Medicine, 32,* 514–520. doi:10.1006/pmed.2001.0834

Elder, J. P., Woodruff, S. I., & Eckhardt, L. (1994). Participation in a telephone-based tobacco use prevention program for adolescents. *American Journal of Health Promotion, 9,* 92–95.

Graham, J. W., Flay, B. R., Johnson, C. A., Hansen, W. B., & Collins, L. M. (1984). Group comparability: A multiattribute utility measurement approach to the use of random assignment with small numbers of aggregated units. *Evaluation Review, 8,* 247–260. doi:10.1177/0193841X8400800206

Graham, J. W., Flay, B. R., Johnson, C. A., Hansen, W. B., Grossman, L. M., & Sobel, J. L. (1984). Reliability of self-report measures of drug use in prevention research: Evaluation of the Project SMART questionnaire via the test-retest reliability matrix. *Journal of Drug Education, 14,* 175–193. doi:10.2190/CYV0–7DPB-DJFA-EJ5U

Grenard, J. L., Ames, S. L., Pentz, M. A., & Sussman, S. (2006). Motivational interviewing with adolescents and young adults for drug-related problems. *International Journal of Adolescent Medicine & Health, 18,* 53–68. doi:10.1515/IJAMH.2006.18.1.53

Griffin, K. W., Botvin, G. J., & Nichols, T. R. (2006). Effects of a school-based drug abuse prevention program for adolescents on HIV risk behavior in young adulthood. *Prevention Science, 7,* 103–112. doi:10.1007/s11121-006-0025-6

Kypri, K., Sitharthan, T., Cunningham, J. A., Kavanagh, D. J., & Dean, J. I. (2005). Innovative approaches to intervention for problem drinking. *Current Opinion in Psychiatry, 18,* 229–234. doi:10.1097/01.yco.0000165591.75681.ab

Laken, M. P., & Ager, J. W. (1996). Effects of case management on retention inn prenatal substance abuse treatment. *American Journal of Drug & Alcohol Abuse, 22,* 439–448. doi:10.3109/00952999609001670

Leed-Kelly, A., Russell, K. S., Bobo, J. K., & McIlvain, H. (1996).

Feasibility of smoking cessation counseling by phone with alcohol treatment center graduates. *Journal of Substance Abuse Treatment, 13,* 203–210. doi:10.1016/S0740-5472(96)00052-9

Lewsey, J. D., & Thomson, W. M. (2004). The utility of the zero-inflated Poisson and zero-inflated negative binomial models: A case study of cross-sectional and longitudinal DMF data examining the effect of socio-economic status. *Community Dentistry & Oral Epidemiology, 32,* 183–189. doi:10.1111/j.1600-0528.2004.00155.x

Lisha, N. E., Sun, P., Rohrbach, L. A., Spruijt-Metz, D., Unger, J. B., & Sussman, S. (2011). *An evaluation of immediate outcomes and fidelity of a drug abuse prevention program in continuation high schools: Project Towards No Drug Abuse (TND*). Manuscript submitted for publication.

MacDonald, T. K., Zanna, M. P., & Fong, G. T. (1998). Alcohol and intentions to engage in risky health-related behaviors: Experimental evidence for a causal relationship. In J. Adair, D. Belanger, & K. L. Dion (Eds.), *Advances in Psychological Science. Vol. 1. Social, Personal, and Cultural Aspects* (pp. 407–428). East Sussex, England: Psychology Press.

McCuller, W. J., Sussman, S., Holiday, K., Craig, S., & Dent, C. W. (2002). Tracking procedures for locating high risk youth. *Evaluation and the Health Professions, 25,* 345–362. doi:10.1177/0163278702025003006

Mermelstein, R., Hedeker, D., & Wong, S. C. (2003). Extended telephone counseling for smoking cessation: Does content matter? *Journal of Consulting and Clinical Psychology, 71,* 565–574. doi:10.1037/0022-006X.71.3.565

Míguez, M. C., Vazquez, F. L., & Becona, E. (2002). Effectiveness of telephone contact as an adjunct to a self-help program for smoking cessation: A randomized controlled trial in Spanish smokers. *Addictive Behaviors, 27,* 139–144. doi:10.1016/S0306-4603(00)00166-0

Miller, W. R., & Rollnick, S. (2002). *Motivational interviewing*. New York, NY: Guilford Press.

Murray, D. M., & Hannan, P. J. (1990). Planning for the appropriate analysis in school-based drug prevention studies. *Journal of Consulting and Clinical Psychology, 58,* 458–468. doi:10.1037/0022-006X.58.4.458

Needle, R., McCubbin, H., Lorence, J., & Hochhauser, M. (1983). Reliability and validity of adolescent self-reported drug use in a family-based study–A methodological report. *International Journal of the Addictions, 18,* 901–912.

Ringwalt, C., Paschall, M. J., Gorman, D., Derzon, J., & Kinlaw, A. (2011). The use of one- versus two-tailed tests to evaluate prevention programs. *Evaluation & the Health Professions, 34,* 135–150. doi: 10.1177/0163278710388178

Rohrbach, L. A., Gunning, M., Grana, R., Gunning, G., & Sussman, S. (2010). Dissemination of Project Towards No Drug Abuse (TND): Findings from a survey of program adopters. *Substance Use & Misuse, 45,* 2551–2566. doi:10.3109/10826081003725278

Rohrbach, L. A., Sun, P., & Sussman, S. (2010). One-year follow-up evaluation of the Project Towards No Drug Abuse (TND) dissemination trial. *Preventive Medicine, 51,* 313–319. doi:10.1016/j.ypmed.2010.07.016

Rohrbach, L. A., Sussman, S., Dent, C. W., & Sun. P. (2005). The five-year prospective prediction of tobacco, alcohol, and other drug use among high-risk adolescents. *Journal of Drug Issues, 35,* 333–356.

Rooney, B. L., & Murray, D. M. (1996). A meta-analysis of smoking prevention programs after adjustment for errors in the unit of analysis. *Health Education Quarterly, 23,* 48–64.

SAS Institute. (2008). *SAS release 9.2.* Cary, NC: Author.

Skara, S., & Sussman, S. (2003). A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. *Preventive Medicine, 37,* 451–474. doi:10.1016/S0091-7435(03)00166-X

Smedslund, G., Berg, R. C., Hammerstrom, K. T., Steiro, A., Leiknes, K. A., Dahl, H. M., & Karlsen, K. (2011). Motivational interviewing for substance abuse. *Cochrane Database of Systematic Reviews, 5,* 1–128.

Stacy, A. W., Flay, B. R., Sussman, S., Brown, K. S., Santi, S., & Best, J. A. (1990). Validity of alternative self-report indices of smoking among adolescents. *Psychosocial Assessment: Journal of Consulting and Clinical Psychology, 2,* 442–446.

Sun, P., Sussman, S., Dent, C. W., & Rohrbach, L. A. (2008). One-year follow-up evaluation of Project Towards No Drug Abuse (TND4). *Preventive Medicine, 47,* 438–442. doi:10.1016/j.ypmed.2008.07.003

Sun, W., Skara, S., Sun, P., Dent, C. W., & Sussman, S. (2006). Project Towards No Drug Abuse: Long-term substance use outcomes evaluation. *Preventive Medicine, 42,* 188–192. doi:10.1016/j.ypmed.2005.11.011

Sussman, S. (2007). Sexual addiction among teens: A review. *Sexual Addiction. & Compulsivity: The Journal Treatment and Prevention, 14,* 257–278.

Sussman, S. (2010). Emerging adulthood and substance abuse. In L. V. Berhardt (Ed.), *Advances in medicine and biology* (Vol. 6; pp. 221–232). Hauppauge, NY: Nova Science Publishers.

Sussman, S., Dent, C. W., Simon, T. R., Stacy, A., & Craig, S. (1998). One year outcomes of Project Towards No Drug Abuse. *Preventive Medicine, 27,* 632–642 (Erratum, *27*, 766).

Sussman, S., Dent, C. W., & Stacy, S. (2002). Project Towards No Drug Abuse: A review of the findings and future directions. *America Journal of Health Behavior, 26,* 354–365.

Sussman, S., Earleywine, M., Wills, T., Cody, C., Biglan, T., Dent, C. W., & Newcomb, M. D. (2004). The motivation, skills, and decision-making model of "drug abuse" prevention. *Substance Use & Misuse, 39,* 1971–2016. doi:10.1081/JA-200034769

Sussman, S., Miyano, J., Rohrbach, L. A., Dent, C. W., & Sun, P. (2007). Six-month and one-year effects of Project EX-4: A classroom-based smoking prevention and cessation intervention program. *Addictive Behaviors, 32,* 3005–3014. doi:10.1016/j.addbeh.2007.06.016

Sussman, S., Rohrbach, L., Patel, R., & Holiday, K. (2003). A look at an interactive classroom-based drug abuse prevention program: Interactive contents and suggestions for research. *Journal of Drug Education, 33,* 355–368. doi:10.2190/H04H-KGQN-HW9X–6R60

Sussman, S., Skara, S., & Ames, S. L. (2008). Substance abuse among adolescents. *Substance Use & Misuse, 43,* 1802–1828. doi:10.1080/10826080802297302

Sussman, S., Skara, S., & Pumpuang, P. (2008). Project Towards No Drug Abuse (TND): Needs assessment of a social service referral telephone program for high risk youth. *Substance Use & Misuse, 43,* 2066–2073. doi:10.1080/10826080802290208

Sussman, S., Sun, P., McCuller, W. J., & Dent, C. W. (2003). Project Towards No Drug Abuse: Two-year outcomes of a trial that compares health educator delivery to self-instruction. *Preventive Medicine, 37,* 155–162. doi:10.1016/S0091-7435(03)00108-7

Valente, T. W., Ritt-Olson, A., Stacy, A., Unger, J. B., Okamoto, J., & Sussman, S. (2007)., Peer acceleration: Effects of a social network tailored substance abuse prevention program among high-risk adolescents. *Addiction, 102,* 1804–1815. doi:10.1111/j.1360-0443.2007.01992.x

Whelan, V., McBride, D., & Colby, R. (1993). Public health department tracking of high-risk drug users. *Public Health Reports, 108,* 643–645.

White, D., & Pitts, M. (1998). Educating young people about drugs: A systematic review. *Addiction, 93,* 1475–1487. doi:10.1046/j.1360-0443.1998.931014754.x

Zhu, S. H., Tedeschi, G., Anderson, C. M., Rosbrook, B., Byrd, M., Johnson, C. E., & Gutierrez-Terrell, E. (2000). Telephone counseling as adjuvant treatment for nicotine replacement therapy in a "real-world" setting. *Preventive Medicine, 31,* 357–363. doi:10.1006/pmed.2000.0720

Received February 28, 2011
Revision received August 22, 2011
Accepted August 25, 2011 ■