Published in final edited form as:

Subst Use Misuse. 2012 March ; 47(4): 418–428. doi:10.3109/10826084.2011.641057.

Boosting a Teen Substance Use Prevention Program with Motivational Interviewing

Elizabeth Barnett, Donna Spruijt-Metz, Jennifer B. Unger, Ping Sun, Louise Ann Rohrbach, and Steve Sussman

Department of Preventive Medicine, University of Southern California, Los Angeles, California, USA

Abstract

A brief motivational interviewing (MI) intervention may be a viable adjunct to school-based substance abuse prevention programs. This article describes the development and implementation of a brief MI intervention with 573 adolescents (mean age 16.8; 40.3% female, 68% Latino) enrolled in eight continuation high schools in Southern California. Study participants were assigned to the MI condition in a randomized controlled trial of Project Toward No Drug Abuse. Data are provided on dosage, topics discussed, and quality of MI determined with the Motivational Interviewing Skill Code (MISC). Results suggest that the protocol was feasible and implemented with adequate fidelity. The study's limitations are noted.

Keywords

adolescent; motivational interviewing; substance use; prevention; intervention; telephone; school-based; booster

INTRODUCTION

Substance misuse is among the most prevalent causes of adolescent morbidity and mortality in the United States (Brannigan, Schackman, Falco, & Millman, 2004; Sussman & Ames, 2008), particularly among older teens and emerging adults. There are few effective drug use prevention programs that target older teens (Skara & Sussman, 2003). One of these few programs is Project Towards No Drug Abuse (TND), which has been evaluated in six previous randomized controlled trials. Although these trials have shown reductions in the use of cigarettes, alcohol, marijuana, and hard drugs, consistent effects have been obtained on hard drug use only and some program effects (e.g., on alcohol and marijuana use) have faded after 1 year (Sun, Skara, Sun, Dent, & Sussman, 2006). Hence we hypothesized that a booster program might be able to bolster these effects.

For our purposes, booster programming refers to any activity that is designed to enhance the effects of a program (Cuijpers, 2002), including reviewing or reinforcing previously learned material or enhancing motivation to follow through with behavioral intentions developed during the intervention. Skara and Sussman (2003) concluded, based on a review of 25 adolescent substance use prevention programs, that school-based programs have a greater chance of maintaining long-term effects if such programs are “boosted.” However, most of

Address correspondence to Elizabeth Barnett, Department of Preventive Medicine, University of Southern California, 2001 North Soto St, Los Angeles, CA 90032, USA. embarnet@usc.edu.

Declaration of Interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

the support for booster programming has been obtained from meta-analyses (Rooney & Murray, 1996; White & Pitts, 1998) because very few studies have provided direct tests of the relative effects of adding booster programs within an experimental or quasi-experimental trial (Cuijpers, 2002). The most recent randomized controlled trial of TND was designed to determine the efficacy of a booster (Sussman, Sun, Rohrbach, & Spruijt-Metz, 2011) and thus address the gap in the literature identified by Cuijpers.

For the booster, we selected a motivational interviewing (MI) approach. MI is a client-centered counseling approach designed to enhance intrinsic motivation for behavior change by exploring and resolving ambivalence toward changing behavior and habits (Miller & Rollnick, 2002). MI has often been used as an adjunct to other treatments, (Hettema, Miller, & Steele, 2004), suggesting it would be compatible with our 12-session classroom based intervention and has been delivered in brief doses of 10–20 minutes, with the ability to affect behavior in 1–3 sessions (Hettema et al., 2004). Of the 68 studies included in the Hettema et al. meta-analysis, the MI intervention length ranged from 15 minutes to 12 hours (average intervention length was 2.24 hours [SD 2.15]). Effect sizes on alcohol, drug, or tobacco related studies were an average of $d = .3$ for 6–12 months postintervention (lower for cigarette smoking, $d = .14$) and dipped down to around .2 at greater than 12 months, *except* when MI was used to supplement other programming (e.g., when MI was being used as an initial screening tool or as a means of follow-up). In the latter case, the effect size showed stability at $d = .6$. Thus, the use of MI as booster programming for TND materials appears well indicated from this review.

According to a 2006 literature review by Grenard, Ames, Pentz, and Sussman (2006) on substance use interventions with adolescents and young adults, 30% of the included studies ($n = 17$) demonstrated that the MI condition had a significant advantage over the comparison group among youth. They also concluded that length of the sessions did not appear to be an important influence on reducing outcomes.

Furthermore, it appears to be feasible to deliver MI to teens over the telephone (Kaminer, Burleson, & Burke, 2008; Kealey et al., 2009; Peterson et al., 2009). The target population for this intervention was high-risk continuation high school students who appear to be more transient than their regular high school counterparts (McCuller, Sussman, Holiday, Craig, & Dent, 2002), and many research teams have suggested that telephone interventions may be the only way to reach these youth (McCuller et al., 2002; Mermelstein, Hedeker, & Wong, 2003; Míguez, 2002). Hence, a telephone-based intervention appeared to be the most promising modality to deliver booster programming.

Numerous MI studies with adolescents have been delivered via telephone. Kealey et al.'s (2009) process evaluation demonstrated that an MI-based proactive smoking cessation intervention among regular high school students in Seattle was successful in reaching 956 (67.2%) participants for at least one contact. Outcomes from that same study showed that the intervention increased the percentage of prolonged smoking abstinence (Peterson et al., 2009). In a direct comparison of MI provided in person versus over the telephone, Kaminer et al. (2008) found no difference between the aftercare treatment groups, suggesting that advantages of a telephone intervention did not compromise the effect of MI among adolescents.

The present article describes the development and implementation of the MI booster component, specifically, interventionist hiring, retention, training and coaching, participant retention, topics discussed during the MI sessions, and intervention fidelity.

MATERIALS AND METHODS

Design, Study Sample, Measurement, and Procedures

Design and Study Sample—Twenty-four continuation high schools participated in the main trial. School selection criteria are described in Lisha et al. (in press). Schools were randomly assigned to one of three possible conditions: standard care control, TND classroom program only, or TND + MI, resulting in a sample with eight schools per condition. Within each school, at least two classrooms were selected to participate in the study. Participation in the study was voluntary. At each school, one teacher was assigned as a contact for Project TND. We attempted to enroll and consent all the students in the classes taught by this teacher, regardless of drug use status. In order to participate, signed parental informed consent and subject assent were required for youth under age 18. For those 18 and over, signed informed consent was obtained from the participant. Students were provided with elective class credits for their participation in the research study.

Of the enrolled students in the teachers' classes, 1,694 (70.7%) were consented to participate in the study. Of these, 1,676 students completed the pretest survey. Reasons for subject level decline were parental non-response (23.4%), student decline (5.1%), and parent decline (0.8%). Overall, a total of 80% of the participants attended the first classroom session. Across the other classroom sessions, the average attendance was 77%.

The consent form explained their possible assignment into the TND+MI condition. Once the schools had been randomized, students in the MI condition were further informed about the follow-up contacts during the classroom portion of the program. An interventionist made a 5-minute announcement to the students during the later portion of the program (between Sessions 8 and 11, of the 12 sessions). Students were told that they would be meeting individually with someone from the project, not the classroom program instructor, to discuss their thoughts about the program as well as any goals or changes they would like to pursue in the near future. After the announcement was made, students participated in a 5- to 10-minute brainstorming process about the pros and cons of participating in these sessions.

Intervention Development—The booster to the TND classroom program was originally conceptualized as a six-session, telephone-based booster component. The objective of the first session was to review the key points of the classroom program. MI would begin in the second session, followed by four additional MI contacts. We initially intended to implement a booster program session every 4 months after implementation of the classroom program for a period of 2 years (i.e., a total of six calls to each subject), with each call lasting 15–20 minutes.

In order to refine the protocol, we pilot tested the six-session booster intervention with 16 youths who had previously participated in a TND evaluation trial, but who were not from the current study schools. Based on difficulties establishing rapport over the telephone, implementers' anecdotes regarding negative reactions from students, and input from a focus group of continuation high school students, we decided to modify our original plan. First, we would conduct the first interview in person immediately after the classroom-based program in order to establish rapport with the students. Second, we would remove the program material review because it was redundant with what the youth had just learned in the classroom. Third, we would reduce the number of contacts from six to three. Our decision to reduce the number of sessions was influenced by the reception and challenges we encountered while contacting students. Over the telephone, this resistance was displayed as varying degrees of apathy during the discussion and avoidance in taking the calls. Furthermore, the decision to redesign the booster to be delivered in three sessions allowed us

to complete the entire MI intervention between the end of the school-based program and administration of the 1-year follow-up survey.

Transitioning From TND to the Booster—Although TND ends with a personal commitment from students, the booster was designed to begin with eliciting reasons to change. The overall purpose of the MI booster was to enhance motivation or intention to quit, thereby increasing the likelihood that students would actually quit. It was our belief that starting the booster with the student's commitment would have circumvented the building motivation phase of MI (Miller & Rollnick, 2002). Research has shown that one of the mechanisms through which MI builds motivation is dependent upon eliciting and reinforcing reasons to change as well as commitment language (Apodaca & Longabaugh, 2009).

Final MI Booster Intervention—Ultimately, the booster intervention consisted of three 20-minute contacts between the youth and an MI interventionist. The first contact was conducted in person 1–3 days after the completion of the classroom-based instruction and the immediate posttest administration. 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.

The MI booster intervention structure included seven components: an opening, finding a target behavior, exploring ambivalence, summarizing, asking a key or transitional question, action planning, and closing. The structured *opening* informed the youth of the purpose of the session (to gather their impressions about the TND program and discuss behavior of interest to them), their rights, and the limits of confidentiality and provided an opportunity for youth to decline audio recording if he/she desired. For the second and third contacts, the opening consisted of reestablishing an understanding of the purpose of the call and checking-in regarding the topic or behavior discussed in the previous session.

Once interventionists perceived adequate rapport, they shifted their attention to *establishing a behavioral target for change*. Since the first session occurred immediately following the TND program, we believe that students were primed and opened to speaking about substance use. Interventionists prioritized finding a substance use target behavior when possible. If students reported use of multiple substances, the interventionist either asked the student which of the substances they wished to focus on or interventionists proceeded with the topic they deemed most problematic or amenable to change based on details provided by the student. In cases where students disclosed not using any substances, they were either directly asked if there was a health behavior they would like to work on or interventionists used an agenda-setting tool (Spruijt-Metz, Barnett, Davis, & Resnicow, 2011) that allowed the youth to choose among a variety of target behaviors. According to Rollnick, Mason, and Butler (1999), an agenda-setting tool facilitates client engagement as they select the topic and can increase overall effectiveness. We designed an agenda-setting tool to cover a wider range of adolescent health and life concerns, including getting a job, graduating from high school, practicing safe sex, smoking cigarettes, drinking alcohol, smoking marijuana, using club drugs, becoming independent/moving out, exercise, healthy eating, going to college, choosing friends, and having a baby. The flexible protocol and the spirit of client autonomy underpinning this MI intervention make it unlikely that the emphasis on substance use harmed retention rates. For the second and third contacts, interventionists began by following up on the previously established target. Depending on reported progress or change, the interventionist either decided to continue to pursue the topic or went through the agenda-setting process again to find a new target behavior.

Once the target behavior had been established during the first contact, interventionists *explored ambivalence* by inquiring about the pros and cons of the behavior. If appropriate, they also explored the pros and cons of changing the behavior. The second contact employed the use of a personal values exercise (Miller, C'de Baca, Matthews, & Wilbourne, 2001), where students were asked over the phone to select 3 of 15 values, such as good student, good son/daughter, good brother/sister, etc., belief in god, that were read to them. Once students had selected the values, interventionists inquired about why they chose the values. Ultimately, they asked how the target behavior fits in with these values. For the third contact, interventionists asked students to choose three words from a list of positive attributes, such as reliable, strong, honest, trustworthy, etc., that the student felt described them (Miller, editor, 2004; Miller, Hedrick, & Orlofsky, 1991). These words were then used by the interventionist to affirm client strengths and support client self-efficacy to change. The interventionist also explained that these words described people who were successful in making changes in their behavior. Interventionists then asked students to describe how they felt these attributes might be helpful to change the behavior they had been discussing.

After completing the exploration exercise, the protocol indicated the use of a *transitional summary and key question* to reinforce the youth's stated importance or confidence to change and a question that invited the youth to consider what his/her next steps would be. If the student responded to the transitional question by indicating that some type of action or change was needed, the interventionist proceeded to elicit *action steps*. If a student indicated feeling stuck or ambivalent about making change, the interventionist acknowledged this and proposed that the action be limited to checking in about the topic again in a few months to see if his/her thoughts or feelings had changed. Finally, once all of the other steps had been conducted, the contact ended by thanking the student for his/her engagement, openness, and thoughtfulness; expressing optimism about his/her proposed change or enthusiasm about talking to him/her again; confirming the best phone number to reach him/her; and establishing an approximate time at which the student would be called again.

Hiring, Training, and Managing Interventionists—We hired interventionists using a two-stage process. First, applicants completed an adapted Helpful Response Questionnaire (HRQ; Miller et al., 1991), a tool used to assist in assessing counselor empathy. We used a five-item measure asking them to write a response to a client statement that would indicate they were listening (e.g., client statements included “Just because I use drugs doesn't make it a problem. Everybody uses drugs.”) Applicants responding with open-ended questions or reflective listening received invitations to interview. In addition to a structured in-person interview, applicants participated in a recorded mock-telephone interview. Two Motivational Interviewing Network of Trainers (MINT) trained project staff reviewed the recordings for both global skills and behavior counts as set forth in the Motivational Interviewing Treatment Integrity (MITI) 3.0 (Moyers et al., 2007) coding scheme. We selected interventionists based on their ability to meet the global skill proficiency standard in the MITI (see Appendix for more details).

We hired and trained a total of 15 interventionists, hoping to keep caseloads manageable at 20–30 students per interventionist and to have the same interventionist for all contacts with each student. All interventionists had at least a 4-year college degree. We provided a minimum of 40 hours of MI training to interventionists and used the Video Assessment of Simulated Encounters (VASE-R) as a posttest measure of skill (Rosengren, Baer, Hartzler, Dunn, & Wells, 2005). The VASE-R presents three video scenarios that trainees watch and then provide written responses to client statements. These statements are then rated based on established criteria set forth in the manual. All interventionists met these criteria by the end of training (mean score 32 of 36 possible points).

A total of 10 attempts were made to reach each student during each 8-week call period. If a student could not be reached during a contact period, we made another 10 attempts during the next call period, which began 3 months later. Supervision and coaching were provided by two MINT-trained staff members on a biweekly basis to all interventionists. Because all in-person and telephone contacts were recorded, supervisors used the MITI to code a randomly selected recording for coaching, or interventionists could request that a certain contact be reviewed. During supervision, interventionists received feedback on global skills, behavior counts, and adherence to the protocol.

Data Collection Procedures

Student Survey—A closed-ended, self-report questionnaire was administered to students at a pretest, with items that assessed demographic characteristics, substance use behaviors, and psychosocial correlates of substance use. The survey was administered on-site during regular classroom periods and took approximately 20–30 minutes to complete. All study procedures, including informed consent, were approved by the University of Southern California's Institutional Review Board.

Demographic measures included age, gender, and ethnicity (coded as Latino/Hispanic, Caucasian, African American, Mixed, Asian American, Native American, or Other). To assess substance use, subjects were asked “How many times in the last month have you used ...” each of 12 different drug 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 ($\alpha = .82$). Responses were reported on 12-point scales, starting at “0 times,” increasing in intervals of 10 (e.g., “1–10 times,” “11–20 times,”) with the last (12th) category being “over 100 times.”

Recorded MI Contacts—We attempted to record all contacts between the students and MI interventionists. In-person interviews were recorded with handheld digital recorders, while telephone contacts were recorded via a web-based client resource management (CRM) system. The CRM provided an interface for interventionists to access their caseload, keep notes about their conversations, and complete a process measure after each contact. The CRM tracked the date and time of each attempt, providing information to supervisors for staff management purposes.

Client Engagement Measure—Following each MI contact, interventionists completed a client engagement measure that included identifying the target behavior and completing six items assessing how comfortable the interventionist felt during the call, how much rapport they felt, how engaged they believed the student to be, how helpful they found the protocol, their beliefs about the helpfulness of the call, and the likelihood that the participant would follow through with the behavior change discussed. For each item, responses were measured using a 5-point Likert scale ranging from not at all to extremely. Factor analysis revealed that all items loaded on a single factor with an alpha of .87.

Coding of MI Contacts—We listened to 231 (22%) of the recorded contacts in order to assess whether the MI met proficiency standards, whether interventionists adhered to the protocol, and what behavior change was targeted during the contact. In order to answer future research questions, recordings were chosen to include 100% of the conversations with a substance use target. They were not stratified. Targets were determined by interventionist report on the client engagement measure. We coded recordings using an unpublished version of the Motivational Interviewing Skill Code (MISC) 2.5 provided to us by its developer Dr.

Theresa Moyers at the University of New Mexico in November 2010. The MISC coding scheme allows one to draw conclusions about both counselor skills and client language. For this article, we analyzed measures of counselor empathy, collaboration, autonomy/support, evocation, and direction; as well as behavior counts including open and closed questions, simple, and complex reflections; and MI consistent and MI nonconsistent behaviors (see Appendix). Instead of using a 20-minute segment of each tape as suggested in the MITI, we coded the entire length of the recording, as our mean recording length was only 18.9 minutes. MI proficiency was established using standards set forth in the MITI 3.0 (Moyers et al., 2007). For further details about either coding scheme, please consult the manuals (<http://casaa.unm.edu/codinginst.html>).

Coding was conducted using the Center on Alcoholism Substance Abuse and Addictions (CASAA) Application for Coding Treatment Interactions (CACTI; Glynn, Hallgren, Houck, McLouth, & Fischer, 2011). This software was designed to automate the parsing of recordings prior to their coding and to store sequential coding of each utterance with no manual data entry. Using this process for double coding ensures that all coders code the same utterances thereby increasing reliability. Although CACTI software does not require or utilize transcripts, we had our entire sample of recordings transcribed for ease of parsing and coding.

Five graduate level students were provided 40 hours of initial training in the MISC 2.5 and the CACTI software. Coders were trained to parse recordings when a new idea was spoken and/or the speaker shifted. Once a recording had been parsed, it was assigned to a different coder, who then, using CACTI, assigned a code to each utterance. Coders practiced on a series of recordings until their inter-rater reliability was at criterion of 0.60 using established intraclass correlation (ICC) guidelines (Cicchetti, 1994). Weekly coding meetings were held throughout coding to improve or maintain reliability. We randomly selected 20% of our coded sample using a random number generator. These 47 recordings were double coded in order to calculate final ICCs. Cicchetti's criterion identifies ICCs below .40 as poor, .40–.59 as fair, .60–.74 as good, and above .75 as excellent. For our data, final ICCs were .94 for open questions, .80 for closed questions, .94 for reflections overall, .48 for simple reflections, .45 for complex reflections, .68 for MI consistent behaviors, and .29 for MI inconsistent behaviors. These results indicate that coders had some difficulty in differentiating simple reflections from complex reflections and in reliably identifying MI inconsistent behaviors (see Appendix).

In order to assess fidelity to the protocol, we developed a dichotomous scale to assess whether interventionists adhered to each of its seven components. We coded calls for the presence of the opening, establishing a target, exploring ambivalence, transitional summary, key question, action plan, and closing as described earlier. Each contact could earn from 0 to 7 points. Coders also performed a reliability check on the target behavior recorded by the interventionists.

Based on the independent assessment of the coders, 11 recordings were removed from the coding sample, as the target did not meet criteria as a substance use target. In order to be considered a substance use target, substance use had to be addressed with the exploration exercise. For example, if an interventionist asked about substance use and the student reported that they had cut back, and the interventionist moved on to another topic, this would not be considered as a substance use target even though the topic was addressed.

Data Analysis

Descriptive statistics were calculated on the sample characteristics and quality of MI. Multilevel regressions were conducted to determine predictors of the number of contacts

received by students (PROC MIXED) and whether they discussed a substance use target (PROC GLIMMIX). All analyses were conducted with SAS 9.2 (SAS Institute, 2008).

RESULTS

Sample Characteristics

Table 1 presents the demographic characteristics of the student sample with complete data. Approximately 60% of the sample was male, with a mean age of 16.8 years ($SD = .96$). Student ethnicity was 67.7% Latino, 6.9% Caucasian, 12.6% Mixed, 5.8% African American, and 7.2% “Other.” The 30-day prevalence of drug use ranged from 57.2% using alcohol to 23.5% using hard drugs. Approximately 30% of the students reported not using any drug (alcohol, tobacco, marijuana, or hard drugs) in the past 30 days.

Description of MI Contacts

Among the 573 students included in the TND+MI condition, 462 (80.6%) were reached for the first contact, 352 (61.4%) were reached for the second contact, and 226 (39.4%) were reached for the third contact, for a grand total of 1,040 contacts (mean contacts per student = 1.8). Overall, we reached 92% of students for at least one contact. Of those reached, 31% ($n = 178$) of students were reached once, 36% ($n = 207$) were reached twice, and 24% ($n = 139$) were reached three times. Of those reached two and three times, 53% and 38%, respectively, were contacted by the same interventionist on all contacts. All others were contacted by at least two different interventionists.

In the final adjusted multilevel linear regression model with school as the random effect, the number of contacts was found to be significantly associated with both younger age and living with both parents ($p < .05$). No significant associations were found for gender, Latino ethnicity, or baseline alcohol, tobacco, marijuana, or hard drug use.

Based on our protocol, we intended each MI session to take approximately 20 minutes. After review of our coded sample ($n = 231$), we determined that the average call lasted 18.9 minutes. Contact length ranged from 5 to 86 minutes with 5% of the contacts taking less than 10 minutes and 10% lasting more than 30 minutes.

Target Behaviors

Over 50% of the contacts focused on graduating or finding either current or future employment, while substance use topics accounted for approximately 30% of the conversations (see Table 2). The “interpersonal” category (9%) contained topics related to self-improvement (e.g., “work on my temper or stop gossiping”). The “other” category (3%) was used for targets that provided specific other types of goals (e.g., obtain driver’s license). The drug-related lifestyle category (8%) was used when no specific substance was mentioned; rather, the student described partying, getting into trouble, hanging in the streets, and using drugs.

Of those who reported using drugs on the survey, 43.5% talked about substance use with the MI interventionist at least once. Among students who did not report drug use on the survey, 19.3% talked about substance use targets with the MI interventionist (see Table 3). Among the students who received more than one MI session, if they did not speak to us about substance use at their first contact ($n = 330$), only 6.3% did so on a subsequent contact. For those who did speak to us about substances at the first contact ($n = 187$), 35.3% spoke about it again during a subsequent contact.

In the final adjusted multilevel logistic regression model with school as the random effect, speaking to us about a substance-related target behavior was between 1.5 and 2 times as likely for those reporting the following: male gender (adjusted odds ratio [AdjOR] 1.55; 95% confidence interval [C.I.] 1.04, 2.29), baseline marijuana use (AdjOR 2.07; 95% C.I. 1.37, 3.12), and baseline cigarette use (AdjOR 1.81, 95% C.I. 1.20, 2.11). No significant associations were found between speaking about a substance-related target behavior and age, living with both parents (vs. not), Latino ethnicity, or baseline alcohol or hard drug use.

Quality of Motivational Interviewing

On average, the intervention met the proficiency standard put forth in the MITI guidelines, exceeding the standard for all global measures and behavior counts (see Table 4). Eighty eight percent of the contacts exceeded proficiency in percent MI Consistent behaviors, 68% exceeded proficiency in percent complex reflection, 62% exceeded proficiency in percent open question, and 64% exceeded proficiency in reflection to question ratio.

Fidelity to Protocol

The majority of calls (69%) had five or more components of the structure. The component most likely to be excluded was creating a change plan; only 40% of the calls contained this element. The change plan was excluded when, in response to the transitional question, students indicated that they were not interested in making an action plan *Client Engagement Measure Data*. Overall, the engagement of clients was perceived by the interventionists to be moderately high. On the five-point scales, mean (sd) responses ranged from a low of 3.1 (.85) for the helpfulness of the call to a high of 3.5 (.94) for student engagement.

DISCUSSION

The data presented in this evaluation suggest that MI can be feasibly used as an adjunct to classroom-based prevention programs and that reasonable fidelity can be obtained. The protocol developed for this project provided adequate structure and flexibility for the interventionists. Target behaviors were established in 92% of the MI contacts. Based on the findings from our coded sample, almost three quarters of the contacts included at least five of the seven protocol components. Feedback from interventionists indicated that the addition of a face-to-face contact at the outset increased their comfort and confidence when trying to reach students by telephone, and the CRM telephone recording system allowed for easy monitoring of interventionist's effort as well as data management.

To our knowledge, this booster is the first to offer MI in conjunction with a classroom-based targeted substance abuse prevention program, designed for youth at psychosocial or behavioral risk for substance misuse, making it unique in that MI sessions not only addressed substance use, but also myriad other life issues relevant to adolescents (e.g., graduating, employment). Furthermore, it differed from other MI applications as it was conceived of as a motivational "booster" to be administered every few months, rather than an opportunistic intervention for people exhibiting substance use problems or a pretreatment activity to enhance readiness to change.

The majority of students in our study chose to discuss graduating and seeking employment as a target or goal that they were pursuing. In general, students did not express ambivalence about accomplishing these goals, so interventionists chose to focus more on action planning. This finding causes us to consider whether interventionists needed to be better prepared to deal with change planning rather than exploring ambivalence about change, which is often emphasized in an MI approach. In addition, it is possible that providing booster programming primarily aimed at helping youth graduate and find employment, with

secondary messages that drug use is inconsistent with those goals, is more appropriate than a primary focus of substance use prevention for youth in continuation or alternative high school settings.

At baseline, more than one fourth of the students who participated in the MI booster reported that they had not used any substances in the past 30 days. Data show that the booster encouraged 33 of 167 students to disclose drug use that they did not report on their pretest survey. The study is also notable among the adolescent MI literature for its sample size, over 1,000 contacts with more than 550 students. Although the data are nested within schools, the sample size will allow investigators sufficient power to detect effects regarding mechanisms of change.

The implementation and evaluation also conformed to best practices with respect to training, monitoring, supervision, and evaluation. Training, supervision, booster development, and project management were provided by two MINT trained trainers, under the advisement of a third. Contacts were reliably recorded using a web-based CRM system, giving supervisors remote and immediate access to recordings, allowing the opportunity to monitor, code, and coach interventionists throughout the intervention. Thus, it was possible to address concerns identified within the MI literature that interventionist competence is frequently not reported, not monitored consistently, or not performed using standardized instruments (Dunn, Deroo, & Rivara, 2001; Kealey et al., 2009). Without rigorous monitoring that employs tools designed specifically to assess MI, it is impossible to determine whether or not “motivational interviewing” interventions actually conform to MI standards. In this study, on average MI quality reached MITI proficiency standards for all behavior count and global measure indicators. Furthermore, the coding was done with the most recent version of the MISC, and used the CASAA CACTI for the first time outside of the University of New Mexico.

Limitations of the booster implementation include several staffing issues. First, we encountered difficulty in retaining interventionists due to the schedule for their work, which involved making calls after school and in the evening and weekend hours during 3-month intervals for the 2-year duration of the project. It was also difficult for interventionists to maintain the perseverance necessary to reach participants via telephone with an average of six attempts per successful telephone contact. As a result of staffing issues, nearly one third (32%) of students spoke to multiple interventionists. Staff turnover might have jeopardized the development of successful helping relationships, which might have decreased our ability to reach participants. Ultimately, only 25% of the students received the full 3-session intervention. Kealey et al. (2009) reported the ability to reach 53.2% (756) participants for all planned counseling calls; however, their intervention design was significantly different from ours. In the present study, the MI contacts were conceived of as a “booster” for motivation and occurred approximately every 3 months. Whereas, in the Peterson and Kealey’s design, contacts occurred within close succession to each other. Ninety-eight (17.1%) students had an MI contact at school only, meaning we never reached them by telephone despite repeated attempts during both contact periods, suggesting some limitations with the telephone modality. Our experience suggests that the students’ ability to screen telephone calls facilitated avoiding the contacts. It was not uncommon for students to ask to be contacted at a later time and then proceed to ignore the attempt to reach them. These avoidance behaviors were likely the most important factor contributing to our retention rates.

One limitation relates to the measurement of the quality of the MI sessions. Despite an “excellent” ICC of .94 for the ability to differentiate reflections from other behaviors, we found “fair” ICCs for differentiating reflections into subcategories of simple (.48) and

complex (.45) reflections, even with ongoing weekly supervision and training of coders. This suggests perhaps larger issues with the assessment of these behaviors in the MISC. Differentiating between simple and complex reflections requires determining whether or not the interventionist added meaning, emphasis, additional points, or direction to a client statement. Also, as noted by the authors of the MISC, behaviors that occur infrequently are often difficult to be coded reliably, hence we believe this explains the “poor” ICC for coding MI inconsistent behaviors found in this study (Moyers, Martin, Catley, Harris, & Ahluwalia, 2003). Our coding revealed that only 7 of 231 (.03%) recordings contained any MI inconsistent behaviors.

In addition, while the average MITI scores for the interventionists were above established proficiency, the standard deviations indicate that there was variation across interventionists. This finding is not atypical of MITI score variations due to the subjective nature of their coding.

An additional limitation should be noted that although over 40% of students reported drinking in the past 30 days, only approximately 5% of students chose alcohol use as the target behavior. Possible explanations for this discrepancy include that students do not perceive their alcohol use as problematic and therefore do not see the need to change it, and perhaps the high rates of reported alcohol use co-occur with other drugs, which students are more likely to discuss due to their perception of these drugs as causing problems for them.

In future analyses of these data, we will examine whether the quality of the MI differentially affects the content of the contacts, student retention, and successful behavior change. We will examine possible effects of having contact with multiple interventionists on client engagement. We will also be able to examine sequential effects of participant and interventionist utterances on subsequent sessions and drug use outcomes. In future investigations, it will be important to determine how, in a similar context, interventionists could achieve greater disclosure of substance use issues. For instance, participants might be more forthcoming about drug and alcohol use with interventionists with whom they have established a regular, trusting relationship.

Ultimately, this study brings us one step closer to answering important implementation and program development questions in our efforts to prevent and reduce substance use among at-risk adolescents. Furthermore, we conclude that this implementation was conducted with sufficient fidelity to infer that any incremental effects observed at subsequent follow-ups may be attributed to the inclusion of the MI booster.

Acknowledgments

This article was supported by a grant from the National Institute on Drug Abuse (no. DA020138). The authors wish to thank Dr. Theresa Moyers; Lisa Hagen Glynn, M.S.; and Kevin Hallgren from the University of New Mexico and Mary Beth Abella, M.S.W.

GLOSSARY

**Motivational
Interviewing (MI)**

A client-centered counseling style designed to explore and resolve ambivalence about behavior change

**Motivational
Interviewing Treatment
Integrity (MITI)**

A coding scheme meant to assess counselor adherence to the practice of MI

**Motivational
Interviewing Skill Code
(MISC)**

A coding scheme that assesses both counselor adherence to MI and client language regarding desire, ability, reason, need, and commitment to change behavior

References

- Apodaca TR, Longabaugh R. Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction* (Abingdon, England). 2009; 104(5):705.
- Brannigan R, Schackman BR, Falco M, Millman RB. The quality of highly regarded adolescent substance abuse treatment programs: Results of an in-depth national survey. *Archives of Pediatrics and Adolescent Medicine*. 2004; 158(9):904. [PubMed: 15351757]
- Cicchetti DV. Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*. 1994; 6(4):284.
- Cuijpers P. Effective ingredients of school-based drug prevention programs: A systematic review. *Addictive Behaviors*. 2002; 27(6):1009–1023. [PubMed: 12369469]
- Dunn C, Deroo L, Rivara FP. The use of brief interventions adapted from motivational interviewing across behavioral domains: A systematic review. *Addiction*. 2001; 96(12):1725–1742. [PubMed: 11784466]
- Glynn, LH.; Hallgren, KA.; Houck, JM.; McLouth, CJ.; Fischer, DJ.; Moyers, TB. Introducing the “CACTI” sequential-coding software: A free, open-source program for rating client and provider speech. Poster presented at the 34th annual meeting of the Research Society on Alcoholism National Conference; Atlanta, GA. 2011.
- Grenard JL, Ames SL, Pentz MA, Sussman S. Motivational interviewing with adolescents and young adults for drug-related problems. *International Journal of Adolescent Medicine and Health*. 2006; 18(1):53–68. [PubMed: 16639859]
- Hettema J, Miller W, Steele J. A meta-analysis of motivational interviewing techniques in the treatment of alcohol use disorders. *Alcohol Clin Exp Res*. 2004; 28:74A.
- Kaminer Y, Burleson JA, Burke RH. Efficacy of outpatient aftercare for adolescents with alcohol use disorders: A randomized controlled study. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2008; 47(12):1405–1412. [PubMed: 18978635]
- Kealey KA, Ludman EJ, Marek PM, Mann SL, Bricker JB, Peterson AV. Design and implementation of an effective telephone counseling intervention for adolescent smoking cessation. *Journal of the National Cancer Institute*. 2009; 101(20):1393. [PubMed: 19822837]
- Lisha N, Sun P, Rohrbach L, Spruijt-Metz D, Unger J, Sussman S. An evaluation of immediate outcomes and fidelity of a drug abuse prevention program in continuation high schools: Project Towards No Drug Abuse (TND). *Journal of Drug Education*. (in press).
- McCuller W, Sussman S, Holiday K, Craig S, Dent C. Tracking procedures for locating high-risk youth. *Evaluation & the Health Professions*. 2002; 25(3):345.
- Mermelstein R, Hedeker D, Wong S. Extended telephone counseling for smoking cessation: Does content matter? *Journal of consulting and clinical psychology*. 2003; 71(3):565–574. [PubMed: 12795579]
- Míguez M. Effectiveness of telephone contact as an adjunct to a self-help program for smoking cessation: A randomized controlled trial in Spanish smokers. *Addictive Behaviors*. 2002; 27(1): 139–144. [PubMed: 11800220]
- Miller, W.; C’de Baca, J.; Matthews, D.; Wilbourne, P. Personal values card sort. Albuquerque, NM: University of New Mexico; 2001.
- Miller W, Hedrick K, Orlofsky D. The helpful responses questionnaire: A procedure for measuring therapeutic empathy. *Journal of Clinical Psychology*. 1991; 47(3):444–448. [PubMed: 2066417]
- Miller, W.; Rollnick, S. *Motivational interviewing: Preparing people for change*. London: Guildford; 2002.
- Miller, WR., editor. NIAAA COMBINE Monograph Series. Vol. 1. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism; 2004. Combined behavioral intervention Manual: A clinical

research guide for therapists treating people with alcohol abuse and dependence. DHHS Publication No. (NIH) 04-5288

- Moyers T, Martin T, Catley D, Harris KJ, Ahluwalia JS. Assessing the integrity of motivational interviewing interventions: Reliability of the motivational interviewing skills code. *Behavioural and Cognitive Psychotherapy*. 2003; 31(02):177–184.
- Moyers, T.; Martin, T.; Manuel, J.; Miller, W.; Ernst, D.; Moyers, T. Revised Global Scales: Motivational Interviewing Treatment Integrity 3.0 (MITI 3.0). University of New Mexico, Center on Alcoholism, Substance Abuse and Addictions (CASAA); 2007. Retrieved April 4, 2008, from <http://casaa.unm.edu/codinginst.html>
- Peterson AV Jr, Kealey KA, Mann SL, Marek PM, Ludman EJ, Liu J, et al. Group-randomized trial of a proactive, personalized telephone counseling intervention for adolescent smoking cessation. *JNCI Journal of the National Cancer Institute*. 2009; 101(20):1378.
- Rollnick, S.; Mason, P.; Butler, C. Health behavior change: A guide for practitioners. Edinburgh and New York: Churchill Livingstone; 1999.
- Rooney B, Murray D. A meta-analysis of smoking prevention programs after adjustment for errors in the unit of analysis. *Health Education & Behavior*. 1996; 23(1):48.
- Rosengren D, Baer J, Hartzler B, Dunn C, Wells E. The video assessment of simulated encounters (VASE): Development and validation of a group-administered method for evaluating clinician skills in motivational interviewing. *Drug and Alcohol Dependence*. 2005; 79(3):321–330. [PubMed: 16102376]
- SAS Institute. SAS/STAT® 9.2 User's Guide. Cary, NC: SAS Institute; 2008. (SAS release 9.2 ed.)
- Skara S, Sussman S. A review of 25 long-term adolescent tobacco and other drug use prevention program evaluations. *Preventive Medicine*. 2003; 37(5):451–474. [PubMed: 14572430]
- Spruijt-Metz, D.; Barnett, E.; Davis, J.; Resnicow, K. Obesity in minorities. In: Naar-King, S.; Suarez, M., editors. *Motivational interviewing with adolescents and young adults*. New York: The Guilford Press; 2011. p. 135
- Sun W, Skara S, Sun P, Dent C, Sussman S. Project towards no drug abuse: Long-term substance use outcomes evaluation. *Preventive medicine*. 2006; 42(3):188–192. [PubMed: 16413605]
- Sussman S, Sun P, Rohrbach L, Spruijt-Metz D. One-year outcomes of a drug abuse prevention program for older teens: Motivational interviewing booster component. *Health Psychology*. 2011
- Sussman, SY.; Ames, SL. *Drug abuse: Concepts, prevention, and cessation*. New York: Cambridge University Press; 2008.
- White D, Pitts M. Educating young people about drugs: A systematic review. *Addiction*. 1998; 93(10): 1475–1487. [PubMed: 9926552]

Biographies

Ms. Elizabeth Barnett received her M.S.W. from Boston University in 2000 and is a predoctoral student at the Keck School of Medicine, University of Southern California. Her current research interests include the use of motivational interviewing with adolescent substance users.

Dr. Donna Spruijt-Metz' research focuses on pediatric obesity and is particularly concerned with understanding how psychosocial, metabolic built environmental, and social environmental forces interact to influence behavior and health. She has studied child feeding practices and the impact that these have on childhood obesity. She received her Ph.D. in Adolescent Medicine and Medical Ethics from the Vrije Universiteit Amsterdam. She is an Associate Professor at the University of Southern California's Department of Preventive Medicine and Director, Responsible Conduct in Research for the Keck School of Medicine.

Dr. Jennifer B. Unger is a Professor of Preventive Medicine at the Keck School of Medicine, University of Southern California. Her research focuses on psychological, social, and cultural risk and protective factors for substance use among adolescents.

Dr. Ping Sun received his Ph.D. in Preventive Medicine in 1999 from the University of South Carolina (USC) School of Medicine. His current research interests include etiology of addiction and outcome evaluation for group randomized health studies.

Dr. Louise A. Rohrbach is currently an Associate Professor of Preventive Medicine at Institute for Health Promotion and Disease Prevention Research, in the Keck School of Medicine, University of Southern California. Her research focuses on interventions to

prevent tobacco, alcohol, and other drug abuse among youth. Currently, her primary emphasis is translational research, including investigation of factors that explain and strategies that enhance the dissemination and implementation of evidence-based programs and practices in real-world settings. She has been the principal investigator on a number of National Institutes of Health funded studies and program evaluations and has published widely in the areas of substance use prevention, school-based health, and etiology of adolescent substance use.

Dr. Steve Sussman, Ph.D., FAAHB, FAPA, received his doctorate in social-clinical psychology from the University of Illinois at Chicago in 1984. He is a professor of preventive medicine and psychology at the University of Southern California, and he has been at the USC for 27 years. He studies etiology, prevention, and cessation within the addictions arena, broadly defined. He has over 385 publications. His programs include Project Towards No Tobacco Use, Project Towards No Drug Abuse, and Project EX, which are considered model programs at numerous agencies (i.e., Centers for Disease Control and Prevention, National Institute on Drug Abuse, National Cancer Institute, Office of Juvenile Justice and Delinquency Prevention, Substance Abuse and Mental Health Services Administration, Center for Substance Abuse Prevention, Colorado and Maryland Blueprints, Health Canada, U.S. Department of Energy, and various State Departments of Education). He received the honor of Research Laureate for the American Academy of Health Behavior in 2005, and he was President there (2007–2008). Also, as of 2007, he received the honor of Fellow of the American Psychological Association (Division 50, Addictions). He is the current Editor of *Evaluation & the Health Professions* (SAGE Publications).

TABLE 1Sample demographics ($N = 573$)

Characteristic	Percent
Gender	
Female	40.3
Male	59.7
Age	
15 years and under	8.2
16 years old	27.6
17 years old	44.9
18 years and over	19.3
Ethnicity	
Latino/Hispanic	67.7
Caucasian	6.8
Mixed	12.6
African American	5.8
Other	4.4
Asian	2.0
Native American	0.7
Drug use prevalence in past 30 days	
Cigarettes	40.2
Alcohol	57.2
Drunk	41.8
Marijuana	46.2
Hard drugs	23.5

TABLE 2Target behaviors in MI contacts^a ($n = 1,040$)

Behavior	Number	Percent
Graduation	432	41.08
Employment	130	12.33
Marijuana	116	11.01
Interpersonal	91	8.63
Drug-related lifestyle	87	8.25
Alcohol	57	5.41
Tobacco	54	5.12
Other	31	2.94
Nutrition	24	2.28
Physical activity	20	1.90
Hard drugs	8	0.76
Sex	3	0.28

^aTotal does not equal 1,040 as some contacts were coded for multiple targets.

TABLE 3Drug use self-report on survey by drug use target during MI intervention ($n = 562$)

	No target drug use behavior in MI intervention	Target drug use behavior in MI intervention
No drug use self-reported on survey	138 (80.7%)	33 (19.3%)
Drug use self-reported on survey	227 (56.5%)	175 (43.5%)

TABLE 4MI Proficiency ($n = 231$)

	MITI proficiency standard	Average	Std. dev.
Global Skills			
Evocation	3.5	3.63	0.77
Collaboration	3.5	4.00	0.82
Autonomy	3.5	3.78	0.70
Direction	3.5	4.18	0.90
Empathy	3.5	3.95	0.69
Behavior count summary scores			
Percent MI consistent	90%	98.9%	
Percent open question	50%	56.8%	
Percent complex	40%	56.2%	
Reflection to question ratio	1:1	1.33	

Appendix

Explanation of Motivational Interviewing Proficiency Data

Measure	Description	Example
Behavior Counts		
Open Questions (OQ)	Questions intended to elicit more than a yes/no or specific answer	Tell me about ... What are your thoughts?
Closed Questions (CQ)	Questions that elicit yes/no or specific information.	When did you start? Did you try ...?
Simple Reflections (SR)	Statements made to demonstrate that the counselor hears what the subject has said.	"So one reason to quit is your health"
Complex Reflections (CR)	Statements that attempt to convey the underlying meaning of what the subject said	"So you're health is something that's really important to you"
MI Consistent Behaviors (MICO)	Counselor statements that affirm clients' strengths or efforts, show support, ask permission before proceeding, or emphasize personal choice or control	"It's great that you are trying so hard."
MI Inconsistent Behaviors (MIIN)	Counselor statements that are inconsistent with the philosophy of MI such as advising, confronting, warning without permission.	"You know you should really stop smoking."
Behavior Count Summary Scores		
Percent Complex Reflection	CR/SR + CR	
Percent Open Question	OQ/OQ + CQ	
Percent MICO	MICO/MICO + MIIN	
Question to Reflection Ratio	SR+CR/OQ + CQ	
Global Measures		
Autonomy	Counselor support of client autonomy	
Collaboration	Counselor ability to treat client as a partner	
Evocation	Counselor ability to draw out client's reasons and ideas about change	
Empathy	Counselor ability to demonstrate understanding of the client's perspective	
Direction	Counselor ability to remain focused on a behavioral change target	