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Short-term effects on substance use of the *keepin' it REAL* pilot prevention program: Linguistically adapted for youth in Jalisco, Mexico

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Abstract

This article presents the short-term effects of a pilot study of *keepin' it REAL* (*Manténte REAL*) conducted in central Mexico by a bi-national team of investigators. This middle school-based model program for preventing substance use was adapted for Mexico linguistically but not culturally. Two Guadalajara public middle schools were recruited and randomly assigned to either implement the prevention program or serve as a control site. The program was implemented in the treatment site by the students' regular teachers, who were trained by the research team. Seventh graders in ten classrooms in the treatment and control schools ($N = 432$) completed a pretest and post-test survey in Spanish similar to the survey utilized in the original efficacy trial of *keepin' it REAL* in the US. T-tests and OLS regressions were conducted to determine the effects of the intervention on substance use outcomes. Differences between treatment and control groups in frequency of use of alcohol and tobacco, the two substances of choice in this sample, were significant and in the desired direction. Differences in amount of use were also in the preferred direction but were not significant for alcohol and only marginally significant for tobacco. When the sample was split by gender, statistically significant treatment effects remained for females but were not observed among males. Effects of the linguistically adapted version of *keepin' it REAL* appears to be driven by the change in female use, however the difference in male and female outcomes was not statistically significant. Implications for cultural adaptation and prevention in Mexico are discussed from a communication competency perspective. The promising results of the pilot study suggest that the linguistic adaptation was effective but that a comprehensive cultural adaptation of *keepin' it REAL* in partnership with Mexican investigators and communities may be warranted.

Keywords

substance use prevention; randomized control trial; Mexico; adolescents

Introduction

Misuse of alcohol, tobacco and other drugs poses a world-wide health threat. In middle-income countries such as Mexico, the impact of alcohol and tobacco use on health is pronounced. In 2005, 89 out of 100,000 deaths in Mexico were caused by cirrhosis of the liver, leading the World Health Organization to designate Mexico's drinking patterns as risky (4 on a scale of 1 to 5 with 5 being the most risky) (World Health Organization [WHO], 2011). Tobacco use accounts for 11% of all deaths in Mexico (WHO, 2009). The effect of alcohol, tobacco and illicit drug use on mortality globally makes substance use prevention an important weapon in the fight for better health outcomes. While substance abuse prevention programs have been widely embraced and empirically tested in the United States and Europe (Tobler et al., 2000), less is known about prevention approaches in other parts of the world. In Mexico over half (57%) of individuals between the ages of 12 and 25 report that they have never been exposed to any substance use prevention training (Instituto Nacional de Salud Pública, 2008). If health outcomes related to substance abuse are to improve, there needs to be a focused effort on increasing the availability and dissemination of evidence-based prevention programs.

Youth Substance Use in Mexico

In Mexico over 50% of youth report having used alcohol in their lifetime (Félix-Ortiz Velázquez, Medina-Mora, & Newcomb, 2001; Latimer et al., 2004). In a 2008 survey 11% of males and 7% of females between the ages of 12 and 17 reported heavy episodic drinking (defined as 5 or more drinks per occasion for males and 4 or more drinks per occasion for females) (Instituto Nacional de Salud Pública, 2008). Since societal norms around underage drinking are more lenient in Mexico than in the U.S., there has been an increasing concern about problem drinking among Mexican youth (Latimer et al., 2004; Medina-Mora & Rojas Guiot, 2003).

Smoking rates among Mexican adolescents are also of concern. While only 9% of Mexican adolescents are active smokers, more recent estimates indicate that over half have smoked cigarettes during their lifetime, with males smoking more than females (Arillo-Santillan et al., 2002; Instituto Nacional de Salud Pública, 2008; OECD, 2011). Although illicit drugs appear to be used less frequently among adolescents than alcohol and cigarettes (only 2% of boys and 1% of girls reporting illicit drug use in the last 12 months), 67% of Mexican adolescents and young adults believe there has been an increase in hard drug use during the last 5 years (Instituto Nacional de Salud Pública, 2008). In addition, 15% of adolescents report that they would experiment with illicit drugs if given the opportunity (Instituto Nacional de Salud Pública, 2008). The perception among young people in Mexico that hard drug use is widespread and their willingness to experiment with hard drugs suggest a shift toward permissive attitudes toward drug use that may signal increases in future rates of use.

Substance use prevention programs in the US and Mexico

Hundreds of school based substance abuse prevention programs have been implemented and tested in the US (Tobler et al., 2000). Within these programs seven major domains of content (knowledge, affective, drug refusal, skills, generic skills, safety skills,

extracurricular activities and other) and four modes of delivery (didactic presentation, interaction between the student and the teacher, structured interaction with peers, and mostly interactive) have been identified (Tobler et al., 2000). Programs that deliver content with minimal interaction between peers are typically knowledge based whereas interactive programs allow students to practice skills and develop anti-substance use norms. In a meta-analysis of 207 substance abuse prevention interventions, interactive programs demonstrated larger effects (Tobler & Stratton, 1997; Tobler et al., 2000). Additionally, interventions that taught comprehensive life skills, which typically included a combination of increasing knowledge, addressing affective aspects of drug use (i.e. self-awareness, attitudes, beliefs and values) and building refusal skills, had one of the largest effect size across program types (Tobler et al., 2000). Tobler and Strantton (1997) found that interactive school based prevention intervention programs were equally or more effective in minority populations (50% or more) than non- interactive interventions suggesting that this intervention method might be important to consider when conducting cultural adaptations. Griner and Smith (2006) found a moderate effect sizes across 76 culturally adapted mental health interventions, with older consumers demonstrating moderately higher effect sizes; a difference that the authors attribute to level of acculturation. This same study showed higher effect sizes for culturally homogenous therapeutic groups but did not provided conclusive evidence about the benefit of cultural matching. More specifically, evidence has emerged suggesting that Latino specific and multi-cultural programs that incorporate the youths' cultural norms and values are more effective for Latino youth (Kulis et al., 2005). Despite these findings, few school based substance abuse prevention programs have been developed for or adapted to communicate prevention messages within the cultural context of the participants (Marsiglia & Booth, 2013). Moreover, the clear differences between national contexts in the US and Mexico suggests that these findings may not be generalizable globally.

Even with the apparent need to address substance use in Mexico, empirically tested evidence-based prevention programs are uncommon, and those that have been implemented report poor or very limited effects on actual substance use. The *Programa Educativo de Prevención Escolar* (PEPE) [Educational Program for School Prevention], one of the most prevalent school-based prevention programs in Mexico, was developed by the ministry of public education (SEP) in collaboration with a foundation in Spain and was designed to address drug addictions. PEPE takes a comprehensive approach to substance use prevention, targeting sixth grade students, parents, and teachers in a joint prevention effort (Zorrilla Fierro, 2008). While the program claims to effectively prevent substance use, there is a lack of empirical evidence supporting this claim. Although this is the most widely disseminated program, there are several other prevention models that have been developed in Mexico but not empirically tested, including: 1) “Construye Tu Vida Sin Adicciones” (Build Your Life Without Addictions) developed by The National Council Against Addictions , Secretaria de Salud, Consejo Nacional Contra las Adicciones ; 2) “Yo Quiero, Yo Puedo” (I want, I can) developed by the NGO Instituto Mexicano de Investigación en Familia y Población (IMIFAP A.C.), which targets younger children in grades four through six; and 3) a community based prevention intervention developed by the Cáritas (Mexican Catholic Charities) called ECO.

In addition to the variety of prevention interventions that have been implemented but not tested, there have been some efforts to test the effectiveness of substance use prevention programs among youth in Mexico. Alonso-Castillo and colleagues (2008) implemented “NTA-No al Consumo de Tabaco y Alcohol,” an adapted version of a prevention program originally developed at the University of Southern California called “Project Towards No Tobacco Use (TND).” Results of this study showed that participation in the program significantly increased feelings of self-efficacy and self-esteem when compared to the control group; however, the program had no significant effects on tobacco use and desirable effects on alcohol use only among youth attending private—but not public—schools (Alonso Castillo, Esparza Almanza, Frederickson, Guzmán Facundo, & Martínez Maldonado, 2008). In addition, “No Te Sigas Quemando” was developed and evaluated with an emphasis on smoking prevention and cessation. Although this program has reported a 17% reduction in the number of adolescents who had experimented with smoking, it did not have an effect on regular smokers (Nuño-Gutiérrez, Álvarez-Nemegyei, & Madrigal-de León, 2008). In another study, Arenas-Monreal et al. (2010) found that their unnamed education-based intervention decreased students' intentions to smoke cigarettes. Unfortunately, the authors did not identify the prevention curriculum so no additional information is available about the program itself. While these results from currently available interventions suggest prevention programming may positively impact substance use among youth in Mexico, none have shown the ability to positively impact both alcohol and cigarette use – the two most widely used substances.

Due to the substantial rates of substance use in Mexico, the lack of empirical support for existing substance use prevention approaches, and students' lack of exposure to substance use prevention programs, the purpose of this project was to assess the immediate effects of *keepin' it REAL*—a school-based substance use prevention program implemented in the US and several other countries—among a population of youth from a large urban area of central Mexico.

keepin' it REAL

As a SAMHSA recognized model program on the National Registry of Effective Programs and Practices, *keepin' it REAL* has been shown to reduce substance use among Mexican heritage youth living in the US (Marsiglia & Hecht, 2005; Kulis et al., 2005). Consistent with interactive substance use prevention programs, the main goals of *keepin' it REAL* are to increase youth's drug resistance skills and promote anti-substance use norms and attitudes which are achieved through interactive lessons (Gosin, Marsiglia, & Hecht, 2003). The *keepin' it REAL* curriculum was developed using communication competence theory (Spitzberg & Cupach, 1984), which posits that when youth are more comfortable using a variety of communication techniques to reject risky or undesirable influences such as substance use offers, they are less likely to engage in those behaviors. Central to this theory of communication is the flexibility to apply a repertoire of strategies in different social situations. Youth must be able to assess the situation in which substances are being offered, decide which resistance strategies will be most effective, and try additional strategies if the one selected does not work. Having a repertoire of resistance strategies to choose from allows the adolescent to adjust to a variety of different scenarios in which substances are

offered or available (Wright, Nichols, Graber, Brooks-Gunn, & Botvin, 2004). *keepin' it REAL* aims to teach students how to use the four resistance strategies- Refuse, Explain, Avoid, and Leave (REAL)- that have been found to be commonly used among US youth (Alberts, Miller-Rassulo, & Hecht, 1991; Hecht, Alberts, & Miller-Rassulo, 1992) and also effective and relevant for Mexican American youth (Kulis et al., 2005; Hecht et al., 2003). Refuse is a simple direct no; Explain is a refusal accompanied by a reason or a story telling the one offering why not; Avoid is the act of not attending an event or participating in a gathering where the youth knows alcohol and other drugs will be used; Leave is used when the youth is already in the situation where alcohol and other drugs are present so the youth removes herself/himself from the situation.

keepin' it REAL was developed in the southwestern US by engaging Mexican American youth in the creation of anti-drug messages and the teaching of drug resistance strategies. The program was created by asking youth to develop realistic scenarios in which drug offers occur in their community and act out ways they would resist these drug offers using the skills taught in the curriculum- Refuse, Explain, Avoid, and Leave. The videos created by the youth, along with a 10 week in-class curriculum teaching resistance strategies, were initially tested in a randomized controlled trial with 35 schools and 6,035 middle school students in Arizona. The results of this initial trial demonstrated the efficacy of the intervention. Relative to the control group, the intervention group reported better behavioral outcomes (use of alcohol, cigarettes and marijuana) and better psychosocial outcomes (anti-drug norms and attitudes) (Hecht et al., 2003). While the sample in the trial was multicultural, the majority of the participants were of Mexican heritage. A separate analyses of the Mexican American participants showed that *keepin' it REAL* reduced the use of alcohol, tobacco, and marijuana, and increased anti-drug attitudes and norms (Kulis et al., 2005). Although the program was found to be effective among all Mexican heritage youth, it was most impactful among the more acculturated students. This led to questions as to whether *keepin' it REAL* would effectively prevent substance use among youth in Mexico (Marsiglia & Hecht, 2005).

Understanding Cultural Context for *keepin' it REAL* in Mexico

Communication, one of the foundational pieces of *keepin' it REAL* (Hecht et al., 1992; Marsiglia & Hecht, 2005), is governed by cultural norms that impact the acceptability and efficacy of drug resistance strategies. For example, among Mexican American adolescents, cultural norms suggest that directly refusing a substance is considered disrespectful, thus youths' likelihood of using direct refusal statements is lowered (Hecht & Ribeau, 1984). Given the influence of culture on communication, prior to the implementation of the prevention program, cross-sectional surveys were conducted to identify if and how adolescents in Mexico used the REAL strategies. A survey conducted in Monterrey, Mexico, with a sample of 327 adolescents, found that Mexican youth not only used the REAL strategies, but that the use of at least one of the REAL strategies was associated with decreased alcohol and tobacco use (Kulis, Marsiglia, Lingard, Nieri & Nagoshi, 2008). More specifically, use of the Avoid strategy predicted decreased alcohol use, and use of Refuse and Avoid predicted decreased cigarette use (Kulis et al., 2008). These findings suggest that

the *keepin' it REAL* manualized prevention curriculum could be applicable with translation to address substance use among Mexican adolescents

Although the REAL strategies appear to be relevant in Mexico, gender roles may also dictate substance use decisions and attitudes among Mexican youth, and impact the effectiveness of prevention messages (Félix-Ortiz et al., 2001). Despite the changes in gender roles in Mexico, some women continue to be influenced by traditional roles that encourage them to exhibit a more deferential attitude (Alducin et al., 2004; Mendoza Flores, Sánchez Jiménez, García Cardona, & Ávila Rosas, 2002). Traditional roles may continue to cause tensions in cultural expectations and impact how females interpret and incorporate substance use prevention messages (Díaz-Olavarrieta, 2010). For example, adolescent females who are experiencing more freedom to pursue romantic relationships may feel pressure within those relationships to accept substance use offers from their significant other as well as pressure to abstain from use, both responses that would be supported by traditional gender roles. Additionally, traditional gender roles for men dictate permissive norms around drinking and substance use and have been associated with higher rates of substance use (Alvarez-Gayou, 2007). In a cross-sectional study conducted in Guanajuato, Mexico with 702 Mexican students, gender differences in Mexican youths' use of REAL strategies and its association with substance use was examined (Kulis, Marsiglia, Ayers, Booth, & Nuño-Gutiérrez, 2012; Kulis, Marsiglia, Ayers, Calderón-Tena, & Nuño-Gutiérrez, 2011). While both males and females used the REAL strategies to resist substance use offers, the relationship between substance use and the use of REAL strategies was either stronger for males than females or only significant for males (Kulis et al., 2012). To understand the way that gender norms impact the use and effectiveness of REAL strategies, it is important to consider how culture may influence male and female patterns of communication, gender role expectations, and the use of alcohol and other substances.

Despite the findings from prior research that the use of REAL strategies is associated with a reduction in substance use among Mexican youth, it is unclear how effective the *keepin' it REAL* program would be in a Mexican cultural context. In order to test the cultural fit of *keepin' it REAL* in Mexico and prepare for possible adaptation of the program to the Mexican social, situational, and cultural context, a longitudinal randomized pilot study was conducted in Guadalajara, Mexico with middle school students. For this pilot study, *keepin' it REAL* was implemented with only minor linguistic adaptations (e.g. English-to-Spanish translation, Spanish dubbing in the videos).

The hypotheses guiding the study are:

1. Students who received *keepin' it REAL* will report more desirable changes in substance use (decreases or smaller increases) from pretest to immediate post-test compared to the control group;
2. Based on our prior study (Kulis et al., 2012), participation in *keepin' it REAL* will have differential effects based on gender, with desirable effects being observed for males but not females.

Methods

Setting

This article reports on the findings of a pilot study implemented in the city of Guadalajara, Jalisco-Mexico through a collaboration between a Mexican and an American university. Guadalajara was chosen to pilot test *keepin' it REAL* for two reasons. First, Guadalajara is a major metropolitan area and population center located in a state, Jalisco, with slightly higher rates of substance use among youth compared to other states in Mexico (Instituto Nacional de Salud Pública, 2008b). Second, an existing bi-national research collaboration existed between investigators in Guadalajara and the US. Two urban schools were invited to participate, one randomized as the control school and the other randomized as the treatment school. As reported later in the manuscript, the schools had similar student demographics and were located only a few miles apart. Both schools had fewer males than females, and the average age in both groups was 13 years. About three-fourths lived in a two-parent household, and in both schools, the students reported high levels of financial strain. Students were enrolled in the second year of their “secundaria” school, which is the equivalent to 8th grade in US middle schools.

Curriculum Training and Delivery

Ten classrooms participated in the pilot study, five per school. In the treatment school, five social studies teachers implemented *keepin' it REAL* after receiving in-person training from a US-based *keepin' it REAL* trainer employed by the US University. During the training, teachers were introduced to the *keepin' it REAL* curriculum and had opportunities to ask questions, to discuss each lesson, and to practice lesson presentations. The US-based project coordinator and the Principal Investigators from both universities visited the schools and met with the principals, teachers and students before, during, and after project implementation. In addition, the research team associated with the Mexican university also met with their US collaborators to discuss implementation, lesson observation, and the development and administration of the students' pretest and posttest surveys.

While surface modifications were made to the US version of *keepin' it REAL*, the version of the program implemented in Guadalajara was essentially the same as the original Model program. Language modifications were made by having the lessons translated into Spanish, and the videos, which are key program components, were dubbed over in Spanish. As the questionnaire was originally developed in English, it was translated following back translation procedures recommended by Rogler (1989). In addition to modifying the language, rather than delivering one lesson a week, the teachers in Guadalajara were asked to present two lessons a week to ensure completion before the December recess, making the duration of the intervention shorter. Several approaches were used to guarantee that the *keepin' it REAL* curriculum was being implemented as intended: 1) teacher-implementers were trained in curriculum facilitation and maintenance of fidelity; 2) lesson observers were trained to record fidelity through observation forms; and, 3) teachers were instructed to complete a teacher-reflection feedback form at the end of each lesson. Two of the four “core curriculum lessons” –those presenting the REAL strategies—were selected for observation by the Mexican-based research team.

Survey Administration

A pretest survey was administered by the Mexican-based research team to all participants prior to the implementation of the curriculum. It should be noted that two post-tests followed the curriculum, one immediately after the last *keepin' it REAL* lesson and another approximately 8 months after program completion, both also administered by the Mexican-based research team; however the focus of this manuscript is only on the pre to immediate post-test changes. Human subjects' protections were approved by the Institutional Review Boards at both participating universities. Prior to data collection, the participants' parents were notified that their child would be participating in the *keepin' it REAL* research study. If they had any questions or did not want their student to participate, they were invited to contact their child's school or the research team with questions. The students provided written assent that their participation in the surveys was voluntary.

The questionnaires collected information on sociodemographic characteristics and substance use behaviors, as well as substance use norms, intentions, expectancies, and drug resistance skills. The Mexican-based research team entered the data and provided the US-based research team with a data set that excluded personally identifying information. The sample size for this study is 432 (Control $n = 206$; Treatment $n=226$) before adjustments for missing data on particular variables. After accounting for missing data, analyses were conducted on samples ranging from 328 to 347 participants. Due to the large amounts of missing data, MCAR tests were run in SPSS and insignificant findings indicated that missing values were missing at random, and therefore not jeopardizing the validity of the findings.

Approximately 96% of the students that completed the pre-test survey completed the immediate post-test questionnaire.

Measures

To examine the effectiveness of the *substance use* prevention program, the frequency and amount of alcohol and cigarette use were examined at the initial post-test. Marijuana was excluded because less than 2% of the sample reported any use within the 30 day time period. To assess frequency of substance use, the following questions were asked: "In the past 30 days, how many times did you drink an alcoholic beverage?" (0=Never to 6=More than 30 times) and "In the past 30 days, how many times did you smoke tobacco or cigarettes?" (0=Never to 6=More than 30 times). Amount of use for each substance was measured with the following questions: "In the past 30 days, how many alcoholic drinks did you have?" (1=One drink to 6=More than 30 drinks) and "In the past 30 days, how many cigarettes have you smoked?" (0=None to 8=More than 5 packs).

Focal independent variables include, *Treatment condition* coded as 0=control group and 1=treatment group, and *Gender* coded as 0=female and 1=male.

Control variables include financial strain, parent education, family type, risky behavior, and substance use offers. *Financial strain* was measured as a mean scale using a series of questions that gauge financial resources ($\alpha = .81$). The financial strain measure is part of the Mexican Census Bureau households' survey (Instituto Nacional de Estadística y Geografía de México, 2011) and was successfully used by the research team in previous studies

conducted with Mexican samples (Kulis et al., 2012). Respondents were asked “In your house is there enough money to: ...1) Buy food, 2) Buy gas for the car or take the bus, 3) Pay for basic services (lights, water, etc.), 4) Pay for school fees, 5) Buy cloths that you need, 6) Buy cloths that you want, and 7) Do fun things (go on vacation, to the movies, take a walk).” Possible responses ranged from 1=never to 4=always. *Parent education* was measured by asking the highest educational level of the respondent's mother or father. Responses ranged from 1=none to 8=more than a high school education. *Family type* was dichotomized into 0=not living with both biological parents, and 1= living with both biological parents. *Risky behaviors* were measured by summing a six-item scale that ask respondents about the frequency of engaging in problem behaviors other than substance use. Participants were asked “In the past 12 months, how often have you done the following?... 1) Started a fight, 2) Did something dangerous because someone dared you to, 3) Skipped school, 4) Had or brought a weapon with you (knife or gun), 5) Hurt an animal and 6) Stole something”, with possible responses ranging from 0= never to 5= almost every day. *Substance use offers* were measured with separate questions about two substances: “In the last 12 months how many times were you offered...1) An alcoholic beverage, and 2) Cigarettes”, with possible responses ranging from (0) never to (5) more than 10 times.

Analysis Strategy

All analyses for this project were conducted using IBM SPSS Statistics 18. First, descriptive statistics were examined for all substance use outcomes and predictors. Within-group t-tests of mean differences in the primary dependent variables (alcohol and cigarette use) from pretest to post-test were conducted for the control and treatment groups. T-tests were also conducted to test the between-group mean differences of all possible covariates. Next, OLS regression models predicting frequency and amount of alcohol and tobacco use were estimated controlling for treatment condition, substance use at pretest, gender, substance use offers and the covariates that differed significantly in the treatment and control group. Lastly, in order to explore the impact of the intervention by gender, the sample was split into males and females and the OLS regressions were estimated separately.

Results

Table 1 reports correlations means and standard deviations for all variables used in the analyses. Table 2 reports within-group t-tests of mean differences from pretest to immediate post-test in the control and treatment groups and between group paired t-tests comparing differences between the treatment and control group in substance use outcomes at the immediate post-test. Control variables are measured at the pre-test, except for risk behaviors and number of substance offers which were only measured at post-test.

Statistically significant change in the frequency of alcohol use from pretest to post-test was observed in the control group; however the treatment group showed no statically significant difference from pre to post test. When examining between-group differences, a statistically significant difference was found between the treatment and control group in the amount of cigarettes smoked at post-test, with the treatment group reporting less. A marginally significant difference in the frequency of alcohol use was also found at post-test, with the

treatment group reporting less frequent alcohol use. Gender differences in substance use at pre-test were also tested and a significant difference in alcohol use frequency (Males: $M = 0.42$, $SD = 0.76$, Females: $M = 0.61$, $SD = .94$) ($t(409) = 2.22$, $p > .05$) and amount (Males: $M = 0.50$, $SD = 0.82$, Females: $M = 0.67$, $SD = 1.03$) ($t(408) = 1.85$, $p > .05$) was found (results not shown).

The treatment and control groups were similar in demographic composition and on other key covariates as shown by tests of mean differences that are summarized in the far right column of Table 2. In addition to demographic similarities, there were no significant differences in number of alcohol and cigarette offers and risky behaviors. Parent education was the only control variable that significantly differed between groups, with participants in the treatment group reporting that their parents had received more education ($p < .001$); the mean highest level of education was attending but not completing *preparatoria* (high school) for control parents, and graduation from *preparatoria* for treatment parents.

Table 3 reports the results of OLS regression analyses predicting post-test substance use frequency and amount. This was done using residual change models that controlled for pretest measures of substance use frequency and amount of use while estimating the effect of being in the treatment condition. Only the most parsimonious models are presented, including only covariates were shown to be significantly different in the treatment and control at pretest (see Table 2) or were of principle interest. Gender was retained for substantive reasons. The measure of substance use offers corresponding to the dependent variable (i.e., alcohol offers for alcohol outcomes) was retained due to its direct impact on substance use. Of the remaining control variables only parent education was retained because it alone differed significantly between treatment and control groups.

Results in Table 3 indicate a statistically significant ($p < .05$) difference in alcohol frequency ($\beta = -0.22$) and cigarette amounts ($\beta = -0.18$), and marginally significant differences ($p < .10$) for cigarette frequency ($\beta = -0.15$) in the treatment group when compared to the control group. Pretest frequency and the amount of use predicted post-test frequency and amount of use for each substance. In addition, offers of alcohol or cigarettes predicted a significant increase in the use of these substances. Parent education and gender were not significant predictors of changes in substance use at post-test.

When the sample was split by gender, statistically significant treatment effects remained for females but were not observed among males; females appear to be driving the effect observed when the sample is aggregated (See Table 4). Compared to females in the control group, females in the treatment group reported a relative reduction in the frequency of alcohol ($\beta = -0.28$) and cigarette use ($\beta = -0.25$) and in the number of cigarettes smoked in the previous 30 days ($\beta = -0.22$). Other effects in Table 4 mirrored those in Table 3 for the combined sample. Pretest substance use and number of substance offers predicted the level of use at post-test for both males and females, while parent education remained unrelated to changes in substance use. In additional analyses (not shown), moderation effects were not statistically significant, indicating no significant difference in treatment effects for males and females.

Discussion

This purpose of this article was to report the initial findings of a substance use prevention intervention pilot study among youth in Guadalajara, the second largest city in Mexico. Due to the lack of empirically proven prevention programs in Mexico, studies like this are crucial steps toward the development of effective prevention approaches, given the traditionally low but increasingly permissive attitudes toward drug use for Mexican adolescents. Our findings suggest that the *keepin' it REAL* substance use prevention program shows promising signs of effectiveness in impeding the frequency at which adolescents drink alcohol and smoke cigarettes.

During adolescent developmental period, experimentation with substance use can rise sharply. Participation in the linguistically adapted version of *keepin' it REAL* appeared to retard the students' transition to more frequent substance use, as indicated by the decrease in mean substance use from pre to post –test for students in the treatment group. This dampening effect supports our first hypothesis that students who received *keepin' it REAL* will report more desirable changes in substance use (decreases or smaller increases) from pretest to immediate post-test compared to the control group. While these decreases were not consistently significant at the immediate end of *keepin' it REAL* for all substances, there is no evidence of harmful program effects. Additionally, students in the control group showed sizeable and more undesirable changes from pre to post-test in their alcohol and cigarette use. And when compared to the control group, alcohol and cigarette use was significantly lowered at the post-test for those youth receiving *keepin' it REAL*.

While the linguistically adapted curriculum showed encouraging signs of some overall effectiveness, when males and females were examined separately, differences emerged. Although gender was not a significant predictor of changes in substance use, there was an apparent variation in the ways males and females appeared to respond to *keepin' it REAL*. When males and females were analyzed separately, participating in *keepin' it REAL* significantly predicted a decrease in alcohol frequency, cigarette frequency, and cigarette amount for females but not for males. This was in contradiction of our hypothesis that when examining gender separately, males will report desirable effects on substance use from participating in the *keepin' it REAL* program. These results may be reflective in cultural norms surrounding communication patterns of Mexican heritage individuals - directly refusing a substance is considered disrespectful (Hecht & Ribeau, 1984) – or cultural norms surrounding gender socialization – women socialized to be submissive, deferential, and non-assertive. This could hinder females' opportunity to develop a repertoire of resistance strategies, rehearse and practice them, and effectively resist substance offers. These findings should be interpreted with caution due to insignificant interaction effects but indicate the need for further research into the gendered experience of Mexican youth and how that interacts with substance use prevention programming.

Despite these overall encouraging findings, based on focus groups conducted with students and implementers after the completion of the pilot, cultural adaptation of *keepin' it REAL* may be needed in order to improve the intervention's impact, particularly for males. The simple modifications that were done as part of this pilot study (e.g., translating and dubbing

the videos) may be insufficient to replicate the effects of *keepin' it REAL* that were obtained with previous samples of Mexican-heritage youth living in the US. Because the core components of *keepin' it REAL* are based in communication competence theory (Spitzberg & Cupach, 1984), cultural norms influencing the acceptability and effectiveness of drug resistance strategies and the way in which they are communicated maybe limiting the impact of the program among this population. While we expected and found that the core elements of *keepin' it REAL* resonate for Mexican adolescents, the contextual and situational differences between the U.S. and Mexico suggest the need to add more culturally-grounded examples and scenarios to the curriculum. For example, in the pilot study, the videos were dubbed over in Spanish using Mexican American voiceovers. Based on focus groups conducted at the completion of the pilot study, the students reported being distracted with the accents of the Mexican American voiceovers. The students in Guadalajara felt the actors “spoke Spanish with an American accent.” One of the implementing teachers said, “The youth saw these videos as very foreign...the students did not identify with these videos.” Since the completion of the pilot, videos have been produced using scenarios developed by the students in Guadalajara and using actors from Guadalajara who spoke with a regional dialect. Also, additional adaptation needs to account for the situational differences between U.S. and Mexican schools. The U.S.-based *keepin' it REAL* was designed for small group activities for an average classroom size of approximately 25 students. In Guadalajara, the average classroom size was around 50 students, making small group activities more challenging. In the focus groups a teacher captured this when she reported that because of the size of the classroom, “they are large groups. So, for them to understand, to grasp the concepts, ... or for them to complete the activities... we need to condense the lesson a little bit.” Additionally, the lack of access to technology and equipment also lead to difficulty in teacher's ability to deliver the curriculum as developed. While the findings of this study suggest *keepin' it REAL* effectively suppresses the progression of substance use among Mexican adolescents the situational differences encountered in the implication suggest that effects more on par with those demonstrated in the US may be achieved with some additional adaptation.

Limitations

Because this is a pilot study, cautions are indicated in interpreting the results generalizability. First, although this is a large sample of adolescents ($N = 432$), only two schools were involved, inherently limiting the generalizability of these findings. Second, the post-tests were conducted immediately after the completion of *keepin' it REAL* and some youth may not have had sufficient time to internalize the messages taught in the prevention program and apply them. When data are available from the longer-term follow-up survey additional analyses may reveal changes in behaviors for all substances regardless of gender. Third, the delivery of *keepin' it REAL* occurred over a 5-week period rather than the 10-week period of the SAMHSA model program in the US. While there is no evidence to indicate that the 5-week period is less effective, it is important to consider that the intervention was delivered in a shorter than typical timeframe. Fourth, although gender norms and gender socialization was the assumed pathway between treatment group and substance use outcomes, measures of gender norms were not included in the survey, and therefore, this relationship could not be tested directly.

Conclusion

This pilot study provides support for the applicability of an efficacious substance use prevention program originally developed in the US to work in Mexico as well, but also the importance of assessing for cultural, contextual, and situational fit and adapting the programs to achieve maximum efficacy. The results indicate that *keepin' it REAL* can be an effective tool in teaching drug resistance strategies and reducing substance use among adolescents in a major urban area in Mexico. The findings also point to the possible impact of gendered cultural norms on the efficacy of prevention interventions in Mexico, and the need for these interventions to recognize gender differences in substance use patterns and their etiology. Although a more extensive cultural adaptation of *keepin' it REAL* may be needed in Mexico the core components of *keepin' it REAL* provides a promising foundation for creating an evidence-based substance use prevention curriculum for adolescents living in Mexico.

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Table 1
Correlations, means, standard deviations and alphas for all study measures

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	-													
2	.88**	-												
3	.38**	.38**	-											
4	.42**	.43**	.92**	-										
5	.54**	.53**	.27**	.28**	-									
6	.57**	.57**	.25**	.25**	.92**	-								
7	.31**	.34**	.45**	.50**	.46**	.40**	-							
8	.26**	.29**	.47**	.48**	.43**	.39**	.90**	-						
9	.39**	.37**	.21**	.20**	.41**	.43**	.24**	.31**	-					
10	.34**	.39**	.45**	.44**	.34**	.34**	.48**	.51**	.65**	-				
11	-.07	-.07	-.07	.02	-.01	-.04	-.09	-.07	.02	-.09	-			
12	.14**	.15**	.04	.04	.04	.01	.03	.04	.02	.11*	-.19**	-		
13	.05	.01	.03	.04	.01	-.01	.02	.03	-.02	-.04	.16**	-.06	-	
14	.20**	.19**	.16**	.17**	.28**	.30**	.25**	.26**	.35**	.37**	.01	-.01	-.06	-
M	.53	.59	.24	.28	.60	.61	.27	.27	1.12	.75	6.36	13.01	3.47	0.43
S	.86	.94	.80	.96	1.05	1.04	.93	.96	1.39	1.33	1.69	.43	.48	0.63
α	-	-	-	-	-	-	-	-	-	-	-	-	.81	0.71

Notes: (1) alcohol frequency T1, (2) alcohol amount T1, (3) cigarette frequency T1, (4) cigarette amount T1, (5) alcohol frequency T2, (6) alcohol amount T2, (7) cigarette frequency T2, (8) cigarette amount T2, (9) alcohol offers T2, (10) cigarette offers T2, (11) parent education, (12) age (13) financial strain, (14) risk behaviors

* $p < .05$,

** $p < .01$

Table 2

Within Group and Between Group Paired T-Tests

Variable	Control Group (n=206)				Treatment Group (n=229)			
	Pre Mean	Post Mean	t		Pre Mean	Post Mean	t	
Alcohol Frequency (30-Day)	0.51	0.70	2.68**		0.52	0.51	-0.26	-0.10
Alcohol Amount (30-Day)	0.65	0.69	0.53		0.55	0.52	-0.48	0.87
Cigarette Frequency (30-Day)	0.24	0.28	0.67		0.24	0.24	-0.08	-0.23
Cigarette Amount(30-Day)	0.25	0.36	1.42		0.29	0.18	-1.48	0.33
Gender (Male=1, Female=0)	0.44				0.47			-0.61
Age	13.02				13.00			0.64
Two parent household	0.78				0.76			0.50
Parent Education	5.96				6.73			-4.80***
Financial strain	3.45				3.49			-0.86
Risk Behavior (Post)	3.45				3.29			1.05
Offers Alcohol (Post)	0.46				0.40			-0.58
Offers Cigarette (Post)	0.90				0.96			-0.22

† p<10;

* p<05;

** p<01;

*** p<001

Table 3
Linear Regressions Predicting Post-Test Frequency and Amount of Use

	Alcohol Frequency <i>n</i> =332			Alcohol Amount <i>n</i> =328			Cigarette Frequency <i>n</i> =337			Cigarette Amount <i>n</i> =347		
	<i>B</i>	<i>SE</i>		<i>B</i>	<i>SE</i>		<i>B</i>	<i>SE</i>		<i>B</i>	<i>SE</i>	
Condition (Treatment Group=1)	-0.22*	0.09		-0.14	0.09		-0.18*	0.09		-0.15†	0.08	
Pre-Test Outcome	0.61***	0.06		0.49***	0.05		0.31***	0.05		0.34***	0.06	
Gender (Male=1)	-0.11	0.09		-0.12	0.10		-0.06	0.09		-0.05	0.09	
Parent Education	0.01	0.03		0.02	0.03		0.00	0.03		-0.01	0.02	
Offers	0.15**	0.04		0.17***	0.04		0.28***	0.04		0.26***	0.04	
R ²		0.37			0.34			0.37			0.42	

† $p < .10$;

* $p < .05$;

** $p < .01$;

*** $p < .001$

Table 4
Linear Regressions Predicting Post-Test Frequency and Amount of Use by Gender

	Alcohol Frequency				Alcohol Amount				Cigarette Frequency				Cigarette Amount			
	Males(n=157)	Females(n=196)	Males(n=156)	Females(n=192)	Males(n=163)	Females(n=193)	Males(n=156)	Females(n=192)	Males(n=163)	Females(n=193)	Males(n=156)	Females(n=192)	Males(n=156)	Females(n=192)	Males(n=156)	Females(n=192)
	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE	B	SE
Condition (Treatment Group=1)	-0.14	0.11	-0.28*	0.14	-0.03	0.12	-0.22	0.14	-0.11	0.11	-0.25*	0.13	-0.06	0.11	-0.22†	0.12
Pre-Test Outcome	0.52***	0.08	0.66***	0.09	0.36**	0.07	.55***	0.07	0.36***	0.07	0.27***	0.07	0.42**	0.08	0.29***	0.08
Parent Education	0.01	0.03	0.01	0.04	0.00	0.03	0.03	0.03	-0.04	0.03	0.03	0.04	-0.03	0.03	0.01	0.04
Offers	0.11*	0.04	0.18**	0.04	0.14**	0.05	0.18***	0.04	0.19***	0.04	0.28***	0.04	0.18***	0.05	0.33***	0.05
R ²	0.34		0.38		0.24		0.37		0.31		0.41		0.32		0.37	

†
 $p < .10$;

*
 $p < .05$;

**
 $p < .01$;

 $p < .001$