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Binational Cultural Adaptation of the *keepin' it REAL* Substance Use Prevention Program for Adolescents in Mexico

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Abstract
Sharp increases in substance use rates among youth and the lack of evidence-based prevention interventions in Mexico are a major concern. A team of investigators from Mexico and the USA are actively addressing this gap by culturally adapting *keepin' it REAL* (*kiR*)—a former US SAMHSA model program—for Mexico. This paper reports on the processes and outcomes of the cultural adaptation of *kiR* for adolescents in Mexico. Multiple forms of data informed this cultural adaptation, including focus groups with students about gendered and violence experiences with substance use, feedback from teachers who previously implemented the original versions of *kiR*, lesson fidelity observations, and external expert reviews. The culturally adapted version of *kiR* integrates Ecological Validity and Cultural Sensitivity Models in the adaptation process. The process encompassed surface structure adaptations, like updating language, graphics, and videos, as well as deep structure adaptation components including cultural norms, attitudes, and beliefs salient among Mexican adolescents. Youth reported receiving alcohol offers from family members, links between substance use and violence, and that shifting gender norms result in more females initiating substance use offers. In adapted *kiR* activities, students practice navigating substance use offers in these contexts. This approach to cultural adaptation led to a true collaborative between investigators in two countries. This study advances knowledge about how to undertake cultural adaptations of efficacious US-based prevention programs in international settings.

Keywords Cultural adaptation · Substance use prevention · Adolescents · Mexico

Introduction

While substance use prevention programs have been widely accepted and empirically tested in the USA 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 never receiving substance use prevention training (Instituto Nacional de Salud Pública 2008), and few evidence-based prevention programs have been implemented and proven efficacious in Mexican schools (Marsiglia et al. 2014). This is particularly important in the context of Mexico, where the rise and spread of drug violence has become an urgent international concern. The number of drug cartels operating in Mexico has more than doubled in the past 8 years, and drug-related homicides increased over 40% from 2009 to 2010 alone (Calderón et al. 2018; Baker 2013). Pervasive violence in many Mexican communities coupled with the lack of efficacious prevention programming places Mexican youth at an increased vulnerability for drug and alcohol use.

One evidence-based substance use prevention program that may be efficacious in Mexico is *keepin' it REAL* (*kiR*) (Marsiglia and Hecht 2005). *kiR* is grounded in Mexican American culture and is efficacious in reducing alcohol, tobacco, and marijuana use and increasing anti-drug attitudes among Latino adolescents in the USA (Hecht et al. 2003; Kulis et al. 2005). However, it is critical to determine if this efficacious intervention developed in the USA can address the substance use prevention needs in an international context or

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if cultural adaptations are needed (Parra-Cardona et al. 2018). *kiR* may not account for the cultural communication patterns of Mexican youth resisting substance use or reflect the socio-environmental context of substance use offers in Mexico. The purpose of this article is to describe how data drove the determination for a cultural adaptation of *kiR*, and the cultural adaptations made to *kiR* in order to improve its cultural fit and efficacy among adolescents in Mexico.

Overview of *keepin' it REAL*

kiR is a multi-cultural drug-resistance strategies curriculum designed for early adolescents (Hecht et al. 2003). Formerly recognized as a National Model Program by the Substance Abuse and Mental Health Services Administration (SAMHSA), *kiR* teaches students to use four drug resistance strategies, represented by the acronym REAL—Refuse, Explain, Avoid, and Leave. *kiR* teaches a variety of communication techniques to navigate risky or undesirable influences and the flexibility to select appropriately from a repertoire of strategies in different situations. *kiR* recognizes the central role of culture in determining norms of communication and the importance of addressing cultural relevance in prevention messaging. *kiR* is a 10-lesson manualized curriculum delivered in school classrooms by teachers over a 10-week period. The curriculum includes classroom-based scenarios and exercises for adolescents to practice in small groups, as well as videos to reinforce each resistance skill through portrayals of successful drug resistance strategies (Hecht et al. 2003).

Over a period of 15 years, researchers tested *kiR* across different regions of Mexico using a linguistically translated version of *kiR*. Findings from various pilot tests demonstrated that the core components of *kiR* were pertinent, as Mexican adolescents also used the REAL strategies to resist alcohol, tobacco, and marijuana offers (Kulis et al. 2008; Marsiglia et al. 2009). These pilot trials also revealed important gender differences among adolescents in Mexico. Compared to females, males employed the REAL strategies more when resisting marijuana and cigarettes and used the Avoid strategy significantly more in situations involving alcohol (Marsiglia et al. 2009). In addition, the original *kiR* showed desirable effects differentially by gender. Females reduced alcohol and cigarettes in the short term, while males reduced long-term use of marijuana (Marsiglia et al. 2014, 2015). These findings demonstrated a need to adapt *kiR* culturally for Mexican youth, taking into account gendered communication patterns, as well as various cultural and social factors specific to Mexico.

Cultural Adaptation

Program adaptations are commonly defined as purposeful or inadvertent modifications, including deletions or additions to a program, changes in manner or intensity of a program, and modifications to cultural aspects (Escoffery et al. 2019). The field of intervention research has historically discouraged adaptations (McKleroy et al. 2006); however, the field is increasingly viewing adaptation as an imperative process to ensure that programs are responsive to the cultural and contextual needs of minority communities (Castro et al. 2004).

Cultural adaptations should not interfere with the core components of the curriculum that influence behavior change and make it efficacious. A successful cultural adaptation keeps these core elements unchanged, while integrating cultural components and nuances to enhance the audience's understanding of, identification with, and receptiveness to those core components (Castro et al. 2004). Research shows that a successful culturally grounded approach to adaptation (Marsiglia et al. 2009) integrates core cultural values of the targeted population, rather than merely making superficial alterations to language or visual images, and accommodates cultural differences in preferred strategies for resisting substance use in different contexts (Kulis and Brown 2011). This process should include partners from the culture in which one is working, as they are "able to bridge any gaps between program features and needs for and preferences of the existing host system, they are host 'experts'" (Sussman et al. 2018, p. 2).

There are several models for cultural adaptation; however, there are few reported and published examples of these models being implemented (Bernal et al. 2009). We chose to follow two complementary models in culturally adapting *kiR* for Mexico: (a) the ecological validity model (EVM; Bernal et al. 1995, 2009) to identify areas for consideration in the adaptation and (b) the cultural sensitivity model (CSM; Resnicow et al. 2000) to develop surface and deep structure adaptations. Through creating an intervention that is relevant, respectful, and recognizable to both ecology and culture, participants are more likely to be engaged in and receptive to the intervention's core components (Bender and Clarke 2011), thereby enhancing its efficacy (Resnicow et al. 2000).

The EVM identifies specific program components to adapt. It involves maintaining the integrity of the lived experiences of the targeted audience, while simultaneously incorporating the larger cultural and social context. The EVM recommends culturally adapting eight elements of a program's content or implementation, including language, people, metaphors, goals, methods, content, concepts, and context. This model asserts that the core components of an intervention are not compromised during the cultural adaptation, but rather following the EVM will enhance its efficacy and beneficial outcomes (Bernal et al. 1995, 2009) because the target audience will be more likely to internalize the intervention's messaging and change behaviors (Gosin et al. 2003).

The cultural sensitivity model incorporates cultural characteristics, experiences, patterns, and behaviors into all aspects

of an intervention. The eight EVM program elements are embedded and integrated throughout two overarching types of adaptations: visible (surface) and non-visible (deep). Surface structure adaptations refer to tailoring a curriculum to the aspects of a culture that are "observable" (Resnicow et al. 1999). These can include names, clothing, music, locations, and language, as well as the fit of the intervention—the "where" and "how" of intervention delivery.

Deep structure adaptation incorporates less visible aspects of culture, including social, psychological, environmental, and historical factors that are known to influence health behaviors differentially across racial/ethnic groups (Resnicow et al. 2000). Beyond surface structure, deep structure adaptations integrate cultural norms, attitudes, and behaviors into the intervention (Resnicow et al. 2000). These factors are important because they reflect and underscore a person's motivations and beliefs (Castro et al. 2004). The process of a deep structure adaptation requires more than simply what the scientific literature suggests and more than making stereotypical cultural depictions or assumptions (Resnicow et al. 2000). It requires incorporating the voice and input of the community to understand the core cultural norms and values of the individual, family, and society (Bender and Clarke 2011).

The purpose of this article is to (a) describes how various forms of data about substance use patterns, risk factors for substance use, and the predictors of substance use among Mexican adolescents informed the cultural adaptation of *kiR* and (b) presents examples of the adaptations that resulted from these data, based on the ecological validity and cultural sensitivity models.

Methods

A binational team (Mexico and US-based researchers) collected multiple sources of data from the three largest urban areas in Mexico (Mexico City, Guadalajara, and Monterrey) during an initial pilot phase of *kiR*. This phase entailed delivering the linguistically adapted version of *kiR* (i.e., the original Latinx version of *kiR* translated from English to Spanish) in one school per study site. The research team collected data from (a) focus groups with students, (b) focus groups with teachers, (c) fidelity observations, (d) teacher reflections, and (e) external expert reviewers.

Data collection procedures and protocols were identical across sites, and local research team members at each site collected all data. Each site contributed equally to data collection, and all data collection followed the approved protocol from the university's institutional review board (IRB) and the Ethics Committee at Mexico's Secretary of Health. All binational members received joint research training in leading focus groups and observing implementation fidelity.

Data Collection

Focus Groups with Students Members of the local site research team conducted focus groups with students in 7th and 9th grades. Teachers identified students to participate based on student's gender, academic ability, learning styles, personal interests, and behaviors. The overall goal was to ensure that the focus groups represented a diverse group of students and not simply those considered to be the "best" or the most well-behaved in class. A total of 103 students participated in 21 focus groups: 73 students from the 7th grade, and 30 from the 9th grade. The number of students in each focus group ranged from nine to 11. Focus groups lasted an average of 90 min. Facilitators used a focus group guide to pose questions and then probed for details or clarification of the meaning of responses (see Table 1 for example questions from each round of focus groups). All focus groups were audio recorded and transcribed verbatim in Spanish by research staff at each site in Mexico. Questions in the student focus groups concentrate on both surface and deep structure dimensions and reflect the language, content, concepts, metaphors, and context elements of the EVM model.

The 7th grade students participated in three separate focus groups that occurred before, during, and after *kiR* implementation in the pilot phase. These focus groups were gender-segregated to ensure that boys and girls had an equal voice and opportunity to share feedback. The first round of focus groups (April 2016) elicited information about the students' exposure to substances, what they would say to their friends who were in a risky situation, and whether males and females manage these situations in a similar manner. The second round (June and July 2016) elicited data on what the students learned, liked, understood, and retained from each of the core *kiR* lessons (refuse, explain, avoid, leave). In the third round (July and August 2016), focus group questions centered around what kinds of changes the youth would make to *kiR*, which drug resistance strategy worked best for them and why, and their reactions to the videos and scenarios presented in the lessons.

The 9th grade students did not receive the *kiR* curriculum and participated in one mixed-gender focus group per site (April 2016). These focus groups gathered more in-depth information about the students' exposure to substances, who offered the substances, how they managed these situations, and whether there were gender differences in receiving and refusing substance use offers. Feedback from the 9th grade students shed light on the substance use experiences and attitudes of Mexican adolescents as they mature and encounter more risky situations.

Focus Groups with Teachers To gain teachers' in-depth and first-hand perspectives on the implementation of *kiR*, the team also conducted one focus group with teachers at each site after

Table 1 Examples of questions from focus groups and fidelity observations

(a) With students				(b) Focus groups with teachers	(c) Fidelity observation questions
7th grade—focus group #1	7th grade—focus group #2	7th grade—focus group #3	9th grade—focus group		
How often do you think the students in your school have the chance to use alcohol or drugs?	What's your favorite part of the program up until now?	How similar were the scenarios to what you and your friends might experience? Would you change anything about the videos?	How certain are you that your classmates are using drugs and alcohol? When and where does it happen? With whom?	Which lessons worked best for students? For you? Please describe the positive attributes of the lessons.	Please note any differences in reactions between male and female students.
Have you been in a situation where, if you wanted, drugs or alcohol were available for you to consume? Who else was there?	Is there something that you do not like about the program?	What is the most important thing you learned from the program and why?	In general, are these situations the same for boys and girls, or are they different?	Which lessons were difficult for students? For you to teach? Why?	Was the teacher prepared for the lesson?
Would the way you handle these situations change depending on the substance that was offered?	Are there situations that are more common or you are more used to seeing that were not represented in the scenarios?	If you could change just one thing from the program (activities, homework), what would it be?	Have you ever been in a situation where, if you wanted to, alcohol and drugs were available for you to consume? What happened in the situation? Who else was there? Did someone offer you drugs or alcohol directly? If so, who was it?	To what extent did the videos help students understand the concepts presented in the lessons?	How closely did the teacher follow the curriculum regarding the instructions, videos, activities, and homework?
What would you tell your best friend if he/she were in a situation where they were offered drugs or alcohol? Why?	Did the conflict scenarios represent real life? If not, what could we do to make them more realistic?	Which R.E.A.L. strategy do you think you would use in the future or you have you already used one?	How do you think that [males/females] learn to manage these types of situations? Is it the same or different?	Were there parts in the program that did not seem to match with the values or culture of the students here in Mexico? How could it be modified?	
How do you think that [males/females] learn to manage these types of situations? Is it the same or different?	Did the kids in the videos remind you of people you know?	Have you seen or heard peers use other strategies besides R.E.A.L. in order to avoid risky situations? What were they?			

implementation was complete. At each site, three teachers who implemented *kiR* discussed their curriculum reactions in a focus group format. Following the approach used with the students, the questions focused on surface and deep structure elements reflecting language, content, concepts, metaphors, and context dimensions of the EVM model. Teachers explored questions such as (a) which lesson(s) worked best for the students and why, (b) which lesson(s) was the most difficult for you to facilitate and why, and (c) how relevant *kiR* is to the students' Mexican culture.

Lesson Fidelity Observation During implementation, one trained research team member at each site visited each classroom an average of five times to conduct fidelity checks on teacher adherence, preparedness, and any deviations. The fidelity form also asked if student responses varied according to gender and the degree to which students engaged with the lesson content and activities. Research team members also noted students' comments and reactions to the lesson, using direct quotes when possible. The team conducted 47 fidelity observations.

Teacher Reflection Forms and Notes At the end of each lesson, all implementing teachers ($n = 9$) completed a reflection form that gauged the parts of the lesson that engaged students the most, any activity or concept that presented challenges for students, and whether teachers believed there was information missing from the lesson which could have helped facilitation.

Teachers were also encouraged to make notes directly in the curriculum manual to reflect their experiences and suggestions for changes.

External Expert Reviews The study team sought input and feedback from five external expert reviewers to ensure the adaptations were appropriate and representative of the study sites. Three external reviewers, one from each study site in Mexico and two US-based experts in the fields of curriculum design, prevention science, and/or adolescent development, reviewed a draft of the adapted curriculum. The reviewers provided feedback on the clarity and age appropriateness of lesson objectives, vocabulary, in-class activities and homework, the cultural fit to the Mexican context, and any inappropriate content. The team compiled and synthesized comments to inform any additional edits and modifications to the curriculum.

Data Analysis

The team chose thematic analysis because it allows for a deductive approach based on prior research with the original *kiR*. Thematic analysis is also well suited to find prevailing patterns that were not reflected in the original *kiR* (Cho and Lee 2014). To ensure the universality of the culturally adapted program, the analysis focused on exploring commonalities in experiences and beliefs among students and teachers. Specifically, the overall objectives were to identify scenarios of substance use risk (contexts of drug offers) and resilience (effective drug resistance strategies), to ascertain their connection to gender norms and violence, and to assess the feasibility and applicability of delivering the *kiR* in the urban Mexican context.

To ensure rigor and trustworthiness, the research team engaged in multiple strategies, including (a) prolonging engagement, (b) reducing researcher bias, (c) triangulating the data, and (d) developing a coding system and process (Morse 2015). Prolonged engagement was assured by having the same research team members conduct three separate focus groups over time with the same youth and spend time in their classrooms observing fidelity. One way the team chose to reduce researcher bias was to rely on teachers to identify a diverse group of students to participate in the focus groups, rather than having the research team potentially select the most well-behaved or high-achieving students. To triangulate the data and check the validity and reliability of the findings, multiple sites, data sources, methods, and investigators were used throughout the research process.

A coding system and process was developed to establish consistent meanings among the coders (Morse 2015). Based on Mayring's (2000) deductive category development, the research team developed an *a priori* list of categories, definitions, and coding system that included (a) substance use patterns (e.g., "alcohol," "cigarettes," "marijuana," "drinking," "smoking"), (b) risk and protective factors for substance use (e.g., "offers," "permission," "quinceañeras," "school," "family"), (c) resistance strategies and experiences (e.g., "no," "tell," "go," "ignore," "take away"), (d) references to gender (e.g., "boys," "girls," "men," "women," "boyfriend/girlfriend"), (e) references to violence (e.g., "gangs," "hit," "grab," "intimidate," "threats"), (f) curriculum content (e.g., "videos," "activities," "examples," "concepts," "like/not like"), and (g) curriculum facilitation (e.g., "time," "instructions," "unclear," "engage," "difficult").

Coding was conducted independently by six research team members—three bilingual coders from USA and three from Mexico. These six coders represented multiple backgrounds, including psychology, social work, nursing, and education, in order to ensure that diverse perspectives were embedded throughout the analysis (Berends and Johnston 2005). Coding was based on text-based units, including lines, sentences, and whole quotes (Berends and Johnston 2005). Using Microsoft Word, each site color-coded references to the themes mentioned above. After the initial independent coding of all data, the primary US-based coder developed a matrix that integrated all codes by each theme, noting any discrepancies between sites. The six coders then met in person for an intensive one-week session to compare findings, discuss, and resolve any discrepancies, and verify conclusions across all coders (Tashakkori and Teddlie 2003). When discrepancies existed between the US and Mexico coders, the team deferred to the Mexico coders. The coding process and discussion continued until saturation of the data occurred and no new information or themes emerged.

Results

The following presents examples of key EVM elements and surface and deep structure cultural adaptations made to *kiR*, narratives used to inform the adaptations, and descriptions of adaptations made to the curriculum. Tables 2 and 3 present comprehensive lists of adaptations made and where they reflect the EVM and CSM. The quotes provided have been translated from Spanish to English and serve to highlight why specific changes were made to the curriculum.

Key Surface Structure Adaptations

Adaptation Purpose: Help Students Identify with and Engage in Curriculum Content Feedback from both students and teachers indicated that some elements of the original version of *kiR* were not relatable, or in some cases were distracting. In particular, the original *kiR* videos were written and filmed in the USA, featuring the experiences, communication patterns, and culture of adolescents in Southwestern USA. These cultural nuances in the videos presented a cultural mismatch with the audience, and ultimately posed a distraction from the

Table 2 Examples of surface structure adaptations

Adaptation EVM elements	Description of adaptation	Data source
(1) Metaphors, language, & context: help students identify and engage with curriculum content	Added current, popular Mexican music.	Student focus groups #1, #2
	Included online gaming scenario.	Student focus groups #1, #3
	Updated manual's cover art to represent Mexican youth culture. Updated modes of communication with texting and use of emoticons.	Student focus group #2, Teacher focus groups
(2) Methods & context: enhance teachers' experience in facilitating the curriculum.	Created one-page summaries for teachers with key lesson points and tips for facilitating each lesson.	External reviewers, Mexico team members
	Expanded the range of recommended time for each lesson to 45–65 min. Provided teachers with a suggested time allotment for each activity and suggestions on how to break up each lesson into multiple days.	Teacher focus groups Fidelity observations Teacher reflections
	Provided each school with audio visual equipment to be used for the program.	Teacher focus groups, Fidelity observations
(3) Language: update curriculum to reflect the Spanish language used in Mexico.	Replaced passive language and phrasing with active language and phrasing, e.g., "alumno" to "estudiante." Changed "discussion" to "debate" to reflect academic connotation.	External reviewers Mexico research team members
	Changed "hacerse de la pinta" to "irse de pinta" to remove vulgar connotation.	

videos' core messages. Similar issues arose for students while completing curriculum activities. The study team heard a resounding need from students and teachers to update the curriculum manuals and videos with culturally relevant communication styles, language, and experiences relatable to Mexican adolescents:

> "If they make these videos more realistic and more like what happens to us we'd identify more and would say: oh this has happened to me, let's see what happens next." (Student)

> "I would make things more attractive using more realistic examples…the examples they have are things that would happen in the past…in our case it's rare that that would happen. For example, I play online games and I was playing and getting a really good streak; I was talking with the other players about the game and other people; and this guy asked me to go out with him and have a good time at a party…I'd say they should have examples like that where someone is playing or something." (Student)

> "Yes, I think it's very important to incorporate social media because that's what the kids experience and it's through social media that they exchange information and even drug offers. So I think it's vital, it's part of their social identity and their culture." (Teacher)

To address the need for representing the real-life experiences, culture, and communication patterns of Mexican adolescents, the adaptation team updated many hypothetical situations presented throughout the curriculum. For example, one of the newly adapted *kiR* videos takes place in a typical Mexican middle school setting—complete with the buildings, students in public school uniforms, and language relatable to Mexican adolescents. The new scenarios integrated into the videos and student manuals came directly from the experiences of the youth who participated in the pilot study. These changes represent a surface structure adaptation to the metaphors, language, and context dimensions of the EVM.

Adaptation Purpose: Enhance Teachers' Experience in Facilitating the Curriculum Teachers shared that facilitating *kiR* during the pilot phase posed contextual and logistical challenges. *kiR* was originally designed for typical American classroom structure, timing, teaching style, and resources. For example, the original *kiR* materials include DVD videos and PowerPoint slides, but many Mexican schools did not have the audiovisual equipment needed to deliver these components of the curriculum. The original *kiR* teacher manual asks teachers to have students work in small groups. However, Mexican class sizes are often upwards of 50 students, making classroom management a challenge during these activities. Many teachers reported they could not complete a lesson during the classroom period because of the time

Table 3 Examples of deep structure adaptations

Adaptation EVM elements	Description of adaptation	Data source
(1) Concepts: reflect gender norms and gendered communication patterns.	Included a new video in which girls pressure other girls to try drugs.	Teacher focus groups
	Created a mixed-gender activity where boys and girls pair up; one pushes drug offers and the other refuses.	Fidelity forms Student focus groups
	Designed a gender role activity where students mark if they agree or disagree with certain gendered statements and why, and then discuss as a class.	
(2) Content, context, & language: help students navigate risky situations with family members.	Added an in-class activity of a hypothetical situation where an uncle offers an adolescent a drink at a family party, and the adolescent must resist the offer.	Student focus group #1 Teacher focus group
(3) Content, context, & concept: address experiences of violence in relation to substance use.	Emphasized in each core lesson that sometimes it is appropriate to use the strategy "Leave" when feeling threatened or in danger.	Teacher focus group Student focus groups
	Designed a new in-class activity where students practice identifying strong emotions and brainstorming ways to diffuse the situation.	

it took to group and un-group students. In the teacher reflection forms and notes, teachers highlighted this constraint:

> "Add more time for this lesson. 45 minutes IS NOT ENOUGH FOR THE LESSONS. There was a lot of participation in the activities, in response to what they were learning, and what experiences they had been through." (Teacher)

> "I have up to 50 students in my classes, … and it's really not easy to organize a group of [50] students…no matter how much planning and organizing you do, it's definitely not possible to stay within the time frame." (Teacher)

To address these concerns and challenges, the adapted version of *kiR* provides teachers with recommendations on how to divide a single lesson over the course of several days, if they are unable to complete a lesson in one session. The research team provided participating schools the necessary audiovisual equipment to project PowerPoint slides and videos, which was then donated to each school. The research team also created one-page summaries for each adapted *kiR* lesson to distribute to teachers 1 week prior to each scheduled lesson. The goal of these summaries is to prompt teachers to remember the overall lesson objectives, activities, and any advance material preparation needed for the lesson. These changes represent a surface structure adaptation to the methods and context components of the EVM.

Adaptation Purpose: Update Curriculum to Reflect Spanish Language Used in Mexico Feedback from the expert reviewers and the internal Mexican research team members indicated that certain words and phrases needed to be modified to better reflect the nuance of everyday Spanish usage in Mexico. To update the curriculum material, the team changed the term "alumno" (pupil) to the word "estudiante" (student). The word "alumno" has a very academic, traditional, passive meaning and suggests that a person receives knowledge from an expert, while "estudiante" refers to a person who participates in and is an active player in their own learning process. The term "debate" replaced "discusión" (discussion) because "discusión" is associated more with a verbal fight or altercation. "Debate" more accurately reflects the exchange of ideas that the curriculum promotes.

Additionally, in a country as large and diverse as Mexico, regional language differences appear across Monterrey, Mexico City, and Guadalajara. One example was translating the phrase "playing hooky" from school. One suggested phrased was deemed inappropriate, even vulgar in one site.

In the end, a seemingly small tweak led to the phrase "irse de pinta," which was agreed upon by members of all three sites. In cases where the team did not reach consensus regarding what vocabulary to use, they deferred to the most widely used version of a word or phrase. Study team members agreed that one of the most difficult aspects of adapting *kiR* was agreeing on language. These changes represent a surface structure adaptation to the language component of the EVM. This quote from a Mexican team member sums it up:

> "Words have different meanings [across sites] and we had to reach a consensus on which were the most widely understood. Finding a universal language was particularly discussed…So there wouldn't be a wrong interpretation of the word and its meaning or usage, we had to avoid regionalization and use more of a national language." (Mexico Research Team Member).

Key Deep Structure Adaptations

Adaptation Purpose: Reflect Gender Norms and Gendered Communication Patterns Data from the students' focus groups revealed the salience of changing gender norms around substance use and substance use offers. Both boys and girls reported finding it challenging to resist peer pressure from a friend of the same gender. In addition, the students (particularly boys) wanted depictions and scenarios where girls were offering to use a substance.

> "It's harder to say no when you're with other girls because they're all like 'come on, drink…drink…'" (Student, girl)

> "And why can't they (videos) show girls offering drugs to boys, because in all the videos they show a boy offering (the drug)." (Student, boy)

The adaptation team integrated these experiences by creating a new video for the Refuse drug resistance strategy. The new video shows two popular girls encouraging and pressuring two other girls to sneak into the school bathroom and use drugs. This video gives students a concrete example and idea of how to navigate a situation among peers of the same sex. This change illustrates the dimension of context, as outlined in the EVM.

Fidelity observations and focus group data from teachers illuminated a different gender dynamic in the classroom during *kiR* lessons. Teachers and observers noted that boys often dominated group discussions, and girls felt uncomfortable speaking up:

> "Boys participate more than girls, and when girls do speak, the boys tend to make fun of them, laugh, and talk over them in a loud voice." (Fidelity observation)

To provide students with an opportunity to practice assertive communication techniques with their peers of the opposite sex, the team adapted an activity that asks students to work in pairs. In this activity, one student practices the Refuse strategy and saying "no" assertively to the other student's proposition to do something. Students switch roles so they each have a chance to voice their opinions and practice asserting themselves. The study team updated the activity instructions so that students work with a partner of the opposite sex, which reflects the content dimension of the EVM.

Adaptation Purpose: Help Students Navigate Risky Situations with Family Members The notion that drinking alcohol is safer when among relatives was a common theme throughout data sources. Some students reported that they receive offers and encouragement to drink alcohol from their adult family members. These situations pose a challenge to youth, as they may not want to offend, show disrespect, or risk negative sanctions by turning down the offer. This ties into the role of *familismo*, a Latino cultural value that encourages strong ties with immediate and extended family:

> "…Or sometimes we go to (family) parties and they give us wine." (Student)

> "…what my mom, my parents have always made clear is that it's better to drink with them, so if something bad happens to me they can take care of me, because if I'm with my friends they're not going to do anything good for you and they will tease you or something could happen to you." (Student)

> "It's not so much the friends who influence them, sometimes it's the siblings, the parents, they're the ones consuming…" (Teacher)

To respond to the discomfort expressed by students receiving substance use offers from family members, the adaptation team incorporated hypothetical situations that ask students to respond to tricky situations with family members. For example, one situation involves asking students to practice what they would say in response to an uncle offering a drink at a family gathering. These deep structure adaptations represent the context, content, and language dimensions of the EVM.

Adaptation Purpose: Address Experiences of Violence in Relation to Substance Use Violence in conjunction with substance use offers was an emergent theme in both the student

and teacher focus groups. The teens' stories showed how substance use and violence (or the threat of violence) were often linked to one another contextually. A teacher noted that in Mexican culture, people tend to explain or excuse their behavior. This may be dangerous in situations where violence can occur. Teachers shared that the core *kiR* lessons need to focus more on addressing when it is more appropriate for a student to leave a situation—particularly a violent situation—rather than feeling obliged to explain or excuse his or her behavior:

> "Some of them (pushers/offerors) are really aggressive." (Student)

> "Culturally, we're a country where we think that we have to explain…in case that's not feasible, I told my students, there will be times where you don't have to give any reason. If they insist, you don't explain, just use the last strategy: Leave!" (Teacher)

In focus groups, boys and girls reported resorting to violence as a strategy to resist substances:

> "If my best friend were to be drinking alcohol, I would grab her and slap her…" (Student)

> "We just hit them once because they kept on insisting and they grabbed us, like threatening us." (Student).

To address the connection between substance use and violence without promoting violence or condemning self-defense, the adaptation team integrated violence prevention and de-escalation techniques into the adapted *kiR* curriculum. In a new activity, students learn to recognize the link between their emotions and actions, and identify the physiological sensations that arise when they feel intense anger. The activity also presents students with a list of techniques they can employ to quell feelings of rage (e.g., take deep breaths, count to ten before responding, and take a "time-out" from the situation until they are more calm). In addition, the adapted curriculum now repeatedly emphasizes to students to use the "Leave" strategy in any situations where they feel threatened. These deep structure adaptations represent the context, content, and concept dimensions of the EVM.

Discussion

The research team employed a multidimensional approach to adapt the *kiR* curriculum by facilitating adaptations, while following the EVM and CSM. These models guided the team in what to consider when adapting the *kiR* curriculum for students in Mexico and led to surface and deep structure changes to the metaphors, methods, language, concept, content, and context of the *kiR* curriculum. Drawing upon both models identified the need to make contextual adaptations, like providing teachers with recommendations on how to divide a single lesson over the course of several days because of the larger classroom sizes in Mexico, as well as cultural adaptations, like addressing Mexican gender norms and gendered communication patterns. This process entailed altering the language and graphics in the original version of *kiR* to better represent the Mexican context, modifying existing activities and videos to resonate with and appeal to Mexican youth, and adding new activities that reinforce violence prevention and help students navigate risky situations with family members. The level of detailed changes undertaken by this research team ensures that the cultural and contextual adaptations to *kiR* did not alter the core components of the curriculum that made it efficacious in the USA. By adapting the content of the curriculum to reflect the current experiences, culture, and norms of Mexican adolescents, the research team hypothesizes that the youth receiving the culturally adapted version of *kiR* will be more likely to internalize the intervention's messaging (Gosin et al. 2003).

This adaptation process would have not been possible without the strong relationship between the US- and Mexico-based collaborators as co-equals in the design, execution, and interpretation of the study. The Mexico-based partners provided their perspectives and were very effective in gathering the appropriate adaptation data in their own sites across Mexico. They bridged cultural gaps and were the cultural experts in this process (Sussman et al. 2018). Throughout the adaptation process, Mexico-based team members provided crucial expertise both as cultural insiders and skilled prevention researchers. They helped the US-based team navigate the nuances and cultural elements found in the many sources of data.

This strong partnership also made it possible to engage equitably in research in a context with high levels of drug violence and within schools systems lacking efficacious prevention programming. The extensive training and experience of the Mexico team members in research on preventing youth risk behaviors was vital in understanding how to successfully engage school system administrators, principals, teachers, and students and maintain scientific rigor in data collection and analysis. The equitable US-Mexico partnerships were key to gathering these rich data in a rigorous fashion, adapting the *kiR* curriculum, and testing its efficacy with over 5000 students, which is currently underway.

The adapted curriculum that is currently being tested in a randomized controlled trial may indicate the need for additional adaptations. During teacher trainings for the efficacy trial, feedback was solicited on the videos, situations, and examples from the adapted curriculum and more than 5000 students participating in the efficacy trial are being asked to respond in the post-survey to how well they identified with the

curriculum. This feedback may indicate that additional considerations and adaptations are needed before *kiR* can become a national curriculum for Mexico.

There are important limitations of this cultural adaptation. First, the pilot study and focus groups were implemented with urban youth. Although 77% of the Mexican population lives in urban areas (Instituto Nacional de Estadística y Geografía 2014), there are likely differences between the experiences of urban and rural youth, especially in relation to traditional gender roles and norms. If the intervention is expanded countrywide, it must appeal to as many youth as possible, thus the argument for basing the adaptation on urban centers. Not all the proposed changes from students and teachers were incorporated into the new curriculum. Some changes were not feasible, such as suggestions to have lessons outside on the playground, while others would deviate too much from the core curriculum elements (e.g., to add sexual assault prevention or include parents in the intervention). Future interventions can tackle these issues in a more comprehensive manner. The data collection methodology may not have captured some of the nuances in the lived experiences of the students, and in-depth interviews may have led to different types of conversations and adaptations to the curriculum. Although the triangulation of data and the multiple people involved in data analysis mitigated some risk of bias, the quotes chosen in this manuscript may not fully represent all the participants' voices. It is also worth noting that due to the complexity of a binational, bilingual cultural adaptation, the research team failed to obtain precise information regarding interrater reliability. Although consensus was reached through the data analysis process, there are, unfortunately, no quantitative metrics to indicate the level of agreement between coders.

The methodology and approach to adapting *kiR* was successful in many ways. The team used the EVM and CSM to guide adaptations to all curriculum materials. The adapted version of *kiR* spans beyond topics of substance use prevention by addressing key salient elements in the lives of Mexican adolescents, such as the role of family members, gender, and violence, all of which were incorporated with input from students, teachers, and researchers. The adaptation process convened a team of diverse researchers from two countries, and as a result, enabled the team to successfully and collaboratively facilitate school-based prevention research. The Society for Prevention Research recognized this team's collaborative effort and spirit by awarding it the 2018 International Collaborative Prevention Research Award.

Conclusion

By employing multiple data sources and relying on Mexican partners in this adaptation process, the surface and deep structure adaptations made to the *kiR* curriculum will increase the chances that *kiR* will be successful in its new setting and provide an opportunity to extend knowledge and expertise to create a national substance use prevention program for Mexico. The framework and process established by the research team for this adaptation provides a template for others wanting to test prevention interventions outside the US context. This clear, uniform, and established process enables prevention research teams to maintain the core elements of a curriculum while making the necessary adaptations to enhance cultural fit across diverse settings. As a result, researchers can employ this adaptation process to develop culturally relevant and scientifically sound prevention interventions.

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Compliance with Ethical Standards

Conflict of Interest The authors declare no conflict of interest. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIDA or the NIH.

Research Involving Human Participants All study procedures involving human participants were approved by the Arizona State University's Institutional Review Board and in accordance with standards for ethical research practice, including the 1964 Helsinki declaration and its later amendments.

Informed Consent Participants were informed of their rights, and parental informed consent coupled with youth assent was obtained prior to any data collection.

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