

Drug Resistance Strategies and Substance Use among Adolescents in Monterrey, Mexico

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Abstract This study examined drug resistance strategies and substance use among adolescents from Monterrey, Mexico. The focus was strategies that U.S. adolescents use most often to resist using substances, including refuse (saying no), explain (declining with an explanation), avoid (staying away from situations where drugs are offered), and leave (exiting situations where drugs are offered). Using self-administered questionnaire data from a convenience sample of 327 Mexican students enrolled at two secondary schools (*preparatorias*), we tested whether frequent use of particular drug resistance strategies predicted actual substance use. Multiple regression results showed that different strategies were effective for different substances, that some effects were mediated by number of offers received, and that certain effects were stronger for females than for males. Students using the refuse strategy reported less cigarette use and less binge drinking; those using the avoid strategy reported less alcohol and cigarette use; and those using the leave strategy reported less binge drinking and, for females only, less marijuana use. Use of the

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explain strategy was not significantly related to substance use after controlling for use of other strategies. Findings are discussed in terms of Mexican cultural values and their implications for the design of prevention programs for Mexican youth. *Editors' Strategic Implications:* Replication is necessary to evaluate some of the effects of sampling, the prevention model, implementation, and culture on these findings, but the study underscores the importance of recognizing and understanding the cultural context in which prevention programs—and the clients they serve—exist.

Keywords Adolescents · Substance use · Substance use offers · Mexican youth · Drug resistance

Research on substance use among Mexican youth provides growing evidence that prevalence rates, the types of substances used, social risk factors for use, and the health and social problems associated with use are assuming patterns similar to those reported by youth in the United States (Medina-Mora Cravioto 2003; Villatoro et al. 2004). Of growing concern are increases in illicit drug use among Mexican youth, who until recently have consistently reported lower rates of consumption of illicit drugs than U.S. youth, and a decrease in the typical age of initiation of substance use from 15 to 8 years of age (Felix-Ortiz et al. 2001; Tapia-Conyer et al. 2001; Villareal et al. 2004; Villatoro et al. 1998).

Despite the upward trend in drug use among Mexican youth and expanding research on its etiology, there are large gaps in the knowledge needed to inform the design of effective prevention efforts in Mexico. One relatively neglected research area is the strategies that Mexican adolescents actually use when confronted with substance use opportunities and the relative effectiveness of these strategies for resisting use of different substances. This study investigated whether the strategies used most commonly by U.S. adolescents to resist offers of alcohol, tobacco, and marijuana are used with apparent success by Mexican youth, and whether use of particular strategies depends on the gender of the youth and the frequency with which the youth encounters offers of substances. We used data from a sample of Mexican secondary school students in middle adolescence living in Monterrey, a large city in northern Mexico. The study aimed to advance knowledge of the drug resistance strategies that Mexican youth employ and the degree to which these strategies are connected to their actual substance use. This knowledge can inform the design of prevention efforts by identifying drug resistance approaches that are shown to succeed empirically and that are consistent with the particular social and cultural context. To provide a foundation for our specific research questions, we present the theoretical framework guiding the study, review research on the drug resistance strategies used by youth in the U.S. and Mexico, highlight key trends in the prevalence of substance use among Mexican youth, and discuss salient social factors that influence their use of substances, such as the continuing but narrowing gender gap in substance use.

Drug Resistance Strategies, Substance Offers, and Substance Use

Drug Resistance as Communication Competence

This study was guided conceptually by communication competence theory (Spitzberg and Cupach 1984) and variations in the expression of communication competence across cultural or ethnic groups (Collier et al. 1986). The theory suggests that adolescents are better able to avoid engaging in risk behaviors like substance use when they possess knowledge of various ways of communicating, master the ability to assess the situation, and choose the most appropriate form of communication. Because youth are confronted with new situations and relationships as they progress through adolescence, specialized communication skills may be needed to handle drug offers and other opportunities to use substances (Crick and Dodge 1994; Hecht and Driscoll 1994). Often adolescents need to have the ability to consider multiple strategies for a given situation (i.e., divergent thinking). Those who use more divergent thinking are able to replace ineffective responses or strategies with another more effective strategy. The most successful divergent thinkers will continue to use different strategies until an effective strategy or response is found (Wright et al. 2004). There is considerable evidence that culture plays a role in the development of specific sets or repertoires of drug resistance strategies (Hecht et al. 1992; Marsiglia and Hecht 2005).

Research on drug resistance strategies and responses to substance offers has emerged over the past two decades, largely through studies of the etiology of youth substance use and through the development and testing of substance abuse prevention programs for youth in the United States. Because much less is known about these issues for Mexican youth, this review focuses first on U.S. evidence. Research on the key role of peer influences in substance use among U.S. youth has highlighted the importance of good communication and social skills for handling substance offers from peers (Botvin and Botvin 1992; Skara and Sussman 2003). Adolescents vary in their susceptibility to drug offers and employ different types of drug resistance strategies depending on the number and diversity of offers and the degree of peer pressure to use substances (Alberts et al. 1992). The adolescents who are most at risk of using substances not only receive more offers but also receive diverse offers of alcohol and other substances and offers involving peer pressure. Substance users, however, tend to rely on more diverse strategies than non-users, who typically rely on simple “no” and “no desire” responses (Alberts et al. 1992). This finding may reflect substance users’ increased risk of exposure to many substance use opportunities and more complex strategies for dealing with added peer pressure to use substances after refusing an initial offer.

Middle school students in the U.S. report that they respond to drug offers with a restricted range of resistance strategies, with more than 75 percent voicing a simple “no” (Hecht et al. 1992). The minority reporting other strategies most often describe tactics like leaving the scene, making a statement explaining why they will not accept, or expressing fear of negative consequences. In a study on tobacco refusal strategies, Reardon (1989) found that five strategies accounted for 80% of the refusals of tobacco: simple rejection, statement of typical behaviors, expression of attitude/belief,

rejection of the person, and walking away. Similar research on the strategies used most commonly by adolescents to resist use of alcohol, tobacco and other drugs led to the identification of four principal strategies: reject, explain, avoid, and leave (Alberts et al. 1991). The refuse strategy involves straightforward verbal or non-verbal refusals without explanation. The explain strategy includes verbal and non-verbal refusals accompanied by a reason or an excuse for not accepting a drug offer. The avoid strategy entails efforts to physically distance oneself from situations where drugs may be offered or to avoid an offer once a conversation has begun. The leave strategy is one of physically removing oneself from a drug-related situation.

Drug Resistance Strategies and Substance Use

Research connecting drug refusal strategies and actual substance use has examined the impact of refusal assertiveness, wider repertoires of strategies, and general social competence. While strong refusal assertiveness—the ability to unequivocally say ‘No’ to substance offers—is associated with less substance use among youth (Epstein et al. 2001), it also has been shown to result in alienation from peers (Miller et al. 2000). Youth who are more socially adept at turning down substance offers may be more successful at resisting substance use if they can do so while maintaining relationships with peers (Skara and Sussman 2003). Adolescents who know how to utilize a diverse set of drug resistance skills report less substance use (Doi and DiLorenzo 1993; Jackson et al. 1997). One explanation is that youth with more extensively developed cognitive and behavioral self-management skills handle drug offers in more socially competent ways (Griffin et al. 2002). Scheier et al. (1999) found that adolescents with a more developed repertoire of refusal skills and higher personal competence reported lower alcohol use in both the eighth and tenth grades. Conversely, youth who had poor social skill development reported lower refusal efficacy and more alcohol use.

Drug Resistance Strategies in Prevention Programming

Knowledge of the importance of drug resistance skills for youth has been incorporated into the design of prevention efforts (Gottfredsen and Wilson 2003). Substance use prevention programs for youth have been shown to be more effective if they include specific skill development to deal with substance use offers and opportunities (Botvin and Griffin 2003; Botvin et al. 2001; Griffin et al. 2004a, b; Hecht et al. 2003; Tobler and Stratton 1997; Vega and Gill 1998). Many programs are designed to help youth acquire and practice appropriate skills to act on what they learn from the program about the negative effects of substance use or the anti-drug attitudes that the program reinforces. In addition to teaching life skills such as risk assessment and decision making in general, effective programs have been developed to teach specific drug resistance strategies—that is, skills for responding to drug offers and opportunities (Botvin et al. 2001; Hecht et al. 1993; Holland and Kilpatrick 1993).

The logic model for programs that include drug resistance training assumes that youth not only need to be motivated to resist drug offers and make the decision to decline them, they also must have the knowledge of resistance strategies, when and

with whom to use a strategy, and skill in implementing the strategy. For example, one model prevention program for youth, *keepin' it REAL* (Marsiglia and Hecht 2005), is based on the four successful drug resistance strategies used commonly by multi-ethnic samples of adolescents: refuse, explain, avoid, and leave (Alberts et al. 1991; Alberts et al. 1992; Hecht et al. 1992). The success and importance of drug resistance skills-based training is well documented in the prevention literature, both in influencing substance use behaviors and key norms and attitudes toward substance use that are important mediators in substance use etiology (Botvin et al. 1994; Griffin et al. 2004a, b). Programs that teach a repertoire of specific, culturally appropriate, drug refusal strategies have been found to be effective among samples of U.S. samples, including Mexican American and other Latino youth (Botvin et al. 1994; Kulis et al. 2005; Hecht et al. 2003).

Cultural and Gender Differences in Drug Resistance Strategies

Research on drug resistance strategies for U.S. youth has addressed their variability and appropriateness across cultural and gender groups. Ethnicity and culture appear to influence the source of substance offers, factors in substance use, and the drug resistance strategies preferred by youth. Compared to European Americans, who receive most of their substance offers from non-family peers (friends, school acquaintances), Mexican American youth report receiving more offers of substances, and offers that come from extended family peers (e.g. cousin) at a party. African American students tend to receive relatively more substance offers from dating partners and parents (Moon et al. 1999). Mexican American youth are less likely than European American youth to use simple refusals to resist substance offers because from a cultural perspective these strategies may convey disrespect toward the offerer (Hecht et al. 1989). Instead, they are likely to stress less direct or confrontational strategies, such as the use of explanations, to decline substance offers (Gosin et al. 2003).

Gender differences have also been documented in the types of drug offers that youth receive as well as in the resistance strategies used. Males tend to receive drug offers from other males in public settings, while females tend to receive drug offers from other females and from dating partners in private settings (Moon et al. 1999). Drugs offers directed at males often appeal to their social standing, while offers to females tend to minimize the harmful effects of the drugs being offered. These differences in the nature of how offers are made may contribute to a gender gap in choice of a drug resistance strategy, with females relying less often on the explain strategy (Moon et al. 1999). Social conditioning of adolescent girls to suppress their self-expression as a way of maintaining important family, peer and dating relationships may also influence females to eschew direct refusals of substance offers (Spira et al. 2002). Gender gaps in substance use that are most pronounced in more traditional cultures may also influence the development of different drug resistance strategies for males and females (Kulis et al. 2007). For example, in Mexican culture women are socialized to adopt a collectivist approach that elevates family obligations and needs over individual desires, which may provide opportunities for females to employ culturally resonant explanations or excuses for why they need to abstain from substance use (Perea and Slater 1999).

Some program designers argue that prevention efforts need to systematically cultivate resistance skills that are culturally appropriate for the target groups by deliberately incorporating traditional cultural values and practices that promote anti-drug norms and attitudes (Castro et al. 1999; Gosin et al. 2003; Hecht et al. 2003). Programs that teach multiple drug resistance strategies may enable youth to choose a particular strategy that is suited not only to the situation but also to the youth's cultural values and norms. For example, the directness of a strategy of direct refusal may be more acceptable for European Americans and males but less acceptable for Latinos or females because it may threaten to disrupt the relationship with the person offering the substance.

Sources of Substance Offers among Mexican Youth

The limited research on the social context of substance offers for Mexican youth demonstrates some parallels with evidence from Latino youth samples in the United States, but there are also some important differences. Mexican adolescents report very different patterns of exposure to licit and illicit substances. They are most often introduced to illicit drug use through offers by friends or acquaintances, at parties or other places where adolescents may gather such as a parks or night clubs, and much less often by a drug dealer or stranger (Medina-Mora et al. 2001; Nuno-Gutierrez and Flores-Palacios 2004; Tapia-Conyer et al. 2003; Wagner et al. 2003). Friends greatly outnumber strangers as the source of illicit drug offers (Medina-Mora et al. 2001); among Mexican adolescents who use illicit drugs, two-thirds of the males and over half of the females report that they first obtained the drugs from a friend (Medina-Mora et al. 2003). Compared to their counterparts in the U.S., Mexican adolescents report frequent access to alcohol at supervised and family settings. A study of adolescents and young adults in Mexico City found that 81% of those surveyed consumed alcohol primarily at restaurants, 74.6% at family gatherings, and 52% at parties (Mora-Rios and Natera 2001). Our review uncovered no studies that reported on specific drug resistance strategies used by adolescents or any other population group in Mexico.

Substance Use among Mexican Youth and Its Correlates

Although there are variations by region and degree of urbanization, large percentages of Mexican adolescents report using alcohol, tobacco, or other drugs. Alcohol is the substance used most commonly by Mexican youth, the majority of whom report having used alcohol by age 18 (Herrera-Vazquez et al. 2004; Felix-Ortiz et al. 2001; Latimer et al. 2004; Villatoro et al. 1998). The prevalence and amount of alcohol use has been increasing among Mexican adolescents (Villatoro et al. 1998), and their rates of alcohol consumption exceed those of U.S. adolescents (Felix-Ortiz et al. 2001). About half of Mexican students in secondary schools report lifetime use of alcohol, one-third report alcohol use in the prior year, 15% report use in the past month, and four percent of males and one percent of females report binge drinking on a weekly basis (Jernigan 2001). Additional indicators point to problem drinking as a serious public health issue for Mexican youth. A 1998 national survey found that youth between the ages of 12 and 18 constituted nearly

18% of those who could be defined as alcoholics in Mexico (Medina-Mora et al. 2003). Estimated rates of alcohol abuse and dependence among secondary students in Mexico City have risen steadily, to 20% or more (Caraveo-Anduaga et al. 1999; Villatoro et al. 2005).

Cigarette use is quite prevalent among Mexican youth and it is also on the rise, especially among females (Berenzon et al. 1999). Smoking rates for adolescents increased by 51% in the 1990s (Tapia-Conyer et al. 2001). More than half of adolescent females (52.3%) and males (58.7%) in Mexico describe themselves as at least occasional smokers (Santillan et al. 2002). Adolescent smoking not only carries its own serious negative health consequences, but it is also associated with increased risk of using tobacco and other drugs into adulthood. Very large majorities of Mexican youth using illicit drugs (94%) and alcohol (87%) started using those substances after they began smoking tobacco (Medina-Mora et al. 2002). Over 61% of adult smokers in Mexico report they began smoking before the age of 18, and they have very high rates of using other substances, especially alcohol and marijuana (Tapia-Conyer et al. 2001).

While use of illicit substances is a growing problem among Mexican youth, it remains at much lower levels than use of alcohol and tobacco and generally is less prevalent than among youth in the U.S. (Latimer et al. 2004; Felix-Ortiz et al. 2001). Still, illicit drug use in Mexico among Mexican adolescents increased significantly during the 1990s (Medina-Mora et al. 2003). In a recent survey, 25% of males and 5.5% of females 18–29 years old reported using at least one illicit drug in their lifetime (Medina-Mora et al. 2006). Marijuana is the most common illicit drug used by Mexican adolescents (Caraveo-Anduaga et al. 1999). Lifetime prevalence of marijuana use is approximately five percent among the general Mexican population, 2.5% among adolescent males, and .5% among adolescent females (Medina-Mora et al. 2003). Of those reporting ever using marijuana, 71% of males and 38% of females reported using it in the last 30 days (Medina-Mora et al. 2003).

In addition to a clearer picture of the magnitude of substance use and its attendant problems among youth in Mexico, recent research has documented important demographic, social and psychological risk factors associated with youth substance use that parallel those found in other countries. Key factors in youth substance use in Mexico include age, gender, school attendance and performance, socioeconomic status, and substance use among family and friends (Abdelrahman 1998; Felix-Ortiz et al. 2001; Latimer et al. 2004; Medina-Mora et al. 2003; Medina-Mora and Rojas Guiot 2003; Villatoro et al. 2004). Males and older adolescents have more exposure to drug use opportunities. Rates of illicit drug use are much higher among the majority of Mexican youth who are not enrolled in secondary school education, while substance use rates are generally lower among high academic performers. Rates of use (especially of alcohol and tobacco) are higher among adolescents from higher socioeconomic status homes and those with drug using family members and friends.

Perceptions of the risks, likely outcomes, availability, and prevalence of substance use are important proximal influences on Mexican youth (Felix-Ortiz et al. 2001; Villatoro et al. 1998). One third of Mexican adolescents report they have easy access to illicit drugs, and such access is positively correlated with substance use among both male and female adolescents (Felix-Ortiz et al. 2001).

Although social tolerance for illicit drug use is lower in Mexico than in the United States, perceived social tolerance of substance use in Mexico is also positively correlated with adolescent substance use (Medina-Mora and Rojas Guiot 2003). The majority (62%) of Mexican adolescents report that their peers view alcohol and drug use negatively (Medina-Mora et al. 2003). Still, a study comparing adolescents in Los Angeles and the Mexican state of Baja California Norte showed that despite low levels of social tolerance for illicit drug use, Mexican students had higher rates of alcohol use compared to their peers in Los Angeles (Felix-Ortiz et al. 2001). This may be the result of alcohol being more acceptable than other substances in Mexican culture (Villatoro et al. 1998).

There are wide regional variations in the consumption of alcohol, cigarettes, marijuana and other illicit drugs in Mexico, with higher prevalence in the large metropolises of the northwest region and lower proportions in the southern region (Medina-Mora et al. 2003). Rates of youth drug use in the northern Mexican states along the U.S. border already approximate those in the United States (Felix-Ortiz et al. 2001). Lifetime prevalence of alcohol use is higher among secondary students in the northern-most regions of Mexico—74% (Latimer et al. 2004) and in large urban centers like Mexico City—66% (Villatoro et al. 2005).

The Gender Gap in Mexican Substance Use

Gender differences in substance use historically have been larger and more persistent in Mexico than in the U.S. Although the prevalence of alcohol, tobacco and other drug use among Mexican women has increased over time, women overall continue to consume significantly less alcohol, tobacco and other drugs than Mexican men do, and they are much less likely than men to engage in binge drinking (Caraveo-Anduaga et al. 1999; Medina-Mora et al. 2003; Medina-Mora and Rojas Guiot 2003). Although Mexican women remain less likely than Mexican men to smoke cigarettes, increases in smoking have been especially pronounced among females (Berenzon et al. 1999). A recent Mexican national survey of drug use found that 8.6% of men and 2.1% of women in the general population had used drugs other than alcohol and tobacco in their lifetime (Ortiz et al. 2006). A large gender gap appeared in a recent Mexican school population survey, with males reporting lifetime prevalence of marijuana (9.6%) and cocaine (5.3%) at double the rates reported by females (4.8%, 2.7%) (Ortiz et al. 2006).

Gender differences in age of initiation for alcohol and tobacco have also been identified. On average, Mexican males start drinking alcohol and smoking cigarettes one year before Mexican females, with 60% of males starting to drink by 17 years of age and smoking tobacco by 18 years of age (Herrera-Vazquez et al. 2004). Males' use of these substances at young ages has been linked to their subsequent higher propensity to use other drugs (Wagner et al. 2005).

Mexican cultural norms are the most commonly cited reason for the continuing gender gap in substance use. Large majorities of both Mexican men and women endorse norms that allow men, but not women, to drink alcohol to intoxication (Caetano and Medina-Mora 1988; Medina-Mora and Rojas Guiot 2003; Villatoro

et al. 1998). Another factor contributing to the gender gap is differential exposure to drug use opportunities: adolescent males in Mexico are more than twice as likely to receive drug offers as adolescent females are (Medina-Mora and Rojas Guiot 2003). These gender differences, however, show at least initial signs of eroding due to expanded educational and occupational opportunities for Mexican women and changes in gender socialization and family roles. The gender gap in substance use has narrowed substantially in the U.S. (Amaro et al. 2001; Dakof 2000; National Center on Addiction and Substance Abuse 2003); evidence of a similar trend has begun to appear in Mexico, at least in certain regions, among younger age groups, and for some substances (Medina-Mora et al. 2006). A large random sample of Mexico City students in middle and secondary schools found tobacco and alcohol use to be equally prevalent among males and females, although use of marijuana remained substantially more common among males (Villatoro et al. 2005). Although it may be narrowing in some circumstances, the appreciable and persistent gender gap in substance use among Mexican youth suggests that models used to predict adolescents' use of substances need to be tested separately by gender group.

Research Questions and Hypotheses

The extant research on drug resistance strategies has focused on multi-ethnic samples of youth from the United States. Comparable research in Mexico is a natural and potentially useful extension of efforts to identify drug resistance strategies that find particular cultural expression as well as those that extend across cultures. Although the above review summarizes the mounting evidence that Mexican and U.S. youth experience similar risk factors for substance use, the existing literature does not provide detailed information about the skills that youth in Mexico use when confronting offers of alcohol and drugs, their degree of success in using the strategies to resist actual substance use, or variability in drug resistance strategies across social circumstances and demographic subgroups. The purpose of this study was to advance existing knowledge of the drug resistance behaviors that characterize contemporary urban adolescents living in Mexico by investigating the degree to which use of specific drug resistance strategies may help to prevent use of substances. Specifically, this study examined whether the drug resistance strategies used most commonly by youth in the U.S. are employed by Mexican youth, whether these strategies are associated with patterns of substance use, and how the apparent effectiveness of these resistance strategies varies by substance, by gender and under conditions of more or less exposure to drug opportunities.

The study investigated four drug resistance strategies that are used most often by adolescents in the Southwest United States: refuse, explain, avoid, and leave (hereafter the REAL strategies). Based on evidence from U.S. samples of multicultural youth, including those that are predominantly Mexican American (Hecht et al. 2003; Kulis et al. 2005), the study was guided by the overall hypothesis that among youth with the same level of exposure to substance offers, those who use each of the REAL strategies more frequently will report less substance use.

H₁ Among Mexican youth, more frequent use of the refuse, explain, avoid, or leave strategy to resist offers of alcohol, tobacco, and marijuana in the last 30 days will be associated with lesser amounts and less frequent use of those substances, controlling for the frequency with which the substance has been offered.

Because of ethnic or cultural variations in social tolerance for use of different licit and illicit substances by youth and possible cultural and gender preferences for specific drug resistance strategies, relationships between resistance strategies and substance use among Mexican youth can be expected to differ in strength depending on the substance, the type of strategy, and the gender of the respondent. The paucity of past research on these subjects in Mexico requires that hypotheses be stated tentatively. For cultural reasons, strategies where substances are declined in a very abrupt manner (refuse), which might be interpreted as a rejection of the relationship with the person offering the substance, may be less effective than the explain or avoid strategies. The latter strategies align with Mexican cultural norms that discourage confrontation or the appearance of discourtesy, and they promote relationship preservation in friendship, peer and family circles.

H₂ The inverse association between frequent use of a resistance strategy and actual substance use among Mexican youth will be stronger for more culturally appropriate strategies (explain, avoid) than for less appropriate strategies (refuse).

However, effective use of drug resistance strategies may vary by substance due to differential social tolerance for various types of substance use. Given the widespread acceptance and common use of alcohol in Mexican society, where half or more of the adolescents have at least tried the substance, alcohol may not be viewed as a major risk factor in the health and well being of the youth. Very direct and personally interactive strategies involving outright refusal or explanations for declining an offer may thus lack legitimacy and be more difficult to employ than an indirect strategy that circumvents offers of the substance. The more direct resistance strategies may be viewed as appropriate for illicit substances that are not generally socially tolerated, such as marijuana. Given that marijuana use is illegal in Mexico and much less common than alcohol or cigarette use, its use is less widely tolerated and may be viewed as a significant risk to health and well being. This may deter youth from using the substance or from entering into a relationship or environment that promotes the use of the drug. It also may provide greater cultural support for a wide range of strategies to resist marijuana offers or limit one's exposure to them.

H₃ Direct strategies (refuse, explain) will be less strongly associated with reduced general use of alcohol than they are with use of an illicit substance like marijuana.

Gender socialization and the exposure of females to substances by family members or dating partners may make it relatively more difficult for females to rely on direct refusals and limit their ability to simply leave the situation. However, cultural expectations that drinking to intoxication is much less appropriate for females may allow them the option of choosing more direct strategies to resist excessive alcohol use such as binge drinking.

H₄ Except for binge alcohol drinking, reduced use of substances by females will be more strongly associated with the use of the explain and avoid strategies than with the refuse and leave strategy.

The final hypothesis was based on research suggesting that youth achieve social competence for resisting substance use through the development of a larger repertoire of drug resistance skills.

H₅ Mexican youth who employ multiple drug resistance strategies will report less substance use than those employing fewer strategies.

Methods

Data

This study utilized data from a non-probability sample of students in two secondary schools, or *preparatorias*, in Monterrey, Mexico. These schools were part of a field trial of a school based substance abuse prevention program for youth that was developed for multicultural populations in the United States and later adapted for use with Mexican youth (for details, see Rodriguez and Luis Villar 2004). Data for the current analysis were drawn from 327 students who responded to the pre-test survey conducted in spring 2003, before the prevention program was implemented. Prior parental consent and participant assent were obtained following institutional review board approval by the Universidad Autónoma de Nuevo León in Monterrey. During survey administration, teachers informed the students about the voluntary nature of the project and guaranteed confidentiality for those who chose to answer the surveys. All students present on the day the survey was administered chose to participate in the study.

The respondents were either first or second year students within the *preparatorias*, mostly 15 or 16 years of age (87%), and with slightly more males (56%) than females (44%). A majority of the students were living in two-parent households (76%) and in Mexico would be considered middle class based on the reports of parental occupations: most students had at least one-parent employed in a white collar occupation (58%), including a substantial minority (38%) who had parents in professional occupations.

Measures

The key outcomes and predictors examined in this study were Likert-type items that summarized students' use of drug resistance behaviors and use of alcohol, tobacco, and marijuana in the last 30 days. Resistance behaviors were measured by reported use of each of the four REAL resistance strategies. Students reported how often they had “refused an offer of [particular substance] without saying why” (refuse); “said ‘no’ to the offer and had explained why” (explain); “avoided a situation or place where [particular substance] was offered” (avoid); and “left situations or places where [particular substance] could be offered to them” (leave). These items were

substance specific, with separate reports of the frequency of use of each strategy (scored 0, 1, 2, or 3 or more times) in the last 30 days to resist offers of alcohol, offers of cigarettes, and offers of marijuana. The items were developed and validated with a multi-ethnic but predominantly Mexican heritage sample of adolescents in Arizona (see Hecht et al. 2003). Another measure was created to gauge the expansiveness of the repertoire of drug resistance skills by counting the number of different REAL strategies that the student had used in the last 30 days, ranging from 0 to all 4. The repertoire measure was calculated separately for skills employed to deal with alcohol, cigarette, and marijuana offers.

Substance use was measured by separate reports of the amount of alcohol, cigarettes, or marijuana used within the past 30 days and over the lifetime. The Likert-scale items for alcohol use ranged from 1 = “None” to 9 = “30 or more drinks” for both recent and lifetime alcohol use; from 1 = “None” to 9 = “More than five packs” for lifetime and recent cigarette use; and 1 = “None” to 9 = “More than 100 times” for lifetime and recent marijuana use. An additional binge alcohol drinking outcome was examined: the number of times within the last 30 days that the respondent consumed five or more alcohol drinks at one sitting, scored from 1 = “None” to 6 = “10 or more times.” High scores on all these measures corresponded to higher amounts of substance use. Dichotomous versions of each of the substance use measures were created, contrasting any use to non-use, to produce estimates of the prevalence of recent and lifetime use.

To assess an important contextual factor in the use of strategies, students also reported the number of times they had ever been offered substances in their lifetime. There were separate indicators of offers of alcohol, cigarettes and marijuana, all scaled from 1 = “Never” to 8 = “Over 100 times.”

Age was self-reported in years, and students self-identified their gender as male or female. Occupational prestige of the employed parent with the highest status served as a measure of socioeconomic status, using ordered occupational status categories from 0 (unemployed) to 7 (independent professional) as used in the Mexican national census. School achievement was measured by the student’s report of his or her usual grades on a percentage basis. Responses approximated a grade point average (GPA) on a 1–4 scale, ranging from 1 = (<70%) to 4 = (90%–100%) with higher values indicative of better grades.

Analysis Strategy

This study examined the extent to which four drug resistance strategies—reject an offer without saying why, decline but explain why, leave a situation or location where drugs are offered, and avoid situations or places where they might be an offered—were associated with alcohol, cigarette and marijuana use among a group of urban, adolescent Mexican males and females. Initial tests explored bivariate correlations between the frequency of use of the resistance strategies and lifetime use of substances, recent use of substances, and number of drug offers.

Relationships were further explored through hierarchical multivariate ordinary least square regression models that controlled for demographic variables that appeared to be relevant to substance use among Mexican youth, as well as

controlling for the use of each of the REAL drug resistance strategies. Models were contrasted with and without controls for the number of substance use offers received by the youth to determine how exposure to drug offers may mediate the effects of resistance strategies on substance use. Finally, the models were estimated separately by gender, and tests for gender interactions were conducted to determine if associations between the resistance strategies and actual substance use differed for females and males. Although the data came from a non-probability sample and the results cannot be used to generalize to a specified population through the use of inferential statistics, conventional statistical significance (Type I error) is reported as a means of identifying the more robust associations in the data.

Results

Descriptive statistics for the variables in the analysis appear in Table 1. In addition to means and standard deviations for all variables, the last column utilizes dichotomized measures to indicate the percentage of students who had used each type of substance, who had employed each resistance strategy, and who had received offers of each substance. Demographic characteristics of the sample are indicated by the means for control variables, which indicate that the average respondent was male (56%) rather than female (44%), just under 16 years old, a C+ student, and living with a parent employed in an occupation more than halfway up the categorical hierarchy of the Mexican national census.

The prevalence of substance use in this sample corresponds to levels reported in national samples of Mexican youth (Villatoro et al. 2004). About two-thirds had used alcohol and cigarettes in their lifetime, and about one-third had used each of those substances recently. Marijuana use, both lifetime and recent, was comparatively rare.

Over half the students had used each of the four resistance strategies within the last 30 days to deal with alcohol and marijuana offers. To deal with cigarette offers, students relied more often on the refuse and the explain strategies (over 60%) than on the avoid and leave strategies, which were used by less than half. The measures of the size of the REAL strategies repertoire showed that most students tended to rely on more than one strategy, with the average student reporting using somewhat more than two strategies to deal with each of the three substances. When dichotomized, the repertoire measures indicated that three-fourths or more of the students had recently used at least one of the REAL strategies for each substance.

Although the means for the frequency of substance offers were on Likert scales that do not translate to a specific number, they indicated that cigarette offers were most frequent—they were received by over 70% of the respondents—and marijuana offers were least frequent, with only 30% ever being offered that substance. Just over half the respondents reported having received alcohol offers, which was fewer than the percentage reporting having used alcohol.

Table 2 presents bivariate correlations between measures of resistance strategies and substance use outcomes. In these correlations, the strategies and substance use measures have been matched in the table to be substance specific. For example, the

Table 1 Descriptive statistics for study variables

| Variable | <i>N</i> | Mean | Standard Deviation | Percent using substance or strategy, or receiving offer |
|--------------------------------------|----------|-------|--------------------|---|
| Substance use outcomes | | | | |
| Alcohol, lifetime | 320 | 4.20 | 2.84 | 68.12 |
| Alcohol, last 30 days | 323 | 2.56 | 2.46 | 33.44 |
| Binge drinking, last 30 days | 323 | 1.52 | 1.14 | 23.84 |
| Cigarettes, lifetime | 322 | 3.94 | 3.06 | 65.84 |
| Cigarettes, last 30 days | 323 | 2.71 | 2.64 | 37.77 |
| Marijuana, lifetime | 323 | 1.15 | 0.81 | 6.81 |
| Marijuana, last 30 days | 321 | 1.08 | 0.62 | 3.12 |
| Drug resistance strategies | | | | |
| Refuse-Alcohol | 309 | 1.24 | 1.25 | 57.93 |
| Explain-Alcohol | 309 | 1.21 | 1.24 | 57.93 |
| Avoid-Alcohol | 309 | 1.12 | 1.25 | 52.10 |
| Leave-Alcohol | 309 | 1.06 | 1.22 | 51.13 |
| Refuse-Cigarettes | 306 | 1.51 | 1.28 | 67.65 |
| Explain-Cigarettes | 306 | 1.39 | 1.28 | 62.42 |
| Avoid-Cigarettes | 306 | 0.92 | 1.20 | 43.46 |
| Leave-Cigarettes | 306 | 0.87 | 1.19 | 40.85 |
| Refuse-Marijuana | 284 | 1.40 | 1.38 | 58.10 |
| Explain-Marijuana | 284 | 1.39 | 1.38 | 56.69 |
| Avoid-Marijuana | 284 | 1.65 | 1.36 | 66.55 |
| Leave-Marijuana | 284 | 1.51 | 1.37 | 61.27 |
| REAL repertoire-Alcohol | 309 | 2.19 | 1.46 | 82.20 |
| REAL repertoire-Cigarettes | 306 | 2.14 | 1.47 | 80.72 |
| REAL repertoire-Marijuana | 284 | 2.43 | 1.69 | 74.65 |
| Frequency receiving substance offers | | | | |
| Alcohol offers, lifetime | 322 | 2.73 | 2.19 | 53.42 |
| Cigarette offers, lifetime | 323 | 3.34 | 2.26 | 71.52 |
| Marijuana offers, lifetime | 323 | 1.66 | 1.31 | 30.03 |
| Controls | | | | |
| Gender (Female = 1; Male = 0) | 323 | 0.44 | 0.50 | |
| Age | 319 | 15.73 | 0.93 | |
| Family socioeconomic status | 319 | 4.15 | 2.14 | |
| Grades | 323 | 2.10 | 0.73 | |

top-left entry gives the correlation between lifetime alcohol use and the frequency that the refuse strategy was used to resist an offer of *alcohol*. The bottom right entry provides the correlation between the number of marijuana offers received and the number of different REAL strategies used to resist an offer of *marijuana*.

There are clear substance-specific patterns in the correlations. Respondents who used the avoid and leave strategies more frequently reported significantly less alcohol use on three separate measures, but the refuse and explain strategies were

not significantly related to alcohol use. Although a larger repertoire of REAL strategies was inversely correlated with each of the measures of alcohol use, the size of these correlations was smaller than the correlations with the individual avoid and leave strategies measures. Conversely, greater use of each of the four strategies was associated with less cigarette use, but using them in combination as indicated by a larger REAL repertoire produced an even larger correlation with lifetime and recent cigarette use measures. In sharp contrast, none of the individual strategies or the number of them used in combination was related to marijuana use. Correlations with the number of offers of particular substances show diverging patterns. Students using the avoid and leave strategies received fewer offers of alcohol and cigarettes, as did those who employed a larger repertoire of REAL strategies to deal with those substances. In contrast, those receiving more offers of marijuana used all the strategies, except avoid, significantly more often, and they had larger repertoires of REAL strategies for marijuana as well. Unlike the pattern for avoid and leave, those offered alcohol more frequently also used the refuse strategy more often.

A series of hierarchical regression models were estimated to test the hypotheses that REAL strategies would be associated with substance use. The first set tested the predictive power of each REAL strategy separately while controlling for gender, age, socio-economic status and academic performance; the second set tested the REAL strategies all together; the third set controlled for the number of offers received; the fourth set tested for gender differences in the effects of the REAL strategies; and the final set assessed whether a larger repertoire of REAL strategies was more strongly associated with substance use than use of individual strategies. The multiple regression analyses used last 30 day substance use outcomes rather than lifetime use, although the pattern of effects was similar for recent and lifetime use. Choosing recent rather than lifetime substance use allowed us to see the effects of use of the resistance strategies as predictors of substance use when both the predictor and the outcome are measured over the same prior 30-day period. The

Table 2 Correlations between use of drug resistance strategies and substance use outcomes

| | Refuse | Explain | Avoid | Leave | Number of REAL strategies |
|---------------------|-----------|-----------|-----------|-----------|---------------------------|
| Lifetime alcohol | -0.071 | -0.082 | -0.312*** | -0.288*** | -0.227*** |
| Recent alcohol | -0.067 | -0.062 | -0.270*** | -0.207*** | -0.189*** |
| 5+ Alcohol drinks | -0.101 | -0.044 | -0.220*** | -0.234*** | -0.209*** |
| Lifetime cigarettes | -0.203*** | -0.133** | -0.308*** | -0.275*** | -0.335*** |
| Recent cigarettes | -0.270*** | -0.225*** | -0.301*** | -0.278*** | -0.352*** |
| Lifetime marijuana | -0.033 | -0.026 | -0.083 | -0.050 | -0.042 |
| Recent marijuana | -0.063 | -0.097 | -0.106 | -0.079 | -0.094 |
| # Alcohol offers | 0.133* | 0.011 | -0.230*** | -0.191*** | -0.130* |
| # Cigarette offers | 0.023 | -0.008 | -0.242*** | -0.208*** | -0.175** |
| # Marijuana offers | 0.245*** | 0.202*** | 0.111 | 0.126*** | 0.199*** |

* $P < .05$, ** $P < .01$, *** $P < .001$

Note: Ns for bivariate correlations: $N = 309$ for alcohol related outcomes; $N = 306$ for cigarette related outcomes; $N = 284$ for marijuana related outcomes

outcomes and strategies were matched in all the models to be substance specific, e.g. the predictors of cigarette use include only resistance strategies employed to deal specifically with cigarettes. Although there were substantial correlations between some predictors, especially use of the leave and avoid strategy, all the models were free of multicollinearity (variance inflation factors were all below 5 and most below 1.5).

In the first set of regressions, where each REAL strategy was entered singly in turn along with demographic controls—but not controlling for use of other strategies—the pattern of effects was nearly identical to those in the Table 2 correlations; thus these results are not presented in tables. The single difference was that the refuse strategy predicted less binge drinking of alcohol in the multiple regressions but not in the correlational analyses.

Tables 3 and 4 show the results of the second, third, and fourth sets of regression models. For each substance use outcome, the first column examines the REAL strategies when all four strategies were entered in combination, that is, controlling for the frequency of use of the other REAL strategies as well as other controls. In the second column, an additional control for the number of offers of the particular substance that the respondent received in the last 30 days was added. The first and second columns thus include models that address the first three hypotheses of the study: whether REAL strategies predict substance use controlling for offers and whether certain specified strategies are more powerful predictors than other strategies. The third and fourth models address the fourth hypothesis; results are presented separately for males and females.

Table 3 presents results predicting use of alcohol, both recent amounts and frequency of binge drinking. Controlling for the effects of other strategies, avoid was the only strategy significantly associated with less recent alcohol use, while the leave strategy was linked to fewer episodes of binge drinking. In the second model, controlling for the number of alcohol offers received reduced the size of the effect of the avoid strategy on recent alcohol use, but the effect remained significant. After controlling for number of alcohol offers in the model predicting binge drinking, however, the effect of the leave strategy was attenuated to non-significance and a suppressed significant negative effect of the refuse strategy emerged. The third and fourth separate models by gender suggested that both the effect of the avoid strategy in reducing recent alcohol use and the effect of the refuse strategy on reducing binge drinking were stronger for females than for males; both differences in the size of the effects were confirmed through tests with gender interaction terms (not presented in tables). Although females reported significantly less frequent binge drinking than did males, explained variance was higher for females than for males. The introduction of number of offers as a predictor increased explained variance markedly for both outcomes, and it mediated the effect of age, suggesting that older respondents reported more alcohol use and binge drinking than younger respondents because they received more alcohol offers. Socioeconomic status was unrelated to the alcohol outcomes, and higher academic performance as measured by grade point average was significant only in predicting lower recent alcohol use by females.

Table 4 presents results for last 30-day use of cigarettes and marijuana. Controlling for the effects of other strategies, refuse and avoid were the only

Table 3 Effects of *keepin it REAL* drug resistance strategies on alcohol use outcomes unstandardized regression coefficients, standard errors in parentheses

| | Recent alcohol use | | | | 5+ Alcohol drinks | | | | |
|-----------------------------|--------------------|-----------------|-----------------|-----------------|-------------------|-----------------|--------------|-----------------|--------------|
| | Total sample | Males only | Females only | Total sample | Males only | Females only | Total sample | Males only | Females only |
| Refuse | 0.016 (.137) | -0.211 (.127) | -0.138 (.172) | -0.069 (.064) | -0.177** (.059) | -0.210** (.068) | | -0.154 (.090) | |
| Explain | 0.017 (.139) | 0.051 (.126) | 0.077 (.167) | 0.070 (.065) | 0.086 (.059) | 0.078 (.066) | | 0.077 (.089) | |
| Avoid | -0.474** (.153) | -0.284* (.140) | -0.355* (.179) | -0.094 (.071) | -0.003 (.065) | -0.002 (.071) | | -0.004 (.100) | |
| Leave | -0.077 (.160) | 0.016 (.145) | 0.060 (.207) | -0.151* (.075) | -0.107 (.068) | -0.083 (.082) | | -0.115 (.099) | |
| Gender (M = 0, F = 1) | -0.430 (.291) | -0.262 (.264) | | -0.282* (.136) | -0.203 (.123) | | | | |
| Age | 0.318* (.156) | 0.067 (.144) | 0.128 (.201) | 0.226** (.073) | 0.107 (.067) | 0.054 (.080) | | 0.140 (.099) | |
| SES | 0.010 (.068) | -0.031 (.061) | -0.098 (.079) | -0.001 (.032) | -0.020 (.029) | -0.047 (.031) | | -0.012 (.045) | |
| Grades | -0.308 (.201) | -0.133 (.183) | -0.678** (.258) | -0.088 (.093) | -0.005 (.085) | -0.101 (.102) | | 0.042 (.124) | |
| # Alcohol offers | | 0.507*** (.063) | 0.470*** (.087) | 0.559*** (.087) | 0.240*** (.029) | 0.265*** (.034) | | 0.226*** (.043) | |
| Intercept | 1.918* (.977) | 1.659 (.886) | 0.855 (.969) | 1.197** (.456) | 1.075** (.412) | 0.735 (.384) | | 0.849 (.509) | |
| Adjusted R ² | 0.088 | 0.251 | 0.346 | 0.100 | 0.266 | 0.386 | | 0.195 | |
| N | 303 | 303 | 127 | 303 | 303 | 127 | | 175 | 127 |

* P < .05, ** P < .01, *** P < .001

Table 4 Effects of *keep it REAL* drug resistance strategies on cigarette and marijuana use unstandardized regression coefficients, standard errors in parentheses

| | Recent cigarette use | | | Recent marijuana use | | |
|-------------------------|----------------------|------------------|------------------|----------------------|-----------------|-----------------|
| | Total sample | Males only | Females only | Total sample | Males only | Females only |
| Refuse | -0.429** (.137) | -0.511*** (.121) | -0.723*** (.210) | 0.017 (.051) | -0.006 (.051) | 0.040 (.092) |
| Explain | 0.030 (.144) | -0.041 (.127) | 0.062 (.212) | -0.036 (0.556) | -0.041 (.055) | -0.100 (0.091) |
| Avoid | -0.476* (.186) | -0.238 (.167) | -0.212 (.248) | -0.037 (.050) | -0.035 (.050) | -0.051 (.087) |
| Leave | -0.054 (.196) | 0.019 (.173) | -0.023 (.261) | 0.027 (.053) | 0.034 (.052) | 0.031 (.088) |
| Gender (M = 0, F = 1) | -0.908** (.292) | -0.575* (.261) | | -0.092 (.081) | -0.069 (.080) | -0.032* (.012) |
| Age | 0.281 (.155) | 0.127 (.138) | 0.263 (.192) | 0.230*** (.043) | 0.215*** (.043) | 0.295*** (.065) |
| SES | 0.086 (.068) | 0.023 (.060) | -0.025 (.092) | -0.009 (.019) | -0.013 (.018) | -0.027 (.030) |
| Grades | -0.750** (.203) | -0.595*** (.181) | -0.479 (.252) | 0.093 (.056) | 0.120* (.056) | 0.211* (.086) |
| # Cigarette offers | | 0.530*** (.058) | 0.502*** (.083) | | | |
| # Marijuana offers | | | 0.565*** (.077) | | | |
| Intercept | 2.205* (.976) | 0.998 (.872) | 0.671 (1.053) | 0.655* (.267) | 0.631* (.264) | 0.534 (.344) |
| Adjusted R ² | 0.215 | 0.387 | 0.328 | 0.104 | 0.127 | 0.167 |
| N | 300 | 300 | 174 | 277 | 164 | 112 |

* $P < .05$, ** $P < .01$, *** $P < .001$

strategies significantly associated with less cigarette use as shown in the first model. The effect of the avoid strategy was then reduced to non-significance in the second model by controlling for number of cigarette offers received. In the separate models by gender, more frequent use of the refuse strategy predicted reduced cigarette use for both males and females, although significantly more powerfully for males than for females as shown by gender interaction tests (not presented in tables). Control variables indicated that females generally smoked cigarettes less frequently than males did. Students with better grades reported reduced cigarette use, even controlling for number of offers; however, this effect was stronger for females than for males. Age and SES were not significant predictors. The models explained a substantial proportion of variance in cigarette use, especially for females.

In contrast to the results for cigarettes, none of the models in Table 4 for recent marijuana use showed that REAL strategies were significant predictors, except for a small effect of the leave strategy in reducing females' marijuana use. Although no overall gender differences in marijuana frequency emerged, two control variables were significant predictors of marijuana use for males alone. For males, both age and grades were appreciable influences on marijuana use, but these were not important factors for females. Marijuana use was reported more frequently by older male students and by males with higher grades. All the models explained a small proportion of the variance in marijuana use. Unlike the results for cigarettes, however, the models were much better at predicting males' use of marijuana than females' use.

The last set of regression models, which are not presented in tables, examined the fifth hypothesis: whether the use of multiple REAL strategies—the REAL repertoire—predicted substance use outcomes better than individual strategies did. Several models were tested for each outcome: first including the REAL repertoire with controls, and then adding each individual REAL strategy in turn. The results indicated that individual strategies were more salient than the size of the REAL repertoire in predicting all outcomes. Although the REAL repertoire predicted less recent alcohol use, less binge drinking, and less recent cigarette use in the initial models, these effects became non-significant after controlling for the individual strategies that demonstrated significant effects in Table 3 and 4. The more salient individual strategies were avoid for recent cigarette use and refuse for binge drinking and cigarette use. The REAL repertoire was not a predictor of marijuana use in any model.

Discussion

This study's findings reveal a pattern of association between Mexican adolescents' use of certain drug resistance strategies and lower levels of use of alcohol, cigarettes, and marijuana. In multivariate models that controlled for other important predictors, students using the refuse strategy more often reported less cigarette use and less binge drinking; those using the avoid strategy reported less alcohol and cigarette use; and those using the leave strategy reported less binge drinking and, for females only, less marijuana use. Use of the explain strategy, which was correlated

with less cigarette use, was not significantly related to any substance use outcome when use of other strategies was controlled.

The findings provide limited support for the study's first hypothesis that all of the REAL strategies would be associated with reduced substance use. All four REAL strategies were correlated with reduced use of cigarettes. However, after controlling for the frequency of offers of the substance, only one or two of the strategies were generally salient, with different patterns emerging for each substance. At best, these patterns provided mixed support for the second hypothesis that arguably more culturally appropriate strategies, such as the explain and avoid strategies, would be associated with reduced levels of substance use than for a strategy like refuse that might be viewed as less culturally consistent. Results showed that explain was not a salient predictor for any substance in any multivariate model; avoid was salient for only one outcome, recent alcohol use; and refuse was found to be the most salient predictor of reduced binge drinking and cigarette use.

Considering cultural attitudes that might be thought to emphasize *respeto* and discourage confrontation (Phinney et al. 2000), the use of the avoid and explain strategies appear to align well with Mexican cultural norms, as has been shown for Mexican American populations (Gosin et al. 2003). However, the apparently successful use of the refuse strategy for some substances and the inability of the explain strategy to predict substance use in this population run counter to these cultural expectations. These unexpected results may reflect regional variations in the culture surrounding substance use in Mexico, recent cultural changes, or other unexamined factors that are more salient than cultural expectations in predicting responses to substance offers.

The third hypotheses, that direct strategies (refuse, explain) would be used more often to resist a less socially tolerated substance such as marijuana, received no support. The refuse strategy was associated with cigarette use and binge drinking, but not marijuana use. The lack of stronger relationships between any resistance strategy and marijuana use may be attributed in part to the low prevalence of the latter among youth in this sample.

Findings bearing on the fourth hypothesis showed that there were differential effects by gender, although they did not always conform to initial expectations. It was argued that cultural norms would make it more difficult for females to use the refuse or leave strategies than the explain or avoid strategies. Results showed that females, but not males, who utilized the relatively passive avoid strategy more often did report less recent alcohol use, which may be seen as consistent with traditional gender role expectations. Another suggested reason for this finding, not testable with our data, is the possibility that females in Mexico receive substance offers principally from male family members or boyfriends who are difficult to refuse or leave in an abrupt manner. Lack of tolerance for female intoxication suggested that binge drinking would be an exception to the hypothesis, and this too was supported by the results. Females who used the refuse strategy more often also reported less binge drinking; this relationship was not found for males. Females may be able to refuse outright without social sanction when they are offered multiple drinks because of social norms that drinking to the point of inebriation is less acceptable and normative for females than for males.

Other hypothesized gender differences failed to emerge. Females who used the leave strategy relatively more often reported less marijuana use, and both females and males who employed the refuse strategy also reported less cigarette use. On the surface the latter findings are at odds with depictions of Mexican women as deferential or submissive to men's influence (Medina-Mora 1994) and thus less likely to verbally resist others' requests or demands in an open way.

The differential results by gender may reflect the contextual and gender segregated nature of heavy drinking and illicit substance use in Mexico. If that behavior is outside of the culturally acceptable realm—as in the case of binge drinking and marijuana use—females may not need to use resistance strategies that often, and when they are needed, direct strategies like refuse or abrupt strategies like leave may suffice and be acceptable. Another possible explanation is that female deference to males may surface selectively: females may be able to refuse male friends but not male family members or boyfriends. This study lacked measures of the gender of the person offering substances or their relationship to the respondent and so it is not possible to make this conclusion from the data. In this sample of urban Mexican adolescents, it is possible that substances tend to be offered by friends, making it easier for girls to respond in a less traditionally gendered way. Recent evidence that gender gaps in actual substance use are beginning to narrow among Mexico's youth (Villatoro et al. 2005), as they have in the U.S., may reflect less polarized gender role socialization that will lead ultimately to some gender convergence in the repertoire of resistance strategies used by females and males.

No support was found for the fifth hypothesis, that larger repertoires of resistance strategies would be more strongly associated with less substance use than reliance on single strategies. Resistance to cigarette use was tied more closely to use of the refuse strategy than to use of multiple strategies, and the avoid strategy alone was a more powerful predictor of less use of alcohol than was the use of multiple strategies. The finding that different strategies emerged as predictors of reduced use of particular substances suggests that prevention efforts aimed at training youth to have a larger repertoire of available strategies may be an effective approach.

Additional findings demonstrated crucial connections between substance offers and drug resistance strategies, but they fell into two opposing patterns. The first, based on the inverse correlations between use of the avoid and leave strategies and the number of alcohol and cigarette offers received, suggested that those strategies were effective in reducing youths' exposure to drug using opportunities. The multivariate tests showed that two of the relationships between resistance strategies and substance use were mediated by the frequency with which offers of those substances were received: the association between the avoid strategy and lower alcohol and cigarette use, and the association between the leave strategy in less binge drinking. Thus, it appears that the avoid and leave strategy may be effective at least in part because they prevent youth from entering risky situations and reduce their exposure to offers of substances.

A second pattern suggested that some strategies may be invoked more often due to greater exposure to substance offers. That relationship appeared in the bivariate correlations showing that those receiving more offers of a particular substance used

the refuse strategy more often to resist alcohol and marijuana and used explain and leave more often in response to marijuana offers. Although only two of these types of effects persisted in the multivariate results (refuse reducing cigarette use, and leave reducing females' use of marijuana), they suggest a drug resistance process where greater exposure to substance offers increases the likelihood of a particular response. These relationships merit closer examination in future research.

The study's findings may thus be interpreted as reflecting an interaction between Mexican cultural norms and non-confrontational behavioral styles, degree of availability and exposure to substances, and different perceptions of the risks in using various substances. Consistent with findings from predominately suburban White youth in the U.S. (Griffin et al. 2002), as well as from Latino youth living in the U.S. (Kulis et al. 2005), this exploratory study found that Mexican youth who used a selection of the same drug resistance strategies were less likely to use alcohol, cigarettes, and marijuana. Connections between the use of drug resistance strategies and substance use among Mexican adolescents are an important finding for understanding links in the etiological chain of factors that encourage and discourage substance use for this population. Knowledge of the drug resistance strategies used by Mexican youth is important for the design and implementation of effective prevention programs. Previous studies have found refusal assertiveness and drug offers to be primary factors in youth drug use (Alberts et al. 1992; Epstein et al. 2001). Findings from the present study suggest that Mexican youth could benefit from programs that enhance resistance strategies, particularly those that build on knowledge of gender socialization and the social context where youth encounter substance use opportunities.

Limitations

There are several limitations to the present study. First, because the sample of adolescents was from a northern and highly industrialized metropolitan area in Mexico, results may not be generalizable to other groups of adolescents and to other regions of Mexico. Because of its location close to the U.S. border, heavily influenced by cross-border commerce, cultural interchanges, and a relatively higher prevalence of substance use, the normative orientation of the sample may be more approving of drug use and less traditional in gender roles than in other regions of Mexico (Medina-Mora et al. 2003). Second, the data came from a convenience sample, including only those students who were enrolled at the two *preparatorias*. Third, our cross-sectional measures of resistance strategies and substance use were limited to the number of times respondents used each strategy over the course of the past month. Future research could examine relationships between resistance strategies and substance use longitudinally to determine the nature of causal processes that can only be suggested by the data presented here. Finally, several important predictors of adolescent drug use were not included in the model, such as a host of social influences and family and personality measures. Future research should include these variables to more accurately specify the influences affecting adolescent drug use.

Implications

Throughout the past 20 years, advances have been made in understanding the strategies used by youth to resist alcohol, cigarettes, and marijuana (Botvin et al. 2001). The findings of the current study underscore the importance of recognizing and acknowledging the context in which youth respond to drug offers and the strategies they use to resist using alcohol, cigarettes, and marijuana. Given the findings of this study, there is evidence that resistance skills have deterrent capabilities and that youth can effectively apply these skills to offset various internal and external pressures to use alcohol, tobacco, and other drugs. Understanding the connection between drug offers, drug resistance strategies, and actual substance use among Mexican youth can help shape future substance abuse prevention efforts in Mexico. In addition, conducting research in Mexico can have important implications for the research being conducted in the U.S. among Mexican and Mexican American youth. Assumptions are sometimes made about culture of origin and the protective and risk factors that may be associated with it. More pre-migration research is needed to substantiate some of those assumptions.

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