

# Effects of a School-Based Life Skills and HIV-Prevention Program for Adolescents in Mexican High Schools<sup>1</sup>

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A school-based life skills and sexuality education HIV/AIDS program for adolescents was evaluated in Toluca, Mexico, through a quasi-experimental pre-post design with 1,566 cases, divided over a control group and an experimental group. Based on a previously tested path model, 3 levels of variables were included as a guide for the contents of the program: personal variables (self-knowledge, self-efficacy regarding condom use, and decision making), intervening variables (subjective norms about, knowledge about HIV/AIDS, and attitudes toward condoms), and outcome variables (communication on sexuality and intentions to use condoms). Evaluation was conducted following these categories. Significant increases in all of these variables recognized as precursors of safer sex were found in the experimental group.

Like most countries in the world, Mexico is experiencing a growing HIV epidemic. While the prevalence is still rather low (0.3%; UNAIDS/WHO,

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2004), there has been a rapid expansion throughout the country, particularly among young people. In fact, 14% of AIDS cases have been diagnosed in people younger than 24 years. AIDS is now the third leading cause of death in the 25-to-40-year age range (Magis, Bravo-García, & Uribe, 2002). Of the total number of cases, 83.8% are males and 16.2% are females.

Of the cases in which the source of HIV infection has been identified, 42.3% of infected Mexicans are reported to have contracted the disease through heterosexual contact, 49.1% through homosexual or bisexual contact, less than 2.0% through drug use, while the remaining 6.6% have contracted the disease either through blood contact or at birth (Secretaría de Salud/CONASIDA, 2004). Correct condom use is an obvious tool in controlling the epidemic. The prevailing cultural norm in Mexico, widely taught through the Roman Catholic Church and the education system, is abstinence from any sexual activity before marriage and a strict monogamous relationship thereafter. However, these standards often are not adhered to, and this fact must be recognized.

Although enough information is available regarding sexual and reproductive health, traditional and conservative standards of communication on sexuality prevalent in Mexican society and culture limit discussion, implementation, and transmission of educational materials, thus serving as a significant impediment to prevention. Consequently, misunderstandings about HIV continue to exist, and myths still encourage socially accepted practices that promote high-risk behavior.

Módena and Mendoza (2001), exploring social and cultural patterns related to sexual and reproductive behavior, found that subjective norms play an important role in the persistence of risky sexual behavior. Their study indicated that many people conform to cultural norms regarding communication about sex, limiting communication from parents to children, from teachers to students, and even communication within couples. Children and adolescents are poorly informed on sexual education, and misunderstandings about sex and sexuality seldom are clarified.

Among the most widespread beliefs and practices regarding sexuality in Mexico are the following: Talking about sexuality encourages and induces adolescents to initiate sexual activity; a woman who talks to her partner about sex may cause her partner to leave her; people will have a negative opinion of a woman who talks openly about sex and sexuality; talking about sexuality with one's parents is disrespectful; talking about sexuality with one's partner is acceptable only when the man initiates the conversation; and a woman who takes the initiative to communicate about sexual relations is too interested in sexual pleasure (Amuchástegui, 1998). Examples of myths regarding HIV/AIDS are the following: A person who has AIDS cannot live more than a year; animals can contract HIV; oral sex is a way to prevent

HIV; and HIV is transmitted by touch (Pick, Poortinga, & Givaudan, 2003, Reyes, Givaudan, Pick, Martinez, & Ramón, 2005). Hence, it is important to provide accurate information and to teach skills of communication on sexuality in programs for Mexican adolescents and children.

Gender issues and stereotypes limit decision-making power to practice safer sex, especially among females. A review of research on HIV-preventive behavior indicates that individuals are less likely to practice safer sex with close relationship partners (Misovich, Fisher, & Fisher, 1997). Although research on intimate relationships has suggested that close partnerships are associated with improved physical and mental health (Feeney, Kelly, Gallois, Peterson, & Terry, 1999), a growing body of evidence has revealed that HIV may be an exception to this rule. According to Misovich et al., "Feelings of security and trust, and the associated desire to maintain these feelings, produce and perpetuate elevated levels of AIDS risk behavior in couples and serve as a frequently overlooked source of risk of HIV infection" (p. 77).

The complexity of gender roles requires intervention at different levels. Therefore, a discussion of gender stereotypes must be included in sexuality education programs. Furthermore, programs should target potentially modifiable attitudes, beliefs, and norms that have been associated with condom use (Sheeran, Abraham, & Orbell, 1999).

Models of decision making and self-efficacy have been applied to understanding health behavior (Ajzen & Fishbein, 1980; Bandura, 1977, 1986; Becker et al., 1977). These approaches show a series of overlapping variables that predict behavior, suggesting the need for their inclusion in intervention programs. The theory of reasoned action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) is a widely used framework that allows a broad understanding of behavior, including condom use. According to this theory, intentions to change behaviors are determined by subjective norms and are antecedents of behaviors and attitudes. Ajzen (1998) added perceived behavioral control as a predictor of both intentions and actions. As a result, the impact of intervention programs is expected to increase if, in addition to knowledge about HIV/AIDS, it focuses on attitudes, subjective norms, and self-efficacy with respect to sexual issues.

School-based programs for family planning, education, or HIV prevention often have been implemented and shown to increase students' knowledge about HIV/AIDS and their positive attitudes toward reproductive health and safer sexual behavior (Newman, DuRant, Ashworth, & Gaillard, 1993; Siegel, Marilyn, Roghmann, & Maisha, 1998). With respect to the implementation of intervention programs, two modalities have been shown to be important. First, the teaching methods should be interactive to facilitate solid understanding of the information and development of skills (Kirby, 1997; Kirby & DiClemente, 1994). Second, sexual education programs

should be given to adolescents prior to their sexual debut, since it is easier to acquire positive new behaviors than to change adopted ones (Pick de Weiss, Andrade-Palos, Townsend, & Givaudan, 1994).

Data suggest that most Mexican adolescents and adults already have fairly accurate information about HIV prevention: 91% of 15- to 49-year-old males surveyed by the Ministry of Health in Mexico City were able to name at least two adequate ways of protecting against HIV infection (Uribe & Magis, 2000). Although a general awareness of HIV and AIDS prevails among youth in developing countries, more in-depth knowledge of the major modes of transmission is often limited. For example, a common misconception is that if you look healthy, you cannot be HIV-positive. Misperceptions appear to dissuade youth from using condoms (Brown, Jejeebhoy, Shah, & Yount, 2001).

### The Present Study

While many studies have examined the effects of school-based HIV-prevention programs in high school adolescents, in the current study we have a special condition since most of the adolescents report they have not had any sexual experience. The objective is to evaluate the effectiveness of an HIV-focused, school-based educational program that attempts to reduce unsafe sexual behavior among Mexican youth through the development of skills and the demystification of erroneous information.

The current study is a longitudinal extension of a previous study in which we tested an explanatory model identifying precursors of safer-sex practices in Mexican adolescents with and without sexual experience (Givaudan, Poortinga, & Van de Vijver, 2005). The model is rooted in the TRA (Ajzen & Fishbein, 1980), the theory of planned behavior (Ajzen, 1991; Ajzen & Driver, 1991; Ajzen & Madden 1986), and Bandura's concept of self-efficacy (1991, 1997). Using structural equation modeling, a good fit was found for a path model with partner communication and intention to use condoms as outcome variables; self-esteem, self-efficacy, and decision making as antecedent variables; and perceived norms about sexual practices, attitudes toward condom use, and knowledge of HIV as mediating variables. The most salient findings were that sexual experience does not affect intentions to use condoms and communication with a partner about the use of condoms, and that the two strongest precursor variables of safer-sex behaviors among adolescents were self-efficacy and partner communication.

In the current study, self-efficacy regarding condom use, decision making, and self-esteem were considered individual dispositions. Progress in the theoretical perspective of life-skills programs led us to rename self-esteem as

*self-knowledge*, since it is seen as a modifiable skill, rather than as a personality trait.

The mediating and moderating variables are subjective norms about the use of condoms, attitudes toward condoms, and knowledge about HIV/AIDS and about HIV transmission. Finally, as most participants could be expected to be sexually inexperienced, indicators to assess the effectiveness of the program were variables considered to be precursors of safer-sex behavior in the explanatory model (e.g., communication on sexuality, intention to use condoms).

## Method

### *Participants*

Participants in the pretest were 2,064 tenth-grade students at four of the five public schools of Toluca, Mexico. The city of Toluca was selected as research site because: (a) it is one of the urban and metropolitan areas that is likely to be at the center of an epidemic; (b) education authorities are committed to adapting and extending the educational program to all high schools in the state; and (c) being located in the state of Mexico, its proximity to Mexico City enables a better control of the implementation of the program. One school was excluded from the study because it is larger in size and, being the first and largest high school in the state, has access to more resources than do other schools. The other four schools were assigned randomly to either the experimental group ( $N = 1,107$ ) or the control group ( $N = 957$ ).

Participants' mean age was 15.97 years ( $SD = 11$  months), and gender distribution was similar for both groups (1,024 males, 49.6% male; 1,040 females). The socioeconomic and demographic characteristics of the experimental and control groups were similar. Most of the students who attend government schools are classified in the low to medium socioeconomic level, in which mean family income is about \$500 U.S. per month. In Toluca, Mexico, the majority of adolescents are single, belong to extensive families, and live with their parents until they marry. Most of the families are Catholic; the rate of divorce is relatively low (7%), and maternity at any age is highly valued. Friends and mass media are usually the main source of information of sex-related topics for students.

The school system is regulated by the Autonomous University of the State of Mexico (UAEM). Experimental and control schools are similar with respect to curricula and organization, dropout rates, rates of continuation to university, and average number of students per class. Regarding the sexual education curriculum, information on sexuality is provided through a subject

entitled "Sexuality and First Aid." This course is composed of 15 weekly 2-hr sessions dispersed over the tenth grade. It includes topics such as anatomy and physiology, gender issues, sexuality and reproductive physiology, first aid, and prevention of accidents. Importantly, it differs from the course developed for this project with respect to the amount of time dedicated to HIV prevention. It is based on lectures and readings, with little or no participation of the students. Doctors, nurses, dentists, or social workers may teach the course. They are not necessarily trained, although some of them have taken the initiative to update themselves on new sexuality education approaches. Furthermore, the course is not standardized in content, materials, methodology, implementation, or evaluation.

In the present study, the experimental schools received an enhanced HIV-prevention and sexuality education program entitled "A Team Against AIDS," and the control schools received the standard health education course (i.e., "Sexuality and First Aid"). Uncontrolled dissemination of the experimental treatment to the control group (i.e., members of the control group gaining knowledge about HIV/AIDS) is unlikely, because of the geographical distance between the schools that are dispersed widely around the city of Toluca, with an average distance of 10 km from one another.

### *Program Content and Design*

A new program entitled "A Team Against AIDS" (Fernandez & Givaudan, 1999) was complemented (specifically in the general aspects of skills building and the participatory didactic methodology) by the Mexican life-skills program *Planeando tu vida* ("Planning Your Life"; Pick et al., 1988), which has been used widely and evaluated with Mexican adolescents (Pick et al., 1994) based on previous focus groups with teachers and adolescents.

To measure the impact of a life-skills and sexuality curriculum on students, the present study used a quasi-experimental pre-post design with an experimental group and a control group. The curriculum of "A Team Against AIDS" includes the main topics of *Planeando tu vida* (i.e., life skills to enhance knowledge about sexuality and contraception, and participatory exercises to change perceptions of prescriptive norms in order to prevent unwanted pregnancies) and adapts the skills and methodology to HIV-prevention-relevant contents. The new program includes information about both HIV prevention and formation of specific skills. For example, students analyze their own qualities and limits, are guided to reflect on the consequences of their decisions, and are trained to use a condom with their fingers as a model in order to feel more confident about condom use.

Specific knowledge about HIV transmission modes is presented, attitudes toward condoms and subjective norms are addressed through exercises designed to facilitate the analysis of advantages and disadvantages toward the use of condoms, and participants reflect about social and personal norms regarding sex practices and protective sex behavior. Finally, role-playing activities to practice communication on sexuality and assertiveness related to intention to use condoms are carried out in order to practice alternatives to facilitate the development and consolidation of the skills.

Each session lasted 2 hr and was presented on a weekly basis. Curriculum content is presented in Table 1. The content is similar for teachers and adolescents, with the exception that the teachers' course is 10 hr longer,

Table 1

*Curriculum Content*

Area	Specific content
Sexuality <sup>a</sup>	Self-knowledge about communication on sexuality; attitudes toward communication on sexuality; knowledge about sexuality
Norms and values <sup>b</sup>	Self-knowledge about subjective norms and values; subjective norms about sexuality; gender issues
Knowledge about HIV/AIDS <sup>b</sup>	General knowledge about biological aspects of HIV/AIDS and transmission; beliefs and myths about HIV/AIDS and risk practices; attitudes toward AIDS; attitudes toward people living with HIV/AIDS
Safer sex <sup>b</sup>	Self-knowledge about limits and risky behavior; safer-sex practices and condom use; attitudes toward condoms; assertive communication; negotiation and peer pressure
Sexual orientation <sup>b</sup>	Sexual alternatives; sexual diversity; creativity and freedom
Life skills <sup>a</sup>	Self-knowledge; decision making; life plan
Sexual education <sup>c</sup>	Participatory methodology; integration of cognitive, emotional, and attitudinal aspects of learning; sexual rights; development of positive messages for adolescents

<sup>a</sup>Part of "Planning Your Life" program. <sup>b</sup>Part of "A Team Against AIDS" program. <sup>c</sup>Content for teachers only.



during which time they learn how to implement participatory methodology in the classroom. The emphasis in the training for both teachers and adolescents is on development of psychosocial skills to bridge the gap between information and actual behavior.

### *Procedure*

*Training of teachers.* The experimental group consisted of 17 teachers ( $M$  age = 39 years) who were to present "A Team Against AIDS," while the control group of 15 teachers were to present "Sexuality and First Aid." As mentioned previously, teachers presenting the former subject had varying backgrounds (nine psychologists, six physicians, a lawyer, and a chemist) and had not received prior specific training for their work as high school teachers. All of them were trained to become sexuality educators by an experienced instructor, using a highly participative 40-hr methodology. The content and methodology of the program were similar to the content that they replicated later with the adolescents. They also received suggestions regarding alternatives to deal with difficult questions and to refer students with specific problems to adolescent services in the locality. Participant teachers had the opportunity to reflect about their own sexuality and about their own skills to deal with the difficulties to teach these topics to the adolescents. At the end of the course, teachers received a manual to replicate the program with the students. Teachers in the control group received no training regarding sexual education and were instructed to teach the course "Sexuality and First Aid" over the same period as the experimental group.

Teachers answered a pretest–posttest questionnaire. Analyses of pre–post differences using  $t$  tests show significant ( $p < .05$ ) increases in self-confidence, self-efficacy in sexuality-related matters, knowledge about HIV prevention, and perceived advantages of using condoms; as well as a significant decrease in perceived disadvantages of using condoms. Results show that all teachers felt more competent and empowered after the training.

*Intervention delivery.* The curriculum for students in both experimental and control groups was completed in 30 hr over one school semester (15 sessions of 2 hr each). Each session was previously planned following the teacher's manual in order to achieve the specific objectives (see Table 1). In all sessions, teachers created an informal environment in which adolescents learned and had fun. After the training, students received a pamphlet with specific messages about HIV prevention to encourage them to talk about the topic with their friends, as well as a T-shirt with the name of the program ("A Team Against AIDS"). The control schools received the standard "Sexuality and First Aid" curriculum at the same time as the experimental group. All



students answered a pretest questionnaire at the beginning of the school semester. Further, a posttest questionnaire was completed 3 weeks after the course ended.

### *Measures*

A structured questionnaire of 174 items for students was developed. The instrument includes the following topics: demographic information and sexual experience; self-knowledge, decision making, and self-efficacy regarding condom use; knowledge about HIV/AIDS; attitudes toward condoms; subjective norms regarding condom use and communication on sexuality intentions concerning condom use; and sexual behavior, including risky practices and safer-sex behaviors. Final items in the questionnaire were confirmed, modified, or deleted following insight obtained through a pilot study and focus groups. Cronbach's alphas reported here were calculated for the second measure. The reliabilities for the pretest data were largely similar (Givaudan et al., 2005).

*Self-knowledge* (domain-independent). The self-knowledge scale contains nine general items not related to sexual situations. Sample items are "I would like to be able to change a lot of things about myself" and "I feel confident about myself." Items were rated on a 4-point Likert scale ranging from 1 (*almost never*) to 4 (*all the time*). Cronbach's alpha was .78.

*Decision making* (domain-independent). The decision-making scale contains seven general items not related to sexual situations. A sample item is "I have control over what happens in my life." Responses were rated on a 4-point scale ranging from 1 (*almost never*) to 4 (*all the time*;  $\alpha = .81$ ).

*Self-efficacy regarding condom use* (domain-dependent). The scale measuring self-efficacy regarding condom use contains three items. Sample items are "I can interrupt a sexual relation to wear a condom" and "I consider myself able to tell my partner that I will only have sexual intercourse if we use a condom." Responses were rated on a 5-point scale ranging from 1 (*disagree completely*) to 5 (*agree completely*;  $\alpha = .78$ ).

*Subjective norms about condom use* (domain-dependent). The scale measuring subjective norms about condom use contains three items. Sample items are "People who are important to me think I should use condoms" and "My family thinks that if I am to have sexual intercourse, I should use a condom." Responses were rated on a 5-point scale ranging from 1 (*disagree completely*) to 5 (*agree completely*;  $\alpha = .68$ ).

*Attitudes toward condoms* (domain-dependent). The scale measuring attitudes toward condoms contains 10 items related to ideas about the advantages and disadvantages of using condoms. Sample items are "It takes fun

out of sex if you use a condom every single time” and “People who use condoms sleep around.” Responses were rated on a 5-point scale ranging from 1 (*disagree completely*) to 5 (*agree completely*;  $\alpha = .83$ ).

*Knowledge about HIV/AIDS* (domain-dependent). The scale measuring knowledge about HIV/AIDS contains 19 items. Sample items are “A person can contract HIV by having a blood transfusion from an infected person,” “The ELISA test is used to find out whether a person is infected with HIV/AIDS,” and “People who have HIV/AIDS cannot develop antibodies.” Responses were rated on a 5-point scale ranging from 1 (*I am certain this is incorrect*) to 5 (*I am certain this is correct*;  $\alpha = .79$ ).

*Communication on sexuality* (domain-dependent). The scale measuring communication on sexuality contains 11 items designed to explore behaviors that usually induce shame and that could be an obstacle to communication on sexuality and negotiation with the partner. Sample items are “I am ashamed to talk about HIV/AIDS with my partner” and “I am ashamed of asking questions about HIV/AIDS prevention for fear of sounding stupid.” Responses were rated on a 4-point scale ranging from 1 (*almost never*) to 4 (*all the time*;  $\alpha = .70$ ).

*Intentions* (domain-dependent). Intentions were assessed by the question “Which of the following answers best describes your plans about the use of the condom for you and your partner during your next sexual encounter?” Responses were rated on a 5-point scale ranging from 1 (*I am planning not to use a condom*) to 5 (*I am planning to use a condom*).

*Behavior* (domain-dependent). The behavior scale contains 10 items that explore protective and risky sexual practices. The scale was only completed by students who had reported sexual experience. Sample items are “Sometimes I have had sexual intercourse with penetration and without protection” and “I always use a condom.” The items had dichotomous answer alternatives and were scored as 1 (*risky behavior*) or 2 (*protective behavior*;  $\alpha = .80$ ).

### *Statistical Analysis*

*Matching procedure.* The questionnaire was designed to allow for precise matching from one measure (pretest) to the next (posttest), while maintaining both confidentiality and anonymity. The basis for matching was a code that each student created by changing the letters from his or her name into “0s” and “1s,” for vowels and consonants, respectively. Although ideally this should have led to unique codes that could be matched from one measure to the next, the procedure turned out to have some difficulties. Reasons for the

matching problems are varied, but were mostly a result of students either changing the order between parts of their name (Mexicans have a double family name, and often more than one personal name) or its letter content, thus altering the code from one measure to the next. This may have occurred simply because students made errors in the coding procedure, but it cannot be ruled out that the interviewees were concerned about confidentiality.

A more extensive matching procedure was developed and implemented in a computer program. The program took into account a student's name code as well as additional variables that could help in establishing a correspondence between questionnaires, including gender, month and year of birth, age, school, and class schedule. Furthermore, the method allows the user to adjust the probability of different types of errors in the name code and for assigning a different weight to the respective additional variables. Finally, the method includes a parameter indicating how stringent the procedure is in establishing a link. Matching questionnaires based on the computer procedure resulted in 1,566 matched cases (experimental group,  $N = 892$ ; control group,  $N = 674$ ).

*Consistency of data.* The quality of the data varied, depending on the type of information requested from the students. Although consistency tended to be high in the general responses, questions regarding actual behavior showed missing data and shifts in answers, even within the same administration. Thus, mutually exclusive countercheck variables were used in order to control for consistency in answers related to sexual experience. For example, the question "At what age did you have your first sexual relation?" was checked against three other variables that included the option of not having had sexual relations. Furthermore, to ensure that the questionnaire was understandable to the sexually inexperienced and unknowledgeable, a pilot study was conducted, and all terms related to sexual intercourse were defined and exemplified in the questionnaire. These points exemplify the difficulty of exploring sexual behavior in adolescents who are having new experiences that might bring them into conflict with themselves (see Table 2).

*Method.* Data were analyzed using MANOVA with two time points (pretest–posttest) as a within-subject variable, while group (control–experimental) and gender (male–female) were between-subjects variables. The dependent variables were self-knowledge, decision making, self-efficacy regarding condom use, knowledge about HIV/AIDS, attitudes toward condoms, subjective norms about the use of condoms, communication on sexuality, and intention to use condoms. Effect sizes were evaluated using values of Cohen's  $d$  and partial eta squared ( $\eta^2$ ). An analysis with a subsample of students who reported having had sexual intercourse ( $N = 158$ ) was conducted separately.

Table 2

*Percentage of Matching and Nonmatching Cases for Experimental and Control Groups From Pretest to Posttest*

Variable	Matching cases ( $N = 1,566$ )		
	Experimental ( $n = 892$ )	Control ( $n = 674$ )	Nonmatching cases ( $n = 498$ )
Gender			
Missing	—	0.4	0.6
Male	46.7	49.1	54.8
Female	53.3	50.4	44.6
<i>M</i> age (in years)	15.8	16.0	16.3
Marital status			
Missing	0.4	0.4	0.6
Single	98.7	97.9	97.2
Married or living together	0.9	1.3	1.8
Widowed	0.3	0.3	0.4
Divorced	—	—	—
Have a boyfriend/girlfriend?			
Yes	30.8	33.1	36.6
No	69.2	66.5	63.4
Sexual experience by gender			
Females without	51.5	47.3	40.7
Females with	1.9	4.1	5.6
Males without	37.6	36.3	34.4
Males with	9.0	11.8	19.2
Age at first intercourse			
< 14 years	2.0	2.7	3.8
14–17 years	7.0	10.0	16.0
$\geq 18$ years	—	0.3	0.2
Repeating school semester	2.3	5.2	11.6

## Results

### *Preliminary Analyses*

When we compared the demographic data from matched and unmatched cases (see Table 2), we found that 11.6% of the unmatched students ( $N = 498$ ) were repeating the school year; hence, they tended to be older ( $M = 16.3$  years) than those who remained in the study. Moreover, such students often go to school irregularly. We also lost more males (54.8%) than females (44.6%), and 5.6% of the unmatched females reported having had sex, in contrast with 19.2% of the males for whom there were matching records. Interestingly, no significant differences were found between the experimental and control groups among the unmatched cases.

*Gender differences.* Significant gender differences were found in five of the eight variables. Females scored higher than did males on self-efficacy regarding condom use ( $M = 3.36$  and  $2.99$ , respectively), attitudes toward condoms ( $M = 3.39$  and  $3.25$ , respectively), communication on sexuality ( $M = 2.40$  and  $2.13$ , respectively), and intention to use condoms ( $M = 3.98$  and  $3.19$ , respectively). Males scored significantly higher than did females only in self-knowledge about HIV/AIDS, but the effect size was negligible ( $M = 2.22$  and  $2.14$ , respectively).

*Effects on sexual debut.* There were 12 females and 25 males from the experimental group who had not reported vaginal sexual intercourse in the pretest and who reported being sexually active in the posttest, as did 12 females and 24 males from the control group. So, the proportion of participants who had their sexual debut since the beginning of the study was fairly small in both the experimental group and the control group. Our data do not provide any support for the popular belief that more attention to matters of sexuality and protective sex behavior leads to promiscuous behavior.

### *Program Effects*

*Effects on dependent variables.* Time  $\times$  Group effects (see Table 3) show that the experimental group improved significantly in all variables after the implementation of the school-based program in the three different variable levels (personal, intervening, and outcome). Smaller effects for the personal-resource variables in the experimental group (self-knowledge, Cohen's  $d = .15$ ; self-efficacy regarding condom use,  $d = .04$ ; decision making,  $d = .14$ ) were found (see Table 4). Scores in the control group did not show corresponding increases. Table 4 indicates that the strongest effects of Time  $\times$  Group were observed on knowledge about HIV/AIDS ( $\eta^2 = .141$ )

Table 3  
*Effect Sizes of MANOVAs With Time, Gender, and Group as Independent Variables and Psychological Scales as Dependent Variables*

	Between subjects				Within subjects			
	Treatment group		Gender × Group		Time		Time × Gender × Group	
	Gender		Group		Time	Time × Gender	Time × Group	Group
Self-knowledge	.009**	.003*	.000	.009**	.001	.005*	.005*	.002
Self-efficacy/condom use	.063**	.014**	.000	.001	.001	.005*	.005*	.000
Decision making	.000	.007	.001	.000	.000	.017**	.017**	.001
Knowledge of HIV/AIDS	.000	.079**	.001	.148**	.004	.141**	.141**	.000
Attitudes/condoms	.026**	.051**	.001	.015**	.010**	.049**	.049**	.001
Subjective norms	.002	.024**	.000	.000	.005*	.031**	.031**	.000
Communication on sexuality	.177**	.004*	.000	.012**	.001	.007*	.007*	.000
Intentions	.005*	.020**	.001	.001	.001	.037**	.037**	.001
Behavior <sup>a</sup>	.021	.023	.008	.000	.000	.010	.010	.007

Note. N = 1,566.  
<sup>a</sup>Participants with sexual experience only (N = 158).  
 \*p < .05. \*\*p < .01.

Table 4

*Means and Effect Sizes for Control and Experimental Group at Pretest and Posttest*

Scale	Time	Experimental group		Control group	
		<i>M</i>	Cohen's <i>d</i>	<i>M</i>	Cohen's <i>d</i>
Self-knowledge	Pre	2.17	—	2.16	—
	Post	2.24*	0.15	2.17	0.02
Self-efficacy/condom use	Pre	3.26	—	3.16	—
	Post	3.33	0.04	3.06*	-0.10
Decision making	Pre	2.28	—	2.27	—
	Post	2.35*	0.14	2.20*	-0.14
Knowledge of HIV/AIDS	Pre	3.06	—	3.05	—
	Post	3.47*	0.99	3.06	0.01
Attitudes about condoms	Pre	3.32	—	3.25	—
	Post	3.53*	0.56	3.19*	-0.10
Subjective norms	Pre	3.32	—	3.29	—
	Post	3.46*	0.20	3.14*	-0.20
Communication/sexuality	Pre	2.26	—	2.25	—
	Post	2.34*	0.22	2.26	0.03
Intentions	Pre	4.05	—	4.02	—
	Post	4.19*	0.22	3.98	-0.02
Behavior <sup>a</sup>	Pre	0.39	—	0.38	—
	Post	0.49	0.04	0.40	0.02

<sup>a</sup>Participants with sexual experience only ( $N = 158$ ).

\*Significant pre-post difference,  $p < .05$ .

and attitudes toward condoms ( $\eta^2 = .049$ ). Cohen's  $d$  analysis confirms that the major effects in the experimental group were associated with the intervening variables. Knowledge about HIV/AIDS clearly increased in the experimental group ( $d = .99$ ), as did attitudes toward condoms ( $d = .56$ ) and subjective norms with respect to the use of condoms ( $d = .20$ ; see Table 4).

With respect to outcome variables, students in the experimental group had small but statistically significant gains on both communication on sexuality ( $d = .22$ ) and intention to use condoms ( $d = .20$ ). The scores in the control group remained at virtually the same level at pretest and posttest.



*Time effects.* Time effects (with rather small effect sizes) were found for self-knowledge, attitudes toward condoms, and communication on sexuality. Table 4 reveals that only for knowledge about HIV/AIDS was there a substantial effect (pretest,  $M = 3.06$ ; posttest,  $M = 3.49$ ). This entails an expected increase in both experimental and control groups as a result of maturity. Some small Time  $\times$  Gender effects were found also. Female students scored higher ( $M = 3.46$ ) than did males ( $M = 3.26$ ) in the posttest on attitudes toward condoms, and males scored higher ( $M = 3.33$ ) than did females ( $M = 3.27$ ) on subjective norms about condom use. We found no significant Gender  $\times$  Group differences nor Gender  $\times$  Group  $\times$  Time interactions.

A separate analysis was conducted with reported actual behavior as the dependent variable, including only matching pairs of protocols of participants with sexual experience ( $N = 158$ ). There were 15 females and 63 males from the experimental group and 20 females and 60 males from the control group who provided consistent answers and who were considered valid cases. No significant effects were found in protective behavior (see the last row of Tables 3 and 4).

The questionnaire contained an item about current condom use. Of the 37 participants in the experimental group who had begun engaging in sexual behavior between pretest and posttest, 10 reported that they had used a condom the last time that they had sexual intercourse, compared to 11 of 38 participants in the control group. Although the sample size is small and the results are inconclusive, it should be noted that there was no discernible effect of the experimental program. Follow-up data are needed to evaluate more fully the possible impact on actual behavior.

## Discussion

The present study presented the development and evaluation of an HIV/AIDS prevention program for Mexican adolescents. The focus was on the short-term effects of such a program, as post-intervention data were collected 3 weeks after the program ended. The intervention was based on an explanatory model dealing with antecedents of safer-sex behavior (Givaudan et al., 2005). The model showed that communication on sexuality and intention to use condoms can be used as outcome variables to evaluate the effect of early prevention programs when most of the participants have not had sexual experience, because of the significant relation of these two variables with protective sex behavior in Mexican adolescents. This is in line with Whitaker, Miller, May, and Levin (1999), who found that adolescents with a positive attitude toward protective practices were more likely than were others to talk openly with their partners about HIV prevention.

In addition to difficulties collecting information on sensitive topics (e.g., sexuality) in Mexico, methodological limitations of the study focus on problems of the matching procedure when confidentiality and anonymity must be guaranteed. Another limitation of the present study is the difficulty in obtaining consistent information regarding sexual experience. In this study, we faced the problem of attaining accurate yet confidential responses from adolescents, especially those in the control group.

This also raises the question as to whether or not answers have been influenced by social desirability. As in any study that utilizes self-report data, particularly on such sensitive topics, there is the danger of biased reporting. In this case, even when the ideal solution was not found, the condition of coding and response checks was probably close to optimal, given the positive consistency. Data from the unmatched cases show that the adolescents who did not answer the second questionnaire were slightly older and more sexually experienced. Some of these students were repeating the tenth semester or had irregularities in their curriculum, suggesting that they were atypical of the population in the program. In this respect, we feel confident with the analyses that were carried out, even when we lost cases.

No other limitations were found in the implementation of the program. Teachers' support in both the experimental group and the control group was crucial for the implementation of the program. The schools informed us that parental consent was not required, since schools do not need authorization from parents regarding the content of the curriculum in any subject. Previous meetings with authorities and teachers were helpful in this sense. Teachers and students in the control group received the program once the evaluation had been carried out.

Of direct interest for the evaluation of the program is the Time  $\times$  Group effect, which shows that the group that received the "A Team Against AIDS" program improved significantly on all variables. The strongest effects of the program were observed for knowledge about HIV/AIDS and attitudes toward the use of condoms (see Table 4). Although the data suggest that most Mexican adolescents already have substantial information about HIV prevention, the program appears to have had a clear and strong effect in this respect. The specific information included in the program suggests the need to clarify myths as a first step in a program with both teachers and students. It is relevant to mention here that the teachers also showed a significant increase in knowledge about HIV/AIDS after the training.

Some studies have reported that knowledge about HIV/AIDS is a relatively poor predictor of safer-sex behavior (Villaseñor-Sierra, Caballero-Hoyos, Hidalgo-San Martín, & Santos-Preciado, 2003). Additionally, it has been found that other factors (e.g., attachment style, emotional control) play an important role in determining whether knowledge about HIV/

AIDS translates into safer practices (Feeney, 1994) and that life-skills approaches improve the sexual and reproductive health of youth (Moya, 2002). In the present study, the program "A Team Against AIDS" included both knowledge and life skills in order to deal with the obstacles that impair application of knowledge into applied behavior (Pick et al., 2003). Significant effects were found in the variables that we defined as personal resources or skills (i.e., self-knowledge, self-efficacy regarding condom use, decision making), to which the program was specifically geared. The significant differences found in these variables, compared with the absence of positive changes in the control group, can be interpreted as a positive effect of the program on the variables that facilitate the translation of information into preventive action.

Finally, students in the experimental group scored significantly higher on both communication on sexuality and on intention to use condoms, which, in this study, were considered to be the final outcomes. In general, combined with the directions of the pathways in the explanatory model developed prior to this study (Givaudan et al., 2005) and the size effects of the results in the experimental group, the data suggest that initial changes in this type of program occur at the cognitive level, in knowledge about HIV/AIDS and attitudes toward condoms. This implies that it may require a longer process of maintenance to obtain major effects on relevant skills and personal resources.

Significant differences for gender were found. Females scored higher than did males on self-efficacy regarding condom use, attitudes toward condoms, communication on sexuality, and intention to use condoms; whereas, the reverse was found for self-knowledge. Other authors have mentioned that males have a more positive self-concept and higher self-esteem than do females (Amezcuca & Pichardo, 2000; Wilgenbusch & Merrell, 1999). This difference has been attributed to gender stereotypes (Crain, 1996). Females in general were reported by teachers to be more cooperative than were males during the program implementation. This finding is consistent with other authors (Agha, 2002; Kirby & DiClemente, 1994), indicating that, when compared to males, females are generally more receptive to sexuality education programs, or that such interventions tend to target females, leaving males disinterested or disconnected. These data are relevant in our context and are useful to guide the training of teachers. Teachers require more knowledge about gender differences in order to promote student participation with the specific objective of diminishing these differences and furthering gender equity.

It has been argued that safer-sex practices involve a sequence of behaviors in which knowledge about HIV/AIDS must be followed by the learning of skills to resist peer pressure and to communicate and negotiate the use of

condoms in sexual encounters (Feeney et al., 1999). As mentioned previously, we consider it likely that the increase of both cognitive level and skills allows adolescents to apply knowledge in safer-sex practices once they become sexually active. In this sense, the evaluation of the program can be seen as having a positive effect on precursor variables of safer-sex behaviors, especially for adolescents who have not yet had sexual intercourse.

Follow-up studies, for both matching and non-matching cases, would allow us to look at greater numbers of adolescents who have become sexually active. However, irregular school attendance among others renders follow-up for nonmatching cases prohibitively expensive. Many authors have recommended early-prevention programs in the field of sexuality education. Yet, it is extremely difficult to assess final outcomes and demonstrate the benefits of early-prevention programs. Further research, including long-term follow-up and the possibility of maintenance programs beyond an initial program, is necessary. The results of the present study strongly suggest that such research will be worthwhile.

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