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EFFECTIVENESS OF A SCHOOL HIV/AIDS PREVENTION PROGRAM FOR SPANISH ADOLESCENTS

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Due to a lack of controlled studies on HIV prevention interventions among Spanish adolescents, COMPAS, a five-session behavioral intervention, was developed and tested on Spanish adolescents aged 15–18. Participants included 827 adolescents from central, east and north Spain. Six hundred and seven students (M = 15.71 years) received the intervention. The control group consisted of 220 students (M = 15.78 years). The authors used self-report measures at two points in time to assess changes in HIV knowledge, HIV attitudes, perceived norms, and condom use intentions. Compared to the control group, the intervention group demonstrated improved outcomes with regard to HIV knowledge (d = .93) and HIV attitudes (d = .37), and maintained high levels of condom use intentions. The intervention's impact was greater in females and adolescents who were not sexually active. The findings suggest that COMPAS is an acceptable and feasible school intervention for reducing sexual risk among Spanish adolescents.

It is estimated that 2,500 young people in the world become infected with the HIV virus every day (UNICEF, 2011). In 2009, 41% of new infections occurred in young people between 14 and 25 years of age. Among European Union countries, Spain has one of the highest prevalence rates of HIV infection (Spanish Ministry of Health, 2011), and unprotected sex represents the principal transmission route for HIV and other sexually transmitted infections (Díez et al., 2012; Spanish Ministry of Health, 2011).

Efforts to prevent HIV/AIDS sexual risk behaviors among young people, particularly primary prevention programs delivered in educational contexts, have proven to be most promising (Bauermeister, Tross, & Ehrhardt, 2009; Holtgrave & Curran, 2006). Interventions producing the best results are typically delivered over at least four sessions, provide skills training in addition to transmitting information, and are

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based on behavioral change models (Albarracín et al., 2005; Durantini, Albarracín, Mitchell, Earl, & Gillette, 2006).

The behavior prediction models applied most frequently in sexual risk behavior prevention programs propose that intention is the most proximal determinant of behavior (Ajzen, 1989; Fishbein & Ajzen, 1975; Morales, Rebolloso, & Moya, 1994). Furthermore, research shows that condom use intentions are determined by a number of precursors, which may depend on the level of HIV knowledge, including attitudes and perceived norms toward condom use (e.g., perceptions about the beliefs that other significant persons have toward using condoms) and skills (Romero, Galbraith, Wilson-William, & Gloppen, 2011).

In Spain, existing research on HIV preventive interventions for adolescents suffers from a number of significant methodological deficiencies. A classic review study evaluated the methodological quality and effectiveness of 29 studies of Spanish school-based HIV prevention programs, which met the following criteria: (a) targeted toward adolescents aged 13–19; (b) published in scientific journals from 1990 to 1995 in Spanish, French, or English languages; and (c) their effectiveness has been evaluated quantitatively (Juárez & Díez, 1999). To determine intervention quality and effectiveness, the extent to which each intervention was based on a theoretical model, the number of sessions included, and the effects of the intervention on knowledge, attitudes, intention, and behavior were reviewed. To determine methodological quality, whether a control group was used and its comparability to the intervention group, the sample size, the time between the pretest and posttest, and participant attrition rates were reviewed. According to these criteria, we concluded that only 38% of the Spanish HIV school-based programs could be considered to be of high or intermediate quality.

A recent review of Spanish school-based HIV intervention studies (Espada, Morales, Orgilés, Piqueras, & Carballo, 2012) published since the previous review (between 1995 and 2010) found that there has been no clear improvement in the methodological quality or effectiveness of HIV prevention interventions in schools. Using quality criteria similar to those outlined by Juárez and Díez (1999), we found that almost 60% of school HIV prevention programs were classified as medium to low quality. Only 43% of the studies reviewed included a control group design. With respect to the results, 100% of the programs increased knowledge about HIV, and 11 of the 14 interventions had a positive impact on relevant attitudes, such as attitudes toward condom use. For example, two interventions included in the review were *AulaSida* (AIDS classroom), an intervention delivered to 1,579 students aged 12–19 years in a classroom setting (Fernández-García et al., 2000), and *SIDA: Saber Ayuda* (AIDS: Knowing helps), an intervention delivered in a school by health professionals, experts, and peers (Prats, 1995). Both programs significantly improved HIV knowledge and attitudes of participants. However, both studies were limited by the lack of a control group and lack of follow-up assessments.

HIV prevention interventions that are able to produce behavioral change to reduce sexual risk are most important from a public health perspective (Albarracín et al., 2005; Durantini et al., 2006). Of the Spanish controlled HIV prevention studies published in peer-reviewed journals, only three studies reported effects on behavior, two of which were published more than 10 years ago. The PRESSEC (Díez, Juárez, Nebot, Cerdá, & Villalbí, 2000) and PARLEM CLAR (*Straight Talk*) (Díez et al., 2002) programs showed significant increases in HIV knowledge, attitudes, intentions, and behavioral outcomes among adolescents from Barcelona. However, in spite of these encouraging results, there were no follow-up measurements beyond the

posttest assessment. Callejas and colleagues (2005) reported on a brief educational intervention that increased by 10% the correct use of condoms in a sample of 238 students. However, these results should be interpreted with caution because of the lack of a control group as well as other deficiencies in the quality of the intervention.

No recent data exist concerning the effectiveness of controlled HIV prevention interventions with adolescents in Spain. All the interventions have been implemented in specific Spanish geographic areas, and so extrapolating the results is limited to the adolescents in those areas. The evaluations of these programs have typically focused only on changes in attitudes and knowledge, without assessing other key theoretical variables necessary for predicting condom use (Ajzen, 1991).

This article presents an evaluation of a school-based HIV/AIDS prevention intervention, *Skills for Adolescents with a Healthy Sexuality* (COMPAS, its Spanish acronym). COMPAS was designed to improve knowledge, attitudes, and behaviors related to HIV/AIDS sexual risk taking among adolescents. We studied whether participants who received COMPAS, compared with those who did not receive the intervention, reported increases in HIV knowledge; improvements in attitudes toward HIV testing, condom use, and people living with HIV/AIDS; and positive changes regarding perceived peer norms related to condom use and condom use intention. We evaluated the intervention's effect on the number of sexual partners and the percentage of sexually active individuals. Furthermore, the program's effectiveness was analyzed separately by participants' gender and levels of previous sexual activity. The study had two levels of analysis: intragroup (between the pre- and postintervention measurements) and intergroup (with respect to the control group).

METHODS

PARTICIPANTS

The sample was made up of 996 adolescents (aged between 15 and 18 years) from schools distributed throughout five geographic areas in Spain. Fifteen schools participated, whose students were enrolled in either the fourth grade of Compulsory Secondary Education (53%) or the first grade of high school (47%). Some cases (5%) were excluded due to incomplete or invalid data, 10% due to discordance between the pre- and posttest, and 2% for not attending at least three program sessions. There were 827 students in the final sample (mean age = 15.73, SD = .72). The gender distribution was 39.7% males and 60.3% females. Most participants were living with married parents (83.4%), although 12.8% had separated or divorced parents. Most participants came from middle or high income families (56% and 30.4%, respectively). Schools were randomly assigned to the intervention or control conditions. In the intervention schools, participants received the COMPAS program (n = 607, mean age = 15.71, SD = .73) and in the control schools, students did not receive the COMPAS program (n = 220, mean age = 15.78, SD = .71).

INTERVENTION

The COMPAS program is an HIV preventive intervention based on Social Learning Theory (Bandura, 1977) and the Information-Motivation-Behavioral model (IMB; Fisher & Fisher, 1992). These theoretical models highlight the importance of social influences and predict that behavioral change can be explained by an individual's level of information, motivation, and personal skills, with the first of these being necessary, but not sufficient, while the latter two components are essential.

The COMPAS intervention consists of five 1-hour sessions that include components shown to be effective in preventing HIV in young people (Givaudan, Leenen, Van de Vijver, Poortinga, & Pick, 2008; Romero et al., 2011). Covert behavior rehearsal is applied in the fourth module, which is a less studied component in HIV prevention. The sessions took place over 5 weeks during school hours in groups comprising 15–20 students. The facilitators were trained psychologists with at least 2 years' experience. Prior to the intervention, all facilitators received intensive training about the program and online tutoring sessions. In order to assess implementation fidelity, records were kept regarding the degree to which each session was administered, and a final fidelity rating was made for each group receiving the program.

DATA COLLECTION

The Institutional Review Board (IRB) at Miguel Hernández University reviewed and approved the study. Fifteen secondary schools from five Spanish provinces participated in the study, all from urban areas distributed throughout Spain: three from the north of the country, three from the south, three from the east, three from the southeast, and three from the center. Using a computerized random number generator, the project coordinator randomly selected three schools from each province (Alicante, Asturias, Castellón, Madrid, and Murcia), of which two were randomly assigned to an intervention group (IG) and a control group (CG). Each school's principals were invited by letter to participate in the study. A meeting was held with each school principal in order to outline the aims of the investigation and answer questions in order to facilitate participation and collaboration. The schools that had implemented HIV/AIDS prevention activities in the preceding academic term were excluded from the study. Approximately 5% of the schools that were approached could not participate in the study because of conflicts with other activities.

Informed consent was asked of both the participants and their parents, and a 98% acceptance rate was achieved. Data were collected on paper-and-pencil questionnaires at two different times, separated by a 6-week interval, which coincided with the week before and the week following the program's implementation. Members of the research team administered the questionnaires to groups of 25–30 students. The assessments took 1 hour, and teachers were not present during data collection so that students would feel free to ask questions and to report honestly on the survey items. Furthermore, the questionnaires were anonymous in order to enhance the sincerity of the answers. Students did not receive any incentives for participating in this study.

PSYCHOSOCIAL OUTCOME MEASURES

Sociodemographic data were obtained by a series of items that evaluated personal (age and gender), family (family structure), and school (academic performance) variables for participants. With the goal of analyzing the sexual characteristics and identifying possible differences between the intervention and control groups, a *sexual habits questionnaire* (developed ad hoc) was administered. The survey inquired about (a) first sexual experience (*Have you ever had penetrative sex?*); (b) age of sexual initiation (*At what age did you have your first penetrative sex?*); and (c) number of sexual partners in the preceding six months (*How many sexual partners have you had in the last six months?*). The questionnaire included several items to measure condom use intentions and perceived norms for using protective methods. Perceived norms items included "Do you think that peers of your age use condoms in their sexual relations?" with a dichotomous response, and "How frequently do

you think your peers use condoms in their sexual relations?" with a Likert-type four-point scale answer. Condom use intentions were assessed with items such as "Would you use a condom in your sexual relations?" with a dichotomous response.

Knowledge about HIV was assessed using the *HIV Knowledge Scale for Adolescents* (HIV-KS; Espada et al., 2009). This scale consists of 10 items with a true-false response format and produces scores on a scale of 0–10. It evaluates three factors: (a) beliefs about oral transmission of HIV, (b) knowledge of the impact of HIV, and (c) knowledge about other routes of HIV transmission. Examples of these items are "Giving a wet kiss involves risk for HIV transmission" and "HIV is transmitted by vaginal, seminal and blood secretions." The scale's internal consistency is .71.

Attitudes about HIV/AIDS and risk practices were measured by the *HIV Attitudes Scale for Adolescents* (HIV-AS; Espada et al., in press). This scale evaluates four factors: attitudes about condom use, attitudes toward the obstacles in the way of their use, attitudes toward HIV tests, and attitudes toward persons with HIV/AIDS. The scale includes 12 items and produces scores ranging from 4 to 48. Examples of these items include "Would you be prepared to publicly defend condom use?" and "Would you be willing to use a condom in a sexual relation with penetration?" The scale's internal consistency is .77.

STATISTICAL ANALYSIS

A quasi-experimental 2 × 2 factorial design was used. The experimental conditions were: (a) HIV prevention program (IG) and (b) control group (CG). All statistical analyses were conducted using the SPSS statistics package, assuming a confidence level of 95% for Type I error. Because schools were the unit of randomization and individuals the unit of analysis, potential clustering effects were examined by testing the population variance factor for each dependent variable. Using the Wald Z statistic, we examined whether a significant (nonzero) amount of variance in each dependent variable was attributable to the random factor (school); we found that none differed significantly from zero. Baseline differences between groups were examined using univariate analyses and controlled in the analyses. The effectiveness of the COMPAS program was evaluated with a series of multivariate analysis of covariance (MANCOVA) analyses. Gender was included as a covariate in order to control for the higher proportion of females than males in the intervention group relative to the control group. Repeated-measures analyses were conducted to examine intragroup effect intervention. Effect size was calculated using the index *d* proposed by Cohen (1988) (for quantitative variables) and odds ratio (OR) (for categorical variables). We analyzed whether the program had a differential impact on males and females and between adolescents with previous sexual experience relative to those without.

RESULTS

BASELINE CHARACTERISTICS

The linear mixed-effects models (MIXED) analyses revealed that the population variance factor was similar across schools in both conditions (*Wald Z* = .48, p = .62); this indicates that any school clustering effects were negligible and not statistically significant across dependent variables.

Baseline sample characteristics by intervention assignment are shown in Table 1. There were no statistically significant differences between groups in sociodemo-

graphic variables (age, family structure, family income, and academic performance). However, a larger percentage of females was observed in the intervention group than in the control (63% vs. 52%, $\chi^2 = 8.14$, $p < .01$). Forty-three percent of the participants reported being sexually active at the initial measurement, with an average age of sexual debut of 15.04 ($SD = .90$).

INTERGROUP ASSESSMENT

At baseline, there were no significant differences in the outcome variables (HIV knowledge, attitudes toward HIV, perceived peer norms, and condom use intentions) (Table 2). However, significant differences were seen in three of the four principal outcome variables at the postintervention survey. The IG obtained higher scores in all areas of knowledge about HIV compared with the CG. According to Cohen's criteria (1988), the effect size on the total HIV knowledge was high ($d = .93$).

Compared with adolescents in the control group, adolescents in the intervention group demonstrated a more favorable attitude toward condom use when there are obstacles to obtaining them, $F(1, 825) = 10.92$, $p < .01$, more favorable attitudes toward HIV testing, $F(1, 825) = 13.54$, $p < .001$, more favorable attitudes toward persons infected with the virus, $F(1, 825) = 13.33$, $p < .001$, and higher scores in *Total HIV attitudes scale,* $F(1, 825) = 17.24$, $p < .001$. The attitudinal variables presented medium and low effect sizes.

Although subjective norm scores were not affected by the preventive intervention, the program did have a positive effect on condom use intention, $F(1, 825) = 5.37$, $p < .05$. The IG reported greater condom use intention than the CG after receiving COMPAS intervention.

INTRAGROUP ASSESSMENT

Using repeated measures analyses, improvements in all outcome variables were observed in the IG over time ($p < .001$), with the exception of condom use intentions. The effect sizes were moderate and high.

As for the CG, improvements were found in knowledge scores regarding effects of HIV on the body ($t = 2.28$, $p < .05$), the transmission routes ($t = 4.46$, $p < .001$), and total HIV knowledge ($t = 2.92$, $p < .01$) over time. Attitudes toward persons living with the virus were more favorable with respect to Measurement 1 in CG ($t = 2.75$, $p < .01$). However, effect size of these differences was low.

Figures 1 and 2 represent the mean scores in the total HIV Knowledge and Attitude for each group at the first and second measurements.

GENDER-BASED ASSESSMENT

We further analyzed the intervention group to determine if COMPAS had a differential impact by gender. At baseline, gender differences were found for two HIV knowledge subscales, such that females scored significantly higher than males on the *Other Routes,* $F(1, 605) = 12.90$, $p < .001$, and *Total HIV Knowledge* subscales, $F(1, 605) = 5.15$, $p < .05$. Compared to males, females showed more favorable attitudes toward condom use when there are obstacles to using them, $F(1, 605) = 76.31$, $p < .001$, an HIV detection test, $F(1, 605) = 7.11$, $p < .01$, people living with AIDS, $F(1, 605) = 10.89$, $p < .01$, and HIV infection, $F(1, 605 = 34.33$, $p < .001$.

MANOVA analyses, controlling gender differences at Measurement 1, revealed that the program's impact between males and females was distinct for HIV knowledge and attitudes measures. After the intervention, females had greater knowledge about HIV, $F(1, 605) = 6.59$, $p < .05$, and other HIV routes of transmission, $F(1,$

TABLE 1. Individual Characteristics of Spanish Adolescents by Intervention Group Assignment

			Overall	IG	CG			CI	
N			827	607	220				
Characteristics			*N* (%)	*N* (%)	*N* (%)	Test[a]	*d*/OR	Low	Top
Mean (*SD*) age in years			15.73 (.72)	15.71 (.73)	15.78 (.71)	1.34	—	—	—
Gender									
	Male		328 (39.7)	223 (36.7)	105 (47.7)				
	Female		499 (60.3)	384 (63.3)	115 (52.3)	8.14**	1.57	1.15	2.14
Family structure	Married parents		690 (83.4)	504 (83)	186 (84.5)	3.84	—	—	—
	Separated or divorced parents		106 (12.8)	83 (13.7)	23 (10.5)				
	Parents who live together		9 (1.1)	7 (1.2)	2 (.9)				
	Single parents		3 (.4)	2 (.3)	1 (.5)				
	Orphan/ death of one or both parents		19 (2.3)	11 (1.8)	8 (3.6)				
Family income	0€		14 (1.7)	12 (2)	2 (.9)	1.40	—	—	—
	Low: Less than 1000€ per month		98 (11.9)	70 (11.5)	28 (12.7)				
	Middle: 1000–2000€ per month		463 (56)	338 (55.7)	125 (56.8)				
	High: More than 2000€ per month		252 (30.4)	187 (30.8)	65 (29.6)				
Academic Performance	Passing	All subjects	507 (61.3)	377 (62.1)	130 (59.1)	1.14	—	—	—
	Failing	1–2 subjects	200 (24.2)	141 (23.2)	59 (26.8)				
		3–6 subjects	108 (13)	80 (13.2)	28 (12.7)				
		More than 6	12 (1.5)	9 (1.5)	3 (1.4)				

Note. IG = intervention group. CG = control group. CI = confidence interval. [a]*t* test for continuous variable and χ^2 test for categorical variables. OR = odds ratio. $^*p < .05$; $^{**}p < .01$; $^{***}p < .001$.

TABLE 2. Intervention Effect Among Spanish Adolescents Between the Intervention and Control Groups

		Baseline				Postintervention						
		IG	CG			IG	CG					
N		607	220			607	220					
Outcome variables		*M* (*SD*)	*M* (*SD*)	*F*(1, 825)	*p*	*M* (*SD*)	*M* (*SD*)	*F*(1, 825)	*p*	*d*		
Knowledge	Oral transmission (0–3)a	1.42 (1.23)	1.35 (1.26)	.28	.59	2.39 (.94)	1.55 (1.20)	101.01	.00***	.77		
	Impact of HIV (0–3)[a]	.28 (.62)	.22 (.54)	1.61	.20	1.02 (.89)	.45 (.66)	68.91	.00***	.72		
	Other routes (0–4)[a]	3.34 (.94)	3.19 (1.12)	2.78	.09	3.76 (.63)	3.36 (1.03)	38.95	.00***	.46		
	Total (0–10)[a]	5.03 (1.94)	4.76 (2.15)	2.36	.12	7.17 (1.74)	5.37 (2.13)	142.56	.00***	.93		
Attitudes	Condom use (4–16)[a]	14(1.80)	13.91 (1.95)	3.49	.06	14.48 (1.79)	13.94 (1.93)	1.27	.25	.29		
	Obstacles to use them (3–12)[a]	9.97 (1.93)	10.07 (1.75)	.13	.71	10.16 (1.91)	9.82 (1.88)	10.92	.00**	.17		
	HIV test (2–8)[a]	6.88 (1.18)	6.89 (1.13)	.41	.52	7.09 (1.15)	6.75 (1.23)	13.54	.00***	.28		
	People living with AIDS (3–12)[a]	9.76 (1.83)	9.44 (1.97)	3.10	.07	10.31 (1.69)	9.75 (1.73)	13.13	.00***	.32		
	Total (12–48)[a]	40.57 (4.59)	40.30 (4.47)	.02	.87	42.01 (4.62)	40.25 (4.76)	17.24	.00***	.37		
		IG	CG			IG	CG				CI	
		N (%)	*N* (%)	*F*(1, 825)	*p*	*N* (%)	*N* (%)	*F*(1, 825)	*p*	OR	Low	Top
Perceived peer norms	Condom use (Yes)	532 (87.6)	199 (90.5)	1.20	.27	545 (89.8)	202 (91.8)	.54	.45	—	—	—
	Frequency											
	Always	201 (33.1)	95 (43.2)	3.57	.06	206 (33.9)	77 (35)	.25	.61	—	—	—
	Almost always	291 (47.9)	89 (40.5)			288 (47.4)	109 (49.5)					
	Almost never	102 (16.8)	31 (14.1)			99 (16.3)	29(13.2)					
	Never	13 (2.1)	5 (2.3)			14 (2.3)	5 (2.3)					
Condom use intention	Yes	598 (98.5)	213 (96.8)	2.53	.11	597(98.4)	210 (95.5)	5.37	.02*	2.84	1.16	6.92
	No	9 (1.5)	7(3.2)			10 (1.6)	10 (4.5)					

Note. IG = intervention group. CG = control group. CI = confidence interval. *d* = Cohen's *d* effect size. OR = odds ratio. [a]Scale range. Higher scores represent less risky cognitions. *$p < .05$; ** $p < .01$; ***$p < .001$.

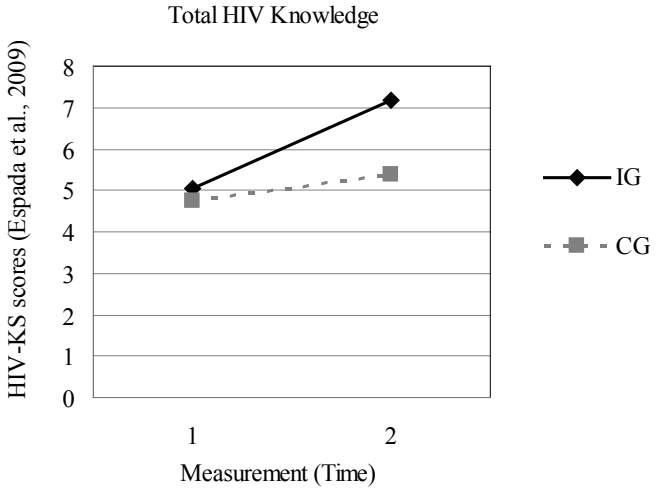

FIGURE 1. Total HIV Knowledge subscale score (means) for each time period by condition.
Note. IG = Intervention Group (IG). CG = Control Group. HIV- KS = HIV Knowledge Scale (scores ranged 0-10).

605) = 9.08, $p < .01$, and they showed a more favorable attitude toward condom use when obstacles exist to using them, $F(1, 605) = 26.97$, $p < .001$, toward people living with AIDS, $F(1, 605) = 6.16$, $p < .05$, and to the infection, $F(1, 605) = 11.62$, $p < .01$, in comparison to males. No gender differences were found for perceived norms and condom use intentions at Measurements 1 and 2.

INTERVENTION IMPACT ON SEXUAL ACTIVITY AND THE NUMBER OF PARTNERS IN THE PRECEDING SIX MONTHS

At baseline, there were no differences in number of sexual partners, $F(1, 356) = .25$, $p = .61$, and proportion of sexually active participants, $F(1, 825) = 2.63$, $p = .10$, between intervention and control groups. As shown in Table 3, the intervention did not affect the sexual debut of those who had not previously been sexually active, nor did it increase the number of sexual partners in the preceding 6 months among participants. Nevertheless, there was an increase in the percentage of the sexually active participants over time in both groups ($p < .001$). The sexually active participants were older than those without any sexual experience ($M = 15.92$, $SD = .76$ vs. $M = 15.58$, $SD = .66$; $p < .001$).

The intervention group was selected to examine whether COMPAS had a different impact on participants who reported being sexually active, compared to those who did not. At Measurement 1, the sexually active participants had greater knowledge about HIV, $F(1, 605) = 4.13$, $p < .05$, and more favorable attitudes toward condom use, $F(1, 605) = 8.16$, $p < .01$, and to HIV testing, $F(1, 605) = 3.94$, $p < .01$. However, with respect to nonsexually active participants, they showed less favorable attitudes toward condom use when there are obstacles to using them, $F(1, 605) = 15.98$, $p < .001$, and their perception of peers' condom use was lower, $F(1, 605) = 4.05$, $p < .05$.

MANOVA procedures were used to examine postintervention scores, controlling for baseline differences between sexually and nonsexually active adolescents. The results indicate COMPAS had a greater impact on nonsexually active adolescents,

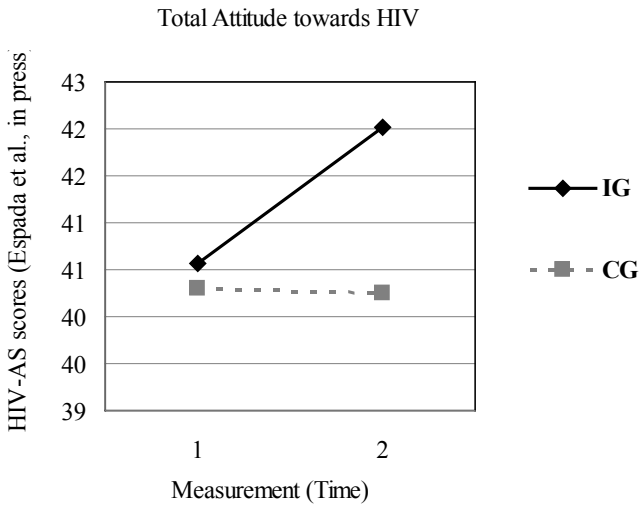

FIGURE 2. Total HIV Attitudes subscale score (means) for each time period by condition.
Note. IG= Intervention Group (IG). CG = Control Group. HIV- AS = HIV Attitude Scale (scores ranged 12-48).

including more favorable attitudes toward condom use when there are obstacles to using them, $F(1, 605) = 17.56$, $p < .001$, relative to sexually active adolescents.

DISCUSSION

There have been few methodologically rigorous studies of school-based HIV prevention interventions in Spain, particularly studies with control group designs (Espada et al., 2012; Juárez & Díez, 1999). The principal objective of this research was to examine the effects of COMPAS, a theory-driven school-based prevention program that focuses on developing skills to prevent HIV infection. The results show that the intervention had a positive impact on theoretically important precursors to risky sexual behavior: knowledge about HIV, attitudes toward condoms, and condom use intentions. Relative to control group participants, adolescents in the IG demonstrated an increase in HIV knowledge and their attitude was more favorable toward condom use, even when faced with obstacles to obtaining condoms when an opportunity for sexual activity presented itself, more favorable attitudes toward HIV testing, and more favorable attitudes toward people living with AIDS.

The effects observed in the present study are consistent with the results obtained in other interventions (Harper, Bangi, Sánchez, Doll, & Pedraza, 2009; Kyrychenko, Koler, & Sathiakumar, 2006). Improvements in knowledge and attitudes, among other cognitive variables, such as protection self-efficacy (Chen et al., 2008), sense of vulnerability to HIV/AIDS (Lee, Donlan, & Paz, 2009), condom use intentions (Gallegos, Villarruel, Loveland-Cherry, Ronis, & Zhou, 2008), and subjective norms (Armitage & Talibudeen, 2010; Givaudan et al., 2008), are often observed following preventive interventions. On a behavioral level, only some interventions with medium- and long-term follow-up achieve significant reductions in sexual risk prac-

TABLE 3. Intervention Effect on Being Sexually Active and Sexual Partners Among Spanish Adolescents

		Baseline				Postintervention			
		IG	CG			IG	CG		
N		607	220			607	220		
				$F(1, 825)$	p			$F(1, 825)$	p
% Sexually active	Yes	44.6	39.5	2.63	.10	52.2	46.8	2.97	.08
	No	55.4	60.5			47.8	53.2		
				$F(1, 356)^a$	p			$F(1, 418)^b$	p
Sexual partners *M* (*SD*)		1.53(1.38)	1.49(.90)	.25	.61	1.40(1.21)	1.99(2.21)	3.68	.05

Note. IG = intervention group. CG = control group. [a]Includes only participants who reported being sexually active at baseline (N = 358): IG (n = 271) and CG (n = 87). [b]Includes only participants who reported being sexually active at postintervention measure (N = 420): IG (n = 317) and CG (n = 103).

tices (Jemmott, Jemmott, Fong, & Morales, 2010; Jemmott et al., 2010) or greater condom use (Harper et al., 2009).

According to Ajzen (1991), condom use intentions are a key predictor of safe-sex behavior. In this study, condom use intentions were very high in the first evaluation, approaching 100% for both the IG as well as the CG. Despite this finding, condom use intentions were higher in the IG compared to the CG at postintervention evaluation. The differences between the groups cannot be clearly attributed to the program because the results of repeated-measures analysis indicate that condom use intention did not improve over time. However, we can say that the intervention had a positive impact on condom use intentions because the IG's high initial level remained so. A small but significant decrease in condom use intentions was observed in the CG between both measurements.

Surprisingly, repeated-measures procedures revealed slight improvements in some areas of knowledge and more favorable attitudes toward persons infected by the virus in the CG over time. These unexpected improvements might be due to informative campaigns about HIV directed toward the general population with the goal of sensitizing and educating about the virus and the people living with it.

Among precursors of condom use intentions, COMPAS impacted knowledge and attitudes, but no changes were observed in subjective norms. When adolescents perceive that their peers are not sexually active, they also tend to have fewer sexual relations and report lower intentions to engage in sexual activity (Wallace, Miller, & Forehand, 2008). At postintervention measurement, almost 90% of the total sample believed that their peers used condoms in their sexual relations, and more than 80% estimated that they used them always or almost always. The reported normative perceptions were slightly more favorable over time, but no statistically significant differences were found between the intervention and control groups.

Effects from the HIV prevention interventions on adolescents can differ depending on their gender and if they have previously been sexually active; however, previous studies have not consistently tested for intervention effects for these subgroups of interest (Yankah & Aggleton, 2008). Givaudan and collaborators (2008) observed at baseline that nonsexually active adolescents showed more favorable attitudes toward condoms and HIV testing, and a greater perception of condom use in their peers, relative to their sexually active peers. Such differences could help to explain the results in the present study, in that after controlling for baseline differences, COMPAS had a greater impact among the nonsexually active participants,

and these participants were younger than the sexually active participants. Following the intervention, nonsexually active participants showed more favorable attitudes toward condom use when there are obstacles to using them compared to sexually active adolescents. Therefore, these findings corroborate the importance of educating adolescents in sexual matters before their first sexual relation (UNESCO, 2010). Because the age of sexual debut is becoming increasingly younger among Spanish adolescents (Castro, Bermúdez, Buela-Casal, & Madrid, 2011), it is important that sex education activities not be delayed. In this sense, the *AulaSida* intervention produced better results in younger participants (12–15 years) compared to older youth (16–19 years) (Fernández-García et al., 2000).

Although COMPAS was designed for both males and females, its impact was greater in females. Compared to males, females showed significant improvements in measures of HIV knowledge and attitudes toward condom use when obstacles to using them exist and toward people with AIDS. Gender differences in attitudes toward condom use may be explained by social and cultural norms; for example, expectations of specific behaviors by men and women differ based on conservative gender roles. The STEP program achieved better self-efficacy, improved communication abilities, and less sexual risk in females than in males (Chhabra et al., 2010). Even in sexually active adolescents, females presented more favorable results for safe sex than did males (Giuvadan et al., 2008). In this study, the intervention's impact was moderated by gender and the sexual status of participants, highlighting the importance of incorporating these factors into program evaluation studies of HIV prevention programs among young people.

The principal limitation of this study is the absence of long-term follow-up measurements of the intervention's effects, which was not possible due to coordination factors with the schools and access to its participants. Medium- and long-term follow-up assessments in future studies will be an important way to improve HIV prevention research in Spain. Another limitation of this study is that all data were assessed by self-report measures (Harper et al., 2009; Yankah & Aggleton, 2008), which are prone to social desirability effects. In the present study, these were minimized by administering the questionnaires to small groups and assigning personal codes.

CONCLUSIONS

The present findings indicate that an HIV/AIDS prevention intervention that combines information dissemination with content for skills development is effective in improving knowledge and attitudes toward HIV and maintains high levels of condom use intentions in Spanish adolescents. The intervention's impact was greater in females and nonsexually active adolescents.

In Spain, COMPAS is the only rigorously evaluated school-based HIV prevention program that has demonstrated its effectiveness with a wide variety of students from different geographic areas as part of a controlled study. COMPAS represents a promising approach for school-based HIV prevention among young people. Future research should examine medium- and long-term evidence of the intervention's impact.

REFERENCES

Ajzen, I. (1989). Attitude, structure and behavior. In A. R. Pratkanis, S. J. Breckler, & A. G., Greenwald (Eds.), *Attitude, structure and function* (pp.241-274). Hillsdale, NJ: Lawrence Erlbaum Associates.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Albarracín, D., Gillette, J. C., Earl, A. N., Glasman, L. R., Durantini. M. R., & Ho, M. H. (2005). A test of major assumptions about behavior change: A comprehensive look at the effects of passive and active HIV-prevention interventions since the beginning of the epidemic. *Psychological Bulletin, 131*, 856-897. doi: 10.1037/0033-2909.131.6.856

Armitage, C. J., & Talibudeen, L. (2010). Test of a brief theory of planned behavior-based intervention to promote adolescent safe sex intentions. *British Journal of Psychology, 101*, 155-172. doi: 10.1348/000712609X431728

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice Hall.

Bauermeister, J. A., Tross, S., & Ehrhardt, A. A. (2009). A review of HIV/AIDS system-level interventions, *AIDS & Behavior, 13*, 430-448. doi:10.1007/s10461-008-9379-z

Callejas, S., Fernández, B., Méndez, P., León, T., Fábrega, C., Villarín, A., et al. (2005). Intervención educativa para la prevención de embarazos no deseados y enfermedades de transmisión sexual en adolescentes de la ciudad de Toledo [Educational intervention for preventing unwanted pregnancies and sexually transmitted diseases among adolescents in Toledo]. *Revista Española de Salud Pública, 79*, 581–589. doi: http://dx.doi.org/10.1590/S1135-57272005000500008

Castro, A., Bermúdez, M. P., Buela-Casal, G., & Madrid, J. (2011). Variables psicosociales que median en el debut sexual de adolescentes en España [Psychosocial variables that mediate on adolescent sexual debut in Spain]. *Revista Latinoamericana de Psicología, 43*, 83-94.

Chen, Y., Lou, C. H., Mueler, L. M., Zhao, S. L., Yang, J. H., Tu, X. W., et al. (2008). Effectiveness of a school-based AIDS education program among rural students in HIV epidemic area of China. *Journal of Adolescent Health, 42*, 184-191. doi:10.1016/j.jadohealth.2007.07.016

Chhabra, R., Springer, C., Leu, C. S., Ghosh, S., Sharma, S. K., & Rapkin, B. (2010). Adaptation of an alcohol and HIV school-based prevention program for teens. *AIDS and Behavior, 14*, 177-184. doi:10.1007/s10461-010-9739-3

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Díez, E., Fernández, S., Riera, C., Soria, M., Villamarín, F., Juárez, O., et al. (2002, July). *Randomised trial of Parlem Clar (Straight Talk), a high school HIV prevention program*. Paper presented at the 14th International AIDS Conference, Barcelona, Spain.

Díez, E., Juárez, O., Nebot, M., Cerdá, N., & Villalbí, J. R. (2000). Effects on attitudes, knowledge, intentions and behavior of an HIV prevention programme targeting secondary school adolescents. *Promotion & Education, 3*, 17-22. doi: 10.1177/102538230000700307

Díez, M., Oliva, J., Sánchez, F., Vives, N., Cervalló, C., & Izquierdo, A. (2012). Incidence of new HIV diagnoses in Spain, 2004–2009. *Gaceta Sanitaria, 26*, 107-115. doi: 10.1016/j.gaceta.2011.07.023

Durantini, M. R., Albarracín, D., Mitchell, A. L., Earl, A. N., & Gillette, J. C. (2006). Conceptualizing the influence of social agents of behavior change: A meta-analysis of the effectiveness of HIV-prevention interventionists for different groups. *Psychological Bulletin, 132*, 212-248. doi: 10.1037/0033-2909.132.2.212

Espada, J. P., Ballester, R., Huedo-Medina, T. B., Secades, R., Orgilés, M., & Martínez-Lorca, M. (in press). Development of a new instrument to assess AIDS-related attitudes among Spanish youngsters. *Anales de Psicología*.

Espada, J. P., Huedo-Medina, T. B., Orgilés, M., Secades, R., Ballester, R., & Remor, E. (2009). Psychometric properties of the HIV/AIDS Knowledge Scale for Spanish adolescents (HIV-KS). *Health and Addictions, 9*, 149-164.

Espada, J. P., Morales, A., Orgilés, M., Piqueras, J. A., & Carballo, J. L. (2012). A review of HIV/AIDS prevention programs in Spain. *International Journal of Hispanic Psychology, 5*, 2.

Fernández-García, C., Molina, R., Ramírez, C., Pérez, E., Castilla, J., Marrodán, J., et al. (2000). Cambios en las actitudes y conocimientos de los adolescentes sobre la infección por VIH tras la intervención escolar de *AulaSida*, 1996–1997 [Changes in attitudes and knowledge related to HIV among adolescents after *AulaSida* scholar intervention, 1996–1997]. *Revista Española de Salud Pública, 74*, 163-176. doi: http://dx.doi.org/10.1590/S1135-57272000000200007.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to*

theory and research. Reading, MA: Addison-Wesley.

Fisher, J. D., & Fisher, W. A. (1992). Changing AIDS-risk behavior. *Psychological Bulletin, 111*, 455-474. doi: 10.1037/0033-2909.111.3.455

Gallegos, E. C., Villarruel, A. M., Loveland-Cherry, C., Ronis, D. L., & Zhou, Y. (2008). Intervención para reducir riesgo en conductas sexuales de adolescentes: un ensayo aleatorizado y controlado [Intervention to reduce sexual risk behaviors among adolescents: A randomized controlled trial]. *Salud Pública de México, 50*, 59-66. doi: http://dx.doi.org/10.1590/S0036-36342008000100012

Givaudan, M., Leenen, I., Van de Vijver, F. J., Poortinga, Y. H., & Pick, S. (2008). Longitudinal study of a school based HIV/AIDS early prevention program for Mexican adolescents. *Psychology, Health & Medicine, 13*, 98-110. doi:10.1080/13548500701295256

Harper, G. W., Bangi, A. K., Sánchez, B., Doll, M., & Pedraza, A. (2009). A quasi-experimental evaluation of a community-based HIV prevention intervention for Mexican American female adolescents: The SHERO's program. *AIDS Education and Prevention, 21,* 109-123. doi: 10.1521/aeap.2009.21.5_supp.109

Holtgrave, D. R., & Curran, J. W. (2006). What works, and what remains to be done, in HIV prevention in the United States. *Annual Review of Public Health, 27*, 261-275. doi: 10.1146/annurev.publhealth.26.021304.144454

Jemmott, J. B., Jemmott, L. S., Fong, G. T., & Morales, K. H. (2010). Effectiveness of and HIV/STD risk-reduction intervention for adolescents when implemented by community-based organizations: A cluster-randomised controlled trial. *American Journal of Public Health, 100*, 720-726. doi: 10.2105/AJPH.2008.140657

Jemmott, J. B., Jemmott, L. S., O'Leary, A., Ngwane, Z., Icard, L. D., Bellamy, S. L., et al. (2010). School-based randomised controlled trial of an HIV/STD risk-reduction intervention for South African Adolescents. *Archives of Pediatrics & Adolescent Medicine, 164*, 923-929. doi:10.1001/archpediatrics.2010.176

Juárez, O., & Díez, E. (1999). Prevención del SIDA en adolescentes escolarizados: Una revisión sistemática de la efectividad de las intervenciones [AIDS prevention among scholars: A systematic review of the intervention's effectiveness]. *Gaceta Sanitaria, 13*, 150-162.

Kyrychenko, P., Kohler, C., & Sathiakumar, N. (2006). Evaluation of a school-based HIV/AIDS educational intervention in Ukraine. *Journal of Adolescent Health, 39*(6), 900-907. doi:10.1016/j.jadohealth.2006.06.006

Lee, J., Donlan, W., & Paz, J. (2009). Culturally competent HIV/AIDS prevention: Understanding program effects on adolescents' beliefs, attitudes, and behaviors. *Journal of HIV/AIDS & Social Services, 8*, 57-79. doi: 10.1080/15381500902736194

Morales, J. F., Rebolloso, E., & Moya, M. (1994). Modelos combinatorios del cambio de actitudes [Combinatorial models of attitude change]. In J. F. Morales, M. Moya, E. Rebolloso, J. M. Fernández-Dols, C. Huici, J. Marqués, et al. (Eds.), *Psicología social* [Social Psychology] (pp. 555-566). Madrid: McGraw-Hill.

Prats, J. (1995). Un programa interdisciplinar para la Educación Secundaria: Sida, saber ayuda [An interdisciplinary program for Secondary Education: AIDS, knowing helps]. *Cuadernos de Pedagogía, 240*, 55-59.

Romero, L. M., Galbraith, J. S., Wilson-William, L., & Gloppen, K. M. (2011). HIV prevention among African American youth: How well have evidence-based interventions addressed key theoretical constructs? *AIDS and Behavior, 15*, 976-991. doi:10.1007/s10461-010-9745-5

Spanish Ministry of Health, Social Policy and Equality. (2011). *National strategy for sexual and reproductive health*. Retrieved Month, Day, Year, from http://www.msc.es/organizacion/sns/planCalidadSNS/pdf/equidad/ENSSR.pdf

UNESCO. (2010). *International technical guidance on sexuality education: An evidence-based approach aimed at schools, teachers and health educators*. Retrieved Month, Day, Year, from http://unesdoc.unesco.org/images/0018/001832/183281s.pdf

UNICEF. (2011). *Opportunities in times of crisis: Preventing HIV from early adolescence to early adulthood*. Retrieved Month, Day, Year, from http://www.unicef.org/spanish/publications/files/Opportunity_in_Crisis-Report_SP_071311.pdf

Wallace, S. A., Miller, K. S., & Forehand, R. (2008). Perceived peer norms and sexual intentions among African American preadolescents. *AIDS Education and Prevention, 20*, 360-369. doi: 10.1521/aeap.2008.20.4.360

Yankah, E., & Aggleton P. (2008). Effects and effectiveness of life skills education for HIV prevention in young people. *AIDS Education and Prevention, 20*, 465-485. doi: 10.1521/aeap.2008.20.6