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REVIEW PAPER

Effects of HIV-Prevention Interventions for Samples with Higher and Lower Percents of Latinos and Latin Americans: A Meta-Analysis of Change in Condom Use and Knowledge

Julia Albarracin · Dolores Albarracin · Marta Durantini

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Abstract This meta-analysis (N = 110,092) assessed the efficacy of HIV-prevention interventions across samples with higher and lower concentrations of Latinos/Latin Americans. Findings indicated that groups with higher percents of Latinos increased condom and HIV-related knowledge to a lesser extent than groups with lower percents of Latinos/ Latin Americans. Moreover, groups with greater percents of Latinos/Latin Americans only benefited from intervention strategies that included threat-inducing arguments, whereas groups with lower percents of Latinos/ Latin Americans benefited from numerous strategies. In addition, groups with greater percents of Latinos/ Latin Americans increased condom use when interventions were conducted by a lay community member, whereas groups with lower percents of these groups increased condom use the most in response to experts. Not surprisingly, there were important differences among Latinos/Latin Americans with different education levels, different genders, and US/Latin American nationality.

Keywords HIV prevention · Knowledge · Behavior · Intervention · Ethnicity · Culture

J. Albarracin
Western Illinois University, Macomb, IL, USA

D. Albarracin (✉) · M. Durantini
Psychology Department, University of Florida, Gaineville, FL 32608, USA
e-mail: dalbarra@ufl.edu

Introduction

Although during recent years Hispanics or Latinos accounted for 13% of the total population living in the United States (United States Census Bureau, 2003), they currently represent 19% of the total number of new AIDS (Acquired Immunodeficiency Syndrome) cases (CDC Division of HIV/AIDS Prevention, 2002). Further, several countries of Latin America show increases in infection that place Latinos in those places at risk (University of California at San Francisco, 2005). The rapid progression of AIDS among Latinos (Latino Commission on AIDS, 2004; National Alliance of State and Territorial AIDS Directors, n.d.) combined with their unique socio-demographic characteristics (poverty, low literacy and language skills, and limited access to health care) demand knowledge about preventive strategies appropriate for this population. Therefore, the objective of the present meta-analysis was to systematically asses the efficacy of HIV/AIDS prevention interventions for the Latino[1] and Latin American population. This objective was achieved by comparing interventions with greater and smaller percents of Latinos/Latin Americans.

In the past, several meta-analyses estimated the outcomes of HIV-prevention programs, particularly condom use (Albarracín, Gillette, Glasman, Durantini, & Ho, 2005; Johnson, Carey, Marsh, Levin, & Scott-Sheldon, 2003; Weinhardt, Carey, & Johnson, 1999).

[1] The US Census Bureau (2003) defines Latino or Hispanic as those persons living in the US who indicate that their origin is Mexican, Puerto Rican, Cuban, Central or South American, or some other Hispanic origin. In this paper, ''Latin background, origin, or ethnicity'' includes Latin Americans and Latinos. Latin Americans are those living in Latin America.

For example, Albarracín et al. (2005) revealed that HIV-prevention strategies produce small to moderate behavioral effects across the board, whereas Albarracín et al. (2003) reported no significant impacts across populations and strategies. Importantly, however, to the best of our knowledge, no prior meta-analysis has concentrated on the efficacy of programs among Latino/Latin Americans vs. non-Latino/Latin American audiences. In fact, there has been a single systematic review of the literature of these interventions for Latino audiences (Darbes, Kennedy, Peersman, & Zohrabyan, 2002). This study found that successful interventions were theory based, culturally sensitive, gender specific, of longer duration, and provided participants with skills training. Although this review was a valuable first step, it did not entail a calculation of the impact of the different programs (i.e., effect sizes). It also failed to consider a number of factors that we were interested in investigating, including the efficacy of interventions using attitude, normative, behavioral or threat inducing arguments, or the type of setting where interventions were conducted, like health clinics or community centers. Moreover, understanding what is unique about a certain population (e.g., Latinos) requires precise *comparisons* with other groups. These comparisons demand introducing percent of Latinos//Latin Americans as a moderator, which we attempted to do in this meta-analysis.

Our review included studies that specified the percent of Latinos even when that percent equaled zero. Thus, we were able to divide samples into two groups, depending on whether samples had an average percent of Latinos/Latin Americans that was below or above 50%. Our analyses then assessed the effects of different prevention characteristics on behavioral and knowledge change across these two groups. These analyses were conducted by also taking into account education, gender, and US vs. Latin-American nationality.

To test the effects of intervention contents, our meta-analysis classified the different intervention strategies as including (a) attitudinal arguments designed to increase the perceived desirability of the behavior (Ajzen & Madden, 1986; Fishbein & Ajzen, 1975), (b) normative arguments describing other people's support of condom use (Ajzen & Madden, 1986; Fishbein & Ajzen, 1975), (c) behavioral skills arguments designed to verbally teach skills and increase perceptions that the behavior is easy and up to the individual (Bandura, 1986), (d) fear- or threat-inducing arguments designed to increase sensitivity to HIV risk (Rosenstock, Strecher, & Becker, 1994), (e) information about the transmission and prevention of the disease, and (Fishbein et al., 1992), (f) actual training in behavioral skills, including interpersonal skills (e.g., condom negotiation), condom use skills (condom application), and self-management skills like dealing with condom use in difficult situations (Fishbein et al., 1992).

Scholars working on HIV prevention for Latinos have criticized the above-described models for their failure to consider the cultural and social context of sexual behavior (Marín, Gomez, Tschann, & Gregorich, 1997). For example, gender roles differ between Latino men and women, partly because the machismo culture stresses virility, independence, physical strength, and sexual prowess. Thus, machismo creates a great cultural divide between men and women, which entails power distance but also a tendency for men to believe that they should cherish and protect women. Given these differential gender roles, Latinos/Latin Americans may present many gender differences in response to HIV-prevention interventions (Gómez & Marín, 1996; Ortiz-Torres, Serrano-Garcia, & Torres-Burgos, 2000). In this regard, we examined how gender moderates the effects of the different prevention strategies, sources, and settings.

Importantly, Hortensia Amaro (1998) cautions that propositions about Latino culture have not always taken into account important socioeconomic factors, such as education, socioeconomic status, participation in the labor force, and residence in rural versus urban areas. Although our meta-analysis did not have information about all these variables, it did assess the effect of education on HIV prevention efficacy. Further, nationality was considered because the living conditions and epidemic context of Latinos in the US and Latin-American countries (studies included in our meta-analysis were from Brazil, Ecuador, Honduras, Mexico, Nicaragua, Peru, and Puerto Rico) differ.

Our study also explored the effect of intervention sources on behavioral and knowledge change for groups with different rates of Latinos/Latin Americans. In particular, researchers and practitioners have debated if experts or lay community members (or peers) should conduct HIV-prevention interventions. The use of lay community members as sources in HIV prevention has become popular in recent years (Turner & Shepherd, 1999) and has been recommended for HIV prevention among Latinos (Amaro, 1995; Center for AIDS Prevention Studies, 2002; Ortiz-Torres et al., 2000). Nonetheless, a prior meta-analysis of this issue found that experts are more successful than peers (Durantini, Albarracín, Earl, & Mitchell, 2006; Schaalma, Abraham, Gillmore, & Kok, 2004) but that similarty in ethnicity, gender, and/or age matters for some groups. Given that these issues have not been

examined for Latinos/Latin Americans, we considered them in our meta-analysis.

Finally, the context and type of presentation used in prevention programs may also have an impact on HIV prevention interventions for Latinos/Latin Americans. It was therefore important to determine the kind of setting (clinics, community settings) that is most appropriate, as well as whether presentations directed to groups or individuals are more or less efficacious in increasing Latinos' condom use and HIV-related knowledge.

Method

Review and Inclusion Criteria

We conducted a review of reports that were available by June of 2005. First, we conducted a computerized search of Medline, PsycINFO, ERIC, Social Science Citation Index, and Dissertation Abstracts International using a number of keywords, including ''HIV (AIDS) messages,'' ''HIV (AIDS) communications,'' ''HIV (AIDS) interventions,'' ''HIV (AIDS) prevention,'' and ''health education and HIV (AIDS).'' Second, we manually searched all available issues appearing during or after 1985 of the journals, *AIDS*, *AIDS Education and Prevention*, *AIDS Research*, *American Behavioral Scientist*, *American Journal of Community Psychology*, *American Journal of Nursing*, *American Journal of Public Health*, *Basic and Applied Social Psychology*, *Communication Research*, *Communications*, *Health Communication*, *Health Education Quarterly*, *Health Education Research*, *Health Psychology*, *Journal of the American Medical Association*, *Journal of Applied Communication Research*, *Journal of Applied Social Psychology*, *Journal of Consulting and Clinical Psychology*, *Journal of Personality and Social Psychology*, *Journal of Sex Research*, *Medical Anthropology*, *Morbidity and Mortality Weekly Report*, *Qualitative Health Research*, and *Social Science and Medicine*. We also checked cross-references in the obtained reports, sent requests for information to researchers funded by National Institutes of Health (NIH), and contacted selected experts and agencies who could provide relevant materials.

We used several eligibility criteria to gather an optimal, relatively homogenous sample of studies that could serve our objectives well, and met our four-fold inclusion criteria. First, studies were included if they described the outcomes of an intervention to promote the use of condoms. We excluded interventions designed exclusively to promote safer intravenous-drug-related behaviors or abstinence from sex. Second, for inclusion, studies had to report outcomes of various types of interventions. Therefore, we included simple communications, as well as interventions in which recipients engaged in behaviors as part of the intervention (i.e., role-playing, practicing condom-use related skills, and HIV counseling and testing). Third, we only included studies that provided information to calculate the effect of interventions over time and excluded reports without a pretest. Most of the reports obtained pre and posttest measures on the same sample, but others used independent samples at each time (for an explanation of the advantages of the use of independent samples for longitudinal studies, see Cook & Campbell, 1979). Finally, we selected all available Latin American studies as well as studies that reported the proportion of Latinos in the sample (e.g., 0% and 70%). Forty-eight studies, comprising 78 intervention groups and 27 control groups were excluded for not reporting the proportion of Latinos in the sample.

Coding of Study Characteristics

Two independent raters coded characteristics relevant to the report and the methods used in the studies. Inter-coder agreement for all categories included in the coding sheet was 85%, and intercoder-reliability coefficients were above .70 in all cases. Disagreements were resolved by discussion and further examination of the studies.

We recorded the percent of people from Latin background, and people from other backgrounds (European, Asian, and Native Americans). In addition, we recorded the percent of people in each sample who completed high school, and the percent of males in each sample. The percents of Latinos/Latin Americans and males were dichotomized for the main analyses in this paper. We also recorded the percent of males, the percent of participants who completed at least high school, and whether the study was conducted in the US or abroad.

We recorded the type of intervention and strategy used in each case. Passive strategies included (a) attitudinal arguments, such as discussions of the positive implications of using condoms for the health of the partners and for the romantic relationship, (b) normative arguments about support of condom use provided by friends, family members, or partners, (c) factual information (i.e., mechanisms of HIV, HIV transmission, HIV prevention), (d) arguments designed to model behavioral skills (what to do when partners do not want to use a condom, when recipients or their partners are sexually excited, and when alcohol

or drugs are involved), and (e) threat-inducing arguments, such as discussions about the recipients' personal risk of contracting HIV or other Sexually Transmitted Infections (STIs). We also recorded the use of active interventions, namely behavioral strategies to train audiences in condom-use promoting skills, and the administration of HIV counseling and testing. Strategies to induce behavioral skills comprised (f) condom-use skills (e.g., practice with unwrapping and applying condoms), (g) interpersonal skills (e.g., role playing of interpersonal conflict over condom use and initiation of discussions about protection), and (h) self-management skills (e.g., practice in decision making while intoxicated, avoidance of risky situations), whereas (i) HIV counseling and testing involved the administration of a seropositivity test as well as the counseling in place. When the counseling was described as involving specific arguments or training aspects, we coded for those in addition to noting the presence of counseling and testing. Finally, we kept a record of whether, prior to the posttest, the researchers provided research participants with condoms.

Based on the above-described coding, control groups were those to whom no passive or active intervention was applied, although some control participants received condoms as part of the study. These codes allowed us to establish the likely effects of each type of strategy and of mere condom provision.

We also coded studies for characteristics of the report, including the (a) publication year and (b) geographic area. We also recorded characteristics of the participants, including demographics of the target group as well as specific characteristics and behaviors of the target group that are associated with HIV-infection risk. To describe the target population, we retrieved the: (a) sample size, (c) percent of participants of African, Asian, and American-Indian descent; and (e) population of the city or village at the time the intervention was conducted.

Finally, we coded for methodological characteristics that related to intervention setup. Thus, we classified each intervention group according to (a) the setting of the intervention (i.e., whether the intervention was delivered in clinics or community settings. We also recorded (b) whether exposure to the communication was individual or in groups. Other features were also coded and are available upon request.

Retrieval of Effect Sizes

Two raters calculated effect sizes independently. Disagreements were checked with a third researcher and resolved by discussion. Raters were instructed to calculate effect sizes representing change from the pretest to the most immediate posttest. Efforts were made to calculate effect sizes for all available measures of the constructs of interest. When there was more than one measure of a construct in one particular study, we first calculated effect sizes for each one and then obtained the average, which was used as the effect size for that particular variable.

To represent change from pretest to posttest measures, we used Becker's (1988) *g*, which is calculated by subtracting the mean at the posttest from the mean at the pretest and dividing the difference by the standard deviation of the pretest measure. This measure controls for the inflation in the standard deviation following treatment. Effect sizes were also derived from exact reports of *t*-tests, *F*-ratios, proportions, *P*-values, and confidence intervals. To derive effect sizes for within-subject studies, it is ideal to know the correlation between posttest and pretest measures to calculate effect sizes. Because some reports did not offer this information, we adopted procedures recommended by Becker (1988) as well as by Dunlap, Cortina, Vaslow, and Burke (1996). We explain these procedures when they become relevant.

We also estimated effect sizes when a report contained inexactly described *P*-values—such as when the authors indicated that a given finding was not significant at .05—using the appropriate within- or between-subjects procedures. Thus, a reported non-significant finding was estimated to have a probability of .99, whereas a significant finding was estimated to have a probability at the level of the cutoff value used in the study (e.g., .05 or .01). However, because the use of such reports may lead to incorrect estimations, we conducted separate analyses on the set of exactly reported effect sizes, as well as on all the effect sizes, including the ones estimated on the basis of inexactly reported p values. Because both sets of analyses yielded similar results, we only report the results that included all effect sizes.

We calculated effect sizes representing change in knowledge and condom use. For the sake of space, we excluded change in norms, control perceptions, intentions, behavioral skills, perceived severity, and perceived susceptibility. These additional measures can be made available upon request.

Knowledge

A large number of studies assessed the participant's knowledge about HIV or AIDS, and typically comprised a series of statements that the participant evaluated as true or false (e.g., ''The AIDS virus can

be caught through ordinary close social contact, such as sitting next to an infected person,'' Rigby, Brown, Anagnostou, Ross, & Rosser, 1989, p. 149). Knowledge scores in most cases were calculated by computing the percent of questions a participant answered correctly. When researchers reported statistics for individual items, we calculated effect sizes for each question and then averaged those effects into a global measure of change in knowledge.

Condom Use

Condom use measures included assessments on subjective frequency scales, as well as reports of the percent and number of times participants use condoms over a period of time. For example, the Community Demonstration Projects Research Group (CDC, 1993) asked participants ''When you have vaginal sex with your main partner, how often do you use a condom?'' (p. 11), and participants provided their response on a scale from 1 (*every time*) to 5 (*never*). To obtain a more precise report of condom use, Ploem and Byers (1997) asked participants to report the frequency of sexual intercourse over the previous four weeks, as well as the number of occasions of sexual intercourse for which condoms were used. The researchers then derived the percent of condom use for each participant. Similarly, Belcher et al. (1998) asked participants to list the first name of all of their sex partners in the previous 90 days. For each name listed, participants were then asked to identify the partner's gender, the partner type (regular, casual, or new), the total frequency of vaginal sex, the frequency of condom-protected vaginal sex, the total frequency of anal sex, and the frequency of condom-protected anal sex. Percents were again derived based on relative frequencies.

Analytic Strategy

We calculated weighted mean effect sizes to examine change over time in intervention and control groups, and performed corrections for sample-size bias to estimate *d*. We used Hedges and Olkin's (1985) procedures to correct the effects for sample-size bias, calculate weighted mean effect sizes, *d*., confidence intervals, and homogeneity statistics, Q, which test the hypothesis that the observed variance in effect sizes is no greater than that expected by sampling error alone. Calculations of the between-subject variance followed procedures developed by Hedges and Olkin (1985). For within-subjects designs, we calculated the variance of effect sizes using Morris's (2000) procedures. Specifically, we performed calculations for the variance of within-subject effect sizes using three alternate correlations between pre- and posttest measures (see also, Albarracín et al., 2003, 2005). Thus, we assumed $r = 0$ and $r = .99$ as the most extreme values, and also imputed correlations from Project RESPECT (see Kamb et al., 1998), which provided moderate values of this association. Because results were similar regardless of the correlation we used, we present only the ones with the imputed correlations (see also Albarracín et al., 2003, 2005).

Computations of effect sizes were performed using fixed- and random-effects procedures. In the first case, one assumes a fixed population effect and estimates its sampling variance, which is an inverse function of the sample size of each group. The inverse of the effect size's variance is used to weigh effect sizes prior to obtaining average values. Thus, effect sizes from studies with larger *N*s are considered more precise and carry more weight than effect sizes obtained from studies with smaller sample sizes. These procedures are powerful and produce narrow confidence intervals (Wang & Bushman, 1999). In contrast, random-effects procedures are based on the assumption that the effect sizes are sampled from a population of effect sizes. Thus, the effect size from a given study results from sampling an effect size at random, but also contains measurement error, which is again an inverse function of the sample size in that particular study.

Because random-effects procedures use the variance of a sample of effect sizes as well as the variance in each study to estimate the variance in the population of effect sizes, the error term is larger and the procedure may overestimate Type I error (Hedges & Olkin, 1985; Hedges & Vevea, 1998; Hunter & Schmidt, 2000). Presumably, fixed-effects models are reasonable when one assumes that effect sizes vary as a result of a few, identifiable study characteristics, whereas random-effects models are appropriate when variation derives from multiple, unidentifiable sources (Raudenbush, 1994). Importantly, both sets of models yielded converging results. However, given that many of the random-effects models were non-significant, we restricted report to fixed-effects analyses.

The main analyses were weighted analyses of variance comparing treatments and controls across samples with higher and lower percents of Latinos. Other analyses looked at specific strategies, characteristics of the intervention facilitator, and intervention delivery. Further, many supplementary analyses were conducted. First, we crossed analyses of the Latin-background samples with gender, education,

and nationality (US vs. Latin America). Second, our use of multiple conditions per study may imply greater statistical dependence within those conditions. Thus, we replicated all analyses with a sample of conditions with only one treatment per study. These analyses replicated most of the times and in no case altered our conclusions about associations between efficacy and percent of participants from Latin backgrounds. For the sake of space, we do not report these analyses.

Results

Description

Sample of Interventions

Our eligibility criteria yielded 142 studies, which provided 277 independent intervention groups and 73 independent control groups representing a total of 110,092 participants.[2] These studies were conducted (see Table 1) in the US (282), Latin America (13), Europe (9), Africa (29), Asia (15), and Australia (2). Based on a split of the intervention groups into those with less and more than 50% Latinos/Latin Americans, 317 conditions were classified as under the mean and 33 as above the mean. The mean percent of Latinos/Latin Americans was 14.27. The means for the percent of Latinos/Latin Americans were 91.94 for samples with higher percents of Latinos/Latin Americans and 6.55 for samples with lower percents of Latinos/Latin Americans. In turn, the median was 100 and .70, respectively. Twenty-three studies had 100% participants from Latin backgrounds (10 from the US and 13 from Latin America).

We compared the characteristics of intervention and control groups summarized in Table 1 to detect systematic biases that may confound the reported differences in effect sizes across intervention and control groups. For that purpose, we used independent-sample *t*- and χ^2 tests (Albarracín et al., 2003, 2005). Although intervention and control samples were highly comparable across most dimensions, high school completion was greater in control than intervention groups, t (157) = 5.18, $P < .05$. Thus, these findings are consistent with prior reports of comparability between studies with and without controls (Albarracin et al., 2003, 2005). This is important to analyze the effects of interventions in the absence of controls (Albarracin et al., 2003, 2005).

[2] For other general characteristics of the studies see Table 1.

Table 1 Descriptive statistics (general characteristics of studies and demographic characteristics population)

Variable	Intervention groups (k = 277)	Control groups (k = 73)
General characteristics of the reports		
Publication year		
M	1996.04	1995.86
SD	4.20	3.84
Area where study was conducted		
Africa	6.9(19)	13.7(10)
Asia	4.7(13)	2.7(2)
Australia	2.7(2)	2.7(2)
Europe	1.8(5)	5.5(4)
Latin America	3.2(9)	5.5(4)
US	82.7(229)	72.6(53)
Not identified	9(32)	10.1(10)
Latinos in sample		
Less than 50%	253	64
M	6.71	5.93
SD	10.54	10.49
More than 50%	24	9
M	94.06	86.29
SD	13.53	20.73
Demographic characteristics of participants		
Age		
M	25.59	24.45
SD	9.07	8.96
% Male	41.53	40.62
Gender not indicated	.02	.04
% Completed high school	29.20	32.20
High school not indicated	58.38	39.72
% White		
M	31.50	32.45
SD	35.00	36.76
% Black		
M	45.32	41.64
SD	38.90	39.67
% Native American		
M	.36	.46
SD	1.36	1.21
% Asian		
M	6.27	8.42
SD	20.57	23.38
% Hispanic		
M	14.28	14.66
SD	26.88	29.19
Other		
M	3.54	2.07
SD	13.46	3.99

Relations Among Latino Ethnicity, Gender, Education, and Nationality

Many of our analyses had the objective of exploring the effects of gender, education, and nationality among samples with high percents of people from Latin

backgrounds. Prior to this, however, we correlated percent of Latinos/Latin Americans in a sample with percent of males, percent of high school completion in a sample, and nationality. The only association was that studies in Latin American had more participants from Latin backgrounds than studies in the US ($r = .16$, $P < .002$). No other significant correlations emerged.

Efficacy

General Effects of Interventions Across Groups With Higher and Lower Percents of Latinos/Latin Americans, Genders, and Educational Levels

We first analyzed change as a function of group (intervention vs. control) and as a function of the percent of Latinos/Latin Americans in the sample. As Fig. 1 shows, intervention groups increased both their condom use ($QB_1 = 256.42$) and their knowledge regarding HIV/AIDS related issues ($QB_1 = 832.19$) to a greater extent than control groups. Figure 2 illustrates that intervention groups with a higher percent of Latinos/Latin Americans increased condom use less than those with a lower percent of Latinos/Latin Americans ($d = .15$ vs. $.21$, $k = 207$, $QB_1 = 9.10$, $P < .01$). Intervention groups with more Latinos/Latin Americans also gained less HIV-related knowledge

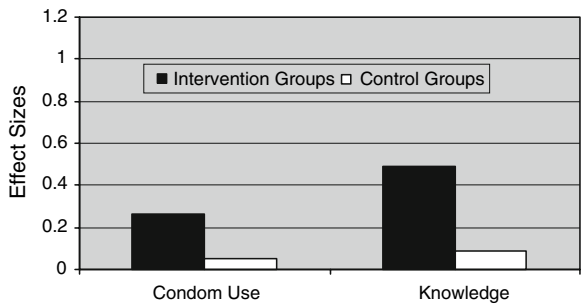

Fig. 1 Condom use and knowledge increase: intervention groups vs. control groups

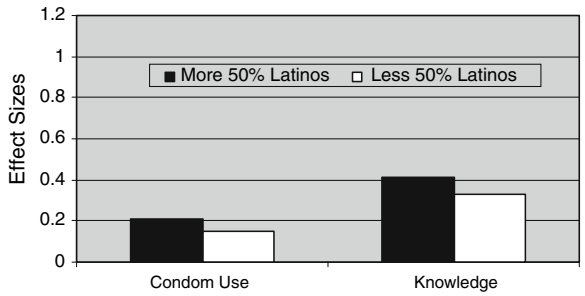

Fig. 2 Condom use and knowledge increase: samples with more than 50%

(Fig. 2) than those with fewer Latinos/Latin Americans ($d = .33$ vs. $.41$, $k = 211$, $QB_1 = 19.99$, $P < .001$). So, in general the interventions perpetuated the gaps observed in the epidemic.

Even when the comparisons across treatments and controls (see Table 1) were reassuring, contrasting all interventions with all control groups is insufficient to rule out two important rival hypotheses. First, considering interventions without controls allows for the possibility that spontaneous maturation might be responsible for the observed increases in condom use (see Cook & Campbell, 1979). Secondly, comparing interventions and controls that did not employ random assignment cannot control for selection biases, and particularly the possibility that the group assigned to the intervention was easier to change than the group assigned to the control. In light of these alternative hypotheses, an additional analysis was conducted in which we calculated scores representing controlled change. For this purpose, we selected only studies that employed random assignment as well as a control group, and subtracted the d representing change in the control group from the d representing change in the treatment group. The variance of the resulting Δ (Becker, 1988) equals the inverse of the sum of the variances of the ds that entered the calculation of Δ, and was used to derive a confidence interval for the overall efficacy of HIV prevention intervention when one selects only controlled randomized trials that had true control ($k = 33$). These analyses provided the same results.

Some analyses were conducted to explore the impact of education and gender on HIV-prevention efficacy for groups with higher concentrations of Latinos/Latin Americans. For this purpose, we built two dichotomous variables reflecting education (complete/incomplete high school) and gender (male/female) of the majority of the participants (more than 50%). In two separate analyses, we used these variables to predict behavior and knowledge change in the samples with higher percents of Latinos/Latin Americans. These analyses were conducted with intervention groups. As Fig. 3 shows, intervention groups with greater education increased their use of condoms ($d = .21$ vs. $.06$, $k = 8$, $QB_1 = 4.13$, $P < .05$) but gained less knowledge ($d = .15$ vs. $.42$, $k = 9$, $QB_1 = 18.71$, $P < .001$) than groups with less educated ones. With regards to gender (see Fig. 4), for the groups with higher proportion of Latinos/Latin Americans, those with a higher proportion of males increased the desired behavior more ($d = .21$ vs. $.11$, $k = 19$, $QB_1 = 6.50$, $P < .001$) but gained less HIV-related knowledge than groups with more females ($d = .13$ vs. $.41$, $k = 25$,

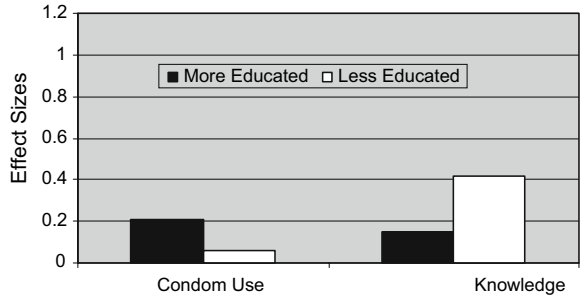

Fig. 3 Condom use and knowledge increase in samples with more than 50% Latinos/Latin Americans: more vs. less educated

$QB_1 = 67.23$, $P < .001$). With respect to nationality (see Fig. 5), intervention groups in Latin America showed more condom use but acquired less knowledge than studies in the US; $QB_1 = 4.69$. $P < .05$, and 8.68, $P < .01$.

Effects of Various Characteristics of the Interventions, the Interventionists, and the Settings

Our remaining analyses examined condom use and knowledge change in all intervention groups as a function of whether interventions (a) included various strategies like attitudinal arguments and behavioral skills training, (b) had expert or lay sources and had sources that were demographically similar or dissimilar, and (c) were presented in community settings or clinics and directed to groups or to individuals. The mean analyses conducted to describe these effects are summarized in Table 2. Tables 3 and 4 present the same analyses except that they consider education and gender as additional moderators using only the groups with higher percents of Latinos/Latin Americans.

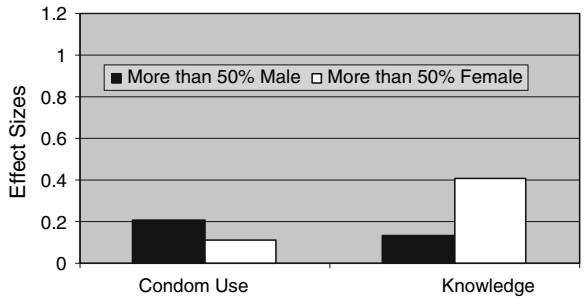

Fig. 4 Condom use and knowledge increase in samples with more than 50% Latinos/Latin Americans: males vs. females

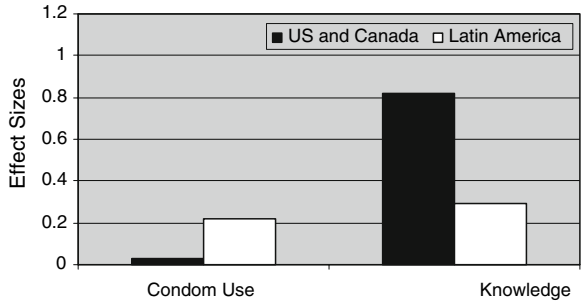

Fig. 5 Condom use and knowledge increase: US vs. Latin America

Effects of Different Intervention Strategies

This study also sought to determine whether different types of strategies commonly used in HIV prevention were more or less successful at increasing condom use and knowledge in groups with higher (vs. lower) percent of Latinos/Latin Americans. For this purpose, we analyzed change as a function of all the coded strategies entered simultaneously, including also the dichotomous percent of Latin background as well as interactions between Latin background and each strategy at a time. Thus, the analyses of each strategy represent its effect independently of (covarying out) the effects of other strategies. All possible strategies were analyzed for condom use; only passive strategies were analyzed for knowledge.

As Table 2 shows, fewer strategies were efficacious for groups with higher percent of Latino/Latin Americans s as compared with groups with lower percent of Latinos/Latin Americans. That is, in samples with fewer Latinos/Latin Americans, attitudinal and behavioral skills arguments, information provision, condom-use skills training, self-management training, and HIV counseling and testing were associated with increased condom use. In contrast, only threat inducing strategies were associated with increased condom use in samples with a higher percent of Latinos/Latin Americans. Further, three strategies decreased condom use in samples with a higher proportion Latinos/Latin Americans (i.e., normative arguments, self-management skills training, and HIV counseling and testing), whereas no strategy did so in samples with fewer Latinos/Latin Americans. Threat-inducing strategies were associated with greater knowledge change in both samples.

Education may impact the way in which Latinos/Latin Americans behave and react to different intervention strategies. Thus, we repeated the analyses in Table 2 by only taking samples with higher percents of Latinos/Latin Americans and adding education alone and in interaction with each intervention strategy at the time while controlling for all other strategies. Interestingly, education analyses (see Table 3) showed that groups with more Latinos/Latin Americans and higher educational levels increased condom use when

Table 2 Effects of characteristics of the interventions, the interventionists, and the settings as a function of percent of Latinos/Latin Americans

Moderator	Higher percent of Latinos/Latin Americans (50–100%)			Lower percent of Latinos/Latin Americans (0–49.99%)			Overall
	d.		QB_1 for simple effect	*d.*		QB_1 for simple effect	QB_1 for interaction
	Strategy included	Strategy not included		Strategy Included	Strategy not included		
Behavior: Condom use							
Intervention strategies (k = 162)							
Attitudinal arguments	.31	.48	11.89***	.46	.41	6.96**	127.37***
Normative arguments	–.22	.57	185.21***	.41	.50	17.42***	138.16***
Behavioral-skills arguments	.13	.38	19.51***	.61	.31	117.67***	93.81***
Threat-inducing arguments	.45	.35	5.29*	.31	.55	240.57***	49.04***
Any kind of information	.41	–	–	.47	.38	8.62**	–
Interpersonal skills training	.08	.52	66.586***	.43	.46	1.02	58.57***
Condom use skills training	.17	.46	32.51***	.47	.43	4.06*	44.24***
Self-management training	–.16	.20	3.85*	.61	.25	152.81***	15.43***
HIV counseling and testing	–.13	.34	53.17***	.68	.25	627.10***	176.26***
Condom provision	.30	.47	11.31***	.44	.42	1.08	12.83***
Intervention sources							
Expert (k = 115)	.19	.31	3.13	.42	.14	376.95***	102.50***
Lay community member (k = 106)	.03	.20	12.71***	.27	.29	.94	9.31**
Ethnic similarity (k = 66)	.11	.14	.09	.28	.07	109.45***	5.74*
Gender similarity (k = 89)	.11	.14	.09	.40	.07	393.28***	13.24***
Age similarity (k = 52)	.03	.09	.53	.19	.07	8.22**	3.49
Intervention settings (k = 162)							
Clinic	.08	.20	5.54*	.54	.12	880.57***	103.18***
Community settings	.14	.20	1.57	.16	.34	188.44***	8.84**
Type of presentation (k = 162)							
Group	.17	.13	.07	.33	.19	104.35***	.32
Individual	.14	.19	1.23	.19	.34	117.52***	4.82*
HIV related knowledge							
Intervention strategies (k = 168)							
Attitudinal arguments	.32	.81	68.56***	.41	.44	1.76	57.93***
Normative arguments	.52	.42	2.44	.38	.43	4.67*	4.75*
Behavioral-skills arguments	.38	.48	2.50	.41	.46	2.71	.54
Threat-inducing arguments	.54	.38	9.92**	.47	.39	19.98***	2.49
Any kind of information	.65	–	–	.64	.21	164.42***	–
Intervention sources							
Expert (k = 139)	.44	.52	2.90	.66	.36	363.42***	65.30***
Lay community member (k = 132)	.72	.39	54.98***	.41	.56	95.47***	104.48***
Ethnic similarity (k = 86)	.49	.69	8.63**	.43	.55	30.34***	1.41
Gender similarity (k = 112)	.51	.69	6.66**	.41	.57	83.15***	.08
Age similarity (k = 94)	.84	.65	7.53**	.65	.52	30.69***	.62

Table 2 continued

Moderator	Higher percent of Latinos/Latin Americans (50–100%)			Lower percent of Latinos/Latin Americans (0–49.99%)			Overall
	d.		QB_1 for simple effect	*d.*		QB_1 for simple effect	QB_1 for interaction
	Strategy included	Strategy not included		Strategy Included	Strategy not included		
Intervention settings (k = 168)							
Clinic	.62	.40	18.59***	.38	.52	44.13***	42.06***
Community settings	.23	.56	62.79***	.67	.44	203.47***	157.04***
Type of presentation (k = 2168)							
Group	.45	–	–	.54	.15	313.20***	–
Individual	.35	.59	33.60***	.29	.52	102.41***	.02

Note: All factors were dummy coded (strategy [e.g., experts or normative arguments] included = 1; strategy not included = 0). *d.* = fixed-effects weighted model means adjusted for all other effects. Control means for higher and lower percents of Hispanics were .05 in both cases. *QB* for simple and main effect = homogeneity coefficient for the difference across levels of a factor, distributed as a χ^2 with number of factor levels – 1 degrees of freedom. *QB* for interaction = homogeneity coefficient for the interaction between factors, distributed as a χ^2 with (number of levels of factor A – 1) × (number of levels of factor B – 1) degrees of freedom. Significant *QB*s indicate significant effects of the involved factors. k = number of conditions in analysis. –: could not be calculated due to incomplete cells

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

intervention strategies used attitudinal and behavioral-skills arguments. In turn, lower educated groups with high percents of Latinos/Latin Americans increased condom use in response to threat-inducing strategies, but decreased condom use when interventions included behavioral skills arguments, and condom-use and self-management-skills training.

The analyses to establish if gender moderated the impact of intervention content in samples with higher percents of Latinos/Latin Americans were very similar. That is, we repeated the analyses in Table 2 by only taking samples with higher percents of Latinos/Latin Americans and adding gender alone and in interaction with each intervention strategy at the time while controlling for all other strategies. These procedures (see Table 4) revealed 10 significant interactions. Three of these analyses suggested that male dominated samples increased condom use when interventions included behavioral skills arguments and condom use training but had no change when interventions included threat-inducing arguments. In contrast, females responded favorably only to threat inducing arguments and decreased condom use interventions included normative and behavioral skills arguments, interpersonal and condom-use-skills training, and HIV counseling and testing. In addition, the predominantly female group showed no change in response to attitudinal arguments.

A last set of analyses of intervention strategies, crossed samples with higher percents of Latinos with US and Latin-American nationality. The only significant interaction was for fear inducing arguments, and condom-skills training (See Table 5).[3] Fear-inducing arguments had a positive effect in the US but a negative effect in Latin-American countries (See Table 5). In contrast, condom-use skills training had a negative effect in the US, but a positive effect in other countries.

Effects of Agent Characteristics

As mentioned above, the use of peer sources for interventions has become popular, in particular for Latino/Latin Americans populations. Our study examined how the presence of experts or lay community members among the intervention sources affected behavioral and knowledge change. In addition, similar analyses explored these effects with regards to the source's demographic similarity to the recipients. These findings are summarized in Table 2 and were conducted by introducing one source variable at a time as well as the dichotomous Latin-ethnicity predictor and the interaction between the two. There were significant interactions for inclusion of experts and community members on both behavior and knowledge change. Specifically, the inclusion of lay community members decreased condom use but increased HIV related knowledge in the groups with high proportions of Latinos/Latin Americans. Correspondingly, samples with lower proportion of Latinos/Latin Americans increased condom use and knowledge when interven-

[3] There were other significant interactions that showed no significant simple effects for either one of or both groups (See Table 5).

Table 3 Effects of characteristics of the interventions, the interventionists, and the settings as a function of education (samples with at least 50% of Latinos/Latin Americans): condom use

Intervention characteristics	Majority completed high school			Majority incomplete high school			Overall
	d.		QB_1 for simple effect	*d.*		QB_1 for simple effect	QB_1 for interaction
	Strategy included	Strategy not included		Strategy included	Strategy not included		
Intervention strategies (k = 69)							
Attitudinal arguments	.71	.52	4.81*	.16	.68	10.87**	63.07***
Normative arguments	–	.55	–	.39	.38	.00	15.67***
Behavioral-skills arguments	.70	.30	16.20***	-.08	.24	2.34	36.41***
Threat-inducing arguments	.41	.87	22.06***	.48	-.34	16.41***	27.14***
Any kind of information	.53	–	–	.12	–	–	35.23***
Interpersonal skills training	.48	.60	1.21	.05	.72	18.16***	1.29
Condom use skills training	.53	.64	1.26	-.48	.61	28.54***	98.06***
Self-management training	–	.55	–	–.37	.53	19.30***	10.68***
HIV counseling and testing	–	.28	–	–	.09	–	68.90***
Condom provision	.55	.61	.50	–	.47	–	123.46***
Intervention source							
Expert (k = 47)	.44	.44	.00	.14	.00	.84	9.16**
Lay community member (k = 45)	.04	–	–	–	.09	–	–
Ethnic similarity (k = 21)	.04	–	–	–	.14	–	–
Gender similarity (k = 35)	.04	–	–	–	.14	–	–
Age similarity (k = 23)	–	–	–	–	.09	–	–
Intervention settings (k = 69)							
Clinic	–	.21	–	–	.09	–	–
Community settings	.04	.44	30.98***	.14	.03	.84	.37
Type of presentation (k = 69)							
Group	.20	–	–	.09	–	–	–
Individual	–	.21	–	–	.09	–	–

Note: All factors were dummy coded (strategy [e.g., experts or normative arguments] included = 1; strategy not included = 0). *d.* = fixed-effects weighted model means adjusted for all other effects. Control means for higher and lower education were .13 and .21, respectively. *QB* for simple and main effect = homogeneity coefficient for the difference across levels of a factor, distributed as a χ^2 with number of factor levels – 1 degrees of freedom. *QB* for interaction = homogeneity coefficient for the interaction between factors, distributed as a χ^2 with (number of levels of factor A – 1) × (number of levels of factor B – 1) degrees of freedom. Significant *QB*s indicate significant effects of the involved factors. k = number of conditions in analysis. –: could not be calculated due to incomplete cells

tions used experts as sources. No significant moderation of these findings was found when education, gender, or nationality were considered.

Further, our study was also intended to assess the impact of the source's similarity to recipient (in terms of race, gender, and age) on behavior and knowledge change. For behavior change, there were significant interactions with percent of Latinos/Latin Americans in all cases but age. These analyses indicated that none of the similarities had significant effects on behavior for samples with higher proportion of Latinos/Latin Americans. In contrast, samples with lower percents of Latinos/Latin Americans increased condom use when sources were similar in ethnicity, gender, and age. For knowledge change, there were no interactions between proportion of Latinos/Latin Americans and demographic similarities. Across the board, groups increased HIV knowledge more when sources were age similar, but less when the source were gender and ethnic similar. Unfortunately, the interactions with education,

Table 4 Effects of characteristics of the interventions, the interventionists, and the settings as a function of gender (samples with at least 13.3% of Latinos/Latin Americans): condom use

Intervention characteristics	Predominantly male			Predominantly female			Overall
	d.		QB_1 for simple effect	*d.*		QB_1 for simple effect	QB_1 for interaction
	Strategy included	Strategy not included		Strategy included	Strategy not included		
Intervention strategies							
Attitudinal arguments	.61	.53	1.33	.18	.60	31.31***	106.79***
Normative arguments	–	.63	.00	-.27	.53	146.68***	72.54***
Behavioral-skills arguments	.87	.49	18.19***	-.14	.48	78.15***	57.67***
Threat-inducing arguments	.49	.62	4.38*	.64	.53	19.48***	12.41***
Any kind of information	.57	–	–	.28	–	–	105.83***
Interpersonal skills training	.70	.63	.63	-.09	.60	100.31***	34.91***
Condom use skills training	.75	.61	4.66*	-.31	.62	161.06***	181.60***
Self-management training	–	.39	–	–.11	.11	1.49	89.79***
HIV counseling and testing	–	.37	–	–.10	.32	34.65***	193.70***
Condom provision	.55	.48	.97	.17	.51	22.03***	267.68***
Intervention sources							
Expert (k = 112)	.30	.44	2.29	.13	.00	1.13	2.04
Lay community member (k = 104)	.04	.23	6.20*	.02	.19	6.74**	3.06
Ethnic similarity (k = 64)	.11	–	–	.11	.14	.07	–
Gender similarity (k = 89)	.11	–	–	.11	.14	.07	–
Age similarity (k = 52)	–	–	–	.02	.09	.53	–
Intervention settings (k = 159)							
Clinic	–	.21	–	.08	.17	2.30	–
Community settings	.11	.44	24.85***	.20	.07	4.13*	24.95***
Type of presentation (k = 159)							
Group	.21	–	–	.13	.13	.00	–
Individual	.23	.21	.07	.11	.15	.34	5.89*

Note: All factors were dummy coded (strategy [e.g., experts or normative arguments] included = 1; strategy not included = 0). *d.* = fixed-effects weighted model means adjusted for all other effects. Control means for predominantly male and female samples were .21 and .04, respectively. *QB* for simple and main effect = homogeneity coefficient for the difference across levels of a factor, distributed as a χ^2 with number of factor levels –1 degrees of freedom. *QB* for interaction = homogeneity coefficient for the interaction between factors, distributed as a χ^2 with (number of levels of factor A – 1) × (number of levels of factor B – 1) degrees of freedom. Significant *QB*s indicate significant effects of the involved factors. k = number of conditions in analysis. –: could not be calculated due to incomplete cells

gender, and nationality could not be tested due to incomplete cells.

Setting/Groups Versus Individual Presentations

A final analysis considered change as a function of the setting and formats variables, each introduced separately. A large portion of the interventions took place in health centers (or clinics) and community settings like neighborhood organizations. This setting interacted with Latin ethnicity for both behavior and knowledge change. For samples with higher proportion of Latinos/Latin Americans, interventions at clinics were successful at increasing knowledge but less successful at increasing condom use. Interventions taking place at community settings had a negative impact on knowledge but no significant impact on behavior (see Table 2). In contrast, groups with lower percents of Latinos/Latin Americans increased condom use when interventions were conducted in health

Table 5 Effects of characteristics of the interventions, the interventionists, and the settings for studies conducted in the US vs. Latin America (samples with at least 50% of Latinos/Latin Americans): condom use

Intervention characteristics	Study conducted in the US			Study conducted in Latin America			Overall
	d.		QB_1 for simple effect	*d.*		QB_1 for simple effect	QB_1 for interaction
	Strategy included	Strategy not included		Strategy included	Strategy not included		
Intervention strategies (k = 162)							
Attitudinal arguments	–.24	.53	34.40***	.60	.60	.02	154.08***
Normative arguments	–.22	.27	19.80***	–	.62	–	1.62
Behavioral-skills arguments	–.19	.43	36.33***	.86	.45	.83***	3.59
Threat-inducing arguments	.53	-.16	36.52***	.48	.72	19.80***	37.14***
Any kind of information	–.04	–	–	.66	–	–	57.70***
Interpersonal skills training	–.12	.39	8.68**	.62	.59	.77	.32
Condom use skills training	–.36	.58	83.05***	.74	.58	5.87**	354.29***
Self-management training	–.20	–.25	.63	–	.42	–	53.34***
HIV counseling and testing	–.18	.20	15.00***	–	.41	–	149.63***
Condom provision	–.38	.40	64.59***	.61	.61	–	326.81***
Intervention source							
Expert (k = 113)	.02	.00	.03	.26	.44	4.71*	.31
Lay community member (k = 106)	.02	.00	.04	.04	.22	10.10**	.63
Ethnic similarity (k = 66)	.02	.00	.02	.14	.20	.21	.60
Gender similarity (k = 89)	.02	.00	.02	.14	.20	.21	.07
Age similarity (k = 52)	.02	.00	.04	–	.20	–	–
Intervention settings (k = 162)							
Clinic	.02	.05	.11	.28	.21	.44	1.36
Community settings	.00	.03	.04	.15	.40	20.57***	3.37
Type of presentation (k = 69)							
Group	.03	.13	.34	.22	–	–	–
Individual	.03	.03	–	.22	.21	.01	.14

Note: All factors were dummy coded (strategy [e.g., experts or normative arguments] included = 1; strategy not included = 0). *d.* = fixed-effects weighted model means adjusted for all other effects. Control means for higher and lower education were .13 and .21, respectively. QB for simple and main effect = homogeneity coefficient for the difference across levels of a factor, distributed as a χ^2 with number of factor levels – 1 degrees of freedom. QB for interaction = homogeneity coefficient for the interaction between factors, distributed as a χ^2 with (number of levels of factor A – 1) × (number of levels of factor B – 1) degrees of freedom. Significant QBs indicate significant effects of the involved factors. k = number of conditions in analysis. –: could not be calculated due to incomplete cells

centers but not in community contexts. Education analyses revealed that community settings proved unsuccessful in increasing condom use in lower educated samples with high percents of Latinos/Latin Americans (see Table 3). Unfortunately, we did not have enough cases to asses the effect of education for clinics. In turn, gender analyses showed that unlike samples with higher percents of males and Latinos/Latin Americans, samples with higher percents of Latinos/Latin Americans and females increased condom use when interventions took place in community settings (see Table 4). Finally, there were no interactions between settings and nationality (Table 5).

With respect to whether interventions were more efficacious when directed to groups or individuals, our study revealed that the group format produced more important increases in both condom use and knowledge in samples with lower numbers of Latinos/Latin Americans (see Table 2). Results for samples with more Latinos/Latin Americans were not significant.

Supplementary analyses of education, gender, and nationality showed no significant differences either (see Tables 2 and 3).

Discussion

Overall, participants in the 277 intervention groups summarized in this meta-analysis increased condom use and HIV-related knowledge. However, groups with higher proportions of Latinos/Latin Americans increased condom use less and acquired less knowledge than groups with lower proportion of Latinos/Latin Americans. This finding is worrisome in suggesting that interventions are less efficacious at increasing protective behavior in one of the populations that is disproportionately affected by HIV/AIDS.

Also, it was surprising that only threat inducing strategies proved efficacious in increasing condom use and knowledge in samples with higher proportion of Latinos in the US. Furthermore, the use of this strategy was also efficacious with samples of lower education and greater proportion of women. According to this finding, HIV prevention models concentrating on the role of the perceived threat posed by a health problem (for example, Rosenstock et al., 1994) may have greater application among Latino populations than any other group. In contrast, a number of different strategies were effective in increasing condom use among populations with lower percents of Latinos (i.e., attitudinal and behavioral skills arguments, information provision, condom use skills and self-management training, and HIV counseling and testing). We believe that this difference gives support to the contention that HIV prevention campaigns for the Latino population need to attend to culture (Marín et al., 1997; Ortiz-Torres et al., 2000). However, more research needs to be conducted to determine why threat-inducing arguments may be more effective among persons of Latino origin relative to other backgrounds.

Consistent with the need of separating culture from education, in this paper we found that education had an important moderating role in the efficacy of HIV prevention campaigns. In this regard, our study showed for samples with higher proportion of Latinos/Latin Americans, more educated populations increased condom use to a greater extent than less educated ones. However, they also gained less knowledge. One possible explanation for the latter result is that more educated populations may have more previous knowledge about HIV/AIDS. Our study also showed that the strategies that were effective among more and less educated populations for samples with high percents of Latinos/Latin Americans were different. Attitudinal and behavioral skills arguments worked better among more educated populations, whereas only threat inducing arguments worked among less educated ones. Although further research may be required, we believe that education should be carefully considered when designing HIV prevention strategies for Latinos/Latin Americans.

Another important finding of this review is that predominately Latino/Latin Americans samples with higher proportions of males showed greater improvement in condom use than samples with higher proportion of females. This difference offers support for the contention that gender roles should receive great attention in designing HIV prevention interventions for Latin/Latin Americans populations (Gomez & Marin, 1996; Marin & Marin, 1992; Marin, Gomez, Tschann & Gregorich, 1997). The reasons for the more limited positive change in females are presently unclear. However, it may be that the prevalent *Machismo*[4] among Latinos/Latin Americans limits women's involvement in condom use decisions, resulting in less increase in both condom use and knowledge about these issues. At the same time, Latino/Latin American women are considered pure beings, and are not expected to discuss sexual issues with their sex partners (Gómez & Marín, 1996). Thus, it seems imperative to find methods to effectively empower women from Latin backgrounds so that they can be proactive regarding condom use.

Our study also showed some differences with regards to the prevention strategies more effective among samples with more Latino/Latin American men and women. Latino/Latin American men increased condom use when intervention strategies included behavioral skills arguments and condom skills training. Although condom-use training may work for men for the obvious reason that these men may be in charge of condom-use decisions, the efficacy of behavioral skills arguments for Latino/Latin American males may require further research. Social cognitive theory (Bandura, 1986) states that that people will engage in the protective behavior when they have the necessary skills (behavioral skills) that yield successful performance of the behavior (and also the knowledge about the transmission and prevention of the disease). In turn, the literature on Latino gender roles tells us that Latino males consider themselves as sexual beings, and

[4] The traditional gender role of *Machismo* can have positive aspects as well like protection of the women and family. Thus, further research should explore the potential of this trait of *Machismo* for HIV/AIDS prevention.

believe that their sexual impulses are beyond their control (Marín & Marín, 1992). Thus, intervention strategies that give Latino/Latin American men control-enhancing tools may be effective.

Our findings with regards to the strategies that were effective among Latino/Latin American women may also require further research. As mentioned above, Latino/Latin American women responded well to strategies that emphasized the perceived threat of HIV. But there were several strategies that reduced condom use among Latino/Latin American women (normative and behavioral skills arguments, interpersonal skills, condom use, and self-management training, and HIV counseling and testing). Because Latino/Latin American women had less increase in condom use than Latino/Latin American men, the failure of these specific strategies may be the reflection of the general difficulty of Latino/Latin American women in changing their behavior. In turn, this difficulty may be related to the above mentioned *machismo* culture prevalent among populations from Latin backgrounds.

Our results with regards to the source of the intervention (expert vs. lay community member, source similarity (ethnic, gender, or age), the type of setting (clinic vs. community center), and the format of the intervention (group vs. individual) are less conclusive. With regards to the source of the intervention, we found that the use of lay community members did not increase condom use for groups with higher percents of Latinos/Latin Americans (even when gender was considered) and that groups with lower percents of Latinos/Latin Americans responded well to experts. This finding with regards to Latinos is worrisome considering the use of lay community members has been recommended for HIV prevention among Latinos (Center for AIDS Prevention Studies, University of California at San Francisco, 2002; Ortiz-Torres et al., 2000). However, the use of lay community members proved effective in increasing HIV related knowledge in groups with high percents of Latinos/Latin Americans.

Source similarity did not yield any significant results for groups with more Latinos/Latin Americans but all types of source similarity were effective to change behavior in samples with fewer Latinos/Latin Americans. Ideally, more research should be conducted in this area. Interventions in clinics proved ineffective to increase condom use among groups with more Latinos/Latin Americans but were successful among samples with less Latinos/Latin Americans. Also, interventions in clinics were effective in increasing HIV related knowledge among groups with more Latinos/Latin Americans. In turn, interventions taking place in community settings increased condom use among female participants. This latter finding is important considering that very few strategies were effective among samples with higher percents of Latinas/Latin Americans. Finally, the format of the intervention (group vs. individual) made no difference for samples with more Latinos/Latin Americans, but group presentations worked better among samples with lower percents of Latinos/Latin Americans.

With regards to the differences between samples with higher proportion of Latinos in the US versus Latin Americans, we found that the first group increased condom use less but acquired knowledge. More research should be conducted to explain this finding. In supplementary analyses, we explored the composition of the samples with regards to education and gender and the only difference was that Latin American countries included more studies that were predominantly female (and females increased condom use less than males). Because this difference does not explain the cross-national differences, we believe that Latin American countries may be better than the US at designing/implementing prevention strategies that are sensitive to the needs of their population.

We also identified the types of intervention strategies that were successful among samples with higher proportions of Latinos in the United States versus Latin Americans. In this regard, we found that strategies that included attitudinal, and fear arguments were successful for samples with more Latinos in the US but not for Latin Americans. However, interventions that comprised condom use skills training and condom distribution were successful in Latin America but not in the US. We believe that these findings may be a good point of departure for further research about the differences between Latin Americans of different origins.

In closing, this meta-analysis is an important step in clarifying the HIV prevention programs that work better for populations with greater and smaller Latino/Latin Americans percents. As such, it is the first to statistically analyze the efficacy of different HIV-prevention strategies for these populations. Nonetheless, it suggests that more work is warranted for HIV prevention among Latinos. Only 23 samples had 100% Latinos, 13 of which were from Latin America. This fact is perplexing considering the incidence of the HIV/AIDS epidemic in the Latino community in the US. More empirical research must be conducted to design interventions with proven behavior-change efficacy for the Latino community.

Appendix

Papers Included in Meta-Analysis

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