

# Empirical and Theoretical Conclusions of an Analysis of Outcomes of HIV-Prevention Interventions

Dolores Albarracín, Marta R. Durantini, and Allison Earl

*University of Florida*

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**ABSTRACT**—*Over two decades of HIV-prevention attempts have generated a most impressive ecological data set for the test of behavioral-change and persuasion theories in the domain of condom use. An analysis of this evidence has yielded five important empirical and theoretical conclusions. First, interventions are more successful at achieving immediate knowledge and motivational change than they are at achieving immediate behavioral change. Second, the immediate motivational change decays over time, whereas behavior change increases over the same period. Third, interventions that engage audiences in particular activities, such as role-playing condom use, are more effective than presentations of materials to passive audiences. Fourth, interventions consistent with the theories of reasoned action and planned behavior, with self-efficacy models, and with information-motivation and behavioral-skills models prove effective, whereas interventions designed to induce fear do not. Fifth, expert intervention facilitators are more effective than lay community members in almost all cases. When populations are unempowered, expert facilitators are particularly effective, and they are most effective if they also share the gender and ethnicity of the target audience.*

**KEYWORDS**—*HIV; health promotion; persuasion; behavior change; attitude change; source effects*

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The HIV epidemic has resulted in a mushrooming of prevention programs and research on these programs. As a result, the literature on HIV prevention is possibly the most extensive, up-to-

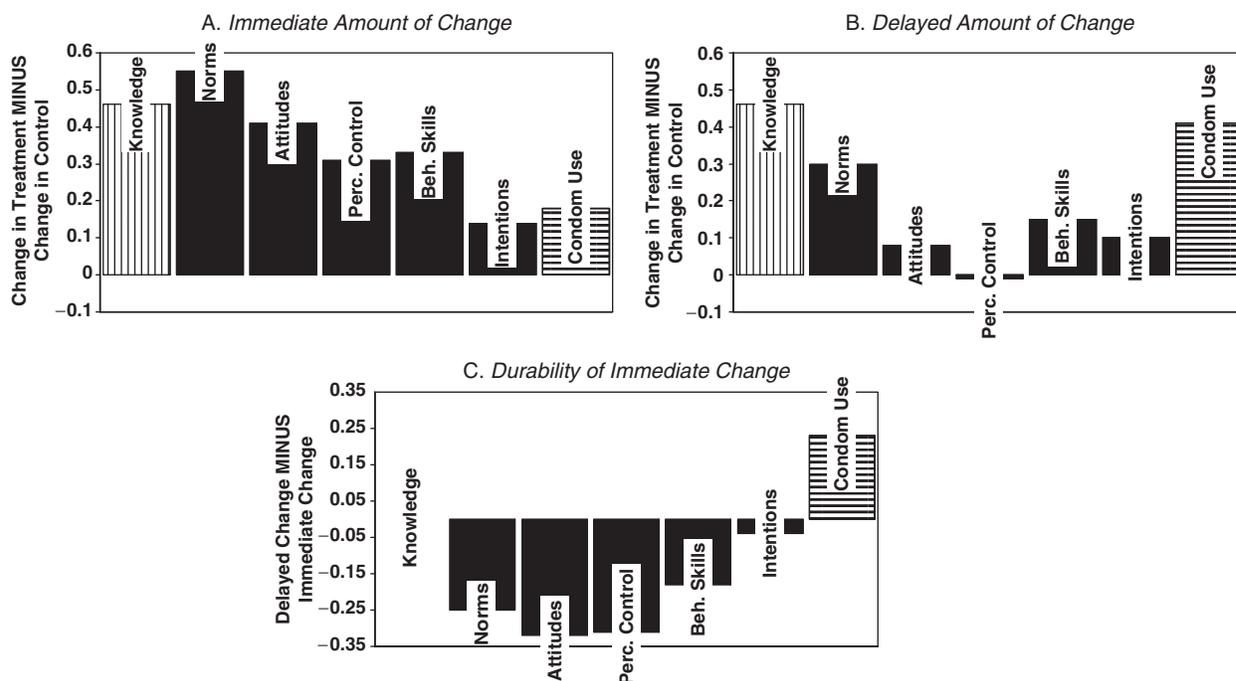
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Address correspondence to Dolores Albarracín, Psychology Department, University of Florida, Gainesville, FL 32611; e-mail: dalbarra@ufl.edu.

date, and diverse laboratory to study change in health behavior and behavioral change in general. In this article, we discuss the conclusions from two comprehensive statistical analyses of this literature. These conclusions pertain to how much change different interventions elicit, how such change evolves over time, and how the data support or contradict theories of behavior change.

## SOURCES OF THIS REVIEW

Over the course of 8 years, we (Albarracín et al., in press) conducted a comprehensive meta-analysis (i.e., statistical analysis of a pool of studies on an issue) of the outcomes of interventions to increase condom use to prevent HIV. As part of this project, over 350 interventions and around 100 control groups were selected, comprising a large number of countries, U.S. states, and years. For each of these groups or conditions, we calculated amount of change in behavior (e.g., increases in condom-use frequency) and various psychological variables including HIV-related knowledge (how much one knows about HIV and how to protect oneself), attitudes and intentions about condom use (whether one thinks that condom use is good and desirable and is willing to use condoms), perceived norms about the use of condoms (thoughts that others support one's use of condoms), perceived HIV threat (feelings of fear and being personally at risk for HIV), perceptions of control over using condoms (perceiving that one can do it if one wants to), and behavioral skills (knowing how to obtain and apply condoms and negotiate condom use with a partner). In addition, characteristics of the intervention content (what is said and done), source (who says it), and target population (the actual audience) were coded and used to analyze the effects of these factors on change, in light of theoretical predictions about the mechanisms and interpersonal sources of behavior change. Many potential methodological aspects were explored. The results we present



**Fig. 1.** Immediate and delayed change in HIV knowledge, condom-related motivations, and condom use after HIV-prevention intervention (panels A and B) and durability of these changes (panel C). Vertical shading indicates knowledge change; solid shading indicates motivational change (including condom-related perceived norms, attitudes, and perceptions of control, as well as behavioral skills and intentions regarding condom use), and horizontal shading indicates behavioral change. The results in panel B minus the results in panel A produce the results in panel C. (A score of 0.2 is considered small, a score of 0.5 moderate, and a score of 0.8 large.)

were not affected by the type of design used, the presence or absence of control groups, or whether or not participants were randomly assigned to study groups.

**CONCLUSIONS ABOUT THE AMOUNT AND DURABILITY OF CHANGE**

**Amount of Change**

A first empirical conclusion from our meta-analysis is that, immediately after the intervention, knowledge and motivational change (change in attitudes, intentions, perceived norms, control perceptions) are much more pronounced than is actual behavioral change. The estimates of standardized change (amount of change when all measures of a variable are comparable) plotted in Figure 1 (panel A shows change from the intervention at the immediate follow-up) lead to the conclusion that recipients of HIV interventions initially experience moderate changes in knowledge and motivation and small changes in behavior.<sup>1</sup> In other words, as measured in the studies, interventions were least effective at increasing immediate behavioral change.

**Durability of Change**

The durability of change is also important and can be examined by analyzing reports that had two follow-ups (in our meta-

analysis, at an average of 2 and 4 months). Although knowledge and motivational change outweigh behavioral change immediately following an HIV-prevention intervention, not all these changes persist over time in the same way (panels B and C of Fig. 1). The motivational impact of intervention programs decays; and although behavioral change is small immediately following an intervention, it increases at the time of the delayed follow-up (see last bar of panel C in Fig. 1).<sup>2</sup> Therefore, although knowledge change continues to be greater than behavior change at the delayed follow-up, any initial advantage for the motivational change has faded at the delayed follow-up. Intriguing possibilities are that condom use may become relatively automatic or that the motivation to use condoms may be shared and implemented by both sexual partners; both may cause condom use to increase even when motivation decreases.

**CONCLUSIONS ABOUT VIABILITY OF THEORIES OF BEHAVIOR CHANGE**

**Theories on Which Behavioral-Change Interventions Are Currently Based**

One key objective of analyzing the outcomes of HIV-prevention interventions was to test theories of behavior change. Several theoretical models that specify the motivational and knowledge antecedents of health behaviors have guided intervention design

<sup>1</sup>Increases in fear or threat perceptions only occurred when the interventions included fear-inducing arguments. The overall effects of all interventions on this variable were nil.

<sup>2</sup>Forty-six of the conditions in the meta-analysis had positive behavioral change.

in the area of HIV prevention. For example, the theory of reasoned action and the theory of planned behavior (Ajzen & Fishbein, 2005; for a meta-analysis, see Albarracín, Johnson, Fishbein, & Muellerleile, 2001) state that protection behaviors are contingent on positive attitudes about a behavior and on social norms favoring it. The theory of planned behavior also takes into account perceptions that the behavior is easy and up to the individual (i.e., perceived behavioral control). According to social-cognitive theory (Bandura, 1994), people will engage in protective behaviors when they perceive that they are capable of doing so, because self-efficacy is central to implementing behavior. Furthermore, social-cognitive theory (Bandura, 1994) and the information–motivation–behavioral-skills model (Fisher & Fisher, 1992) both assume that people are more likely to perform a behavior once they acquire relevant knowledge and behavioral skills.

Other models have concentrated on the role of the perceived threat posed by a health problem. The health-belief model (Rosenstock, Strecher, & Becker, 1994) and the protection-motivation theory (Floyd, Prentice-Dunn, & Rogers, 2000) hypothesize that people are motivated to initiate healthy behaviors when they (a) fear the severity of the disease and (b) believe that they are personally susceptible to it.

Linking specific theories to specific intervention contents is useful for examining the degree to which the various theories are plausible. Interventions that attempt to modify attitudes (i.e., attitudinal arguments) usually consist of assertions that the behavior being advocated will benefit one's physical health or psychological comfort. Arguments to increase favorable norms with respect to condom use (i.e., normative arguments) are often designed to convince an audience that its social network supports the practice. An informational communication typically conveys data on the nature of HIV, modes of transmission, mechanisms of the disease, and methods of prevention.

According to the information–motivation–behavioral-skills model, however, HIV-prevention programs are generally not successful unless they manage to increase behavioral skills as well. Thus, interventions based on this model—which incorporates the theories of reasoned action, planned behavior, and social-cognitive theory—also contain behavioral scripts about strategies that yield successful performance of the behavior. For example, an intervention may attempt to motivate recipients by increasing favorable attitudes and norms. Further, a persuasive message may not only tout the benefits of condom use (i.e., attitudinal arguments) or mention groups that support it (i.e., normative arguments), but also describe how success in condom use depends on preparatory actions (i.e., behavioral skills arguments), such as carrying condoms around all the time or discussing condom use with potential partners. As another example, a widely accepted strategy is to have individuals role-play condom application or negotiation (i.e., behavioral skills training), with the idea that the behavioral practice and the instructional feedback will facilitate the acquisition of the key

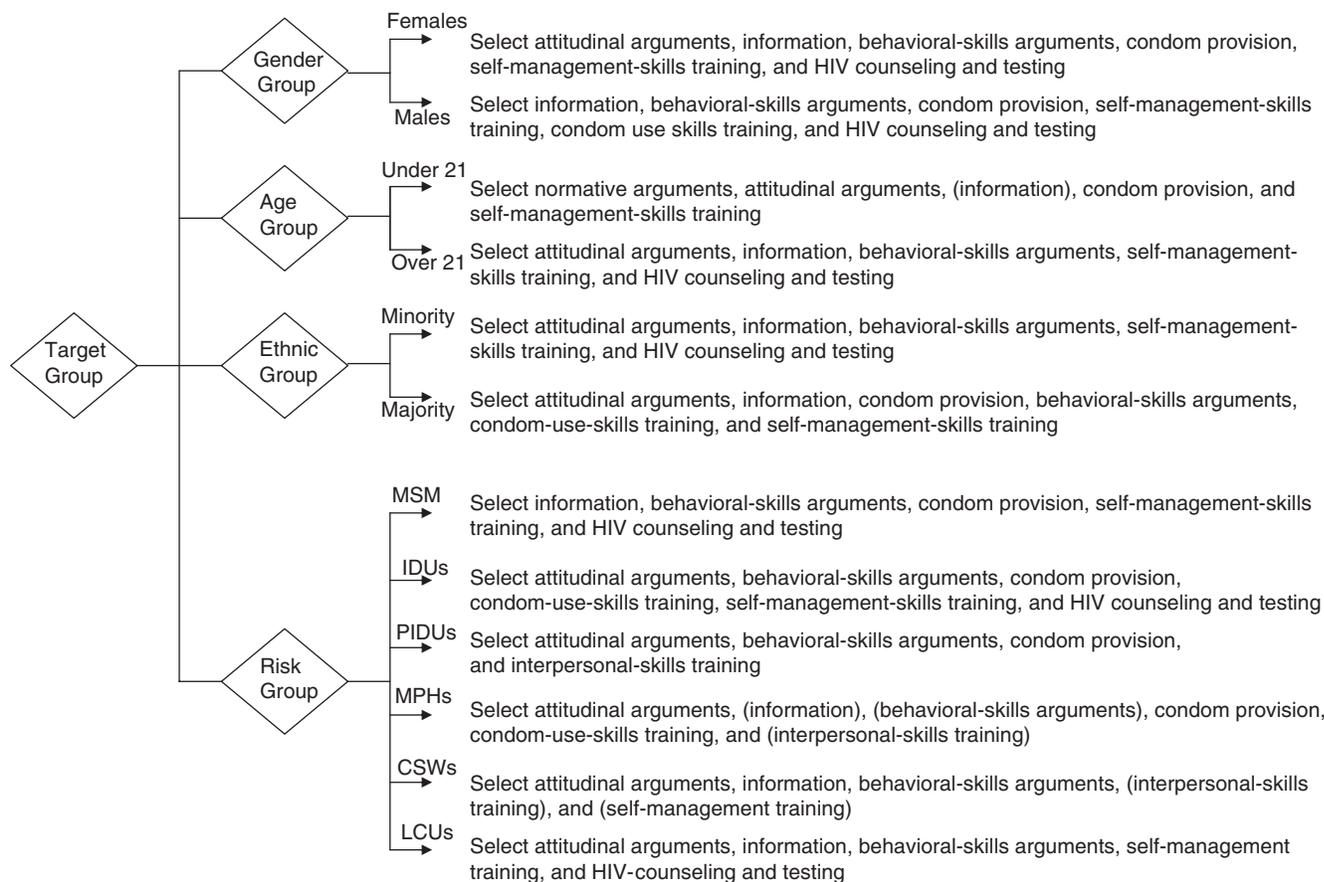
behavioral skills. In addition to teaching behavioral skills, interventions of this type presumably increase perceptions of control (i.e., perceived behavioral control and self-efficacy), which are a critical element in the theory of planned behavior and social-cognitive theory.

As indicated before, the health-belief model and the protection-motivation theory both suggest that inducing perceptions of threat concerning HIV should increase condom use, particularly when interventions also increase response efficacy (Rogers, 1975). Therefore, communications designed on this basis typically use highly emotional scare tactics (i.e., fear-inducing arguments) in the hope that negative affect will stimulate condom use. For example, a campaign evaluated by Rigby, Brown, Anagnostou, Ross, and Rosser (1989) presented an image of the Grim Reaper as the source of an HIV-prevention message. Other less extreme communications based on the same assumptions describe the consequences of the disease, provide data on infection rates, or conduct a detailed interview about HIV risk behaviors to sensitize participants to risk.

#### Viability of the Theories of Behavior Change

The universe of interventions and control groups we meta-analyzed was used to test the effects of components of different theories (e.g., normative arguments or threat-inducing contents) on actual changes in condom use (as well as the mediators of this change). The findings of these analyses revealed that, overall, active interventions—that is, ones that required activities by the recipients (either behavioral-skills training or undergoing HIV counseling and testing)—were more effective than passive interventions that only presented material without the recipients engaging in specific activities. Within passive interventions, the most effective strategies were attitudinal arguments discussing the beneficial outcomes of using condoms and behavioral-skills-inducing arguments explaining how to best implement condom use, along with the distribution of condoms to participants. Within active interventions, the most effective strategies were presenting information, presenting behavioral-skills arguments, and training people in the management of their mood and situations in which drugs and alcohol are involved. Further, fear-inducing arguments were not effective when introduced in either passive or active interventions, either immediately or later in time, for any population or in combination with any other strategy (e.g., behavioral skills training). Thus, these findings provided support for the theories of reasoned action and planned behavior, for self-efficacy models, and for the information–motivation–behavioral-skills model, but did not support the main premise of the health-belief model and the protection-motivation theory.

Another important conclusion of our review is that the theories that were viable were viable across many gender, age, ethnic, and risk-behavior groups. For example, strategies targeting attitudes, perceived control, or behavioral skills were effective



**Fig. 2.** The most effective active interventions for specific groups. (Interventions in parentheses were partially verified but appear to be reasonable assumptions given the data; MSM = men who have sex with men, IDUs = intravenous-drug users, PIDUs = partners of intravenous drug users, MPHs = multiple-partner heterosexuals, CSWs = commercial sex workers, and LCUs = low condom users.) Adapted from Albarraçin, Gillette, et al. (in press).

in all cases (see Fig. 2). To the extent that the theories of reasoned action and planned behavior, self-efficacy models, and the information–motivation–behavioral-skills model propose that information, motivation, and/or behavioral skills must be present to induce behavioral change, these models received support for all populations.

At the same time, disenfranchised groups differed from more powerful groups (see Fig. 2). For instance, normative arguments were reportedly effective only for teenage populations. Likewise, training in interpersonal skills (e.g., proposing and negotiating condom use) was effective only for female partners of injection-drug users. In general, the less a group had access to social resources, the more that group benefited from provision of condoms and behavioral-skills training.

### Viability of Different Sources in Charge of Delivering HIV-Prevention Interventions

Another recent advance in knowledge was to identify who can best present or facilitate HIV-prevention programs (see Durantini, Albarraçin, Earl, & Mitchell, in press). Specifically, this

work investigated the links of source characteristics and similarity between the source and the recipient to actual behavioral changes after the interventions. With regard to who should be the source of the intervention, this review compared two hypotheses. On the one hand, some researchers have argued that persuasive communications (and therefore behavioral interventions) should use experts as sources (Hovland, Janis, & Kelley, 1953). On the other hand, there is extensive work and policy favoring the use of laypersons selected from the target community (Freire, 1972; Putnam, 1911; in the domain of HIV prevention, see Kelly et al., 1997). Although there are some deeply-held beliefs about these issues, there have been no direct comparisons. That is, researchers have compared peer- or expert-led interventions with control groups, but no one has directly compared peer-led interventions with expert-led interventions.

By dividing interventions into those presented by experts (e.g., public health educators, physicians, nurses, research staff) and those presented by lay community members (e.g., community leaders, artists, religious ministers), our meta-analysis (Durantini et al., in press) permitted determining what type of source is more effective and for whom. Findings indicated that

expert sources were more effective than lay-community members for most populations. The exceptions were men and teens (for a meta-analysis of HIV prevention among teens, see Johnson, Carey, Marsh, Levin, & Scott-Sheldon, 2003), for whom both types of sources were equally effective.

In addition, the results from this review revealed that even when experts were generally effective, they were most effective for populations that typically have restricted power in society. That is, the beneficial impact of having an expert source was much stronger for ethnic minorities and women than it was for ethnic majorities and men. Importantly, however, women and ethnic minorities were also sensitive to sources who shared whatever characteristic makes that audience different from the mainstream. For one thing, women changed more in response to other women, and ethnic minorities changed more in response to other ethnic minorities. Also, most populations whose behaviors place them at risk for HIV (injection drug users, multiple-partner heterosexuals, low condom users) benefited from having both an expert and somebody from their group as intervention facilitators. Presumably, lacking power made individuals more sensitive to intervention sources as potential points of access to resources.

### FUTURE DIRECTIONS

Since the HIV epidemic first struck, there has been a remarkable increase in our understanding about how to change behaviors that prevent infection with HIV. However, this understanding raises important, currently unanswered issues. First, although some skills interventions are effective, how to exactly match them to the gender and needs of particular audiences is not clear. Social psychologists are ideally positioned to conceptualize the problem and contribute to the design of a more varied, population-tailored arsenal. Second, with the exception of teenage audiences, presenting normative arguments often works less well than not doing so. It is surprising that years of work on social influence have still not generated any model about how to effectively create norms in the real world. Third, it appears that the source of the intervention is the most direct and beneficial normative influence on behavior change. Our meta-analytic results are particularly provocative because community psychologists and other scholars have touted peer education as the gold standard. However, the results described here say nothing about the processes at stake. Future research must investigate the effects of actual and apparent expertise and community membership and the verbal and nonverbal interactions that transpire when behavioral interventions are implemented.

### Recommended Reading

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**Acknowledgments**—The research was supported by Grant K01-MH01861 from the National Institute of Mental Health and facilitated by grants from the National Institutes of Health (R03-MH58073 and R01-NR08325). We thank Jeffrey Gillette, Laura R. Glasman, Ringo Ho, Cynthia Klein, Penny S. McNatt, Amy L. Mitchell, G. Tarcan Kumkale, and Ece Kumkale for their invaluable contributions and assistance. We thank Joel B. Cohen for comments on an earlier version of this manuscript.

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