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Educating Young Adults about HIV and AIDS

The Impact of Direct Response Television Public Service Advertising

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ABSTRACT

Limited resources combined with a desire to reach as many people as possible often make direct response public service announcements an important tool in educational campaigns. To understand the impact of direct-response TV PSAs, and find ways to increase their effectiveness, this study examined 1) the effects of a highly targeted HIV prevention message on young adults' knowledge, perceptions, and intentions; and 2) whether altering two PSA elements, the telephone number used and the length of time it was displayed, would affect viewers' recall and intention responses. The results indicated exposure to the PSA had no discernible effects on HIV-related knowledge, but did affect perceptions. Compared with an unexposed control group, students exposed to the PSA a) estimated seeing more HIV- and AIDS-related PSAs, b) rated the usefulness of TV PSAs lower, c) were more likely to rate their chances of contracting HIV as low or none (83 percent vs. 66 percent, $p < .05$), and d) expressed less desire to obtain more information. The use of an all-mnemonic phone "number" resulted in a threefold increase in recall of the CDC National AIDS Hotline phone number, but did not affect intentions to call. Overall, the results reaffirm the importance of deploying strategies that go beyond reliance on either a single PSA or TV PSAs alone to affect knowledge, perceptions, or intentions.

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In the absence of a medical solution to the HIV epidemic, education has become the primary tool for preventing the spread of the virus (3,23). To maximize the number of people reached by educational endeavors, many of the efforts to date have involved information campaigns that rely heavily on the mass media and television public service announcements (PSAs) (i.e., noncommercial, unpaid messages placed at the media's discretion). At the federal government level, the U.S. Centers for Disease Control (CDC) (the principal public health agency responsible for AIDS education and prevention) launched its National AIDS Information and Education campaign in 1987 (11,23). Since 1987, the CDC's ongoing "America Responds to AIDS" campaign (ARTA) has gone through five distinct phases and employed both print and broadcast media (20). While direct mail, print advertising, and the CDC National AIDS Hotline (NAH) often form the primary components of the campaign, all of the phases have used television PSAs to extend the reach and visibility of the campaign.

TV PSAs are also used to motivate people to take action, an objective that is attained by adding direct response devices to messages that promote the Hotline and its services. Thus, an integral element of both the information campaign and the PSAs is the Hotline, one of the world's largest health-related telephone information and referral service. The Hotline, whose services include responding to the public's questions about HIV and AIDS and providing referrals to state and local services, has received an average of 1.4 million phone calls per year since October 1987 (i.e., 3,300 calls per day) (39). The Hotline is directly tied into the information campaign through the "ARTA" PSAs, most of which conclude with an endtag that displays the NAH phone number (1-800-342-AIDS). This direct response component increases the effectiveness of the information campaign by providing interested viewers access to more information as well as information that addresses their specific needs.

While the NAH is designed to answer inquiries from all segments of the population, the success of many public service advertising campaigns is reduced by their generalized orientation (10,33). Messages to the population at large often have limited, or no, effects on different segments within that population (8). Diffuse, general messages appear to have little effect on most population segments, while highly targeted messages have had better success in terms of positively influencing knowledge, beliefs, and behavioral intentions (33,40). Further, the public service advertising literature suggests the impact of this tailoring is greatly enhanced when it is integrated with Bandura's (1977) social learning theory (9,33). This theory holds that new actions are learned by the imitation of specific acts of similar or widely regarded others, and are solidified through interpersonal support and reinforcement, including that offered via telephone hotline and counseling services. Combined, the two perspectives suggest that the messages tailored to the specific psychological and cultural characteristics of a highly targeted audience are likely to have the greatest influence on viewers' knowledge, beliefs, and behavior (31).

Given the important role direct response television PSAs play in the federal government's AIDS prevention efforts and the growing need to direct HIV prevention messages to young adults, the purpose of the research reported here was twofold. First, the study examined the effectiveness of direct response TV public service advertising as a source of health education information. This was done by examining the effects of a highly targeted AIDS-related direct response TV PSA on what young adults know about HIV and its transmission (i.e., HIV-related knowledge) and on their perceptions regarding HIV prevalence and likelihood of contracting the virus. The PSA used in the study incorporated the message strategy assumptions outlined above by using modeling to deliver both facts about HIV and the National AIDS Hotline telephone number to a specific audience—college students. While the ARTA campaign, like most social marketing campaigns, is not designed to rely on a single advertising medium or creative execution, an examination of the effects of a single TV PSA is warranted given the amount of time and talent organizations typically devote to planning, creating, and producing TV PSAs. Second, since direct response public service advertising typically promotes sources of additional information (14), we assessed whether changing two of the PSA's executional elements would affect viewers' recall and calling intentions. The elements manipulated were two variables direct response TV advertisers consistently have found positively cor-

related with information seeking behavior: the phone number employed and the length of time the number is shown (32).

COLLEGE STUDENTS AND HIV

HIV infection and AIDS are growing health problems among young adults in the U.S. As of December 31, 1991, a total of 206,392 AIDS cases had been reported to the CDC. The CDC estimates that 1 million people are currently infected with HIV in this country, with at least 40,000 new infections occurring yearly among adults and adolescents (29,34). In 1988, HIV infection/AIDS was the third leading cause of death among U.S. men 25 to 44 years old and the eighth leading cause of death among U.S. women 25 to 44 years old. By 1989, HIV infection/AIDS had become the second leading cause of death among 25- to 44-year-old men, and among the sixth leading cause of death among same-age women. In light of the mean period of ten years between initial infection and the onset of AIDS, many 25- 44-year-old men likely became infected as young adults or teenagers. Although there has not been a dramatic number of cases of HIV infection or AIDS reported among college and university students, students place themselves at risk through sexual practices and behaviors (1,17,38). A survey of California college students found less than 20 percent of the currently sexually active men and women reported using condoms 75 percent of the time or more (4). While overall HIV risk is difficult to gauge, a recent national survey indicated 2 of every 1,000 college students may be infected with HIV (17).

Despite the possibility of contracting HIV, studies suggest college students have widely varying, and often contradictory, HIV-related knowledge and attitudes (1,38). With respect to attitudes, research has found a marked lack of concern about AIDS transmission (27), as well as negative relationships between HIV-related knowledge and sexual attitudes (e.g., a false sense of security in heterosexual persons and negative beliefs about individuals perceived as being at high risk) (13). Studies have also found college students' HIV-related knowledge is often negatively related to personal concern, HIV and AIDS-related attitudes, and positive behavioral changes (3). Fortunately, there is evidence that additional HIV educational materials can increase knowledge, even among college students who have relatively high pre-exposure HIV or AIDS knowledge levels (38).

DIRECT RESPONSE TV AND HIV/AIDS

Content

In promoting the toll-free NAH phone number and services, Bush and Boller's (1991) rhetorical analysis of the TV PSAs used in the CDC's first three ARTA campaigns found the messages changed significantly from year to year. According to their analysis, the PSAs used in the first year of the ARTA television campaign (i.e., 1987) relied on documentary/lecture and "slice-of-death" appeals to provide the general public with pertinent AIDS facts. Further, their analysis indicated the primary theme was "AIDS is fatal, yet preventable if the facts are known." The 1988 campaign used members of high-risk groups to convey behavior-oriented messages, and emphasized the theme "understand the behaviors that put you at risk." Finally, Bush and Boller felt that the 1989 focused on the prevention of future cases of HIV by targeting parents and youth. Unlike previous campaigns, these direct response PSAs used drama and story formats to develop the theme "AIDS is a problem, we have a solution" and to persuade viewers to call the NAH for a free brochure.

Similar to the ARTA campaign, a content analysis of 127 AIDS-related TV PSAs placed primarily by regional organizations, state agencies, or social service agencies found many direct response announcements, but few highly targeted advertising messages (16). The data indicated 71 percent of the HIV and AIDS PSAs aired between April and July, 1988, were informational messages directed toward general audiences, rather than targeted toward specific groups or risk behaviors. Just over half of the PSAs utilized straightforward factual message appeals, while 26 percent used fear appeals. About two-thirds of the PSAs included phone numbers that viewers could call to receive additional information. While most spots advocated some type of preventive behavior, the specific behavior advocated in 50 percent of the PSAs was the viewer calling the number

to obtain more information (versus adopting a specific preventive behavior, such as using a condom or abstaining from sex).

Effects of Television PSAs on Viewers

While no published studies have specifically examined direct response TV public service advertising, a number of published studies have examined the effects of TV PSAs or their executional components on viewers (12,15,21,24,25,26,35,36). Two important conclusions can be drawn from these studies. First, the evidence suggests exposure to TV PSAs increases topic-related knowledge (12,19,37), but the impact of PSAs or their executional elements on targeted viewers' attitudinal and behavioral intention responses is equivocal. Two studies (19,25) found TV PSAs produced more favorable attitudes toward the subject matter, while others have found negative effects, including unfavorable attitudes (35) or no changes in behavioral responses (36). In some cases, there has been a "boomerang" effect, with attitudes toward drug use becoming less negative after PSA exposure (12). Similarly, the most extensive published study to date, a year-long evaluation of a 30-second American Cancer Society spot, found TV PSAs had a significant impact on viewers' knowledge but less influence on beliefs and intentions. The data indicated the national PSA campaign increased awareness of colon cancer from 11 percent to 40 percent, but only achieved a 2 percent to 5 percent change on belief and intention measures (2).

Second, few published studies have examined the effects of AIDS-related PSAs on viewers. Flora and Maibach's (1990) experimental manipulation of PSA message appeals found emotional messages led to greater recall, especially among low-involvement college students. Emotional messages were also more effective in stimulating students' desire to learn more about HIV and AIDS. A second message appeal study involving college students found differential effects with fear appeals (24). Fear appeals not only produced greater tension and energy in viewers, but also created positive reactions toward AIDS prevention messages. Finally, a panel study of injecting drug users found TV PSAs were among the most frequently mentioned sources of HIV and AIDS information (28).

HYPOTHESES

Despite the lack of research regarding what impact, if any, exposure to an AIDS-related TV PSAs has on viewers, the findings from previous studies suggest public service advertising can increase young adults' HIV-related knowledge (i.e., what they know about the AIDS virus) as well as influence their perceptions and beliefs regarding HIV prevalence and risk. Further, this impact appears to be facilitated by three factors: a well-defined or highly targeted audience (8,10,33); exposure to the advertising (8,14); and the congruence between the factual information presented and viewers' pre-exposure topic knowledge (9,12,19,37). In other words, a direct response TV PSA's impact on knowledge and perceptions will be maximized if a) viewers are exposed to the PSA; b) a highly targeted message is used (and effects are measured using members of the appropriate audience); and c) the topic-related information contained in the PSA is not already known. Thus, the first hypotheses were:

H1. TV viewers exposed to an HIV-related informational PSA that is targeted directly toward them will exhibit greater HIV-related knowledge (i.e., know more facts about HIV) than people who are not exposed to the PSA.

H2. TV viewers exposed to an HIV-related informational PSA that is targeted directly toward them will provide more accurate estimates regarding a) their peer group's likelihood of contracting the virus and b) the likely prevalence of HIV and AIDS in their personal social environment (e.g., a college campus) than people who are not exposed to the PSA.

H3. TV viewers exposed to an HIV-related informational PSA that is targeted directly toward them will be more likely to indicate an intention to obtain more information from the National AIDS Hotline than people who are not exposed to the PSA.

The second goal of the study was to determine if altering the presentation of the National AIDS Hotline telephone number would improve recall of the number and/or the PSA sponsor and affect viewers' intention to call for more information. At

the time of the study, most CDC "America Responds to AIDS" PSAs displayed the NAH number (1–800–342–AIDS) only during the last 3 seconds of the spot. Studies involving direct marketing, however, have found executional elements and creative variations can affect viewers reactions to direct response advertising (6,30). Further, the evidence suggests the telephone number used in a direct response TV ad and the length of time it is presented affects viewer recall (32). Specifically, all-mnemonic phone "numbers" and longer exposure times increase recall of the toll-free phone numbers used in PSAs. This led to a second set of hypotheses:

H4. Increasing the length of time the CDC NAH telephone number appears on the TV screen will increase: a) viewer recall of the number and b) viewer intentions to call the number.

H5. Recall of the Hotline number will increase if an all mnemonic "number" is employed (1–800–HIV–AIDS) rather than a partial mnemonic "number" (1–800–342–AIDS).

METHOD

A 2 × 3 factorial experimental design, with a control group, was used to test the hypotheses. Phone number and length of time the number was shown were between-group factors. In the case of the former, the current National AIDS Hotline number, 1–800–342–AIDS, was tested against an all-mnemonic possibility, 1–800–HIV–AIDS. In the case of the latter, the three levels of on-screen time were: the last 3 seconds (i.e., the usual display length and position); the last 6 seconds (i.e., double the usual length); and 30 seconds (i.e., the entire time). Verbal repetition of the number was kept constant at two mentions during the last 5 seconds in all the PSAs.

Stimulus

The direct response TV PSA selected, "Campus," was professionally created and produced and met the criteria previous research suggested maximized effectiveness. The spot was highly targeted in that it modeled a female college student who was discounting her susceptibility to contracting HIV. Structurally, the PSA used a straightforward factual message appeal recommending that the viewer call the toll-free NAH number for more information. Executionally, the PSA interspersed scenes of the woman at various campus locations with 3-second slides of HIV facts (e.g., "HIV is the virus that causes AIDS"). The PSA ended with the CDC's "America Responds to AIDS" tagline and the telephone number for the hotline. As created, the PSA had three communication objectives: 1) to teach college students what HIV was; 2) to convince students HIV was a real and potentially immediate health concern on college campuses; and 3) to increase students' intention to call the Hotline for more information.

Subjects

The subjects were 197 18- to 24-year-old students enrolled in introductory mass communication classes at a large southeastern university; 72 percent were female. Students received two extra-credit points for participating. In terms of relationship status, 46 percent indicated they had one regular dating partner, 9 percent had several dating partners, 31 percent had occasional dates, and 2 percent were married.

Dependent Measures

Memory was measured by using free-recall questions that asked subjects to write down 1) the telephone number given at the end of the PSA and 2) the name of the sponsoring organization. HIV knowledge was measured by having subjects assess the truth–falsity of eight statements concerning the virus and its transmission (using a 5-point scale anchored by "Definitely True" and "Definitely False"). Six of the statements directly reflected HIV and AIDS information provided by the "Campus" PSA. HIV and AIDS-related perceptions were measured by having subjects estimate 1) the number of AIDS-related TV PSAs they had seen in the past month; 2) the number of HIV-infected and actual students with AIDS on the university campus (after being provided with a relevant reference number [i.e., total number of students on the campus]); 3) their personal likelihood of having and acquiring the AIDS virus (each with a 4-point scale anchored by "None" and "High"); and 4) the likelihood someone they know will eventually get AIDS (using a 1 to 7 scale, where 1 was "Very Unlikely" and 7 meant "Very Likely"). Intention to call the NAH was assessed with a similar 7-point likelihood scale.

Procedure

Upon arrival at the test site (i.e., a conference viewing room), subjects completed a consent form and were randomly assigned to one of the seven experimental conditions. Randomization was used, in part, to deal with the slight possibility some of the students may have previously seen the PSA. Although no airing data were available, the nature of the PSA and the fact it was one of six PSAs used in the fifth ARTA campaign probably limited its airplay and reduced the likelihood students in this study had seen it. There were 5 to 13 people per session, and the data were collected in 18 sessions over a 2-day period. The cell sizes ranged from 24 to 31 for the treatment groups; with 33 participants in the control group. None of the groups significantly varied from the female–male ratio previously noted.

Prior to the viewing session, subjects were told they would be watching about 10 minutes of "typical" television programming. The actual programming consisted of a 4-minute "Good Morning America" segment that involved a panel discussion of high school graduation requirements, followed by two 30-second TV commercials, the 30-second AIDS PSA, and a 10-second closing segment from "Good Morning America." The first TV ad was for a chain drug store's photo developing service, and the second was for a regional fast food chain. Since the AIDS PSA was the focus of the study, the programming order was kept constant.

Once the program tape ended, subjects were given a questionnaire that measured, in order 1) recall of NAH telephone number; 2) recall of the PSA sponsor; 3) recall of the TV offers; 4) recall of the TV advertisers; 5) the "truth–falsity" of the eight knowledge items; 6) usefulness of potential HIV information sources; and 7) HIV- and AIDS-related perceptions and estimates. Sections 3 and 4 were included to disguise the primary focus of the study. Similarly, foil items involving the two TV ads were included in the knowledge assessment section. Subjects assigned to the control group completed the same materials, but were not exposed to any programming or commercials.

RESULTS

ANOVA was the primary method of data analysis. The first set of analyses examined knowledge and perception differences between the unexposed control group and the combined treatment groups. The second set of analyses assessed recall and intention differences across the experimental conditions.

As Table 1 indicates, there was no evidence that exposure to the "Campus" PSA increased college students' HIV- and AIDS-related knowledge. Rather, student responses were the same regardless of whether or not they had been exposed to the "Campus," even for the six items that pertained to statements directly made in the PSA. The overall pattern of results did suggest, however, students were not experts regarding HIV. For example, most students did not know a person could have the virus (i.e., HIV) yet not have the disease (i.e., AIDS). There was also considerable uncertainty about whether knowing your partner before having sex was a good way to prevent getting HIV, with about half of all students responding "Don't Know."

The results indicated, however, that exposure to the PSA affected students' perceptions. As Table 2

TABLE 1
Impact of "Campus" PSA on HIV- and AIDS-Related Knowledge

Knowledge Statement	Treatment Groups	Control Group
HIV is the virus that causes AIDS*	4.8	4.6
AIDS is an infectious disease caused by a virus.*	4.6	4.3
Looking at a person is enough to tell if they have the AIDS virus.*	4.0	4.0
People who have HIV never thought they'd get it either.*	3.7	3.9
Knowing your partner before having sex is a good way to prevent getting HIV.*	3.1	3.4
A person can be infected with HIV and not have AIDS.*	2.3	2.4
Any person with the AIDS virus can pass it on to someone else through sexual intercourse.	4.7	4.7
An individual can have HIV and not test positive for up to ten years	4.4	4.2
	(*n* = 164)	(*n* = 33)

(1 = "Definitely False" 5 = "Definitely True")

* Statement made in the PSA.

TABLE 2
Impact of "Campus" PSA on Beliefs and Perceptions

Event/Occurence	All Treatment Groups	Unexposed Control Group
Number of HIV-infected students on campus (assuming 28,000 total students)	$\bar{x}$ = 1834	$\bar{x}$ = 1310
Number of students with AIDS on campus (assuming 28,000 total students)	$\bar{x}$ = 996	$\bar{x}$ = 783
Chances of having the AIDS virus (% responding "low" or none)	90%	85%
Chances of getting the AIDS virus (% responding "low" or none)	83%	66%*
Likelihood someone you know will get the AIDS virus (7 = "very likely")	4.7	4.8
Number of AIDS PSAs seen in past month (% responding):		
Zero	2%	12%*
1–3	18%	42%*
4–6	19%	15%
7–14	26%	24%
15–30	12%	3%*
31 or more	16%	3%*
Usefulness of CDC as a source of HIV and AIDS information (7 = "very useful")	5.9	6.2
Usefulness of PSAs as a source of HIV and AIDS information (7 = "very useful")	5.6	6.2*
Likelihood you would call the phone number in PSA to obtain more information on AIDS (7 = "very likely")	1.9	3.0*
"I am tired of seeing and hearing things about HIV." (5 = "definitely true")	2.3	1.5*
"I am tired of seeing and hearing things about AIDS." (5 = "definitely true")	3.2 (n = 164)	3.4 (n = 33)

* $p < .05$

shows, there were significant differences between the exposed treatment groups and the unexposed control group on a number of measures. Contrary to Hypothesis 2, there were no statistically significant differences between the two groups' estimates of the likely number of students with HIV or AIDS on campus. While the results showed students exposed to the PSA tended to have higher campus HIV and AIDS incidence estimates, the difference only approached statistical significance (p = .08). Both groups' estimate of HIV incidence on the campus far exceeded a) those that would result from using the national projection of 2 cases of HIV infection per 1,000 college students (i.e., 56 students) and b) the University Health service estimate of 10 to 30 HIV-positive students. Similarly, students' perception of the number of AIDS cases on campus far exceeded both the number expected based on a realistic HIV incidence rate (i.e., 0 to 15 students) as well as the University Health Service estimate of 0 to 3. In addition, there was a significant gender difference among students exposed to the PSA. Females estimated there were 1,980 HIV-positive students and 1,147 students with AIDS on campus, whereas males estimated 1,097 and 440, respectively (p's < .03).

Second, despite the tremendous inaccuracy in their incidence estimates, most students believed there was little or no possibility they personally would contract the virus, and nearly all students indicated there was little possibility they personally were HIV-positive. Somewhat surprisingly, however, students exposed to the "Campus" PSA were more likely to rate their chances of contracting HIV as "low" or "none" (36 percent and 47 percent, respectively). By comparison, 66 percent of the control group subjects responded "low" or "none," with 25 percent rating their chances as "medium" (vs. 13 percent among PSA-exposed students, $p < .01$).

Viewing the PSA also negatively affected students' perceptions of the prevalence and usefulness of TV public service announcements. As Table 2 shows, more than half the students in the control group estimated they had seen three or fewer AIDS PSAs in the past month. Conversely, more than half the students in the treatment group said they had seen 7 or more AIDS PSAs in the past month, with 28 percent believing they had seen 15 or more (or about one every two days). Further, students in the control group rated PSAs more useful as a source of HIV information. Overall, however, all students rated TV PSAs more useful than other widely used HIV and AIDS information sources, including family ($\bar{x}$ = 4.1), friends ($\bar{x}$ = 3.3), TV talk shows ($\bar{x}$

= 4.6), and campus newspapers ($\bar{x}$ = 3.0) [p's < .05]. In the only significant gender difference, females rated TV PSAs more highly than males (6.4 vs. 5.4, p = .05).

With respect to Hypothesis 3, the results showed a significant difference between students exposed to the PSA and students in the control group, but not in the expected direction. First, students in the control group had a higher average score with respect to intention to call the National AIDS Hotline. Second, those same students were less likely to indicate they were tired of seeing and hearing things about HIV; which, in this case, was the specific focus of the PSA. Conversely, there was no difference between the exposed group and unexposed group with respect to being tired of seeing and hearing things about AIDS, which was referred to only twice in the PSA.

As Table 3 shows, the telephone number used and the length of time it was displayed affected subjects' recall. Neither, however, affected viewers' self-reported intention to call the CDC NAH phone number. In the case of phone number, the use of an all-mnemonic "number" more than tripled the number of students who could remember it. Time, by itself, increased recall only when there was a considerable disparity; with a continuous phone number presence generating greater recall than a 3-second display. Also significant was the impact of the all-mnemonic "number" on recall of the ARTA logo, although this effect was moderated by time. Although the ARTA logo appeared for 3 seconds in all the PSAs, the all-mnemonic phone "number" increased recall of the logo when the number was displayed for 3 or 6 seconds, but not when the number was displayed throughout. Finally, time on-screen was related also to sponsor recall. Here, the results showed a 6-second endtag doubled the number of students who were able to recall that the CDC sponsored the PSA, whereas both extremely short and long exposures to the phone number reduced sponsor recall.

DISCUSSION

Although generalizing beyond the study is restricted by the research design and nature of the sample, the results of this study replicate and extend previous research involving public service messages and young adults. The findings have also have important strategic implications for the design of direct response TV PSAs, including those dealing with health issues such as HIV and AIDS.

Taken as whole, the results obtained here indicate there are still relatively high levels of confusion, ignorance, and misunderstanding about HIV and AIDS among what should be a relatively well-informed

TABLE 3
Impact of Altering Telephone Number on Recall and Intentions

Executional Component	1-800-342-AIDS			1-800-HIV-AIDS			Control Group
	3 Sec.	6 Sec.	30 Sec.	3 Sec.	6 Sec.	30 Sec.	
Phone number recall (% Correct)	16.7%	20.7%	25%*	77.4%*	70.4%*	79.3%*	3.0%**
Sponsor recall (% Correct)	4.2%	13.8%*	0%	6.5%	11.1%*	6.9%	0%**
ARTA logo recall (% Correct)	4.2	13.8%	12.5%	41.9%*	33.3%*	10.3%	0%**
Likelihood of calling hotline (7 = "very likely")	2.0	1.7	2.2	1.6	2.0	2.1	3.0**
N =	(24)	(29)	(24)	(31)	(27)	(29)	(33)

* p < .05 within treatment conditions.
** p < .05 treatments vs. control.

population. Unfortunately, students' knowledge, perception, and intention responses suggest the "Campus" PSA generally failed to accomplish its three communication objectives. All students, regardless of PSA exposure, exhibited the same knowledge and awareness levels, while students in the control group had more favorable perceptions with respect to PSAs and the CDC NAH. Based on the effects of the single PSA and single campaign tool (i.e., TV PSAs) used in the study, it appears that a single, relatively benign intervention is unlikely to produce observable, large-scale changes in the viewing population.

The suggestion that the PSA was unable to accomplish its objectives, however, must be considered in a broader context. The results, for instance, reaffirm the importance in national education campaigns of deploying strategies that go beyond reliance on either a single PSA or TV PSAs alone to affect people's knowledge, perceptions, or intentions. As a number of researchers have noted, multifaceted public service campaigns have a much greater chance of success, particularly when interpersonal and community support systems are engaged (9,33). In the case of HIV prevention, the HIV and AIDS knowledge levels found among students in the control group were likely the result of multiple exposures to HIV information and prevention messages from multiple sources. Thus, if effects are measured over a longer period of time, research is likely to show direct response TV messages are an effective way to accomplish dual objectives, such as increasing the public's overall knowledge on a topic, while promoting the use of additional services.

In the case of Hypotheses 2 and 3, the findings replicated the "boomerang" effect often found in studies where HIV and AIDS prevention messages were disseminated via print media (13) or films (3). In essence, this phenomena refers to the wide gap that exists between HIV-related knowledge and behavior, particularly among individuals who view their personal risk of HIV infection as low or nonexistent (13). Baggaley et al. (1990), for example, found personal risk messages, particularly those involving HIV prevention and AIDS, often induce viewer resistance, while Wober has found exposure to HIV educational materials reduced levels of perceived personal risk (41,42). Both effects resulted here. The estimated HIV and AIDS incidence rates, particularly those of females, suggests the PSA persuaded students that HIV is a real and immediate threat on college campuses. Unfortunately, students exposed to "Campus" indicated HIV and AIDS TV PSAs were more prevalent and less useful than unexposed students, and almost all students who saw the PSA estimated they had little or no personal risk of contracting HIV. This, in turn, may have reduced their need or desire to call the Hotline for more information. Overall these findings, viewed under Bandura's (1977) social learning perspective, suggest the PSA may have modeled the appropriate behavior (i.e., a student discounting the likelihood of contracting HIV), but then failed to refute it.

Strategically, the results have important implications for organizations that rely on PSAs. First, the study's inability to find knowledge effects does not mean public service advertisements are ineffective information dissemination vehicles. Rather, when combined with the results of general population surveys on HIV and AIDS (e.g., 18), it suggests knowledge and awareness measures need to be sensitive to the presence of a ceiling effect. This effect is often found when most members of a target group are well-versed regarding the information being disseminated and the messages essentially reinforce existing beliefs. If target audience members' pre-exposure knowledge includes awareness of the information contained in the PSA, exposure to the message will likely result in little or no apparent knowledge gain. If reinforcement is not the primary objective of an information campaign, ceiling effects are an indication that increasing viewers' knowledge of a topic will require messages that go beyond rudimentary facts, such as "HIV is the virus that causes AIDS," and focus on higher-level issues, such as when and why a person should be tested for presence of the virus.

Second, the possibility of a "boomerang" effect suggests that if TV PSAs are to positively affect viewer knowledge, perceptions, or intentions, they must effectively deal with the denial responses that operate to alleviate fear. The PSA used here may have boomeranged by simultaneously persuading viewers the virus was fairly prevalent and that there was relatively little they could do to protect themselves (22). Thus, it may be, as some have suggested, the most effective public service messages

not only provide viewers with information, but address self-efficacy by demonstrating appropriate behavioral responses and ways to enact behavioral changes (e.g., showing a person calling the Hotline) (40).

Finally, the results demonstrate the relative importance of the phone number used in a PSA and the length of time the number is displayed. Agencies and organizations that use TV PSAs to promote informational or referral services need to pay attention to both. If the primary objectives of a PSA campaign include teaching viewers the phone number to call for more information, the sponsoring agency has at least two options—use a structurally (i.e., mnemonically) easy number and/or increase the length of time the phone number is displayed. A mnemonically easy "number," however, will require less on-screen display time and will likely be retained by more people. Further, such "numbers" appear to facilitate learning of potentially important ancillary information such as the PSA sponsor or campaign theme. However, an important issue not addressed by the current research is the relationship between the phone number used and viewers' perceptions of either the sponsor and the services offered. All-mnemonic phone "numbers," such as "1-800-HIV-AIDS" or "1-800-COCAINE" may have powerful positioning effects. In other words, such "numbers" may create the perception the service being advertised is only offered for people already in the affected population, such as those who are HIV positive or have AIDS, and not everyone who desires more information regarding the topic. That positioning power is useful if it matches the intentions of the sponsoring organization, but dysfunctional if the goal is to serve a broader constituency. ■

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