



Evaluation of anti-drug public service announcements (PSAs): Comparison of computer-assisted and paper and pencil methodologies in a sample of adolescents from the Boys and Girls Clubs of Metropolitan Philadelphia

M. Fishbein , I. von Haefen , K. Hall-Jamieson , B. Johnson & R. Kirkland Ahern

To cite this article: M. Fishbein , I. von Haefen , K. Hall-Jamieson , B. Johnson & R. Kirkland Ahern (2000) Evaluation of anti-drug public service announcements (PSAs): Comparison of computer-assisted and paper and pencil methodologies in a sample of adolescents from the Boys and Girls Clubs of Metropolitan Philadelphia, *Psychology, Health & Medicine*, 5:3, 259-270, DOI: [10.1080/713690190](https://doi.org/10.1080/713690190)

To link to this article: <https://doi.org/10.1080/713690190>



Published online: 19 Aug 2010.



Submit your article to this journal [↗](#)



Article views: 24



View related articles [↗](#)



Evaluation of anti-drug public service announcements (PSAs): comparison of computer-assisted and paper and pencil methodologies in a sample of adolescents from the Boys and Girls Clubs of Metropolitan Philadelphia

M. FISHBEIN, I. VON HAEFTEN, K. HALL-JAMIESON, B. JOHNSON
& R. KIRKLAND AHERN

Annenberg Public Policy Center, University of Pennsylvania, USA

Abstract *Rapid changes in technology make it increasingly important to understand the impact of modes of presentation and the use of computers to obtain data. In order to begin to explore the effects of new technologies in the domain of anti-drug public service announcements (PSAs), 154 adolescents from the Boys and Girls Clubs of Metropolitan Philadelphia were randomly assigned to one of three series of six anti-drug PSAs or a series of six political PSAs (control). Half the subjects viewed and evaluated the PSAs on a laptop computer, while the other half viewed the PSAs on a TV monitor and evaluated them using a paper and pencil self-completion questionnaire. As expected, sets of anti-drug PSAs were judged to be more effective in helping people avoid drugs than the set of political PSAs. There were, however, important differences in effectiveness as a function of gender and ethnicity. In addition, in contrast to previous research, there were only minimal differences between the use of computer methodology and the more traditional TV and paper and pencil methodology.*

We live in a changing media environment. In the past, television and movies were the only ways to reach a mass audience with moving audio-visual stimuli. Today, the advent of video streaming and the prospect that the computer and television set will converge into a single medium raise the McLuhanesque question, 'Is the medium the message?' Is the same content perceived differently on a computer screen than on a television monitor? Reasons to hypothesize a difference include: the relative size of the monitors of the typical computer screen and typical television set, the increased proximity of the image on a laptop or desktop computer screen, and the interactive associations carried by the computer terminal but not by the standard television set. Until the advent of digitizing, there were of course differences in the quality of the pictures as well. But with the arrival of digital television and digital computer imaging, the difference no longer exists.

Address for correspondence: Professor Martin Fishbein, Annenberg Policy Center, 3620 Walnut Street, Philadelphia, PA 19104, USA. Fax: + 1 215898 5906. E-mail: M fishbein@ asc.upenn.edu

The generation now entering schools in the USA is the first US generation to be born into the computer age with on-line access presupposed in most classes. Increasingly, the Internet is becoming a repository of information on health with the development of such tools as HHS's Healthfinder (www.healthfinder.com). As political action committees, issue advocacy groups and candidates for office have already demonstrated, the Internet is a useful low-cost place to post advertising. Access to health-based public service announcements (PSAs) on the Internet is likely to follow. For these reasons, advocates should be interested in knowing what changes, if any, carrying PSA content on the computer in digital form has on the influence of the message.

Another reason for interest in the question is methodological. The Congress of the USA has recently appropriated over 150 million dollars for a mass media campaign to reduce the use of illicit drugs among adolescents (HR 4328; Public Law: 105-297). While the ultimate effectiveness of this campaign will be determined by changes in drug use among adolescents, it is equally important to understand the ways in which young adolescents respond to the different messages being communicated. One approach to this is to ask adolescents to evaluate the different PSAs (or ads) on a number of dimensions such as 'convincing/not convincing', 'honest/dishonest' and/or 'realistic/not realistic' (Blosser & Roberts, 1985; Hastak & Olson, 1989; Levine & Zimmerman, 1996; Struckman-Johnson *et al.* 1994; Walters *et al.*, 1999). There is however, some concern that rather than giving 'truthful' answers to these types of question, adolescents will give answers that they perceive as 'socially desirable' (Aquilino, 1994; Gribble *et al.*, 1999; Hochstim, 1967). This is of particular concern when those responding are doing so in a classroom under the watchful eye of a teacher.

Recent research has suggested that one can increase the 'truthfulness' of responding, particularly in sensitive or 'socially undesirable' areas, by using computer-assisted interviewing (Catania *et al.*, 1986; Des Jarlais *et al.*, 1999; Gribble *et al.*, 1999; Romer *et al.*, 1997; Turner *et al.*, 1998; Yates *et al.*, 1997). While it seems clear that, compared to face-to-face interviews, the use of computers increases privacy and eliminates the need to give socially undesirable answers to another person, it is not clear that these same advantages occur when computer-assisted interviewing is compared to self-completion questionnaires (Catania *et al.*, 1986; Gribble *et al.*, 1999; Johnson *et al.*, 1999; Mitchell 1990; Tourangeau & Smith, 1996; Turner *et al.*, 1998). Thus we wished to see if adolescents' evaluations of anti-drug PSAs, would differ as a function of the type of research methodology used. We also wanted to see whether young adolescents view anti-drug PSAs as 'effective' in helping them avoid drugs. In other words, in comparison to PSAs designed to increase political participation, are anti-drug PSAs perceived to be more helpful in preventing the adolescents and their friends from using drugs? In addition, given the growing recognition that messages must be targeted to specific audiences (CDC, 1999; Fishbein, 2000), we also wanted to examine the degree to which evaluations of anti-Drug PSAs varied as a function of ethnicity and gender.

The final reason for our interest in this research question is that use of laptop computers makes it possible to carry test messages to hard-to-reach populations. Because a computer can be programmed to present the pre- and post-test questions in audio as well as print form, use of the laptop should help overcome the literacy barrier that often plagues those who administer paper and pencil tests to students with minimal reading skills.

As we move toward media convergence and design studies whose target audience includes those in hard-to-reach places and those with minimal literacy, it becomes important to know whether subjects respond differently when they see a message on a computer screen and evaluate it by responding to a computer-assisted self-completion questionnaire to when a more traditional approach is used in which subjects see the message on a TV screen and

evaluate it by responding to a paper and pencil questionnaire. Although this comparison confounds the method of presentation with the method of responding, it provides an ecologically valid comparison of 'new' versus 'old' technology. As we test messages, we need to know whether one test environment produces different answers from another, and whether one rather than the other more accurately represents the beliefs and attitudes of the respondents.

Method

The study was run in July 1998 in three different sites of the Boys and Girls Club of Metropolitan Philadelphia. Data were collected from 154 (79 male, 74 female, one unknown) adolescents age 9 to 17 (median age = 11 years, 6 months, $SD = 1.80$). These adolescents were in grades 2 to 9 (median grade = 4.5, $SD = 1.40$), with 65 being Caucasian, 85 African-American and the remaining four Hispanic. Because of the small sample size, Hispanic adolescents were not included in the data analyses. In addition, three other respondents were deleted because of missing data, resulting in a final sample of 147 adolescents.

Research design

The design involved two experimental manipulations—the medium (i.e. computer-assisted versus TV and pencil and paper) and the message (three sets of six anti-drug PSAs and one set of six political PSAs that served as a control). In order to reduce the possibility of systematic bias, participants were randomly assigned to one of the eight (2×4) conditions.

The medium. Half the respondents were assigned to small groups to view the PSAs on a television monitor and they evaluated them by filling out a paper and pencil questionnaire [TV, P&P]. The other half individually viewed the PSAs on the screen of a laptop computer and evaluated them by responding to the same questionnaire presented by an interactive program (Jarvis, 1998). More specifically, all participants at each site who were randomly assigned to one of the four TV, P&P conditions first went to a room where the study was described. They were then given instructions on how to fill out the questionnaire and were asked to complete the first part of the questionnaire which assessed demographic variables (see below). When all participants had completed Part I of the questionnaire, they went (usually in groups of five to seven) to one of four locations, each of which contained a TV set and a video cassette recorder that contained a tape with the six PSAs comprising one of the four message conditions. They were then shown the first PSA. After viewing the PSA, the VCR was stopped and the participants were asked to complete the next section of the questionnaire which contained a series of questions concerning the PSA they had just viewed. When they had all completed this section of the questionnaire, the VCR was again turned on and they viewed the next PSA and filled out the next section of the questionnaire. This procedure was repeated until they had viewed and completed the questionnaire for each of the six PSAs in their experimental condition.

In contrast, participants randomly assigned to the computer condition went (in groups of 12) to a room containing 12 laptop computers. Three computers had been preprogrammed with the PSAs for condition 1, three with PSAs for condition 2, three with PSAs for condition 3 and three with the control PSAs. Participants were randomly assigned to one of the 12 computers. The experiment was described and they were given instructions about

how to use the computer. After becoming familiar with the keyboard and the way in which they should respond to questions, they entered the program which began with the same demographic questions asked of those in the P&P conditions. The computer then informed them that they would be viewing a series of PSAs and they were asked to push a key to start the first PSA. After viewing the PSA, the computer asked them the same series of questions as those in the P&P condition. They then were instructed to push a key to start the second PSA. This procedure was followed until they had viewed and answered questions about the six PSAs comprising their experimental condition. In contrast to the TV, P&P participants, those in the computer condition worked individually at their own pace.

The message. Each message condition consisted of a set of six PSAs. Conditions 1 to 3 contained PSAs produced by the Partnership for a Drug Free America that focused primarily on negative consequences of drug use, while condition 4, the control condition, contained public service ads designed to increase political participation.

Although it would have been best to randomly assign PSAs to condition and to systematically vary the order of PSAs within condition, we used pre-existing message conditions in order to maintain comparability with previous research (Annenberg Public Policy Center, 1998). Since order of presentation of the PSAs within conditions could influence the evaluation of PSAs (particularly those in later positions), we will, for the purpose of the present study, consider only the adolescents' responses to the first PSA they viewed as well as their mean response to the six PSAs comprising their condition. Respondents in condition 1 were first exposed to a talking-head personal testimonial (Alex) in which a young man told how his use of marijuana got him in trouble at school and at home, ultimately resulting in his being thrown out of his house. In contrast, boys and girls in conditions 2 and 3 first saw a humorous PSA in cartoon style. The cartoon in condition 2 (Pot Head) showed a cartoon character repeatedly hitting himself on the head with a pot. The audio message stated that smoking marijuana was 'stupid'. The PSA in condition 3 (Noses) showed different shaped noses sniffing and sneezing and the audio message stated that the use of inhalants could result in death.

Generally speaking, the PSAs contained in condition 1 focused on marijuana and inhalant use, while those comprising conditions 2 and 3 focused on harder drugs (e.g. methamphetamine, cocaine and heroin).

Questionnaire. The assessment instrument consisted of a questionnaire with two parts. The first part assessed a number of demographic variables including age, gender and ethnicity. The second contained a series of questions asked after each of the six public service announcements. Generally speaking, these questions focused on subjects' beliefs that viewing the message would help them and their friends avoid drugs, their perceptions of the 'realism' of the message and their emotional reaction to it.

Outcome measures

Based on Part II of the questionnaire, five dependent variables were assessed for each PSA: effectiveness, realism, negative emotional response, positive emotional response and amount learned. In addition to obtaining each of these measures with respect to each of the six PSAs in a given message condition, the average rating of the six PSAs within the condition was also computed.

Perceived effectiveness. This was based on four items from Part II of the questionnaire: Was the message convincing? Would it be helpful in keeping your friends from using the drug? Would people your age who have never used drugs be more or less likely to want to try the drug after seeing the ad? How confident did the ad make you feel about how to best deal with illegal drugs in the real world? Each question was answered on a four-point scale (e.g., definitely yes (4), yes (3), no (2) and definitely no (1)). The mean of these four items was used to indicate the anti-drug effectiveness of each PSA (including the six political PSAs shown in the control condition). In addition, as described above, to assess the overall effectiveness of the set of PSAs presented to each respondent, the mean of the 6 effectiveness scores within each message condition was computed. Both perceived PSA effectiveness and perceived message condition effectiveness can range from 1 to 4, with higher scores indicating greater effectiveness ($\alpha = 0.79$).

Perceived realism. This was also based on four items from Part II of the questionnaire: How believable was the ad/program? Could real people act the way the person in the ad/program did to deal with illegal drugs? If someone did the things shown in the ad/program, would the things you were shown really happen to that person? Were some of the actors in the ad/program high on drugs? Again, for each of the six PSAs, each of the four items was answered on a four-point scale and the mean of these four items was used to indicate the mean realism of each PSA. The mean of the six realism scores within each message condition served as the measure of perceived message condition realism. Both realism scores can range from 1 to 4, with higher scores indicating greater realism ($\alpha = 0.86$).

Negative emotion. Respondents indicated the degree to which, while viewing a PSA, they felt sad, angry, afraid and disgusted. Responses ranged from 1 (not at all) to 4 (very much) and the mean of the four items served as a measure of negative emotional response to a given PSA. Again, the mean negative emotion elicited by the six PSAs in a given message condition provided a measure of the adolescents' negative emotional reaction to the set of PSAs to which they were exposed. Higher scores indicate stronger negative emotional reactions to each PSA or to each set of PSAs ($\alpha = 0.95$).

Positive emotion. Similar to the negative emotion items, respondents were also asked to indicate the degree to which they felt happy while viewing the PSA. The positive emotion item also ranges from 1 (not at all) to 4 (very much) and the mean over the six PSAs indicates the subjects' overall positive emotional reaction to the set of PSAs to which they were exposed. The higher the score, the stronger the positive emotional reaction to the set of PSAs.

Learning experience. Finally, respondents were also asked to indicate, on a three-point scale ranging from 'nothing at all' (1) to 'a great deal' (3), 'How much, if anything, did you see in the ad that you didn't already know?' The mean of the six judgements served as a measure of the amount learned from the set of PSAs comprising the message condition, with higher scores indicating a greater amount of learning.

Data analyses

The data were analyzed using a 2 (medium: computer versus pencil and paper) by 4 (message: condition 1 versus condition 2 versus Condition 3 versus control), by 2 (gender:

male versus female) by two (ethnicity: African-American versus Caucasian) between-subject analysis of variance. The dependent variables were either the respondents' rating of the first PSA they viewed, or the mean of their responses to all six PSAs in a given condition.

Results

Results will be presented in two parts: first, we will consider the adolescents' evaluations of the first PSA to which they were exposed, and then we will consider their mean evaluation of the set of six PSAs. Within each part, we will first consider the impact of the medium, (i.e. TV, P&P versus computer); we will then consider the impact of the message (i.e. individual PSAs as well as message conditions); and finally we will investigate the extent to which evaluations are influenced by the adolescents' gender and ethnicity.

Evaluations of individual PSAs

Effect of the medium. In contrast to expectations based on previous research (Gribble *et al.*, 1999; Turner *et al.*, 1998), there is only a minimal influence of medium on adolescents' reactions to the first PSA to which they were exposed. Not only were there very few main effects, but none of the interactions involving medium were significant. Most important, being in the computer condition or the TV and paper and pencil condition did not effect the adolescents' judgements of the effectiveness of the individual PSAs. Similarly, medium was not significantly related to judgements of learning or positive emotions. There was, however, a significant main effect of medium on the adolescents' negative emotional reactions: those who used a computer-based methodology reported significantly ($p < 0.04$) stronger negative emotional reactions to the PSAs ($m = 1.89$) than those who viewed the PSAs on TV and who responded to a paper and pencil questionnaire ($m = 1.58$). In addition, there was a tendency ($p = 0.064$) for those using the computer-based methodology to rate the PSAs as more realistic ($m = 3.01$) than those using the more traditional TV, P&P methodology ($m = 2.77$).

Effect of message. Somewhat surprisingly, there was no main effect of PSA on effectiveness or on negative emotional reactions. The adolescents saw no differences in effectiveness among the three anti-drug PSAs, and although all three anti-drug PSAs were judged to be somewhat more effective in preventing drug use than the political PSA, the differences were not significant (see Table 1). Similarly, although there was a tendency for the adolescents to have a more negative emotional reaction to the personal testimonial ('Alex') than to 'Noses' or to the political PSA, these differences were also not significant. In contrast, the adolescents did see significant differences between the PSAs with respect to realism ($p = 0.004$) and they tended to have different positive emotional reactions to the different PSAs ($p = 0.069$). More specifically, the adolescents rated all three anti-drug PSAs as significantly more realistic than the political PSA, but they did not differentiate among the three anti-drug PSAs. With respect to positive emotional reactions, the adolescents had the most positive emotional reactions to the two humorous anti-drug PSAs and the least positive emotional reaction to the anti-drug testimonial about the negative consequences of using marijuana.

This effect of the PSAs on positive emotional response must be qualified, however, since there was an almost significant ($p = 0.062$) PSA-by-ethnicity interaction that suggested that African-American adolescents had more positive emotional responses than Caucasians to 'Pot Head' and the political PSA, while the opposite was true with respect to 'Noses'. That

Table 1. Ratings of effectiveness, realism and positive and negative emotional responses to the PSA's

PSA	Effect	Realism	Positive emotion	Negative emotion
Alex – Straight A	2.92	3.15 ^A	1.48 ^a	1.99
Pot Head	2.82	2.96 ^A	1.90 ^b	1.84
Noses	2.81	3.00 ^A	2.14 ^b	1.56
Voting	2.55	2.46 ^B	1.80 ^{ab}	1.56

Note. Column means with different superscripts are significantly different^A < 0.05; ^a < 0.10.

is, Caucasians report more positive emotional reactions to 'Noses' than do African-Americans. There was little difference between the two ethnic groups with respect to their positive emotional reaction to viewing 'Alex'.

Effects of gender and ethnicity. As expected, judgements of the effectiveness of individual PSAs were influenced by both gender and ethnicity. That is, as can be seen in Table 2, there was a significant ($p = 0.003$) gender-by-ethnicity interaction on effectiveness. Overall, the PSAs were rated most effective by white males and least effective by white females and African-American males. A gender-by-ethnicity interaction was also found with respect to negative emotional reactions ($p = 0.054$) with African-American males and white females having more negative emotional reactions to the PSAs than white males (See Table 2).

Interestingly, only gender influenced positive emotional reactions ($p = 0.041$), with males ($m = 2.02$) responding more positively to the PSAs than females ($m = 1.64$). Equally important, neither race nor gender influenced ratings of realism or learning.

Evaluations of message conditions

Effect of the medium. Considering the adolescents' average response to the set of PSAs, the only main effect of medium is on negative emotional responses ($p = 0.025$). Similar to their ratings of the individual PSAs, adolescents using computer-based methodology reported stronger mean negative emotional responses ($m = 2.04$) to the set of PSAs to which they were exposed than did those viewing the PSAs on a TV monitor and responding to a paper and pencil questionnaire ($m = 1.73$). However, the use of 'new' computer methodology or more traditional TV and paper and pencil methodology did not produce differences in the

Table 2. Effectiveness of, and negative emotional reactions to, PSAs as a function of gender and ethnicity

	Effectiveness		Negative emotion	
	Male	Female	Male	Female
African-American	2.67 ^A	2.83 ^{AB}	1.89 ^A	1.65 ^{AB}
Caucasian	3.03 ^B	2.56 ^A	1.53 ^B	1.91 ^A

Note. For each dependent variable, cell means with different superscripts are significantly different^A < 0.05.

Table 3. Mean realism as a function of medium and condition

	P&P	Computer
Condition 1	3.15 ^A	3.16 ^A
Condition 2	3.22 ^A	2.96 ^A
Condition 3	3.06 ^A	3.19 ^A
Control	1.80 ^C	2.58 ^B

Note. Cell means with different superscripts are significantly different ^A < 0.05 .

adolescents' judgements of effectiveness, realism or amount learned nor did it affect their positive emotional responses.

Despite this lack of main effects, there was one significant and two near significant interactions involving medium. More specifically, with respect to realism, there was a significant ($p = 0.003$) medium-by-message condition interaction. As can be seen in Table 3, while the three sets of anti-drug PSAs were judged to be equally realistic regardless of the methodology used to obtain the ratings, the set of political PSAs seen on a TV screen and evaluated using a paper and pencil questionnaire were rated as significantly less realistic ($m = 1.80$) than the same political PSAs seen and evaluated on the screen of a laptop computer ($m = 2.58$).

With respect to both realism ($p = 0.064$) and effectiveness ($p = 0.053$), there were strong tendencies for medium to interact with ethnicity. As can be seen in Table 4, Caucasian adolescents using computer-based methodology saw the set of PSAs as significantly more effective ($m = 3.00$) and more realistic ($m = 3.10$) than those using the more traditional pencil and paper methodology ($m = 2.68$ and 2.76 for effectiveness and realism, respectively). In contrast, medium appears to have little impact on African-American adolescents' ratings of the effectiveness or realism of the sets of PSAs.

Effect of message conditions. On average, the three sets of anti-drug PSAs were perceived as significantly more effective in reducing drug use than were the set of political PSAs ($p = 0.001$). Once again, however, the adolescents did not view one set of anti-drug PSAs as more or less effective than another. A similar pattern was found with respect to realism. That is, on average, the three sets of anti-drug PSAs were rated as significantly more realistic than the set of political PSAs ($p < 0.001$), but the sets of anti-drug PSAs did not differ among themselves with respect to realism.

Table 4. Mean effectiveness and realism as a function of medium and ethnicity

	Effectiveness		Realism	
	P&P	Computer	P&P	Computer
African-American	2.79 ^{AB}	2.71 ^A	2.86 ^a	2.85 ^a
Caucasian	2.68 ^A	3.00 ^B	2.76 ^a	3.10 ^b

Note. For each dependent variable, cell means with different superscripts are significantly different ^A < 0.05 ; ^a < 0.10 .

Table 5. Mean effectiveness, realism and emotional reactions as a function of condition

	Effect	Realism	Negative emotion	Positive emotion
Condition 1	2.91 ^A	3.16 ^A	2.21 ^A	1.30 ^A
Condition 2	2.94 ^A	3.09 ^A	1.98 ^A	1.66 ^{AB}
Condition 3	2.96 ^A	3.13 ^A	1.98 ^A	1.74 ^B
Control	2.38 ^B	2.19 ^B	1.37 ^B	1.84 ^B

Note. Column means with different superscripts are significantly different ^A < 0.05.

Perhaps not surprisingly, there were also significant differences in emotional response to the four sets of PSAs. More specifically, the adolescents had significantly stronger mean negative emotional reactions to the three sets of anti-drug ads than to the set of political ads ($p = 0.001$). In contrast, they had stronger positive reactions to the political PSAs and to the PSAs in condition 3 than to the PSAs in condition 1 (See Table 5).

Effects of gender and ethnicity. Consistent with the findings concerning the individual ads, both gender and ethnicity influenced the adolescents' ratings of the set of PSAs. Once again, there was a significant ($p = 0.046$) main effect of gender on positive emotional responses, with males ($m = 1.77$) reacting more favourably to the sets of PSAs than females ($m = 1.50$). In addition, males tended ($p = 0.07$) to have less negative emotional reactions ($m = 1.76$) than did females ($m = 2.01$). Females ($m = 3.04$), however, report learning significantly more from the sets of PSAs than do males ($m = 2.83$, $p = 0.039$).

Also consistent with the findings based on individual PSAs, we again find a highly significant gender-by-ethnicity interaction with respect to effectiveness, with the sets of PSAs being rated as most effective by white males and black females, and least effective by black males (see Table 6).

Summary and conclusions

The present experiment was designed to answer three questions:

- (1) What is the difference between presenting PSAs on video-tape and asking adolescents to rate those programmes using a paper and pencil self-completion questionnaire, and presenting the same PSAs on a laptop computer screen and asking adolescents to rate these programmes using a self-completion computer-assisted questionnaire?

Table 6. Mean effectiveness as a function of gender and ethnicity

	Male	Female
African-American	2.61 ^A	2.89 ^B
Caucasian	2.93 ^B	2.75 ^{AB}

Note. Cell means with different superscripts are significantly different ^A < 0.05.

- (2) To what extent do young adolescents see anti-drug PSAs as 'effective' in helping them avoid drugs? And to what extent do they perceive differences (in effectiveness, realism, learning, etc.) among anti-drug PSAs?
- (3) Do evaluations of PSAs vary as a function of gender and ethnicity?

Before considering the impact of medium on adolescents' judgements, it is important to recognize that any difference related to medium could be due to one of three things: viewing the PSAs on the screen of a laptop computer versus a TV monitor; viewing the PSAs in a small group of friends versus individually; or responding to a paper and pencil questionnaire versus responding to a computer-assisted self-interview.

Despite this confounding to maximize the differences between the two conditions, medium had relatively little effect on the adolescents' ratings of the PSAs. Whether we consider their reactions to a single PSA or their mean reactions to the set of PSAs to which they were exposed, the only consistent effect of medium was on the adolescents' negative emotional reactions. More specifically, adolescents in the computer condition reported significantly stronger negative emotions while watching the PSAs than those in the TV and paper and pencil condition. Unfortunately, we cannot determine whether this difference is due to the viewing situation, the method of presentation or to the response format. Although this is a question for future research, we would hypothesize that this effect is due more to the method of presentation (i.e. computer screen versus TV monitor) or the viewing situation (i.e. in a group versus alone), than to the response format (i.e. paper and pencil versus computer-assisted self-completion questionnaires).

In addition to these medium effects on negative emotional reactions, there was at least a suggestion that differences in medium may have differential effects on members of different ethnic groups. While the shift from TV and pencil and paper to a computer-based methodology tended to increase Caucasian adolescents' mean ratings of the realism and effectiveness of a set of PSAs, this variation in medium appeared to have little or no effect on the realism or effectiveness ratings of African-American adolescents. It is not at all clear why medium seems to make a difference to Caucasian but not to African-American boys and girls. One possibility may be related to differential familiarity with computers and the Internet. That is, the more familiar one is with computers, the more one may come to view computers as providing more realistic and 'factual' information than TV. Additional research in this area is needed.

However, to answer the first question, there appears to be relatively little difference between presenting PSAs on TV and asking adolescents to rate their effectiveness using a paper and pencil self-completion questionnaire, and presenting the same PSAs on the screen of a laptop computer and asking adolescents to rate their effectiveness using a computer-assisted self-completion questionnaire. In contrast, medium did appear to have some influence on negative emotional reactions and on judgements of realism; although the latter was seen most strongly with respect to the political PSAs. Nevertheless, as indicated above, these differences appear to be due more to the presentation of the PSAs (i.e. individually or in groups; on a TV monitor or the screen of a laptop) than to the way in which they were evaluated (i.e. paper and pencil) or computer-assisted self-completion).

Since previous findings suggested rather substantial differences between computer-assisted and face-to-face interviews (see for example Turner *et al.*, 1998), the relatively small effect of medium on the adolescents' judgements found in the present study is somewhat surprising. Several factors may account for this. First, unlike most previous research, this study compared computer-assisted self-interviews to paper and pencil self-completion questionnaires, not to face-to-face interviews. Thus, in this study, respondents did not have to

give potentially undesirable answers to another person in either condition. In addition, most of the differences that have been found between computer-assisted and face-to-face interviews have occurred with respect to highly sensitive questions concerning sexual behaviour and illicit drug use. Although some adolescents in the present study may have felt that it was socially desirable (or 'correct') to say that they learned something from the anti-drug PSAs, and that the PSAs were realistic and effective, failure to do this does not carry the same negative consequences as does providing personal information about illicit drug use or sexual behaviour. Generally speaking, then, at least when it comes to evaluating the effectiveness of anti-drug PSAs, the use of computer-assisted methodology does not seem increase the 'validity' of responding.

How effective are anti-drug PSAs? Before answering this question, an important limitation of the study must be recognized. Recall that one of the main purposes of the present study was to understand the ways in which young adolescents respond to anti-drug PSAs. Consistent with this, the adolescents were asked to indicate how effective they thought the message was in helping them or their friends avoid using drugs. To truly study the effectiveness of PSAs or of any message or set of messages designed to change behaviour, however, one must ultimately consider whether the message(s) did or did not change behaviour. Although this was beyond the scope of the present paper, future research must investigate the relations between *perceived* and *actual* effectiveness. Despite this limitation, we feel the findings are informative.

Perhaps not surprisingly, the three sets of anti-drug PSAs were perceived to be more effective in preventing drug use than the set of political PSAs. What was somewhat surprising was the fact that the adolescents saw the three sets of anti-drug PSAs as equally effective. Based on previous research (Annenberg Public Policy Center, 1998), we had expected the PSAs concerning harder drugs (i.e. those in conditions 2 and 3) to be more effective than those focusing primarily on marijuana (i.e. those in condition 1). Perhaps even more surprising, at the level of individual PSAs, the adolescents saw no differences in the effectiveness of three PSAs—two two of which were humorous cartoons while the third was a serious testimonial pointing out the negative consequences of smoking marijuana. Moreover, although they did tend to see these three anti-drug PSAs as somewhat more effective in preventing drug use than a political PSA, this difference was not significant. This lack of significance with respect to effectiveness contrasts strongly with their judgements of realism and their emotional reactions to the PSAs. That is, the adolescents rated each of the three anti-drug PSAs as significantly more realistic than the political PSA and, not surprisingly, they reacted more positively and less negatively to the humorous PSAs than to the more serious testimonial. Thus, it seems clear that the boys and girls in this study can differentiate between these PSAs on a number of dimensions, which makes the lack of differentiation vis-à-vis effectiveness even more surprising. Nevertheless, it does appear that while a single anti-drug PSA may not be very effective in preventing drug use, exposure to a number of anti-drug PSAs did seem to increase young boys' and girls' feelings that they and their friends will be better able to avoid the use of illicit drugs.

It is important to note, however, that these PSAs are not equally effective for all adolescents. With respect to both the individual PSAs and the sets of PSAs, there was a significant gender-by-ethnicity interaction. Generally speaking, the PSAs were rated as most effective by white males and least effective by African-American males and white females. In retrospect, and consistent with these findings, a content analysis of the PSAs suggests that most were targeted at white males. Clearly, one size will not fit all and considerably more attention will have to be paid to gender and ethnicity both in developing and in distributing future anti-drug PSAs.

Those designing the messages should also take into account where and how the messages will be delivered. Although medium had only a small impact in this study, the data suggest that there may be important differences between viewing PSAs on a TV screen or on a laptop computer, at least with respect to perceived realism and emotional reactions. To maximize the effectiveness of health-related PSAs that may be delivered on the Internet as well as on TV, additional information is needed about differential reactions to these two presentational formats.

References

- ANNENBERG PUBLIC POLICY CENTER (1998). Evaluation of 33 public service announcements (PSAs) from the Partnership for a Drug Free America (PDFA) Report prepared for ONDCP. Philadelphia: APPC.
- AQUILINO, W. (1994) Interview mode effects in surveys of drug and alcohol use. *Public Opinion Quarterly*, 58, 210–240.
- BLOSSER, B. J. & ROBERTS, D. F. (1985). Age differences in children's perceptions of message intent: responses to TV news, commercials, educational spots, and public service announcements. *Communication Research*, 12(4), 455–484.
- CATANIA, J., McDERMOTT, L. & POLLACK, L. (1986) Questionnaire response bias and face-to-face interview sample bias in sexuality research. *Journal of Sex Research*, 22, 52–72.
- CDC AIDS Community Demonstration Projects Research Group (1999). Community-level HIV intervention motivates behavior change in five cities: final outcome data from the CDC AIDS Community Demonstration Projects. *American Journal of Public Health*, 89(3), 336–345.
- DES JARLAIS, D. C., PAONE, D., MILLIKEN, J., TURNER, C. F., MILLER, H., GRIBBLE, J., SHI, Q., HAGAN, H. & FRIEDMAN, S. R. (1999). Audio-computer interviewing to measure risk behaviour for HIV among injecting drug users: a quasi-randomised trial. *The Lancet*, 353 (9165), 1657–1661.
- FISHBEIN, M. (2000). The role of theory in HIV prevention. *AIDS Care*, 12, 213–278.
- GRIBBLE, J. N., MILLER, H. G., ROGERS, S. M. & TURNER, C. F. (1999). Interview mode and measurement of sexual behaviors: methodological issues. *Journal of Sex Research*, 36(1), 16–24.
- HASTAK, M. & OLSON, J. C. (1989) Assessing the role of brand-related cognitive responses as mediators of communication effects on cognitive structure. *Journal of Consumer Research*, 15(4), 444–456.
- HOCHSTIM, J. (1967) A critical comparison of three strategies of collecting data from households. *Journal of the American Statistical Association*, 62, 976–989.
- JARVIS, W. B. G. (1998). MediaLab Research Software, Version 3.0 [computer program]. Philadelphia, PA (www.empirisoft.com): Empirisoft.
- JOHNSON, A. M., COPAS, A., FIELD, J., MANDALIA, S., FENTON, K., KOROVESISS, C., WELLINGS, K. & ERENS, R. (1999) Do computerised self-completion interviews influence the reporting of sexual behaviors? A methodological experiment. Abstract #238, *Thirteenth Meeting of the International Society for Sexually Transmitted Diseases Research*, Denver, CO.
- LEVINE, I. S. & ZIMMERMAN, J. D. (1996). Using qualitative data to inform public policy: evaluating 'Choose to De-Fuse'. *American Journal of Orthopsychiatry*, 66(3), 363–377.
- MITCHELL, B. (1990). Interviewing face-to-interface. *Personnel*, 67(1), 23–25.
- ROMER, D., HORNIK, R., STANTON, B., BLACK, M., XIANNIAN, L., RICARDO, I. & FEIGELMAN, S. (1997). 'Talking' computers: a reliable and private method to conduct interviews on sensitive topics with children. *Journal of Sex Research*, 34(1), 1–7.
- STRUCKMAN-JOHNSON, C., STRUCKMAN-JOHNSON, D., GILLILAND, R. C. & AUSMAN, A. (1994). Effect of persuasive appeals in AIDS PSAs and condom commercials on intentions to use condoms. *Journal of Applied Social Psychology*, 24(24), 2223–2244.
- TOURANGEAU, R. & SMITH, T. (1996). Asking sensitive questions: the impact of data collection mode, question format, and question context. *Public Opinion Quarterly*, 60, 275–304.
- TURNER, C. F., KU, L., ROGERS, S. M., LINDBERG, L. D., PLECK, J. H. & SONENSTEIN, F. L. (1998). Adolescent sexual behavior, drug use, and violence: increased reporting with computer survey technology. *Science*, 280(5365), 867–873.
- WALTERS, T. N., WALTERS, L. M. & PRIEST, S. H. (1999). What we say and how we say it: the influence of psychosocial characteristics and message content of HIV/AIDS public service announcements. In: W. N. ELWOOD et al. (Eds), *Power in the blood: a handbook on AIDS, politics, and communication* (pp. 293–307). Mahwah, NJ: Lawrence Erlbaum.
- YATES, B. T., WAGNER, J. L. & SUPRENANT, L. M. (1997). Recall of health-risky behaviors for the prior 2 or 4 weeks via computerized versus printed questionnaire. *Computers in Human Behavior*, 13(1), 83–110.