Short-Term Effects of an Anti-Marijuana Media Campaign Targeting High Sensation Seeking Adolescents

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ABSTRACT Sensation seeking, a biologically-based personality variable, is strongly related to both drug use and preferences for highly novel, arousing, and/or unconventional messages and TV programs. This connection is the basis of a targeting strategy in an anti-marijuana public service announcement campaign in a medium-sized market aimed at high sensation seeking adolescents. Data from the first half of the media campaign suggest that the anti-marijuana PSAs are reaching the target audience’s marijuana-related beliefs, attitudes, and behaviors in the experimental city when compared to the control city. Implications for future campaigns are discussed.

I don’t think anything’s going to help. Like you were all talking, there’s so many medical uses for it, plus, I mean, there hasn’t been any deaths from it from what I know . . . I ain’t going to lie, sometimes I do smoke marijuana.—10th grade African American male

It’s like everywhere you walk you see somebody lighting up or smoking or something so they think that everybody else is doing it.—8th grade Anglo female

Beginning in the early 1990s, findings from Johnston and associates’ (1994) Monitoring the Future study revealed that more and more adolescents were beginning to experiment with marijuana. Since then the annual national-level report on substance use has documented a steady increase in adolescent 30-day and lifetime marijuana use. Concerned with this and the increased use of other illicit drugs, Congress recently appropriated 1-billion dollars to be spent on a five-year nationwide media campaign targeting, among other illicit drugs, marijuana use among 9 to 17 year-olds (Palmgreen & Donohew, in press). The
Partnership for a Drug Free America already conducts a massive media campaign attempting to reach children and teenagers to educate them about the harmful effects of marijuana and other illicit drugs. Quite clearly, then, media campaigns appear to be one of the more preferred methods used to curb illicit substance use.

One approach that has been used to design drug prevention campaigns is the SENTAR (which stands for sensation seeking targeting) approach. Users of the SENTAR approach target a biologically-based trait called sensation seeking. “It is well established that high sensation seekers (HSS), including the important target group of HSS adolescents, are particularly drawn to the stimulation and/or mood altering effects of a variety of drugs” including marijuana (Palmgreen & Donohew, in press). Most importantly, HSS have a distinct preference for specific media message characteristics, such as intensity and novelty (Donohew, Palmgreen, & Lorch, 1991). What follows is an overview of the most recent SENTAR project that features an anti-marijuana theme, as well as the short-term effects of an ongoing two-city anti-marijuana media campaign. First, however, it is helpful to review the theoretical foundation of this campaign, sensation seeking.

**Sensation Seeking**

Sensation seeking is a biologically-based trait “based on the idea that persons differ reliably in their preferences for or aversions to stimuli or experiences with high-arousal potential” (Zuckerman, 1988, p. 174). Thus, individuals with a high need for sensation desire “complex experiences and [exhibit] the willingness to take risks for these experiences” (Bardo & Mueller, 1991, p. 196). This biological drive for novel, complex, and intense sensations and experiences is typically satisfied by a willingness to take more social risks (e.g., impulsive behaviors, sexual promiscuity), physical risks (e.g., skydiving, bungee jumping, driving fast), legal risks (e.g., getting arrested and put in jail), and financial risks (e.g., paying fines, impulsive purchases) (Zuckerman, 1979, 1994). In contrast, individuals with a low need for sensation are not only likely to take fewer social, physical, legal, and financial risks, but they also differ in preferences for visual complexity and music choice (Zuckerman, 1988).

Zuckerman has determined empirically that these differences in need for sensation can be measured with four subscales: thrill and adventure seeking, experience seeking, disinhibition, and boredom susceptibility. Thrill and adventure seeking accounts for the sensation gained through participation in physically risky behaviors, such as parachuting or bungee jumping. Experience seeking is indicative of the non-conforming lifestyle sought by HSS often characterized by a liking for unusual music or abstract art, as well as making spontaneous decisions or exploring strange places. A third subscale, disinhibition, represents a desire for sensation through socially risky behaviors, such as wild parties, social drinking or drug use, or a variety of sexual partners. Finally, boredom susceptibility expresses an aversion to routine and conventional activities, conditions, or people. The first three represent the need for novelty and stimulation, while the latter is indicative of “the negative reaction that occurs as a result of a lack of novelty” (Bardo, Donohew, & Harrington, 1996, p. 26).

Numerous studies have determined that the variation in one’s level of sensation seeking predicts behavioral differences, especially illicit drug use. HSS are more likely to begin experimenting and using drugs earlier than LSS, as well as use
higher levels of a variety of different drugs (Segal, Huba, & Singer, 1980; Zuckerman, 1979, 1983, 1994). Relevant to this investigation of adolescent marijuana use was Donohew’s (1988, 1990) findings that junior high HSS were four times as likely as LSS to use marijuana; in senior high, HSS were three times more likely to use marijuana than LSS. Other studies have drawn a similar connection between sensation seeking and substance abuse (Teichman, Barnea, & Rahav, 1989). Notably, Andrucci, Archer, Pancoast, and Gordon (1989) determined that sensation seeking was the strongest predictor of drug use and the only variable in their study to predict single versus polydrug use. The logic underlying this link between sensation seeking and drug use implies that “individual differences in the ‘need’ for novelty exist and that these differences may predict the risk for drug abuse” (Bardo et al., 1995, p. 24). These behavioral differences for illicit drug use between HSS and LSS make sensation seeking an attractive individual difference variable for designing prevention campaigns.

Message Sensation Value

Donohew, Palmgreen, and Duncan (1980) have suggested that one’s need for sensation not only translates into differences in drug use, but also into differences in the desired level of stimulation from exposure to information. This Activation Model of Information Exposure suggests that individuals “enter information exposure situations with the expectation of achieving or maintaining [an] optimal state of activation” (Donohew, Lorch, & Palmgreen, 1991, p. 214). If individuals are unable to maintain this optimal level of arousal, they will seek other acceptable stimuli that will meet this need. Consequently, when an individual’s desired arousal level is exceeded because a message is “too threatening or otherwise exciting,” the individual will become uncomfortable and seek out a more preferable level of stimulation (Donohew, Helm, Lawrence, & Shatzer, 1988, p. 206). In contrast, when an individual’s desired arousal level is too low because “the message is too boring,” the individual similarly turns away to find the appropriate arousal level (p. 206). Thus, “it is only when the message satisfies a desired level of arousal that individuals are likely to stay with it” (p. 207). This model reflects the assumptions made by Zuckerman’s (1979) conception of sensation seeking and Berlyne’s (1971) arousal potential, such that individuals differ in their optimal level of arousal “or that point at which attention and resultant pleasure is maximized” and “may differ among individuals based on biological conditions” (Everett & Palmgreen, 1995, p. 228). HSS, then, possess a higher optimal level of arousal than do LSS. Extending this to media preferences, Donohew and colleagues (1980) suggest that HSS prefer to expose themselves to messages that are more stimulating, exciting, and arousing than those preferred by LSS. The ability of messages to provide varying level of stimulation has been labeled by Palmgreen and colleagues (1991) as message sensation value (MSV), or “the degree to which formal and content audiovisual features of a message elicit sensory, affective, and arousal responses” (p. 219).

A series of focus groups with college age students confirmed the variation in media preferences between HSS and LSS (Donohew et al., 1991; Palmgreen, Donohew, Lorch, Rogus, Helm, & Grant, 1991). In general, this formative research determined that HSS have a preference for advertisements containing high sensation value (HSV) message characteristics, while LSS preferred advertise-
ments that included low sensation value (LSV) message characteristics. Specifically, HSS indicated a preference for messages that were presented in a novel or unusual format, had unusual uses of formal features such as more extreme-close ups and more sound effects, included a greater frequency of editing, contained faster and more frequent movement, included more intense music, and incorporated higher levels of suspense and drama. In contrast, LSS preferred messages that had more closure at the end of a story. Interestingly, a series of characteristics were preferred by both HSS and LSS, including humor, a good story line, and believable characters. In sum, then, HSS were more attracted than LSS to HSV-type messages and programming as opposed to LSV messages and programming. Thus, consistent with Zuckerman's (1979) notion that high sensation seekers have higher levels of need for sensation, high sensation seekers “also tend to tolerate or even require stronger messages for attracting and holding their attention” (Donohew et al., 1991, p. 212).

Drug Prevention Message Research

The findings from these focus groups were used to conduct a program of research investigating the effectiveness of anti-drug prevention messages that varied in message sensation value. A series of studies on sensation seeking, media preferences, and illicit drug use confirmed the effectiveness of the SENTAR approach. First, Donohew and his colleagues (1991) determined that HSV messages were more effective with HSS in inducing participant's (young adults) intentions to call a hotline, whereas LSV messages were more effective with LSS. Extending this research to the area of attention and context of programming, Lorch, Palmgreen, Donohew, Helm, Baer, & D'Silva (1994) found that HSS young adults not only paid more attention (using an eyes-on-screen measure) to HSV programs (vs. LSV programs), but that they were more likely to attend to messages (anti-drug PSAs) that were embedded in such programming. In contrast, LSS showed a slight preference for LSV programs. Third, combining the findings from the previous research, Palmgreen, Lorch, Donohew, Harrington, D'Silva, & Helm (1995) conducted a field study in which air time was purchased over a six-month period during HSV programming to broadcast several HSV PSAs aimed at older teens and young adults. The PSAs showed a hotline number individuals could call to obtain a copy of “The Thrill Seeker's Guide to the Bluegrass,” a booklet listing locations for many high sensation seeking activities in the area. Results indicate that 73% of the hotline callers were HSS, that more HSS saw at least one of the PSAs, and that HSS were more likely to report seeing the campaign PSAs than other anti-drug PSAs airing concurrently. Fourth, Everett and Palmgreen (1995) in a study of the influence of anti-cocaine PSAs, found that the interaction between sensation seeking and message sensation value was the most important source of variance in anti-cocaine attitudes, intentions to use cocaine, and message recall. Their results were consistent with previous studies in that HSV PSAs were more effective than LSV PSAs for HSS by enhancing recall, promoting more anti-cocaine attitudes, and reducing intentions to try cocaine. The opposite pattern was displayed by LSS. Thus, this research over the last decade has provided convincing evidence that HSS are more attentive to and more persuaded by prevention messages containing a distinct set of media message characteristics (Palmgreen et al., 1995). More specifically, novel messages with highly sensory,
stimulating, and dramatic features elicit and maintain the interest of HSS. “Such messages are more likely to capture the attention of HSS, to hold it, and to encourage future exposure to such messages” (Everett & Palmgreen, 1995, p. 229). With solid empirical evidence validating this method to drug prevention, the SENTAR approach was used to develop a drug prevention media campaign targeting adolescent marijuana use that is presently ongoing in Kentucky and Tennessee. A review of this campaign follows.

The Present Anti-Marijuana SENTAR Media Campaign

The present drug prevention effort is an anti-marijuana media campaign targeting adolescents in the 8th through the 11th grades. The campaign features five locally developed and professionally produced 30-second HSV PSAs. Each message features one or more of the consequences associated with smoking marijuana, such as lung damage, increased sickness, decreased motivation, lower grades, legal trouble, loss of coordination, psychological and physical dependence, and troubled relationship with friends and family (see Sussman, Stacy, Dent, Simon, & Johnson, 1996, for a review). The goal of the campaign, in addition to assessing the effectiveness of a televised PSA prevention campaign, is to reach at-risk adolescents and produce significant changes in marijuana-related beliefs, attitudes, and behaviors.

The media campaign takes place in two comparable metropolitan areas—Lexington, Kentucky and Knoxville, Tennessee. While the population of Knoxville is slightly larger than Lexington, the two populations are comparable in terms of race, age, education, and income. Additionally, both cities contain the main campuses of the major state universities. Finally, both cities are served by affiliates of the three major networks, independent stations, and multi-channel cable systems. The media markets in these cities do not overlap, thus eliminating potential cross-contamination.

This field study employs an innovative and methodologically rigorous controlled time-series design. The first part of the campaign, an intensive 4-month effort from January through April, 1997, was conducted in Lexington, Kentucky while Knoxville, Tennessee served as the control city. The short-term effects of this campaign are examined here. Later, a 4-month booster campaign (January through April, 1998) was conducted in Lexington while simultaneously running for the first time in Knoxville. Interviews with 100 adolescents in both cities began in May, 1996, 8 months prior to the first campaign, and will continue 8 months after the subsequent campaign in both cities. The last cohort was interviewed in December, 1998.

In addition to using sophisticated methodology, targeting a specific group of at-risk adolescents, and designing messages with specific characteristics that appeal to the target audience, the SENTAR campaign employs three other important principles of effective campaign development: formative research, message placement, and purchased advertising time (Palmgreen & Donohew, in press; also see Perloff, 1993 and Rogers & Storey, 1987 for an overview of effective campaign design). These three, as applied to this campaign, are briefly discussed.
Formative Research for the Anti-Marijuana Campaign

Failing to conduct formative research is a major reason that media campaigns tend not to be effective (Backer, 1990; Rogers & Storey, 1987). Practitioners who fail to assess the existing attitudes, beliefs, and values, as well as the media usage and consumption of the target audience may develop a campaign that contains information not relevant to or desired by the target audience. Flay and Burton (1990) suggest a “need for more research at the front end of the campaign design, particularly needs assessment and formative research,” implying that “health campaigners need to place far greater emphasis on marketing research if they are ever to be successful” (p. 145). Many successful campaigns attribute their results to careful precampaign research (e.g., McDivitt, Zimicki, & Hornik, 1997; Flora, Maccoby, & Farquhar, 1989) because they were able to target the audience’s salient beliefs (Perloff, 1993).

Significant time was invested in this project in conducting formative research. Atkin and Friemuth (1989) suggest that formative research occurs in two stages: preproduction and production testing. During preproduction, campaign planners spend time gathering and learning “as much as possible about the intended audience before specifying goals and devising strategies” for the campaign (p. 134). Preproduction for this media campaign was accomplished by conducting a series of after-school focus groups with different cohorts of the target audience—adolescent high sensation seekers. Because of potentially different developmental and cultural differences, eleven different focus groups were conducted and varied by grade (8th through 11th) and ethnicity (Anglo and African-American). Participants were asked to comment on 10 different anti-drug PSAs and offer their opinions on the effectiveness of the PSAs as well as the formal features of each PSA. Participants were also asked about different drugs, their prevalence in the school and community, and how these drugs were perceived by peers who were both users and non-users.

These focus groups offered considerable insight into the characteristics that adolescents perceive to be most effective in drug prevention PSAs as well as valuable information about the current drug situation in the school and community. Among the information found most valuable by the campaign design team was that (1) HSS showed a distinct preference for those messages that told a story, (2) that HSS felt that depicting the consequences of drug use was one of the more effective ways to reach them, (3) and consistent with the national figures, marijuana was considered to be very prevalent locally, but perceived by the adolescents as being little, if any more harmful than cigarettes or alcohol. With this preproduction information, the campaign design team began conceptualizing and designing PSAs. Several concepts were selected to be transformed into “video boards,” or what might be equivalent to a rough draft version of a televised PSA. These video boards were used to conduct production testing.

Production testing, according to Atkin and Friemuth (1989), is the process of “gathering target audience reactions to preliminary versions of messages” (p. 141). Once again, a series of focus groups was conducted with the target audience members to gauge their reactions to the PSAs developed by the campaign design team. This process of using the target audience to pretest potential campaign messages “is a central part of formative research—campaign planners need to develop messages that attract the audience’s attention, are understandable and
will motivate the audience to respond in the desired manner" (Brown & Einsiedel, 1989, p. 161). Consequently, the major goals were to determine if the PSA concepts would be effective, to eliminate those message considered ineffective, and to refine elements of the messages that showed promise with the target audience. Additionally, “formative evaluation at this stage also assists in creating messages that reflect the target audience’s vernacular” (Nowak & Siska, 1995, p. 175). One set of focus groups assessed potential PSAs by showing teenagers the video boards. A second set of focus groups tested ideas in script form. Both methods were effective, providing the design team with the information necessary to have five anti-marijuana PSAs professionally produced for use in the campaign.

In this campaign, the formative research process was invaluable in determining what messages were most likely to be successful in reaching the target audience. Campaign planners “have not typically used systematic approaches at the preproduction stage, as mass media campaign efforts often proceed in the absence of a research foundation” (Atkin & Friemuth, 1989, p. 132). While conducting formative research may take a considerable investment of time and energy, valuable information is gained by interacting with the target audience about the most appropriate and effective ways of conveying campaign messages.

Message Placement

No matter how well one integrates formative research into message design, if the messages are not placed where the target audience will see them, then the campaign is likely to be ineffective. With this in mind, the SENTAR approach utilizes the campaign principle of message placement. Palmgreen and Donohew (in press) suggest that “the most elegant message consigned to a media channel or program context to which no one in the target audience attends is like the beautiful hemlock falling in the forest—except that in a prevention campaign it clearly makes no sound of consequence, nor is anyone there to appreciate its beauty” (p. 20). Therefore, to assist in the placement of the HSV PSAs in programming viewed most by HSS, data were collected for three months prior to the campaign from the adolescents participating in the field study regarding their five favorite television programs and their five favorite channels. This data was combined with local television market viewing data to place the PSAs in programming most likely to be viewed by HSS.

Purchased Advertising Time

Placement of the PSAs in desired programming was accomplished by purchasing advertising time. Erickson and colleagues (1990) suggest that message placement has been troubling for those who rely on free airtime to publicize their campaigns. Competition for free air time continues to be high, and when it is donated, it is typically at an undesirable time when “a relatively small number of spots are shown ... thwarting their ability to motivate and persuade an increasingly fragmented and distracted audience” (p. 242). As a result, the efforts behind developing and disseminating a media campaign may be in vain and outcomes may be discouraging. On top of the limited free airtime is the issue of diversification in the number of channels and programs available today. The three networks once had a monopoly, but with cable and satellite television, programming is more
diverse and there is a clear need to determine when and where the target audience can be reached through television. Paid advertising may be the most “powerful tool” for media campaigns so that the campaigners have control over when and where the messages are broadcast (p. 243).

In order to successfully accomplish message placement, a professional media buyer negotiated with local stations and the cable service to obtain approximately $60,000 in airtime in the Lexington market in which to place the HSV anti-marijuana PSAs. Additionally, each of these broadcasting companies donated at least one free 30-second spot time for each 30-second spot time purchased by the campaign. The cable service donated two free spots for each one purchased by the campaign.

In sum, the SENTAR approach, used in this two city anti-marijuana drug prevention media campaign, employs the sensation seeking trait as the major segmentation variable, designs prevention messages that are high in sensation value to reach high sensation seekers, utilizes formative research to conceptualize and design the campaign, and purchases air time to place messages in HSV programming (Donohew, Lorch, & Palmgreen, 1998; Palmgreen & Donohew, in press). Five professionally produced anti-marijuana PSAs (“Michael,” “Dealer,” “Downer,” “Relationships,” and “True Lies”) were featured in this campaign and addressed the consequences of marijuana use. For a description of each, see Table 1. Using Knoxville, Tennessee as a control city, the first of a two-part PSA campaign was conducted in Lexington, Kentucky for the first four months of 1997.

What follows is an overview of the interview methods used to gather campaign data. Then, a series of results are presented to gauge the effect of the first Lexington

<table>
<thead>
<tr>
<th>PSA</th>
<th>Description</th>
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<tbody>
<tr>
<td>“Michael”</td>
<td>Based on a true story and features an African-American male who liked to smoke marijuana because it made him do crazy things in front of his friends. One day, while smoking pot, Michael and his friends play a game of Russian Roulette—Michael lost, paralyzing him. He says “I only smoked pot for a few months, but now I’m on drugs for life.”</td>
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<tr>
<td>“Dealer”</td>
<td>An in-your-face drug dealer in a school bathroom asks if “you want to get depressed or anxious, lose your girl, flunk out of school, get a little clumsy, smell bad, do something stupid? Then have some weed.” Video depicting consequences matches the drug dealer’s message.</td>
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<tr>
<td>“Downer”</td>
<td>Three friends are hanging out smoking pot when one of the three falls off the fence. As he uncontrollably rolls down the steep hill, vivid text is superimposed suggesting that marijuana can make you lose your grip on reality, friends, family, school, sports, jobs, and it can really “bust your lungs.”</td>
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<tr>
<td>“Relationships”</td>
<td>A teenage girl sits in her boyfriend’s room while he puts in a CD. She tries to talk to him about how since he has starting smoking marijuana, all he does is lie around. She also tells him that he is always sick and always forgetting things, and that she had to get a ride home from practice last night with another guy. The boyfriend ignores her and eventually turns up his music, when she gets up and leaves. The tagline says “Marijuana: It’s messed up a lot of relationships.”</td>
</tr>
<tr>
<td>“True Lies”</td>
<td>Opening with a man preaching the evils of smoking marijuana in classic “Reefer Madness” style, one of four girls grabs the remote and turns the TV off. While rolling a joint, she asks “Are they still trying to feed us that junk about weed?” Her three friends tell her that “she needs to listen girl.” They tell her that she “could get hung up on it,” that it can mess up her lungs, and that she can quit caring about things, like school and her friends. The girl rolling the joint gets up and leaves saying, “Well I can see I’m in the wrong place.”</td>
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campaign, including (1) frequency of advertising, (2) recall certainty and (3) post-campaign effects on beliefs, attitudes, intentions, and behaviors.

**Method**

**Subjects**

Adolescents in grades 8 through 12 were recruited via stratified systematic random sampling from Lexington, Kentucky and Knoxville, Tennessee for participation in this study. Of the 1,601 individuals who participated, 802 were from Kentucky and 799 were from Tennessee. About 100 participants were recruited each month from each county. Only subjects recruited from May through December, 1997 were included in this analysis. Of those participating, about 53% were female and 13% were non-white. The acceptance rate in Lexington was 42%, while the rate in Knoxville was 53%.

**Procedure**

To secure adolescent participation, survey workers from a university survey research center contacted a parent or guardian by telephone requesting the child to participate in this study. If parents agreed, and if the adolescent was willing to participate, then an interview was scheduled to take place in the adolescent’s home. Because of the sensitive nature of the interview questions, the interview was conducted somewhere in the adolescent’s home where nothing could be overheard. Consent forms were obtained from the parents and the adolescent before interviews began. Parents answered a series of demographic and socioeconomic questions before leaving the room for the confidential interview with the adolescent.

Using a laptop computer, the interviewer used a computer program designed specifically for these interview sessions. Questions appeared on the computer screen, and the responses could then be keyed into the computer. Data were saved to a hard disk. The first part of the adolescent interview session was conducted by the interviewer asking the questions and keying the adolescent’s responses into the computer. Given the sensitive nature of many of the questions, responses to the last half of the interview questions were answered directly by the participants. To accomplish this, the laptop computer was turned toward the adolescents so that their responses could be privately entered into the computer. This assisted with the confidentiality of their responses in that only the participant knew how the questions were answered and that it also prevented responses to sensitive questions being answered aloud. Each interview lasted about 45 minutes. Adolescent participants received certificates for a free movie rental and a pizza for their participation.

**Measures**

**Beliefs.** Twelve marijuana-related beliefs about occasional use of marijuana and twelve belief items about regular marijuana use were assessed on a four-point scale with the response options of disagree strongly, disagree somewhat, agree somewhat, and agree strongly. The items were: Occasional/Regular use of marijuana . . . (1) is harmful to people’s health, (2) helps people deal with their problems, (3) leads to the use of more harmful drugs, (4) hurts people’s coordina-
tion, (5) has harmful effects on people’s memory, (6) can cause lung cancer, (7) can cause emotional problems, (8) makes people do stupid things, (9) People who occasionally/regularly use marijuana . . . have trouble getting a boy or girlfriend, (10) smell bad, (11) become lazy, and (12) do worse at school, work, or sports. Belief measures for occasional marijuana use demonstrated good internal consistency ($\alpha = .91$) as did belief measures for regular marijuana use ($\alpha = .88$).

**Attitudes.** Seven marijuana-related attitudes about occasional use and seven items about regular use were assessed on a four-point scale, with the response options of disagree strongly, disagree somewhat, agree somewhat, and agree strongly. The items were: (1) I have bad feelings toward people who smoke marijuana occasionally/regularly, (2) I don’t want to hang around people who smoke marijuana occasionally/regularly, (3) Occasional/Regular use of marijuana is harmful, (4) People should not smoke marijuana occasionally/regularly, (5) Occasional/regular use of marijuana is okay, (6) Marijuana would be enjoyable if used occasionally/regularly, and (7) The idea of occasionally/regularly smoking marijuana scares me. Measures for attitudes toward occasional use demonstrated good internal consistency ($\alpha = .91$) as did measures for attitudes toward regular use ($\alpha = .85$).

**Intentions.** Participants were asked their intent to engage in experimental or regular marijuana use in the future. Specifically, experimental intent was assessed with “In the future, do you think you will try marijuana at least once.” Intent to use marijuana regularly was assessed with “In the future, do you think you will use marijuana regularly.” Responses to both of these items include definitely will not, probably will not, probably will, and definitely will.

**Behavior.** Participants were asked about 30-day marijuana use and lifetime marijuana use. Specifically, lifetime use was assessed with “Have you ever used marijuana?” By answering yes or no to this question, participants were then asked to “Please type in the number of days between 0 and 30 that you have used marijuana in the last 30 days.”

**Viewer Certainty.** To assess whether the PSAs had been seen by the target audience, adolescents were asked to read a short description of each of the five PSAs and indicate their certainty in seeing or not seeing the ad. Response options included very certain I did not see it, fairly certain I did not see it, fairly certain I saw it, very certain I saw it.

**Sensation Seeking.** Sensation seeking was measured using the Sensation Seeking Scale for Adolescents (SSS-A), which was developed specifically for this study (e.g., Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 1997: Hoyle & Stephenson, 1996). Since about half the teenage population are HSS (Zuckerman, 1979; Donohew, Palmgreen, & Lorch, 1994), a median split on the sum of the 20 items was used to define HSS and LSS, which follows the procedures employed in most studies of sensation seeking.

The SSS-A is an adapted version of two validated instruments, the Sensation Seeking Scale, Form V (Zuckerman, 1979) and the Sensation Seeking Scale for Adolescents (Huba, Newcomb, & Bentler, 1981). Each of the four dimensions of
sensation seeking was represented by five items. Thus, the completed scale contained 20 questions, which attained good internal consistency ($\alpha = .82$). See Table 2 for scale items.

Neither alcohol nor drug use is mentioned in any of the questions. However, the construct validity of the original measures from which this survey was adapted has been demonstrated in studies of adolescent alcohol and drug use (e.g., Huba et al., 1981; Newcomb, Maddahian, & Bentler, 1986; Stacy, Newcomb, & Bentler, 1993), where moderate to strong correlations were reported between sensation seeking and use of alcohol and drugs.

**Results**

The following analyses reflect post-campaign effects assessed over a period of 8 months (May through December, 1997; the campaign ran in Lexington, Kentucky from January to April, 1997 while Knoxville, Tennessee served as a control group). We will first review the frequency of advertising from information gathered by the professional media buyer. Then, the short-term effects of the anti-marijuana campaign are evaluated by examining viewer certainty of exposure to the PSAs, and post-campaign effects on marijuana-related beliefs, attitudes, intentions to use marijuana, and marijuana use or non-use.

**Frequency of Advertising**

Between January 1 and April 30, 1997, the HSV campaign PSAs were broadcast a total of 1,998 times in Lexington. From that total, the campaign paid for 753

| TABLE 2 |
| The Sensation-Seeking Scale for Adolescents (SSS-A) |

<table>
<thead>
<tr>
<th>Experience Seeking</th>
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<tbody>
<tr>
<td>1. I would like to explore strange places.</td>
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<td>5. I like modern or abstract paintings.</td>
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<tr>
<td>9. I like to try new foods.</td>
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<tr>
<td>13. People should dress the way they want.</td>
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<td>17. I would like to take off on a trip with no pre-planned routes or timetables.</td>
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<tr>
<th>Thrill and Adventure Seeking</th>
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<tbody>
<tr>
<td>2. I would like to try rock climbing.</td>
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<tr>
<td>6. I like to do frightening things.</td>
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<tr>
<td>10. I would like to try parachute jumping.</td>
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<tr>
<td>14. I would like to ski down a steep mountain.</td>
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<tr>
<td>18. I would like to try bungee jumping.</td>
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<tr>
<th>Disinhibition</th>
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<tbody>
<tr>
<td>3. I like wild parties.</td>
</tr>
<tr>
<td>7. I like to be around real party-ers.</td>
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<tr>
<td>11. I would like to live in the fast lane.</td>
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<tr>
<td>15. I like watching sexy scenes in movies.</td>
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<tr>
<td>19. I would love to have new and exciting experiences, even if they are illegal.</td>
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<thead>
<tr>
<th>Boredom Susceptibility</th>
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<tbody>
<tr>
<td>4. I hate watching a movie for the second time.</td>
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<tr>
<td>8. I get bored seeing the same kids all the time.</td>
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<tr>
<td>12. I get bored with people who always say the same thing.</td>
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<tr>
<td>16. I get restless when I spend too much time at home.</td>
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<tr>
<td>20. I prefer friends who are excitingly unpredictable.</td>
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</tbody>
</table>
commercial airtime slots, while local broadcasting companies ran the PSAs 1,245 times free of charge. Consequently, the campaign PSAs ran about 500 times a month, or 114 times a week for the 17½ weeks of the Lexington media campaign.

Viewer Certainty

To assess recall certainty by HSS and LSS in Lexington (since the first campaign did not run in Knoxville), an analysis of variance was used with sensation seeking (low vs. high, based on median split) as the independent variable and recall certainty as the dependent variable. A significant main effect for sensation seeking on recall certainty was found for “Michael,” \(F(1,709) = 4.39, p < .05\), “Downer,” \(F(1,709) = 12.98, p < .01\), for “Relationships,” \(F(1,709) = 19.90, p < .01\), and for “True Lies,” \(F(1,709) = 8.67, p < .01\), with HSS indicating greater recall certainty than LSS for each PSA (see Table 3). No significant effect emerged for “Dealer,” but production delays relegated it to run only during the last two weeks of the campaign (which accounts for the low levels of recall certainty for this PSA).

Differences in recall certainty between the campaign city and the control city also were assessed through ANOVA, with city (Lexington, Knoxville) as the independent variable and recall certainty by all viewers (HSS and LSS combined) as the dependent variable. A significant main effect for city on recall certainty was found for “Michael,” \(F(1,1452) = 618.13, p < .01\), “Dealer,” \(F(1,1452) = 13.78, p < .01\), “Downer,” \(F(1,1452) = 659.90, p < .01\), for “Relationships,” \(F(1,1452) = 587.73, p < .01\), and for “True Lies,” \(F(1,1452) = 1030.5, p < .01\), with Lexington viewers indicating much greater recall certainty than Knoxville viewers (see Table 3).

Campaign Effects

To assess post-campaign effects, a 2 (Lexington, Knoxville) \(\times\) 2 (high sensation seeker, low sensation seeker) \(\times\) 8 (May through December) Factorial Analysis of

<table>
<thead>
<tr>
<th>PSA</th>
<th>City</th>
<th>HSS</th>
<th>LSS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Recall</td>
<td>Percent Recalling</td>
<td>Mean Recall</td>
</tr>
<tr>
<td>Michael</td>
<td>Lexington</td>
<td>3.08</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Knoxville</td>
<td>1.64</td>
<td>15</td>
</tr>
<tr>
<td>Dealer</td>
<td>Lexington</td>
<td>1.79</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Knoxville</td>
<td>1.62</td>
<td>14</td>
</tr>
<tr>
<td>Downer</td>
<td>Lexington</td>
<td>3.03</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>Knoxville</td>
<td>1.45</td>
<td>10</td>
</tr>
<tr>
<td>Relationships</td>
<td>Lexington</td>
<td>3.11</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Knoxville</td>
<td>1.65</td>
<td>18</td>
</tr>
<tr>
<td>True Lies</td>
<td>Lexington</td>
<td>3.27</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Knoxville</td>
<td>1.48</td>
<td>13</td>
</tr>
</tbody>
</table>

\(^1\) = very certain not seen; 2 = fairly certain not seen; 3 = fairly certain seen; 4 = very certain seen. Averages were calculated from eight post-campaign months.

\(^2\)Percent recalling is the cumulative percentage of respondents indicating “fairly certain” or “very certain” they had seen the PSA.
Variance was employed separately on each of the eight dependent variables (beliefs about occasional use, beliefs about regular use, attitudes toward occasional use, attitudes toward regular use, intent to experiment with marijuana, intent to use marijuana regularly, 30-day marijuana use, and lifetime marijuana use). All significant main effects and interactions are reported below. However, particular attention is given to any significant interactions between interview city and time period, where a significant interaction would reveal differences between the two cities over time that may be attributed to the campaign. Media campaign effects can emerge over a period of approximately one year (Palmgreen & Donohew, in press), therefore effects that are marginally significant or approaching significance are reported with the caveat that such results are not indicative of campaign effects and should be interpreted cautiously. Because of large sample size, certain differences between variables were statistically significant, but perhaps not significant in an absolute sense. We leave this issue to the reader to judge the differences.

**Beliefs About Occasional Use of Marijuana.** A significant main effect was detected for interview city on beliefs about occasional marijuana use, $F(1,1560) = 25.75, p < .05$. where Lexington adolescents ($M = 2.19$) responded with stronger pro-marijuana beliefs about occasional marijuana use than did Knoxville adolescents ($M = 2.01$). A significant main effect was also detected for sensation seeking on beliefs about occasional marijuana use, $F(1,1560) = 267.39, p < .05$, where HSS ($M = 2.33$) responded with stronger pro-marijuana beliefs than did LSS ($M = 1.84$). No main effect for time period was detected. Additionally, the interaction between interview city and time period approached significance, $F(7,1554) = 1.59, p = .13$. Multiple comparison tests ($p < .05$) suggest that pro-marijuana beliefs about occasional marijuana use increased between the first and eighth post-campaign month (where adolescent beliefs in Knoxville increased significantly more [from $M = 1.99$ to $M = 2.24$] than adolescent beliefs in Lexington [from $M = 2.17$ to $M = 2.32$]), the second and eighth post-campaign month (where adolescent beliefs in Knoxville increased significantly more [from $M = 2.02$ to $M = 2.24$] than adolescent beliefs in Lexington [from $M = 2.25$ to $M = 2.32$]), the fourth and eighth post-campaign month (where adolescent beliefs in Knoxville increased significantly more [from $M = 2.07$ to $M = 2.24$] than adolescent beliefs in Lexington [from $M = 2.21$ to $M = 2.32$]), and the fifth and eighth post-campaign month (where adolescent beliefs in Knoxville increased significantly more [from $M = 2.06$ to $M = 2.24$] than adolescent beliefs in Lexington [from $M = 2.20$ to $M = 2.32$]).

**Beliefs About Regular Use of Marijuana.** A significant main effect was detected for interview city on beliefs about regular marijuana use, $F(1,1560) = 4.76, p < .05$, where Lexington adolescents ($M = 1.67$) responded with significantly stronger pro-marijuana beliefs about regular marijuana use than did Knoxville adolescents ($M = 1.59$). A significant main effect was also detected for sensation seeking on beliefs about regular marijuana use, $F(1,1560) = 148.08, p < .05$, where HSS ($M = 1.78$) held significantly stronger pro-marijuana beliefs about regular marijuana use than did LSS ($M = 1.48$). No main effect for time period was detected, nor were any interactions involving time period.
**Attitudes Toward Occasional Use of Marijuana.** A significant main effect was detected on attitudes toward occasional marijuana use for interview city, $F(1,1560) = 20.52, p < .05$, where Lexington adolescents ($M = 2.29$) responded with significantly stronger pro-marijuana attitudes toward occasional marijuana use than did Knoxville adolescents ($M = 2.13$). Additionally, a significant main effect was detected for sensation seeking, $F(1,1560) = 389.16, p < .05$, where HSS ($M = 2.57$) reported significantly stronger pro-marijuana attitudes toward occasional marijuana use than did LSS ($M = 1.99$). No main effect for time period was detected. No two-way interactions were significant, although the interaction between interview city and time period again approached significance, $F(7,1554) = 1.71, p = .10$. Multiple comparison tests ($p < .05$) reveal significant differences between the first and eighth post-campaign month (where pro-marijuana attitudes increased at a significantly greater rate for Knoxville [from $M = 2.08$ to $M = 2.33$] than for Lexington [from $M = 2.20$ to $M = 2.32$]), and between the third and eighth post-campaign month (where pro-marijuana attitudes increased at a significantly greater rate for Knoxville [from $M = 2.08$ to $M = 2.33$] while declining slightly in Lexington [from $M = 2.35$ to $M = 2.32$]). No other interactions were statistically significant.

**Attitudes About Regular Use of Marijuana.** A significant main effect was detected for sensation seeking, $F(1,1560) = 208.10, p < .05$, where HSS ($M = 1.99$) indicated significantly stronger pro-marijuana attitudes toward regular marijuana use than did LSS ($M = 1.50$). No main effects for interview city or time period were detected, and there were no significant interactions.

**Intention to Try Marijuana at Least Once.** A significant main effect was detected for interview city, $F(1,1475) = 19.47, p < .05$, where Lexington adolescents ($M = 2.26$) were significantly more likely than Knoxville adolescents ($M = 2.03$) to try marijuana at least once. More specifically, 57% of Lexington adolescents indicated that probably or definitely would try marijuana at least once compared to 35% of Knoxville adolescents. Additionally, a main effect was detected for sensation seeking, $F(1,1475) = 298.26, p < .05$, where HSS ($M = 2.56$) were significantly more likely LSS ($M = 1.66$) to try using marijuana at least once. More specifically, 57% of HSS indicated that they probably or definitely would try marijuana at least once compared to 20% of LSS. No main effect for time period was detected. No interactions were significant.

**Intention to Use Marijuana Regularly.** A significant main effect was detected for interview city on intentions to use marijuana regularly, $F(1,1475) = 13.00, p < .05$, where Lexington adolescents ($M = 1.37$) had slightly stronger intentions to use marijuana regularly than Knoxville adolescents ($M = 1.25$). More specifically, 8% of Lexington adolescents indicated that they probably or definitely would use marijuana regularly in the future compared to 5% of Knoxville adolescents. Additionally, a significant main effect was detected for sensation seeking on intention to use marijuana regularly, $F(1,1475) = 107.83, p < .05$, where HSS adolescents ($M = 1.48$) were significantly more likely to use marijuana regularly than LSS ($M = 1.12$). More specifically, 11% of HSS indicated that they probably or definitely would use marijuana regularly in the future compared to 2% of LSS.
The main effect for time period approached significance, $F(7, 1469) = 107.93, p = .08$. No interactions were statistically significant.

**30-Day Marijuana Use.** A significant main effect was detected for sensation seeking on 30-day marijuana use, $F(1, 1530) = 118.97, p < .05$, where HSS ($M = .28$) were significantly more likely than LSS ($M = .07$) to have used marijuana in the past 30 days. No main effects for interview city or time period were detected, and there were no significant interactions.

**Lifetime Marijuana Use.** A significant main effect was detected for interview city on lifetime marijuana use, $F(1, 1530) = 3.99, p < .05$, where Lexington adolescents ($M = .36$) were significantly more likely than Knoxville adolescents ($M = .30$) to have used marijuana in their lifetime. Additionally, a significant main effect was detected for sensation seeking on lifetime marijuana use, $F(1, 1530) = 150.11, p < .05$, where HSS adolescents ($M = .45$) were significantly more likely than LSS ($M = .18$) to have used marijuana in their lifetime. A main effect for time period on lifetime marijuana use approached significance, $F(7, 1524) = 1.96, p = .06$. Additionally, a significant interaction between interview city and time period on lifetime marijuana use was detected, $F(7, 1524) = 2.04, p < .05$. Multiple comparison tests ($p < .05$) reveal significant differences between the first and eighth post-campaign month, where the number of adolescents reporting lifetime marijuana use increased at a significantly greater rate over the post-campaign time period for Knoxville (from $M = .23$ to $M = .43$) than for Lexington (from $M = .30$ to $M = .43$). Additionally, significant differences were detected between the second and eighth post-campaign month, where the number of adolescents reporting lifetime marijuana use increased at a greater rate for Knoxville (from $M = .21$ to $M = .43$) than in Lexington (from $M = .36$ to $M = .43$). No other interactions were significant.

**Discussion**

**Campaign Effects**

This short-term evaluation of the anti-marijuana campaign on several persuasive outcome variables offers some indication that campaign city adolescents may have been affected when compared to adolescents in the control city. The campaign effect (revealed through a significant interaction between campaign city and time period) was most evident on lifetime marijuana use, where the number of adolescents reporting lifetime marijuana use did in fact increase at a significantly faster rate in the control city compared to adolescents in the campaign city. In fact, over eight post-campaign months, lifetime use by adolescents in Knoxville increased 20% compared to 13% in Lexington. Given the arduous task of persuading teenagers about the consequences of using a drug that has attained general acceptance among many of their peers, this reduction in lifetime use is particularly notable. Additionally, the rate and amount of growth of favorable beliefs and attitudes toward occasional marijuana use in the campaign city decreased in comparison with control city over the eight post-campaign months.

However, we will point out that campaign effects on one behavioral-use variable in combination with these trends toward statistical significance do not qualify this campaign as a success. Perhaps part of the difficulty in attaining statistically
significant findings is that adolescents become more pro-marijuana as they get older. This is clearly articulated in our data given that we are tracking the same sample of adolescents over time (i.e., 7th through 10th grade the first year, 8th through 11th grade the next, etc.). Consequently, in considering the goals of the campaign, it is more realistic to slow the rate of increasingly pro-marijuana beliefs and attitudes (as well as marijuana use) than it is to expect sudden or sharp decreases in these outcomes. Because it is maintained that media effects are not immediate, but rather emerge over time (e.g., Palmgreen & Donohew, in press; Wartella & Middlestadt, 1991), the marginally significant findings become particularly interesting in light of a second (or “booster”) campaign in Lexington. The booster campaign may potentially provide the stimulus needed to generate clear and statistically significant differences between the two cities.

While only lifetime marijuana use was affected by the first campaign (in terms of statistical significance), we remain cautiously optimistic about these trends in the belief and attitudinal variables. However, we acknowledge that there are limits on the conclusions we can draw about any short-term effects of this campaign, part of which are attributed to the restrictions in data analysis. The ideal statistical assessment of this data is a time series analysis, which will be used for campaign evaluation when the larger study involving 32 months of data collection is complete. However, time series analysis is inappropriate for a short-term assessment, such as this one, with a restricted number of available data points (e.g., Box, Jenkins, & Reinsel, 1994). Thus, with the existing data, it is difficult to examine the relationship of pre-campaign and during campaign data to the post-campaign effects. A related issue, then, is the use of analysis of variance to assess the effects of the campaign thus far. Using monthly mean scores makes ANOVA less sensitive to detecting campaign effects, especially where already increasing pro-marijuana thoughts or behaviors are offset by any declines in these same thoughts or behaviors once the campaign has begun. A time series analysis will provide a more clear and definitive answer as to whether this campaign affected marijuana-related beliefs, attitudes, intentions, and behaviors.

**Campaign Design Principles**

Other evaluative aspects of this study support design principles employed in the SENTAR approach. First, results indicate that the campaign reached the target group of high sensation seeking adolescents. With the exception of one of the five PSAs, which was delayed in production, HSS in Lexington on average appear to be more than “fairly certain” that they have seen the campaign PSAs. In some cases, LSS also give some indication that they have seen the PSAs as well. These findings can be attributed in part to message placement and purchased advertising time, two campaign design principles endorsed by the SENTAR approach (Palmgreen & Donohew, in press). Consistent with earlier SENTAR research, purchasing airtime and strategically placing the PSAs in high sensation value programming strongly increased the chances that the target group would be exposed to the campaign messages. To a certain degree, these results can also be attributed to the cooperation of the local television stations and cable company for committing at least one free PSA airing for each purchased time slot, although donated PSAs were less likely to air in HSV programming. Nevertheless, the combined frequency
of paid and donated airtime strongly contributed to the high levels of campaign PSA awareness.

Additionally, it is also worth noting that these results support the well-researched idea that HSS are much more likely to engage in thrill-seeking behaviors, such as using drugs. In this study, HSS displayed significantly stronger pro-marijuana beliefs and attitudes for both occasional and regular use. Further, HSS are more inclined to both experiment with marijuana as well as use marijuana regularly. Finally, the data suggest that HSS are much more likely to experiment with marijuana, as supported by 30-day and lifetime use of marijuana. Consequently, HSS remain a viable target for this and future drug prevention efforts.

Implications for Design and Application of Anti-Drug Campaigns

In highlighting the fundamentals of this campaign's design and execution, it is instructive to note that studies involving the use of televised anti-drug PSAs alone generally have exhibited flaws in campaign design and execution. Typically, three important campaign principles are violated: (1) lack of widespread, frequent, and prolonged exposure to messages—in several campaigns reported in the literature, PSAs were aired outside prime time and/or on non-commercial stations, and then only infrequently; (2) lack of segmentation or targeting—many anti-drug PSA campaigns have not been directed at identifiable audience segments (Flay & Sobel, 1983), and (3) lack of any pre-campaign analysis, or formative research (Atkin & Friemuth, 1987).

Therefore, for campaign practitioners, we would advocate the approach taken in this and our previous efforts to design and implement anti-drug campaigns. First, conduct formative research. This process not only facilitates a better understanding of the target audience, but it also provides a means to pretest a variety of PSA concepts before expending valuable resources on potentially ineffective ads (Stephenson, 1999). Focus groups are often a convenient and informative method of gaining this information.

Second, when possible, purchase advertising time so that messages may be placed in television programming typically viewed by the target audience. Typically, one can get a sense of the preferred programming from focus groups, although media purchasing agencies often have access to Nielson Ratings. The latter is very useful because television show viewing rates contain demographic breakdowns, allowing the campaign design team to determine appropriate programming in which to place the PSAs.

Third, when targeting HSS, employ content and formal features characteristic of high sensation value messages. In extensive formative research involving HSS and LSS, media messages and instructional materials found to be most effective with HSS are those that are (a) novel, creative, or unusual; (b) complex; (c) intense (auditory and visual stimuli that are emotionally strong or physically arousing; i.e., exciting or stimulating); (d) graphic or explicit; (e) ambiguous; (f) unconventional; (g) fast paced; or (h) suspenseful. Although not all of these characteristics of HSV messages need to be included in a single message to reach HSS, more effective messages tend to be characterized by a greater number of these features (Donohew, Lorch, & Palmgreen, 1998).
Practical Value and Importance

The National Institute on Drug Abuse (NIDA) estimated the economic cost to the United States society of drug abuse in 1995 to be $109.8 billion, warranting a "strong, consistent, and continuous investment in research on prevention and treatment" (Swan, 1998, p. 1). The effects of television are of particular interest to those involved in drug abuse prevention because of this medium's huge reach with a variety of target populations, even adolescents (Klein, Brown, Walsh-Childers, Oliveri, Porter, and Dykers, 1993). Thus, while changes in belief and attitudinal variables in this anti-marijuana campaign may initially be perceived as relatively insignificant, even a small reduction in the percentage of adolescents reporting 30-day or lifetime marijuana use (typically associated with changes in belief and attitudinal variables) may potentially translate into hundreds of teenagers (possibly thousands if applied to national anti-drug campaigns). Perhaps this is one main reason for our expressed optimism of the declining pro-marijuana beliefs and attitudes reported here.

Television has been by far the most widely used means of disseminating media prevention messages, usually in the form of PSAs (Backer, 1990). Knowledge about television's potential effects on at-risk populations, whether when used alone or in conjunction with institutional or other media channels, is vital to campaign designers. Unfortunately, one finds only a few published scientific evaluations of anti-drug media-only campaigns. Research on the massive and well-designed Partnership for a Drug-Free America television campaign (supported by over $2.8 billion in donated air time and print space since 1987) provides some evidence of its effectiveness (Black, 1991; Zastowny, Adams, Black, Lawton, & Wilder, 1993). The published evaluations of this campaign, however, have been criticized for being based on a series of annual cross-sectional samples which for several years employed a controversial mall-intercept design. No satisfactory control population exists for this national campaign. The present anti-marijuana campaign, in part, attempts to correct for the methodological shortcomings of previous anti-drug research (by utilizing a control city and time series analyses) while simultaneously assessing the effectiveness of a media-only intervention that has been conceptualized with well-established principles of campaign design. Although the early history of mass media health campaigns was largely one of failures (Flay & Sobel, 1983; Rogers & Storey, 1987), the promise of reaching large audiences through the media has led to continued efforts with research studies such as this one.

Limitations of this Study

This preliminary analysis is not without its limitations. As noted, the ideal statistical method of evaluation is time series analysis, which will be utilized upon completion of gathering 32 months of data.

A second limitation to this study is the absence of any effect on beliefs and attitudes about regular use of marijuana. One possible explanation for this finding is that the PSAs in this campaign did not address issues relating to regular marijuana use. Instead, the campaign was conceptualized and designed from a prevention perspective, with efforts focused at discouraging teenagers from even
experimenting with marijuana. Consequently, it is entirely possible that even the
final time series analysis will detect little, if any, significant movement among
these variables as most participants appear to already hold relatively negative
beliefs and attitudes about regular marijuana use.

Finally, there is some ambiguity in translating recall certainty in Lexington and
Knoxville. While tables 3 and 4 document that Lexington viewers were much more
certain that they had viewed the PSAs when compared to Knoxville viewers, there
is still a small percentage of Knoxville respondents who feel at least fairly certain
they have viewed the PSA even though they were in the control city. We believe
that the percentage of “false positives” could be reduced by changing the verbal
PSA descriptions to one in which respondents actually view the PSA on portable
video players. The ambiguity of the recall assessment in combination with social
desirability may be the factors inflating recall by control city participants.

Conclusion

The short-term effects of the first anti-marijuana campaign are somewhat
limited, primarily affecting only lifetime marijuana use. In the absence of
statistical significance, the short-term trends of anti-marijuana beliefs and atti-
tudes are promising, although judgment must be reserved until all data are
collected and time series analyses conducted. In addition to reviewing the
preliminary effects, we also discussed and encouraged the use of several campaign
design principles believed to maximize the opportunity of conducting an effective
and successful anti-drug campaign. Finally, we have highlighted the value of
targeting a specific at-risk adolescent population based on the biological link
between sensation seeking and drug use. While many questions remain about the
interim and long-term effects of this anti-drug campaign, the success or failure of
this effort will bring us closer to understanding whether we can design prevention
messages and campaigns that affect adolescent substance use.

Notes

1. Sensation seeking is based on psychobiological theory, and has been shown to have a high
heritability factor (Fulker, Eysenck, & Zuckerman, 1980; Zuckerman, 1990, 1994). Thus, it has a
number of biochemical correlates, including testosterone, monoamines, and their metabolites and
endorphins (Netter, Hennig, & Roed, 1996; Zuckerman, 1979, 1994). Research by Bardo and others
(Bardo, Neiswander, & Pierce, 1989; Bardo & Mueller, 1991; Bardo, Donohew, & Harrington, 1996)
strongly suggests that novelty-seeking behavior and self-administration of drugs in animals may
involve a common dopamine system in the brain. While sensation seeking is primarily biological in
nature, the environment is also thought to account for at least one third of its variance (Zuckerman,
1979). Males typically score higher on sensation seeking measures at all ages, although sensation
seeking tends to decline with age for all individuals (Zuckerman, 1988).

2. These figures represent an average of monthly response rates. Monthly response rates were
calculated by: monthly interviews/(monthly interviews + monthly refusals).

3. For 30-day marijuana use and for lifetime marijuana use, reported means represent percentages of
use since nonuse = 0 and use = 1 in these statistical analyses.

4. As previously noted, campaign effects were determined by a significant interaction between
interview city and time period.
References


