

Sensation Seeking, Message Sensation Value, and Drug Use as Mediators of PSA Effectiveness

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The planners of public health communication campaigns, at the urging of researchers, are becoming increasingly aware of the need to develop campaign messages that are designed to appeal specifically to members of narrowly defined target audiences. The awakening process has been long and painful, coming only after the failure of numerous campaigns that aimed messages of supposed general appeal at unidentifiable audience segments (Flay & Sobel, 1983; Rogers & Storey, 1987). As Flay and Sobel (1983) observed after reviewing mass-media-based drug abuse prevention efforts, much more emphasis should be placed on formative message research in the laboratory before proceeding to more expensive field evaluations and certainly prior to program dissemination: "Only after it has been established that an efficacious communication product has been developed, is it worth disseminating it" (Flay & Sobel, 1983, p. 26; see also Baker, Petty, & Gleicher, this issue). Despite such urgings, however, and in spite of the demonstrated success of several campaigns that did employ formative research to tailor messages to the needs of target audiences (Flay & Sobel, 1983; Flora, Maccoby, & Farquhar, 1989; Rogers & Storey, 1987), a recent review found that:

Health educators have not typically used systematic approaches at the pre-production stage, as mass media campaign efforts often proceed in the absence of a research foundation. Instead, messages tend to be produced in a haphazard fashion based on creative inspiration of copywriters and artists patterned after the normative standards of the health campaign genre. (Atkin & Freimuth, 1989, p. 132)

A series of studies funded by the National Institute on Drug Abuse, one of which is reported on here, is focused directly on the problem of developing and

testing methods of enhancing the effectiveness of televised antidrug public service announcements (PSAs). These PSAs often are submerged in an overwhelming clutter of programming and product advertisements and must be capable of (a) immediately attracting the attention of target audience members and (b) motivating these viewers to attend to the remainder of the message. In addition, such messages require relatively high levels of information-processing intensity and/or involvement to achieve informational and persuasive goals. Further, motives for watching television ordinarily do not include exposure to advertising and PSAs.

SENSATION SEEKING AND TARGETING

Designing effective televised antidrug PSAs for use in comprehensive prevention campaigns is a difficult task. Ways must be found to motivate both attention to the entire message and high-level processing of its content. Our previous research indicates that a promising way of accomplishing these goals is to target messages according to sensation-seeking level (Zuckerman, 1979), a biologically based characteristic found to be associated with both communication (Donohew, Palmgreen, & Duncan, 1980) and drug use (Donohew, 1988; Zuckerman, 1979). Need for sensation—a need related to preferences for novel, complex, and ambiguous stimuli (e.g., Zuckerman, 1988)—has been measured both as a personality trait (Pearson, 1970, 1971; Zuckerman, 1979, 1983, 1988; Zuckerman, Kolin, Price, & Zoob, 1964) and as part of a more general activation theory of information exposure (Donohew, Finn, & Christ, 1988; Donohew et al., 1980).

Several studies have demonstrated that sensation seeking is a powerful etiological factor in drug abuse, leading to high levels of use of a variety of drugs and earlier onset of use. For example, Zuckerman, Neary, and Brustman (1970) found that 74% of college undergraduates who were high sensation seekers (HSSs) had used one or more drugs as opposed to only 23% of low sensation seekers (LSSs). In a study of senior high school students (Donohew, 1988; Donohew, Helm, Lawrence, & Shatzer, 1990), HSSs were twice as likely as LSSs to report use of beer and liquor during the past 30 days and up to seven times as likely to report the use of other drugs. Junior high school students displayed the same overall pattern, although levels of drug use were lower.

In the area of communication, persons with high need for sensation also tend to tolerate or even require stronger messages for attracting and holding their attention (Donohew et al., 1988; Donohew et al., 1980). Findings from communication studies thus far indicate that individual differences in need for sensation and, to a lesser extent, in prior drug use play a major role in exposure to and comprehension of drug abuse prevention messages and in arousal (skin conductance), attitudinal, and behavioral intention responses to the messages (Donohew, 1988; Donohew et al., 1988).

The research results strongly imply, therefore, that messages designed specifically to appeal to the needs of HSSs will be more effective in reaching and influencing this high-risk group. We are testing this proposition in a series of laboratory experiments (the first of which is reported here) in which both HSS and LSS subjects are exposed to televised antidrug PSAs either high or low in sensation value. We define *sensation value* as the degree to which formal and content audio-visual features of a televised message elicit sensory, affective, and arousal responses.

The primary purpose of the study reported here was to determine the relative effectiveness of high sensation value (HSV) and low sensation value (LSV) televised antidrug PSAs presented to groups of 18- to 22-year-old HSSs and LSSs.¹ In this study, the test PSAs were presented in the context of other television messages under controlled laboratory conditions that promoted high levels of attention. Although several dependent variables were measured (e.g., mood, free and cued recall, skin conductance), treatment of the full range of variables is beyond the limited scope of this article. We shall concentrate here on two of the more critical indices of PSA effectiveness: (a) behavioral intention to call a drug hotline as advocated in the PSA and (b) attitude toward drug use. It was hypothesized that the HSV version of the PSA would be more effective with HSSs in inducing a stronger behavioral intention to call the hotline and more negative attitudes toward drugs, whereas the LSV PSA would be more effective with LSSs. In addition, based on research indicating the ability of appropriate introductory material to increase the effectiveness of messages (Burnkrant & Sawyer, 1983), it was expected that a PSA version that included a verbal audio motivational introduction would be more effective than an otherwise identical PSA without such an introduction. A final question for this investigation was: Does drug use mediate the effects of the just-discussed message variables?

METHOD

Message Design and Pretesting

Prior to conducting the experiment, two national-quality 30-sec televised PSAs were developed, one aimed at HSS and the other at LSS individuals in the 18- to 22-year-old age range. A detailed description of the extensive formative research that led to the production of the PSAs is provided elsewhere (Donohew, Lorch,

¹The 18-22 age group displays the highest, or nearly the highest, usage levels for a number of different drugs, according to the 1985 National Household Survey on Drug Abuse. For example, 39.1% of this group had used marijuana in the past 12 months and 23.5% in the past 30 days (highest among the age groups). The group also ranked first in cocaine use, with 17.5% using cocaine in the past 12 months and 8.7% in the past 30 days, compared to figures of 8.2% and 3.9%, respectively, for the 16-17 age group. Reaching this age group with prevention messages should thus be a major goal of drug abuse prevention campaigns.

& Palmgreen, 1991; Donohew et al., 1989). Through this research, characteristics of televised messages that have differential appeal for HSS and LSS young adults were determined. Although HSSs and LSSs responded similarly to a number of message characteristics, HSS subjects reacted more positively to more novel and intense messages. In addition to preferring more novel formats and unusual use of formal features (e.g., extreme close-ups and heavy use of sound effects), HSS subjects also desired higher levels of suspense, tension, drama, and emotional impact than did LSSs. HSV and LSV message versions introduced variations in these characteristics as well as one content difference. Past research (Donohew, 1988) suggests that LSS individuals are relatively unlikely to become users unless society, probably as represented by peers, intervenes. Thus, it was decided that the LSV message should aim at the development of peer resistance skills. In contrast, HSSs' needs for stimulation suggested that HSSs may be influenced by encouraging (via the HSV PSA) the substitution of alternative stimulating but prosocial activities.

The concept chosen for production represented a pinball game. A hand was shown pulling back the plunger to start the ball through the machine. As the ball bounced off bumpers, scenes of social activities (LSV) or exciting alternatives to drug use (HSV) were shown. When the possibility of drug use was introduced, the game "tilted" and the ball entered the game's "Dead End Alley," depicting drug abuse and negative consequences of using drugs as highlighted by a shot of an ambulance exiting the alley. The PSAs ended by presenting 1-800 hotline numbers to call for information about peer resistance skills (LSV) or alternatives to drug use (HSV). In the motivational introduction version of each PSA, the hand pulling back the plunger in the initial scene was accompanied by a dramatic voiceover saying, "The game is life." The final versions were produced by an award-winning producer who participated in all aspects of their development.

Selection of Experimental Subjects

The 18- to 22-year-old subjects were recruited for the laboratory experiment from a variety of sources, including drivers license listings, recruitment ads in a local newspaper and a shoppers weekly, a local public university, and a local 2-year community college. A total of 207 subjects were included in the final analyses of the experiment.

Independent Variables

Independent variables were: (a) sensation seeking—high or low, (b) message sensation value—high or low, (c) motivational introduction to the PSA—presence or absence of a brief verbal audio message (as described before) to attract and motivate continued attention, and (d) drug use—a quantitative measure of fre-

quency of use of various illicit drugs in the past 30 days. These were employed in a $2 \times 2 \times 2 \times 2$ randomized groups design, with a control group.²

The operationalizations of message sensation value and the motivational introduction variable have already been described. The other independent variables were sensation seeking and drug use.

Sensation seeking. Subjects completed the Zuckerman (1979) Sensation Seeking Scale, Form V. A median split on the sum of the 37 non-drug-related items was used to define LSSs and HSSs, who then were randomly assigned to one of the experimental conditions ($n = 165$) or the control group ($n = 42$). The reliability of the scale was .81 (coefficient alpha).

Drug use. Questions about levels of use of illicit drugs were adapted from instruments used in a continuing survey of young people by the Institute for Social Research at the University of Michigan (Johnston, Bachman, & O'Malley, 1982). Active drug users were defined as those who had indicated use of at least one of seven illicit drugs (marijuana, LSD, uppers, downers, tranquilizers, cocaine or crack, opiates) in the 30 days prior to the experiment. Nonusers, for the purpose of this study, were those with no indicated illicit drug use in the month's time.

Laboratory Procedure

Subjects were seated facing a color television monitor and were told they would be shown several televised ads and messages. The videotape began with 4 min of a story from *CBS Sunday Morning* and continued with two 30-sec commercials, one of the test PSAs, then three more 30-sec ads, and a repeat of the PSA. Subjects then completed mood, behavioral intention, attitude, and drug use scales and indicated their age, gender, and educational level. Control group subjects participated in all procedures, except that the antidrug PSAs were not included in the video content.

Dependent Variables

Behavioral intention index. Immediately after the second viewing of the PSA, subjects exposed to the HSV message were asked, "If you wanted information about exciting alternatives to drug use, how likely is it, on a scale of 1 to 5, that you would call an 800 hotline?" Those exposed to the LSV message were asked about information about resisting peer pressure to use drugs using the same

²Because time constraints did not allow subjects to be run individually, they were run in groups of two to five persons (usually four or five persons). These groups (rather than individuals) were randomly assigned to the experimental conditions or control group.

scale. An index was then created that took into account the behavioral intention of the appropriate control group.³ Values greater than 1.0 on the index indicate a stronger intention of the experimental group to call the hotline than the appropriate control group.

Attitude toward drug use. After behavioral intention was measured, subjects were asked to indicate on a scale of 1 to 5 how they felt about their personal use of drugs in relation to each of six adjective word pairs. Again, a ratio was created, with the averaged response of each subject serving as the numerator and the appropriate control group's averaged response as the denominator. Index values less than 1.0 indicate more negative attitudes toward drugs than those displayed by the appropriate control group.

RESULTS

Behavioral Intention

An analysis of variance showed no significant main effects of sensation seeking, message sensation value, or drug use on the index of behavioral intention. However, the PSA versions with the motivational introduction were significantly ($p = .011$) more effective ($M = 1.33$) in inducing subjects to call the appropriate hotline, relative to the appropriate control group, than those exposed to the messages without the introduction ($M = 1.01$).

Much more important from a targeting perspective, however, is the interaction between message sensation value and sensation seeking ($p = .059$). As hypothesized, the behavioral intention of LSS individuals was more affected by the LSV message (relative to the appropriate control group) than by the HSV message ($p = .056$, one tailed). Planned comparisons followed the Bonferroni procedure to control for family-wise error rate. HSS subjects tended to be more persuaded by the HSV message, but this difference was not statistically significant.

The only other significant two-way interaction, between sensation seeking and drug use ($p = .023$), revealed a somewhat surprising pattern. It was expected that HSS users of illicit drugs would, for both behavioral and biological reasons, be the most resistant to antidrug messages. Instead, this group displayed the strongest effects on behavioral intention to call the hotline advocated in the PSA ($M = 1.40$). LSS users of drugs, on the other hand, displayed negative effects on behavioral intention ($M = .85$; $p = .05$, two-tailed, for difference between HSS and LSS users). LSS nonusers showed some positive impact ($M = 1.18$). Finally, HSS nonusers, a group particularly at risk to become drug users, appeared

³Variables employed to determine the appropriate control group were sensation seeking (high or low) and drug use (user or nonuser). Thus, HSSs using drugs in the experimental group were compared to HSSs using drugs in the control group, and so on.

to be unaffected by the hotline appeal ($M = 1.02$). This finding, however, does not take into account the potential effects of message sensation value and motivational introduction for persuading this important group.

The importance of message variables is underscored by the significant interaction ($p = .044$) of message sensation value, motivational introduction, and drug use (see Table 1). For nonusers, both motivational introduction versions were superior to the nonintroduction versions (based on Duncan's test), with the motivational introduction versions producing behavioral intention index means greater than 1.00. Thus, both appeals with motivational introductions were effective with nonusers. For drug users, the picture is less clear, because the four cell means did not differ significantly ($p = .32$). However, the LSV introduction version ($M = 1.72$) and both the nonintroduction ($M = 1.32$) and introduction ($M = 1.23$) versions of the HSV message positively affected behavioral intention to call the hotline.

The three-way interaction just mentioned, although having implications for message targeting, does not consider the sensation-seeking level of the subject. Although the four-way interaction involving all independent variables was not significant, it is enlightening to examine the relative effects of the four different versions of the PSAs on the four types of individuals resulting from crossing sensation seeking with drug use. This examination must be very tentative, of course. Some cell sizes are small, and certain mean differences are not statistically significant by Duncan's test.

If we first consider the two nonuser groups, the motivational introduction version of the PSA was superior to the nonintroduction form in all four comparisons. Moreover, and consistent with our expectations, the LSV introduction message was the most effective message with LSS nonusers ($M = 1.48$), whereas the HSV introduction version was the most effective with HSS nonusers ($M = 1.58$).

TABLE 1
Behavioral Intention: Interaction of Drug Use, Message Sensation Value, and Motivational Introduction

Message Sensation Value	Drug Use in Past 30 Days			
	Nonusers		Users	
	LSV	HSV	LSV	HSV
Motivational introduction				
Nonintroduction	1.08 _{ab}	.82 _b	.88	1.32
Introduction	1.30 _a	1.25 _a	1.72	1.23

Notes. Behavioral intention index indicates mean behavioral intention of experimental group to call the appropriate hotline relative to mean behavioral intention of appropriate control group. For the one-way analysis of variance of the nonuser means, $F(3, 114) = 2.42, p = .07$; means without a common subscript differ at the .05 level by Duncan's test. For the one-way analysis of variance of the user means, $F(3, 43) = 1.21, p = .32$.

Although the overall mean for HSS nonusers ($M = 1.02$) suggested no effect on this group, the more detailed analysis indicates that this important at-risk group was reached effectively with the message hypothesized to do so.

Unfortunately, the LSS user group is too small ($n = 11$) to yield valid inferences. The HSS user group ($n = 36$) yielded no significant differences among the four cell means. Still, the absolute values of the index means indicate that the introduction ($M = 1.43$) and nonintroduction ($M = 1.37$) versions of the HSV message were effective in inducing HSS users to call the correct hotline. Surprisingly, the subgroup of HSS users with the highest behavioral intention mean was that exposed to the LSV message with motivational introduction ($M = 2.04$). The small size ($n = 7$) of this subgroup limits inferences, but it appears that HSS users may be vulnerable to appeals based on exciting alternatives to drug use and to appeals based on peer resistance skills.

Attitude Toward Drugs

An analysis of variance showed significant main effects of motivational introduction ($p = .001$) and message sensation value ($p = .001$) on the attitude toward drugs index. The motivational introduction versions were more effective than the nonintroduction versions ($M = .88$ and 1.01 , respectively) in inducing more negative drug attitudes. In addition, subjects in the HSV condition had more negative attitudes relative to their control group ($M = .87$) than did subjects in the LSV condition ($M = 1.03$).

The Sensation Seeking \times Drug Use interaction was significant ($p = .0001$), with the pattern of means very consistent with the pattern for behavioral intention. For example, HSS users had the lowest (most negative) attitude index mean ($M = .85$), whereas LSS users had the highest (most positive) attitude index mean ($M = 1.35$).

Although there were no overall effects on attitude for nonusers, this finding does not consider the effects of different message conditions. The four-way interaction involving all independent variables approached significance ($p = .087$), and once again it is instructive to examine the relative effects of the four message conditions on the four Sensation Seeking \times Drug Use groups. Again, we must remember that certain cell sizes are small and that not all mean comparisons are statistically significant by Duncan's test.

Although all PSAs depicted negative consequences of drug use, the HSV version had a somewhat longer "drug alley" scene with more young adults shown using drugs in a "down and out" environment and, thus, might have been anticipated to have greater attitudinal impact. In fact, the motivational introduction version of the HSV message was the most persuasive (i.e., it induced the lowest attitude index means) of the four messages with each of the four groups. There is also some evidence of targeting, however. The subgroup of HSS users exposed to the HSV introduction message displayed the lowest attitude index mean across

all groups and conditions ($M = .67$). HSS users were least affected, on the other hand, by the LSV nonintroduction PSA ($M = .96$). Also, among HSS nonusers, the HSV introduction PSA was the only message version that produced attitudes in the experimental group that were more negative than those of the relevant control group ($M = .75$). Once again, a message aimed specifically at HSSs appears to have been more effective with that group.

DISCUSSION

The results of this study provide evidence that two related variables, sensation seeking and message sensation value, can be employed in concert to target televised antidrug PSAs at young adults who are users of illicit drugs or at risk of becoming users. They also indicate the importance of developing effective verbal message introductions that motivate and/or facilitate further message processing. The specific nature of the most effective messages within different audience subgroups depends, however, on whether one's goal is to bring about specific modest behavioral changes or to focus on changing drug-related attitudes in order to create a negative "climate of opinion" for drug use.

If the goal of the media campaign is modest behavioral change, such as inducing young adults to call a hotline for drug-related information or to put them in touch with face-to-face intervention programs, then this study offers clear guidelines for designing messages to reach nondrug users with different needs for sensation. For high-sensation-seeking nonusers, a group whose members are particularly at risk to become users, a message that stresses exciting alternatives to drug use and is high in sensation value clearly is more likely to be effective than one that stresses peer resistance skills and is lower in sensation value. Motivated by a biologically based need for sensation, these individuals are attracted to information about activities that fulfill this need. They may indeed already be involved in many such activities. Low-sensation-seeking nonusers, on the other hand, appear to be more influenced by a message that stresses peer resistance skills and is low in sensation value than by a message that features exciting alternatives to drug use and is high in sensation value. A question worth investigating is whether members of this group actually are frequently subjected to peer group pressure to use drugs or whether they simply fear such pressure. In any case, their lower need for sensation makes information about exciting alternatives to drug use much less salient than it is to HSSs.

The finding that high-sensation-seeking users may be vulnerable to appeals based on exciting alternatives and to those featuring peer resistance information is somewhat surprising and indicates the need for further research (being carried out by Lewis Donohew) into the development of peer group networks among HSSs and LSSs. It may be that HSSs at some point in their psychosocial development begin to choose others as friends who share their propensity for thrilling and exciting activities, including drug use. If indeed the relevant peer groups of

HSS drug users contain disproportionate numbers of other HSS users, then information about peer resistance skills would be sorely needed by those who desire to stop or decrease their use of drugs. In any event, it is encouraging to note that high-sensation-seeking users, who might be expected to be the most impervious to media influence, are vulnerable on the behavioral intention index to both kinds of message appeals employed here and to the HSV messages on the attitude index. Although many of those classified as "users" in this study were only low to moderate in their use of illicit drugs, our findings caution against assuming that HSS users are unreachable in a media PSA campaign. The messages, however, must be carefully designed and targeted.

If a primary goal of a media campaign is to change attitudes in order to create an unfavorable climate of opinion about drugs, then our results indicate somewhat less need for sensation-related targeting of messages. The finding that the HSV message with motivational introduction was the most effective message across all four User \times Sensation-Seeking Groups indicates that a relatively strong message that stresses negative consequences of drug use can be effective in changing drug attitudes.

As discussed earlier, however, there also were indications in the data that HSSs may be more affected attitudinally by an HSV message with an introduction than are LSSs. This is not surprising, given our formative research that showed that HSSs preferred TV ads and PSAs with greater emotional impact. In fact, the focus group findings implied that it might be difficult to make a message too strong for HSSs—that highly sensational fear appeals may work for those with particularly strong sensation needs (something not considered in research on fear appeals).

It is certainly possible, on the other hand, to make a message too strong for LSSs. At just what point one exceeds the limits of tolerance for LSSs is extremely difficult to determine, but apparently the HSV introduction message employed here did not exceed those limits, given its apparent effectiveness with LSSs on the attitude measure. This is consistent with the fact that any serious drug-related health consequences were only implied by the PSA ambulance scene and by the written message (in the HSV version): "Drugs can take you out of the game." More direct, dramatic depictions of serious consequences might be too much for LSSs to accommodate but may prove effective with HSSs. If so, then messages that represent the upper ranges of the message sensation value dimension might be expected to show stronger differential or targeting effects on the attitudes of HSSs and LSSs than those in the present study. Because televised antidrug PSAs are turning to more explicit depictions of drug use consequences, this is a question worth investigating.

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