RESEARCH NOTE

DRUG USE PREVENTION FOR THE HIGH SENSATION SEEKER: THE ROLE OF ALTERNATIVE ACTIVITIES

Margaret Usha D'Silva, Ph.D., 1,* Nancy Grant Harrington, Ph.D., 2 Philip Palmgreen, Ph.D., 2 Lewis Donohew, Ph.D., 2 and Elizabeth Pugzles Lorch, Ph.D. 3

1 Department of Communication, University of Louisville, Louisville, Kentucky
2 Department of Communication, University of Kentucky, Lexington, Kentucky
3 Department of Psychology, University of Kentucky, Lexington, Kentucky

ABSTRACT

Research demonstrating links between sensation-seeking and drug use, and sensation-seeking and participation in leisure activities suggests designing substance misuse prevention projects that encourage substituting alternative activities for drug use. The current study uses factor analysis and discriminant analysis to provide comprehensive information on the kinds of activities high-sensation seekers participate in. Factor analysis of activity participation indicates an eight factor solution. Discriminant analysis of factor scores indicates that

* To whom correspondence and reprint requests should be addressed at Department of Communication, University of Louisville, Louisville, KY 40292. E-mail: dsilva@louisville.edu
high-sensation seekers can be discriminated from low-sensation seekers on the basis of two factors, active-adventure and conflict-combat. Implications for prevention program design are discussed.

Key Words: Sensation-seeking; Drug use prevention; Alternative activities; Leisure.

INTRODUCTION

Sensation-seeking has been defined as a biologically based personality trait characterized by novelty-seeking and risk-taking in order to attain varied, unusual, and complex sensations and experiences (Zuckerman, 1979; 1983; 1994). It has been measured through blood levels of monoamine oxidase (MAO) and testosterone (Murphy, Belmaker, Buchsbaum, Martin, Ciaranello, and Wyatt, 1977; Schooler, Zahn, Murphy, and Buchsbaum, 1978; von Knorring, Oreland, and Winblad, 1984) and by a 40-item scale developed by Zuckerman (1979). The scale includes four dimensions:

- **Thrill- and Adventure-Seeking**: sensation-seeking through physically risky activities;
- **Experience-Seeking**: sensation-seeking through a nonconforming lifestyle, travel, music, art, drugs, and unconventional friends;
- **Disinhibition**: sensation-seeking through social stimulation, parties, social drinking and a variety of sex partners; and
- **Boredom Susceptibility**: an aversion to boredom produced by unchanging conditions or persons.

By convention, individuals who score above the median are classified as high-sensation seekers and those scoring below the median are classified as low-sensation seekers.

Sensation-seeking has been demonstrated to be a powerful ‘risk’ factor for adult and adolescent drug use. On average, those classified as ‘high-sensation’ seekers report higher levels of use of a variety of drugs, and earlier onset of use than ‘low-sensation seekers’ (Bates, Labouvie, and White, 1986; Carrol, Zuckerman, and Vogel, 1982; Donohew, 1988; Donohew, Helm, Lawrence, and Shatzer, 1990; Galizio and Stein, 1983; Zuckerman, 1983; 1994). Although sensation-seeking certainly is not the sole factor increasing the ‘risk’ of drug misuse, several studies have identified sensation seeking as a particularly strong predictor of drug use among adults and adolescents (Andrucci, Archer, Pancoast, and Gordon, 1989; Jaffe and Archer, 1987; Segal and Singer, 1976).
The strong connection between sensation-seeking and drug use suggests avenues for targeting prevention efforts towards individuals at higher ‘risk’ for drug misuse (Donohew, Lorch, and Palmgreen, 1991; Lorch, Palmgreen, Donohew, Helm, Baer, and D'Silva, 1994; Palmgreen, Lorch, Donohew, Harrington, D'Silva, and Helm, 1995). One such avenue is based on research using animal models that suggests that sensation-seeking and drug-seeking behavior are mediated by a common neural pathway, the mesolimbic dopamine reward pathway (Bardo and Mueller, 1991; Bardo, Niesewander, and Pierce, 1989). According to this hypothesis, participation in a variety of novel activities may provide ‘high-sensation seekers’ with rewarding effects similar to those provided by drugs. Thus, participation in such activities may help meet needs for sensation and contribute to reducing the ‘risk’ of using drugs.

There is some evidence that sensation-seeking is related to preference for and participation in various types of leisure activities (Freixanet, 1991). These include high-risk activities such as mountain climbing (Cronin, 1991; Fowler, von Knorring, and Oreland, 1980; Robinson, 1985), sky-diving (Hymbaugh and Garrett, 1974), and auto racing and hang gliding (Straub, 1982), as well as enjoyment of relatively complex art and music (Tobacyk, Myers, and Bailey, 1981; Litle and Zuckerman, 1986).

To inform potential prevention efforts, more systematic and comprehensive investigation is needed of the kinds of leisure activities participated in by high-sensation seekers. The present study is designed to compare the activity participation profiles of high- and low-sensation seekers.

**METHOD**

This article is based on analysis of data from a survey of young adults conducted as part of a drug misuse prevention project.

**Data Collection**

The survey involved face-to-face interviews with randomly selected residents of a Midwestern town in the United States during 1991 through 1992. The experienced interviewers were trained extensively by the authors before the interviews. The participants were between 16 and 25 years of age. Of the 597 participants, 43.7% were female, 90.3% were white, and 7.9% were African American.
Measures

Sensation-seeking was measured using Form V of Zuckerman’s (1979) scale. The 3 items in the original 40-item scale relating to drug use were omitted to remove any part-whole correlation between drug use and sensation-seeking (Palmgreen et al., 1991). The reliability for the sensation-seeking scale using Cronbach’s $\alpha$ was 0.82.

Respondents indicated level of participation in 55 different activities. Activities were selected based on their potential for appeal to high-sensation seekers (Hymbaugh and Garret, 1974; Robinson, 1985; Straub, 1982), and to capture a broad spectrum of activities. Three activities were excluded from analyses because they were determined to be ambiguous. For each activity, respondents indicated whether they had ever participated in the activity, and whether they had participated in the last 12 months. These responses were used to develop a 3-point participation scale for each activity as follows: If the respondent had ever participated in the activity and also participated in the activity in the last 12 months, it was scored as a ‘3.’ If the respondent had ever participated in the activity but not in the last 12 months, it was scored as a ‘2.’ If the respondent had never participated in the activity, it was scored as a ‘1.’

RESULTS

On average, high-sensation seekers had participated in more activities over their lifetimes (M-HSS = 35.6, M-LSS = 31.9; $t(597) = 7.60, p < .001$), as well as over the last 12 months (M-HSS = 21.1, m-LSS = 17.9; $t(597) = 5.87, p < .001$) than low-sensation seekers.

Factor analysis was used to extract meaningful dimensions of the leisure activities and to develop a leisure index of factor scores for subsequent discriminant analysis. The data satisfied the assumptions required for factor analysis; the Kaiser Olkin test for sampling adequacy was 0.81 and Bartlett’s test of sphericity had a value of 5396.59 and a significance of $p < .001$.

A principal components analysis was followed by varimax rotation. A Scree test suggested an eight-factor solution. The eight factors were homogeneous in content, were interpretable, and explained 37% of the variance. Twelve activities were deleted because of loading of less than 0.40 on a factor (Tabachnick and Fidell, 1989). Loading of items on factors is shown in Table 1.

The eight factors were labeled as follows: 1) outdoors, 2) aesthetic/intellectual, 3) competitive, 4) action-adventure, 5) conflict-combat, 6) artistic,
### Table 1. Activities Scale Factor Loadings

<table>
<thead>
<tr>
<th>FACTOR 1</th>
<th>FACTOR 2</th>
<th>FACTOR 3</th>
<th>FACTOR 4</th>
<th>FACTOR 5</th>
<th>FACTOR 6</th>
<th>FACTOR 7</th>
<th>FACTOR 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outdoors</td>
<td>Aesthetic/ Intellectual</td>
<td>Competitive Sports</td>
<td>Action-Adventure</td>
<td>Conflict-Combat</td>
<td>Artistic</td>
<td>Audio/Visual</td>
<td>High Flying</td>
</tr>
<tr>
<td>Boating</td>
<td>.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fishing</td>
<td>.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horseback</td>
<td>.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water skiing</td>
<td>.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camping</td>
<td>.53</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hiking</td>
<td>.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Museums</td>
<td>.62</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Live theatre</td>
<td>.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planetarium</td>
<td>.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concerts</td>
<td>.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performing music</td>
<td>.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoo</td>
<td>.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acting</td>
<td>.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseball</td>
<td>.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basketball</td>
<td>.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Football</td>
<td>.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golf</td>
<td>.49</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tennis</td>
<td>.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scuba Diving</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mountain climbing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White water rafting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kayaking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rock climbing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canoeing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snow skiing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Survival games: .61
- Role playing: .54
- Martial arts: .46
- Paintball: .44
- Sketching: .54
- Crafts: .52
- Yoga: .51
- Photography: .44
- Computer games: .69
- Video games: .59
- Reading: .51
- Movies: .47
- Bungee jumping: .59
- Flying: .56
- Parachuting: .50
- .54
- .50
- .48
- .47
- .46
- .44
- .40
7) audio/visual, and 8) high flying. Factor labels were based on the commonalities among the variables or on the dominant activity or theme of the factor. For example, the “outdoors” factor included activities such as boating, fishing, horseback riding, water skiing, camping and hiking. The “conflict-combat” factor included all the combative activities included in the survey such as survival games, paintball, and martial arts (see Table 1).

Factor scores were computed by summing the scores of each of the items on a particular factor and then dividing the sum by the number of items on that factor. T tests revealed that high-sensation seekers participated in each activity factor more than low-sensation seekers (see Table 2).

Factor scores were submitted to a discriminant analysis. The results from the two-group multiple discriminant analysis showed that the discriminant function was significant, \(2(8, n = 582) = 66.346, p < .001\). There was a fairly strong relationship between the independent and dependent sets (\(R^2 = 0.33\)).

The classification results (see Table 3) indicated that 64.8% of grouped cases were correctly classified. Standardized canonical discriminant function coefficients were used in interpreting the results (Klecka, 1980). The loading matrix of correlations between the predictor matrix and the discriminant function showed that the primary predictor (loading of 0.55) for the discriminant function was participation in action-adventure. By convention, loadings less than 0.30 are not interpreted (Tabachnick and Fidell, 1989). However, because conflict-combat activities had a loading extremely close to the cut-off (0.294), and because this factor is theoretically consistent, it was retained.

<table>
<thead>
<tr>
<th>Table 2. High and Low Sensation Seekers’ Mean Scores on Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>Outdoors</td>
</tr>
<tr>
<td>Aesthetic/intellectual</td>
</tr>
<tr>
<td>Competitive sports</td>
</tr>
<tr>
<td>Action-adventure</td>
</tr>
<tr>
<td>Conflict-combat</td>
</tr>
<tr>
<td>Artistic</td>
</tr>
<tr>
<td>Audio visual</td>
</tr>
<tr>
<td>High flying</td>
</tr>
</tbody>
</table>

* \(p < .01\); ** \(p < .001\)
DISCUSSION

High-sensation seekers participate in a greater number of activities than low-sensation seekers, a difference observed for each of the activity factors. Additionally, the results of the discriminant analysis of factor scores show that high-sensation seekers can be discriminated from low-sensation seekers on the basis of two factors, participation in action-adventure and conflict-combat activities.

These results have potential implications for drug misuse prevention efforts. If prevention programs targeted toward ‘high-sensation seekers’ include a strategy of encouraging alternatives to drug use, one approach would be to offer a wide variety of activities from which to choose. This approach would be in accord with our observations that ‘high-sensation seekers’ are likely to participate in a wide range of activities, and with higher frequency than ‘low-sensation seekers.’ Another approach would be to emphasize activities that most differentiate high- from low-sensation seekers, suggesting more focus on action-adventure and conflict-combat activities.

There are several limitations of the current study that should be addressed in future research. First, we followed the convention of categorizing individuals as ‘high-’ and ‘low-’ sensation seekers based on a median split (Zuckerman, 1979). We did not evaluate the possible contribution of different levels of sensation-seeking, the predictive power of the subscales, or stability in sensation seeking across time. Second, sensation-seeking is one ‘risk’ factor for drug misuse, whereas successful prevention efforts may need to recognize a complex combination of factors. Third, the specific activities to be emphasized in a prevention program may have to be modified to reflect changes in popular activities across time, availability of activities in different locations, and activities appropriate at different ages. Finally, we cannot draw conclusions regarding the effectiveness of participation in the

<table>
<thead>
<tr>
<th>Actual Group</th>
<th>No. of Cases</th>
<th>Predicted Group Membership</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>LSS 0</td>
<td>286</td>
<td>68.2%</td>
</tr>
<tr>
<td>HSS 1</td>
<td>293</td>
<td>38.6%</td>
</tr>
</tbody>
</table>

*Percentage of “grouped” cases correctly classified: 64.77%.*

Table 3. Classification Results
identified alternative activities for reducing drug use in high-sensation seekers. Field tests of the effectiveness of this approach are needed. Empirical studies attesting to the effectiveness of a tailored alternative approach for ‘high-sensation seekers’ would provide a means to expand and enrich current approaches to prevention intervention that focus on social skills and social influences.

ACKNOWLEDGMENTS

This research was supported by Grant No. DA06892-04 from the National Institute on Drug Abuse to Lewis Donohew, Philip Palmgreen, and Elizabeth Lorch, and the University of Kentucky. The work was carried out under the auspices of the Center for Prevention Research at the University of Kentucky.

REFERENCES


Donohew, L.; Helm, D.M.; Lawrence, P.; Shatzer, M.J. Sensation Seeking, Marijuana Use, and Responses to Prevention Messages: Implications


RESUMEN

Una investigación demostrando la existencia de nexos entre la búsqueda de sensación y el uso de la droga por una parte y la búsqueda de sensación y la participación en las actividades de placer por otra parte sugiere el concebir unos programas de prevención contra el mal uso de sustancias con substituir el uso de la droga por unas actividades pasionantes. La investigación presente utiliza un análisis de factores y un análisis discriminativo para suministrar información exhaustiva de los géneros de actividades en las que participan los buscadores de sensación fuerte. Un análisis de factores de la participación en las actividades indica una solución con ocho factores. Un análisis discriminativo de las puntuaciones de factores indica que los buscadores de sensación fuerte pueden ser discriminados de los buscadores de sensación débil a base de dos factores, acción-aventura y conflicto-combate. Se discuten las implicaciones para la concepción de un programa de prevención.
RÉSUMÉ

Une recherche démontrant l’existence des liens entre la poursuite de la sensation et l’usage de la drogue d’une part et la poursuite de la sensation et la participation à des activités de plaisir d’autre part suggère de concevoir des programmes de prévention contre le mauvais usage de substances à substituer des activités passionnantes à l’usage de la drogue. La présente étude emploie une analyse factorielle et une analyse discriminante pour fournir une information exhaustive des genres d’activités dans lesquelles participent les chercheurs de sensation forte. Une analyse factorielle de la participation aux activités indique une solution à huit facteurs. Une analyse discriminante des scores de facteurs indique que les chercheurs de sensation forte peuvent être discriminés des chercheurs de sensation faible sur la base de deux facteurs, action-aventure, et conflit-combat. Des implications pour la conception d’un programme de prévention sont discutées.

THE AUTHORS

Margaret Usha D'Silva, Ph.D., is Associate Professor of Communication at the University of Louisville. She obtained her doctorate from the University of Kentucky, where this study was conducted. She has published extensively on mass media campaigns and drug misuse prevention. She also conducts research on intercultural communication conflicts.
Nancy Grant Harrington, Ph.D., is Associate Professor of Communication at the University of Kentucky and Deputy Scientific Director of the Center for Prevention Research. She has been co-investigator on eight federally funded projects. Her research interests lie in adolescent health promotion, primarily ‘substance abuse’ prevention and premature sexual behavior prevention.

Philip Palmgreen, Ph.D., is Professor of Communication at the University of Kentucky. He is known for his research (supported by a series of grants by the National Institute on Drug Abuse) on media ‘drug abuse’ prevention campaigns and for his work on audience uses of the mass media. He recently served as Scientific Advisor on the Office of National Drug Control Policy’s National Youth Anti-Drug Media Campaign.

Lewis Donohew, Ph.D., is Professor of Communication at the University of Kentucky. He is an internationally recognized scholar on sensation-seeking and ‘drug abuse’ prevention campaigns. He is the senior scientific advisor to the Center for Prevention Research and has been principal investigator on numerous federally funded projects.
Elizabeth Puzgles Lorch, Ph.D., is Professor of Psychology at the University of Kentucky. She has conducted extensive research on developmental changes in children’s attention to and comprehension of television and effectiveness of televised ‘drug abuse’ prevention campaigns. In a recent series of studies (supported by the National Institute of Mental Health) she also has applied television viewing methodology to the study of cognitive processing of children with attention deficit hyperactivity disorder.