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DEVELOPMENT OF A SENSATION-SEEKING SCALE [1]

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This article reports the development of a Sensation-Seeking Scale (SSS) designed to quantify the construct: "optimal stimulation level." Items were written, using the construct as a guide, and given to undergraduates. The items were factor analyzed. A general factor was found and the item-factor correlation pattern was similar in males and females. In another sample, satisfactory reliability for the SSS was obtained and it was found to be positively correlated with field independence as measured by the Embedded Figures Test. In a third sample, nonsignificant correlations between SSS and Howard's Stimulus Seeking Maze tests were found. A significant negative correlation between SSS and anxiety, as measured by the Multiple Affect Adjective Check List was obtained.

The concept of an optimal level of stimulation, excitation, or activation has been offered by Hebb and Thompson (1954), Leuba (1955), Berlyne (1960), and Fiske and Maddi (1961) as a substitute for the unsatisfactory concept of drive reduction which assumes the common goal of all primary motivation is to reduce stimulation to a minimum. Most of these authors propose that too little stimulation, as in perceptual isolation, leads the organism to increase stimulation while too much stimulation, as in sensory overload or high drive states, leads to behavior directed at stimulus reduction. While this theory proposes an "optimal" level of stimulation it is obvious that individuals differ widely in what is "optimal" stimulation during their waking day. Large individual differences in response to perceptual isolation conditions have been noted (Zuckerman, Albright, Marks, & Miller, 1962). Preference for simplicity or complexity in visual stimuli seems to relate to basic personality dimensions (Bieri, 1961). The Barron-Welsh (1952) Art Scale, which measures preference for complexity and asymmetry, was found to be positively correlated with the adaptiveness of responses to perceptual isolation in undergraduates (Holt & Goldberger, 1961).

Interest in the personality implications of the "optimal stimulation" concept and its possible application to ongoing perceptual isolation experiments led us to attempt to develop a questionnaire scale which might measure this postulated trait. While it is possible that sensation seeking is specific to the various types of sensations, we hypothesized that a general factor would emerge from responses to diverse items.

STUDY I: ITEM SELECTION METHOD

Fifty-four items were written in a forced-choice form. An attempt was made to make both alternatives socially desirable by manipulating the item wording. Fourteen items pertained to preference for extremes of sensation (heat, cold, noise, tastes, colors, musical sounds, etc.); 8 items pertained to preferences for the new and unfamiliar as opposed to the familiar; 8 items related to preferences for irregularity as opposed to regularity and routine; 12 items pertained to an enjoyment of danger, thrills, or "kicks"; 6 items related to social values based on the stimulation value of other persons as opposed to their reliability and predictability; 4 items contrasted preferences for security as opposed to adventure; and 2 items pertained to a need for general excitement.

The first version of the Sensation-Seeking

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TABLE 1

ITEMS FOR SENSATION SEEKING SCALE: FORM II

1.	(MF)	A.	I would like a job which would require a lot of traveling.
		B.	I would prefer a job in one location.
2.	(MF)	A.	I am invigorated by a brisk, cold day.
		B.	I can't wait to get into the indoors on a cold day.
3.	(M)	A.	I find a certain pleasure in routine kinds of work.
		B.	Although it is sometimes necessary I usually dislike routine kinds of work.
4.	(MF)	A.	I often wish I could be a mountain climber.
		B.	I can't understand people who risk their necks climbing mountains.
5.	(MF)	A.	I dislike all body odors.
		B.	I like some of the earthy body smells.
6.	(MF)	A.	I get bored seeing the same old faces.
		B.	I like the comfortable familiarity of everyday friends.
7.	(MF)	A.	I like to explore a strange city or section of town by myself, even if it means getting lost.
		B.	I prefer a guide when I am in a place I don't know well.
8.	(F)	A.	I find the quickest and easiest route to a place and stick to it.
		B.	I sometimes take different routes to a place I often go, just for variety's sake.
9.	(MF)	A.	I would not like to try any drug which might produce strange and dangerous effects on me.
		B.	I would like to try some of the new drugs that produce hallucinations.
10.	(MF)	A.	I would prefer living in an ideal society where everyone is safe, secure, and happy.
		B.	I would have preferred living in the unsettled days of our history.
11.	(MF)	A.	I sometimes like to do things that are a little frightening.
		B.	A sensible person avoids activities that are dangerous.
12.	(F)	A.	I order the dishes with which I am familiar, so as to avoid disappointment and unpleasantness.
		B.	I like to try new foods that I have never tasted before.
13.	(F)	A.	I can't stand riding with a person who likes to speed.
		B.	I sometimes like to drive very fast because I find it exciting.
14.	(M)	A.	If I were a salesman I would prefer a straight salary, rather than the risk of making little or nothing on a commission basis.
		B.	If I were a salesman I would prefer working on a commission if I had a chance to make more money than I could on a salary.
15.	(MF)	A.	I would like to take up the sport of water skiing.
		B.	I would not like to take up water skiing.
16.	(M)	A.	I don't like to argue with people whose beliefs are sharply divergent from mine, since such arguments are never resolved.
		B.	I find people that disagree with my beliefs more stimulating than people who agree with me.
17.	(MF)	A.	When I go on a trip I like to plan my route and timetable fairly carefully.
		B.	I would like to take off on a trip with no preplanned or definite routes, or timetables.
18.	(F)	A.	I enjoy the thrills of watching car races.
		B.	I find car races unpleasant.
19.	(F)	A.	Most people spend entirely too much money on life insurance.
		B.	Life insurance is something that no man can afford to be without.
20.	(MF)	A.	I would like to learn to fly an airplane.
		B.	I would not like to learn to fly an airplane.
21.	(MF)	A.	I would not like to be hypnotized.
		B.	I would like to have the experience of being hypnotized.
22.	(MF)	A.	The most important goal of life is to live it to the fullest and experience as much of it as you can.
		B.	The most important goal of life is to find peace and happiness.
23.	(MF)	A.	I would like to try parachute jumping.
		B.	I would never want to try jumping out of a plane, with or without a parachute.

Table 1—Continued

24. (MF)	A.	I enter cold water gradually giving myself time to get used to it.
	B.	*I like to dive or jump right into the ocean or a cold pool.*
25. (F)	A.	I do not like the irregularity and discord of most modern music.
	B.	I like to listen to new and unusual kinds of music.
26. (MF)	A.	I prefer friends who are excitingly unpredictable.
	B.	I prefer friends who are reliable and predictable.
27. (MF)	A.	When I go on a vacation I prefer the comfort of a good room and bed.
	B.	When I go on a vacation I would prefer the change of camping out.
28. (MF)	A.	*The essence of good art is in its clarity, symmetry of form, and harmony of colors.*
	B.	I often find beauty in the "clashing" colors and irregular forms of modern paintings.
29. (F)	A.	The worst social sin is to be rude.
	B.	The worst social sin is to be a bore.
30. (F)	A.	I look forward to a good night of rest after a long day.
	B.	I wish I didn't have to waste so much of a day sleeping.
31. (MF)	A.	I prefer people who are emotionally expressive even if they are a bit unstable.
	B.	I prefer people who are calm and even tempered.
32. (MF)	A.	A good painting should shock or jolt the senses.
	B.	A good painting should give one a feeling of peace and security.
33. (M)	A.	When I feel discouraged I recover by relaxing and having some soothing diversion.
	B.	*When I feel discouraged I recover by going out and doing something new and exciting.*
34. (MF)	A.	People who ride motorcycles must have some kind of an unconscious need to hurt themselves.
	B.	I would like to drive or ride on a motorcycle.

Scale (SSS) was given to 268 male and 277 female undergraduates at Brooklyn College. For about two-thirds of the items the proportions of the subjects choosing one of the forced choices fell in the 30–70% range. The four items with the most extreme splits (greater than .85–.15) were dropped from the test. The remaining 50 items were intercorrelated using tetrachloric correlation. The resulting item matrix of correlations was factor analyzed using a program for Holtzinger's Principal Components Method. Separate factor analyses were performed for male and female subjects. The unrotated factor loadings were then inspected for the presence of a single dominant factor since we were not interested in secondary factors.

Results

One large factor did emerge for both males and females. Twenty-six items for the males and 30 items for the females loaded .30 or higher on this factor. To determine the similarity of the item-factor structure across sexes, the item factor loadings were ranked for the males and females and the two sets of ranks were correlated, using the Spearman rank-order correlation. Rho was .91 indicating near identity between the item-factor pattern in both sexes.

The items comprising the revised SS scales were selected using the criterion of .3 loading on the principal factor. These items are listed above in Table 1. An *M* next to an item indicates a significant loading for males only; an *F* indicates a significant loading for females only; and an *MF* indicates that the item was significant for both sexes. The *M* and *MF* items comprise the scale for males, and the *F* and *MF* items comprise the scale for females. The *MF* items provide a common scale for males and females where the scores must be combined. The letter of the choice, A or B, boldfaced indicates the choice scored in the sensation seeking direction.

STUDY II: RELIABILITY AND CORRELATIONS WITH THE EMBEDDED FIGURES TEST

Two possible interpretations of SSS scores were suggested: (*a*) they might measure impulsivity or psychopathic tendencies (*b*) they might distinguish individuals who are highly sensitive to internal sensations of various types. Possibility 1 would lead us to

predict a negative relationship between the SSS and field independence, as measured by the Embedded Figures Test (EFT), since impulsivity and antisocial tendencies have been found to be related to field dependence rather than field independence. Possibility 2 would lead us to predict a positive relationship with field independence since field independents are more responsive to internal sensations than field dependents. Thus the relationship between the SSS and EFT would help clarify the nature of the trait measured by the SSS.

Method

The revised SSS of 34 items was given to 98 male and 100 female undergraduates at Adelphi College. Several weeks later 32 males and 30 females from the original sample were given Thurstone's (1944) form of the EFT in a group.

Results

The means and *SD*s for males and females on their respective SS scales and on the common (M-F) SSS are given in Table 2, together with the split-half reliabilities of the scales, the means and *SD*s on the EFT, and the correlations between the two scales. The following results can be seen:

1. There is no sex difference on SS tendency as measured by the common scale (M-F).

TABLE 2

COMPARISONS BETWEEN MALES AND FEMALES ON SSS AND EFT, RELIABILITIES OF SSS, AND CORRELATIONS BETWEEN THE SCALES

	Males ($N = 32$)	Females ($N = 30$)	t
M-SSS	15.1	16.7	
SD-SSS	3.9	4.9	
M-SSS (M-F)	12.3	12.2	.09
SD-SSS (M-F)	3.4	4.0	
Reliability SSS	.68**	.74**	
M-EFT	36.4	34.2	.92
SD-EFT	10.9	7.8	
rSSS versus EFT	.54**	.22	
rSSS (MF) versus EFT	.49**	.22	
rSSS (MF) versus EFT all 62 subjects	.36*		

* $p < .05$.
** $p < .01$.

2. The male and female scales of the SSS both have moderate reliability (r's = .68 and .74, respectively).
3. There is no significant difference between the performance of males and females on the EFT.
4. SS tendency is significantly correlated with field independence (EFT) for males. Although there is a tendency toward a positive relationship for females the correlations are not significant.
5. When male and female samples are combined the correlation between the SSS and EFT is significant.

These results support the hypothesis that SS tendency is not a measure of impulsivity, but a measure of sensitivity to internal sensations. However, this latter interpretation is supported primarily for males. At present, we cannot explain why the results for females, taken separately, are not significant.

STUDY III: CORRELATION WITH THE STIMULUS-SEEKING BEHAVIOR TEST AND WITH ANXIETY, DEPRESSION, AND HOSTILITY

The Stimulus Seeking Maze Test was developed by Howard (1961). It utilizes series of pencil and paper mazes. In Form A the mazes consist of alternate paths to alternate goals, and in Form B they consist of alternate paths to the same goal. A series of identical mazes is given, ostensibly as a time filler, between a learning and recall task. Measures of change in paths from maze to maze constitute the stimulus-seeking score.

Since the need for variation constituted one of the types of items in our scale, it seemed reasonable to expect a positive correlation between the SSS and Howard's SS test. However, since neither test has undergone much validation, a failure to find a correlation between them would not indicate a failure of concurrent validity for either test, but would indicate a failure in construct validity for one or both of the tests.

The Multiple Affect Adjective Check List (Zuckerman, Lubin, Vogel, & Valerius, in press) consists of a 132-word adjective check list containing empirically developed scales for

anxiety, depression, and hostility. An average of an individual's score on a number of days is taken as a measure of his general level for the affect (Zuckerman, 1960). Since SS tendency is hypothesized to involve an enjoyment of tension-raising situations we hypothesized that anxiety should be *negatively* correlated with SS. The predictions for depression and hostility are not as clear although one would expect depression to be related in the same manner as anxiety.

Method

The revised SSS and the Howard Mazes, Forms A and B, were administered to 26 females and 14 male undergraduates at Adelphi College. The SSS and mazes were administered in two separate sessions several weeks apart. Half of the subjects received the Form A mazes first and half received the Form B mazes first. The subjects were told that they were taking part in a learning experiment and that the mazes were interpolated material between the learning of word lists and their recall. It was observed that many subjects rushed through the mazes at top speed in order to get to the recall task.

The SSS was scored on the 22-item scale used for both sexes (MF). The Howard Mazes were scored according to the procedure given by the author. The total score on this test represents amount of variation in paths taken from the start to the goals.

The subjects for this study had been given the Multiple Affect Adjective Check List (MAACL) on 3 days, a week apart, to provide a base line for studies of this scale. Fifty-two subjects, who had taken the SSS and the MAACL on at least two of the three occasions, provided the data for these comparisons. Scores on the anxiety, depression, and hostility scales of the MAACL were averaged for each subject for the two or three test occasions.

Results

The correlations between the SSS and the Maze test, Forms A and B, are given in Table 3. These were negative and nonsignificant. The two forms of the Maze test correlated .65 ($p < .001$). The correlation between the SSS and the average of the two Maze forms was −.19, nonsignificant.[2]

The correlations between the SSS and the average anxiety, depression, and hostility scales of the MAACL are also given in Table 2. The correlation between SS tendency and Anxiety was negative and significant as predicted. The correlations with depression and hostility were nonsignificant.

TABLE 3

CORRELATIONS BETWEEN SSS AND HOWARD MAZES MAACL SCALES

	SSS (M-F)
Maze A	−.27
Maze B	−.09
Maze A + Maze B/2	−.19
Anxiety	−.32*
Depression	.10
Hostility	.11

Note.—N = 40 for r's with maze, 52 for r's with MAACL scales.
* $p < .05$.

CONCLUSIONS

Psychologists disagree on the value of factor analysis as a method for developing personality scales. Although the existence of a broad factor including diverse items constructed to sample sensation-seeking preferences is encouraging, the question of the construct validity of the scale remains open. Many scales which have good internal reliability have poor validity because their structure is built upon response sets or other sources of specific test variance. The demonstrated positive relationship between SS tendency and field independence and the negative relationship with anxiety are also encouraging. The failure of the SSS to correlate with the Howard Maze test raises questions about the constructs underlying both scales. The SSS was developed to sample a broad SS tendency, while the Maze test only samples alternation behavior. Using a learning task to disguise the purpose of the maze may interfere with the purpose of this test since it confounds it with the subject's achievement motivation. Our subjects were observed to rush through the mazes in order to get to the recall task. If the maze tests were given in another context, satiation, or whatever underlies alternation behavior, might emerge in a clearer fashion and might

[2] Herman I. Diesenhaus, in a personal communication, 1963, reports finding correlations of .05, .37, and .04 between the SSS and Maze A, Maze B and Maze A + B, respectively. The second correlation was statistically significant. The sample consisted of 40 Employment Counselors, 23 male and 17 female.

be more closely related to the broader SS tendency.

More work is needed to establish the validity of the SSS. Comparisons of volunteers and nonvolunteers for unusual experiments, such as hypnosis, comparisons of risk takers with more security-minded persons, and comparisons of persons whose performance is facilitated by increases in tension with persons whose performance is disrupted by tension are possibilities for the validation of the SSS.

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