4 P.

N64-22437

CODE NONE CAT. 14

Rorschach Indications of Emotional Instability and Susceptibility to Motion Sickness

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THE PROBLEM of susceptibility to motion sickness has not captured the imagination of psychological thinkers. It is, however, of continuing interest to experimenters involved in studies of disorientation and vestibular functioning. Almost all studies of motion sickness and disorientation have alluded to "underlying personality factors" as contributing something to the variance, but investigators have usually not included such factors in the variables studied. These personality factors have gone largely undefined [12] and unrelated to the more important physiological processes.

Individual differences in susceptibility to motion sickness have been noted by many investigators.[1, 4, 5] Some have attributed these differences to the presence of anxiety,[10] or to physiological differences [6] or other unspecified psychological phenomena. The present study explored some of the relationships, in subjects with normal function of the vestibular organs, between certain aspects of personality, as measured by the Rorschach test, and susceptibility to experimentally induced motion sickness. Consequently the variance in susceptibility must be attributable either to unknown differences in physiological mechanisms or to psychological factors.

Descriptions of individual differences in susceptibility to motion sickness contained in the current literature indicated that at least five personality dimensions were related to this problem. One of these personality dimensions was thought to assist subjects in their rapid adjustment to experimental procedures while the other four were considered as possessing negative valences. The former was drive and the latter were anxiety, dependency, lability, and rigidity.

The authors hypothesized that an individual who was highly motivated or possessed a high intellectual drive might be able to control or explain to himself the sensations associated with rotation and by this means avoid becoming motion sick. On the other hand, the authors hypothesized that individuals who were particularly anxious, or dependent, or labile, or rigid would be particularly susceptible to motion sickness because of their sensitivity to their own feelings about themselves and their world. These hypotheses had certain face validities based upon personal observation [9] and individual case study.[7]

PROCEDURE

The sample used in this study consisted of nine volunteer subjects who were exposed to all of the

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Opinions or conclusions contained in this report are those of the authors. They are not to be construed as necessarily reflecting the view or the endorsement of the Navy Department.

Presented at the annual meeting, Aerospace Medical Association, Los Angeles, California, April 30, 1963.

This study was carried out under the sponsorship of the Office of Life Science Programs, National Aeronautics and Space Administration, Order No. R-47.

experimental devices used in a larger study of vestibular functioning and disorientation during the summer of 1962. These nine male subjects were U. S. Navy Ensigns of the Medical Corps Reserve. Their ages ranged from 21 years to 25 years with a mean age of 22.3 years. They represented several large southern medical schools and had a modal educational level of a second year medical student. Their overall grades were in or above the middle one-third of their class and they had not as yet decided upon a medical specialty. They were an equated group for all practical purposes.

They were administered a battery of psychological tests, of which one was the Rorschach, prior to their exposure to the four experimental devices. Motion sickness, in some form, was a common reaction to each of these experimental conditions.

Traditionally, research with the Rorschach test has taken either a qualitative or quantitative form. The qualitative studies have characteristically asked trained clinicians to render a global estimate of selected personality variables without any specific numerical framework being imposed. Other studies have used individual quantitative scores to represent a whole dimension, such as a high "A per cent" to represent rigidity. Neither of these methods seemed satisfactory to the authors. Instead, a more functional approach seemed to be indicated, one that would use all of the quantitative and objective indicators of each of the selected personality dimensions that a clinician would normally consider in making his evaluation. This approach would exclude all of the additional qualitative scores which did not have numerical definition of some kind. Such a method produced several scores for each dimension of personality considered.

These indices were constructed by using norms published by Beck.[2] These norms represent a large sample and are based upon the normal curve. The authors considered the large middle group of scores as not being relevant to the problem under study, and used only those scores at or beyond one standard deviation.[3] The resulting scoring schema for the indices are shown. A score for each dimension of personality was obtained by summing algebraically the individual positive and negative scores. A total score for a single individual was obtained by summing algebraically the five dimensional scores.

The Rorschach protocols for the sample were scored according to norms (Beck) by two clinical psychologists. Each of them scored the dimensions listed. The reliability coefficient between these two scores was .92.

The experimental conditions were used as independent external criteria for the present study and included exposure to aerial acrobatics; going to sea in a power boat in a high sea state; exposure in the Slow Rotation Room; and experiencing zero G. Each of the experimental conditions was directed by cooperating investigators under the overall management of a senior scientist. The detailed results of each of the criterion conditions have been made public in the existing literature.[8, 9] The five composite dimensions of the Rorschach test were correlated to the results of each of the four criteria.

TOTAL SCORE_____

Name_____
Subject Number_____ ANXIETY SCORE_____

	Score (Circle One Each)
1. F + (high only):	
higher 100 per cent or less than 60 per cent	+ 2
high 92-99 per cent or 60-65 per cent	+ 1
not applicable	0
2. Ad:A = Hd:H	
higher anxiety—both AD & Hd greater than A & H	+ 2
high anxiety—either Ad or Hd greater than A or H	+ 1
not applicable	0
3. Grey-black shock: (defined by Beck):	
evidenced on cards: IV	+ 1
V	+ 1
VI	+ 1
VII	+ 1
not applicable	0
4. Y, Yf:	
higher 1Y or more	+ 2
high 1 YF − or more	+ 1
not applicable	0
5. Content (circle those applicable):	
smoke, clouds, figures, crying or other dysphoric moods, death	+ 1
not applicable	0
6. Card:	
excessive card turning	+ 1
not applicable	0

Name_____
Subject Number_____ DEPENDENCY SCORE_____

	Score (Circle One Each)
Popular responses:	
higher 11 or more	+ 2
high 8-10	+ 1
not applicable	0
H per cent:	
higher 25 per cent or more	+ 2
high 21-24 per cent	+ 1
not applicable	0
Exp:	
higher 4-1 or more	+ 2
high 3-1	+ 1
not applicable	0
Content: (circle those applicable):	
Father-son and mother-son relationship figures leaning or supporting each other	+ 1
not applicable	0

Name_____
Subject Number_____ DRIVE SCORE_____

		Score (Circle One Each)
Z score:		
higher organizational activity	84 -110	+ 2
high organizational activity	59 - 83	+ 1
low organizational activity	1.5- 4.0	− 1
lower organizational activity	0 - 1.0	− 2
not applicable		0
R total:		
high intellectual drive	47 or more	+ 1
low intellectual drive	13 or less	− 1
not applicable		0

Name_____
Subject Number_____ LABILITY SCORE_____

	Score (Circle One Each)
1. Saturation:	
higher—1C or more	+ 2
high- 1CF or more	+ 1
not applicable	0
2. Affective ratio:	
higher reactivity .98-1.00	+ 2
high reactivity .80- .97	+ 1
not applicable	0
3. Space percept:	
higher reactivity 6 or more	+ 2
high reactivity 5	+ 1
low reactivity 1	- 1
lower reactivity 0	- 2
not applicable	0
4. Cards	
Rejects any card, card_____	+ 1
not applicable	0
5. Content (circle those applicable):	
Explosion; fire head to head contact blood; cartoon figures; diseased anatomy; squashed, smashed and mutilated figures; fighting or conflict	+ 1
not applicable	0

Name_____
Subject Number_____ RIGIDITY SCORE_____

	Score (Circle One Each)
1. Ap:	
higher rigidity D!! or Dd!!	+ 2
high rigidity D! or Dd!	+ 1
low rigidity W D Dd	- 1
not applicable	0
2. Seq:	
high rigidity—rigid sequence	+ 1
low rigidity—irregular	- 1
not applicable	0
3. A per cent:	
higher rigidity 82-99 per cent	+ 2
high rigidity 65-81 per cent	+ 1
low rigidity 12-28 per cent	- 1
lower rigidity 11 per cent or less	- 2
not applicable	0
4. P (high only):	
higher conventionality 11 or more	+ 2
high conventionality 9-10	+ 1
not applicable	0
5. Card:	
Does not turn cards at all	+ 1
not applicable	0

RESULTS

The raw scores for each subject on the five personality dimensions and a total score are listed in Table I. The raw scores were converted to a rank order within each of the five dimensions and within the total score. The ranks for individuals in each of the personality dimension were correlated, using a Pearson product moment correlation,[11] with the ranked susceptibility to motion sickness on each of the four criterion tasks. The correlations between the five personality dimensions and total score and the four criteria are shown in Table II.

TABLE II. SHOWING THE CORRELATIONS BETWEEN THE PERSONALITY DIMENSIONS AND PERFORMANCE ON THE CRITERION TASKS

	Acrobatic Profile	Zero-G Profile	Sea Profile	Slow Rotation Room
Anxiety	.33	.15	.38	-.12
Dependency	-.11	-.16	-.05	.05
Drive	.00	.00	.00	.00
Lability	.46	.94 **	.36	.15
Rigidity	.69 *	.37	.68 *	.78 **
Total	.67 *	.68 *	.63 *	.47

* 05 level = .60.
** 01 level = .78.

The intercollerations among the personality dimensions are shown in Table III. The four criteria were correlated against each other and these intercorrelations are shown in Table IV.

TABLE III. SHOWING THE INTERCORRELATIONS OF EACH OF THE PERSONALITY DIMENSIONS

	Anxiety	Dependency	Drive	Lability	Rigidity	Total
Anxiety	—	-.60 *	.00	.39	.26	.54
Dependency		—	.00	-.32	-.32	-.05
Drive			—	.00	.00	.00
Lability				—	.25	.71*
Rigidity					—	.59
Total						—

* 05 level = .60.
** 01 level = .78.

TABLE IV. SHOWING THE INTERCORRELATIONS OF PERFORMANCE ON THE CRITERION TASKS

	Acrobatic Profile	Zero-G Profile	Sea Profile	Slow Rotation Profile
Acrobatic Profile	—	.52	.67 *	.73 *
Zero-G Profile		—	.43	.29
Sea Profile			—	.36
Slow Rotation Room				—

* 05 level = .60.
** 01 level = .78.

TABLE I. RAW SCORES OF EACH SUBJECT ON THE FIVE PERSONALITY DIMENSIONS AS MEASURED BY THE RORSCHACH TEST

	Subjects								
	1	2	3	4	5	6	7	8	9
Anxiety	+ 4	+ 2	+ 1	+ 4	+ 1	+ 1	+ 1	0	+ 2
Dependency	0	0	0	0	+ 4	0	0	+ 4	0
Drive	0	0	0	0	0	0	0	0	0
Lability	+ 2	+ 3	+ 1	+ 2	+ 2	+ 1	+ 3	- 1	0
Rigidity	+ 3	+ 2	+ 3	+ 1	+ 2	+ 2	+ 1	- 2	+ 1
Total	+ 9	+ 7	+ 5	+ 7	0	+ 4	+ 5	+ 1	+ 3

DISCUSSION

The subjects used in this study represent an intelligent, equated, and naive sample. Their small numbers require that the results be interpreted with caution and generalized only to comparable groups.

The correlations between the personality dimension and the criterion tasks cover a wide range (−.12 to .94). However, they are grouped in such a way as to support one of the hypotheses offered by the authors. Those individuals who have a high rigidity factor in their personality, as measured by the Rorschach test, seem to be more susceptible to motion sickness in aerial acrobatics, going to sea in a power boat, and in the Slow Rotation Room than were the subjects with lower rigidity scores. These correlations are all significant at or beyond the .05 level of confidence. Individual performances on two of the three tasks are significantly related, at the .05 level, although performances on all three are positively correlated as indicated in Table IV. Such findings indicate that all three of these tasks have a common underlying factor, to which those individuals possessing a high valence of rigidity in their personality reacted.

Essentially, the same rationale can be used when considering the element of lability and motion sickness. Lability of emotions, in this sample, is highly related to susceptibility to motion sickness in the weightlessness state. The resulting correlation of .94 is significant beyond the .01 level of confidence. This criterion task is positively related, although not significantly to the other criteria. The naive subject who possesses a high index of lability of emotions finds the weightlessness state, due perhaps to its novelty and sudden onset, most threatening and is susceptible to becoming motion sick. It should be noted also that the liability and rigidity dimensions carry the bulk of the total variance and that the total score correlations are significant, in all but one case, at the .05 level of confidence.

The number of significant correlations in these findings indicates that the personality variables of rigidity and lability need to be considered as important when an experimenter selects a sample of subjects for studies in disorientation or where motion sickness is likely to be a direct outcome of experimentation.

SUMMARY

Nine volunteer normal subjects were administered a battery of psychological tests, of which one was the Rorschach test, prior to their exposure to four experimental conditions: aerial acrobatics, going to sea in a power boat, experiencing zero G, and the Slow Rotation Room. Five composite dimensions of personality were correlated to each of the four criteria. These dimensions were: anxiety, dependency, drive, lability, rigidity. A total score for all dimensions was similarly correlated. Rigidity was significantly correlated, at or beyond the .05 level of confidence, with susceptibility to motion sickness in aerial acrobatics, going to sea in a power boat, and in the Slow Rotation Room. Lability was significantly correlated, beyond the .01 level of confidence, to susceptibility to motion sickness in a weightless environment.

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