

## The Effects of LSD on Body Sway Suggestibility in a Group of Hospital Patients

By R. MIDDLEFELL

In carrying out short term therapy involving one to six sessions with doses of 75  $\mu$ g. to 200  $\mu$ g. of LSD, the author gained a definite clinical impression that suggestibility was influenced by LSD, although there is little mention of such a parameter in the classification of LSD effects. Remarks meant to be helpful sometimes proved much more effective whilst patients were influenced by LSD than when they had been given in ordinary interview. Classification of the phenomena of LSD intoxication may have therapeutic orientation and dynamic concepts or it may draw on purely descriptive terms with symptomatic significance.

Thus Abrahamson *et al.* (1955) arbitrarily selected the terms neurotic, psychotic, distortions of perception, euphoria and dysphoria as a classification for content analysis of 141 experimental sessions on 31 subjects.

Davies and Davies (1955) may have had similar impressions to the author when treating subnormals with LSD. Their report contains a comment that most of the patients were easily influenced by suggestion.

Such notions resulted in a rather too ambitious scheme for submitting subjects to a battery of suggestibility tests. In preliminary experiments it soon became apparent that with limited time and resources this first study should be confined to testing body sway. Research

work by Eysenck (1947), Ingham (1954) and Stuka (1958) has firmly established the usefulness of this procedure in assessing primary suggestibility.

### EXPERIMENTAL METHOD

Men and women, regardless of diagnostic category, were allocated to the study soon after admission to a modern treatment centre. If in use, drugs were stopped 48 hours before the expected commencement of the first test.

Testing was always done in the same room of a special unit near the main hospital. One charge nurse acted as technician and assistant throughout.

Each individual was tested three times in random order:

- (1) 1½ hours after injecting 75  $\mu$ g. of LSD.
- (2) 1½ hours after injecting 1 c.c. of sterile water.
- (3) without an injection.

Forty-eight hours was allowed between each procedure. The subject stood facing a screen a few feet away. A cotton thread, attached to the back of the collar by a crocodile clip, ran to the lever of a recording pen on a kymograph. By back winding the record paper, tracings were superimposed on the same length to facilitate comparisons.

Suggestion was from the same tape recording to all subjects.

At the beginning the subject was told to stand still with eyes closed. He was then given a trial of swaying once forward then back, and stabilizing again. Following this he was told to maintain his balance despite anything that was being said by the taped voice.

Test suggestions, lasting 8 minutes altogether, then came in three sequences to induce swaying forward and backward.

### RESULTS

#### *Table of Scores arranged in Diagnostic Groups*

The deflections of the maximum forward sway and maximum backward sway on each test were added together to give a score in 1/10th inches.

	Sex	Age	Sterile Water	Control	LSD	
Neurotics:	M	36	55	13	46	Neurotic personality disorder
Average age 28.0	M	26	30	10	41	„

THE EFFECTS OF LSD ON BODY SWAY

	Sex	Age	Sterile Water	Control	L.S.D.			
Neurotics: (continued)	M	22	29	17	41	Mixed anxiety state		
	M	27	15	12	35	Phobic state		
	M	19	18	23	40	Anxiety state		
	F	19	28	13	38	Anxiety state		
	M	28	24	5	31	Anxiety/tension state		
	M	55	36	12	41	Compensation neurosis		
	M	42	18	10	35	Chronic mixed anxiety state		
	F	19	19	23	23	Neurotic personality disorder		
	F	16	22	14	25	Anxiety state		
	Mean		26.7	13.8	36.3			
Depressives:	M	18	8	6	10	Endogenous		
	M	41	20	13	12	Endogenous		
	M	24	15	17	17	Endogenous		
	F	22	6	10	6	Endogenous		
	Average age 29.0		F	43	15	8	13	Endogenous
	F	25	7	21	11	Endogenous		
	F	20	4	8	4	Endogenous		
	F	19	12	10	21	Endogenous		
	F	34	4	4	29	Endogenous		
	F	54	13	10	6	Endogenous		
	F	21	14	3	4	Endogenous		
	F	41	20	13	22	Endogenous		
	F	17	25	11	13	Endogenous		
	M	24	14	9	18	Endogenous		
F	45	26	20	18	Endogenous			
	Mean		13.5	10.9	13.6			
Schizophrenics:	M	31	40	45	37			
	M	38	48	50	48			
	M	22	40	35	35			
Average age 26.8								

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	Sex	Age	Sterile Water	Control	L.S.D.
Schizophrenics: (continued)	M	22	25	50	40
	M	20	70	70	70
	M	33	38	34	45
	F	34	50	12	55
	F	30	32	40	70
	F	19	32	36	40
	F	19	42	40	50
	Mean		41.7	41.2	49.0

STATISTICAL ANALYSIS

The Kruskal-Wallis technique used here tests the null hypothesis that samples come from the same population or from identical populations with respect to averages. In the computations each of the N observations are replaced by ranks. All of the scores from the three (K) samples (diagnostic groups) are ranked in a single series. The test determines whether the sums of the ranks for each sample are so disparate that they are not likely to have come from samples which were drawn from the same population.

$$\text{Formula: } H = \frac{12}{N(N+1)} \sum_{j=1}^K \frac{R_j^2}{n_j} - 3(N+1)$$

K=no. of samples (3)

n<sub>j</sub>=no. of cases in j<sup>th</sup> sample (11, 15 and 10).

N=n<sub>j</sub>, no. of cases in all samples combined (36).

R<sub>j</sub>=sum of ranks in j<sup>th</sup> sample (column).

$\sum_{j=1}^K$  directs one to sum over the K samples (columns).

Values of H are compared with the value of  $\chi^2$  given in appropriate table. If H is equal to or larger than the value for the previously set level of significance the H<sub>0</sub> (null hypothesis) may be rejected at that level.

(1) Analysis of sterile water scores by ranks gave:  $p < .001$  (H=14.6)

(2) Analysis of control scores by ranks gave:  $p < .01$  (H=11.5)

(3) Analysis of LSD scores by ranks gave:  $p < 0.01$  (H=23.7)

The Friedman two-way analysis of variance by ranks can be applied to test the null hypothesis when the same group of individuals have been studied under each of several (K) conditions.

$$\text{Formula: } \chi^2 = \frac{12}{NK(K+1)} \sum_{j=1}^K (R_j)^2 - 3N(K+1)$$

Where N=no. of rows

K=no. of columns

R<sub>j</sub>=sum of ranks in j<sup>th</sup> columns.

$\sum_{j=1}^K$  directs one to sum the squares of the sums of ranks over all K conditions.

Analysis of the neurotic scores by this method gave:  $p < .002$  ( $\chi^2 = 14.00$ )

The depressive and schizophrenic groups show no significant inter test differences.

COMMENTS AND CONCLUSIONS

The three diagnostic categories have differed significantly in their responses to the three experimental conditions.

The neurotics shows a marked "placebo" enhancement of body sway suggestion and an even greater response to LSD.

The generally low score of the depressive is an interesting incidental finding and if confirmed would indicate that body sway measurements had a discriminating value of diagnostic significance. Clinical experience with depressives under LSD supports this finding. One has noticed that in a genuine endogenous mood disturbance the LSD response of the patient differs little from the control state, particularly with regard to verbal productions. The lack of

influence one may have on the morbid pre-occupations of a depressive may also be supportive of the experimental findings here.

The schizophrenics have the highest scores. However, their tracings are very much in contrast to those of the neurotics where the swaying can be seen to relate to the tape-recorded instructions. The schizophrenics appeared to be "simulating" rather than responding specifically. Their swaying is exaggerated and erratic.

Total LSD scores are higher than the sterile water scores and both exceed the control results. It might be presumed that LSD does increase primary suggestibility, particularly in neurotics and possibly in some schizophrenics. The scores of men and women in the depressive and schizophrenic groups are so alike that no sex difference can be claimed in this relatively small series.

In the neurotic group the average score under LSD for 3 women (28) is appreciably lower than the average (39) for 8 men. However, with such a small sample, comment that female neurotics under LSD are less suggestible than male neurotics is not justifiable.

The subjects in this study were relatively young and so no influence of age on body sway suggestibility is demonstrable.

In an allied experiment the author will in effect have an enlarged series with which to confirm his findings.

#### SUMMARY

Eleven neurotic, 15 depressed and 10 schizophrenic patients were each tested three times for body sway suggestibility. (1)  $1\frac{1}{2}$  hours after an injection of 75  $\mu$ g. of LSD (2)  $1\frac{1}{2}$  hours

after an injection of 1 c.c. of sterile water. (3) without an injection.

Statistical analysis of the results showed that differences between the scores of the three diagnostic categories were very significant.

The depressives had low scores in all three tests. Such a finding is regarded as of possible diagnostic value.

The neurotics showed an increase in body sway after the sterile water injection and an even greater response to LSD.

The schizophrenic group had generally high scores with, however, little evidence of a relationship between swaying and tape recorded suggestions, in contrast to the neurotics whose tracings have a high frequency of positive effects related closely in time to specific suggestions to sway forward or back.

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