

The Effects of LSD Upon Group Interaction

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The discovery of D-lysergic acid diethylamide (LSD)* and its impact upon the human organism has stimulated a considerable amount of research activity, largely concerned with the psychological symptoms which are produced by LSD. These symptoms bear a striking resemblance to those appearing in the psychoses, which undoubtedly constitutes the major source of interest

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* Small doses of the diethylamide of D-lysergic acid (LSD) administered orally to nonpatient subjects produce transient psychotic-like features similar to those found in schizophrenia and affective psychoses. The reaction lasts for approximately eight hours. In the majority of the subjects, memory remains intact throughout the entire experience.^a

in LSD. Thus Rinkel et al report: "The psychotic phenomena were predominantly schizophrenic-like symptoms that were manifested in disturbances of thought and speech; changes in affect and mood; perception; production of hallucinations and delusions; depersonalization and changes in behavior" (reference 7, p 277). In addition, the sheer extent of its symptom-producing potential, as suggested by a recent study,⁵ adds greatly to its experimental utility.

The present study is an exploratory attempt to determine the effect of this particular type of stress upon interactive behavior in small task-oriented groups in a laboratory situation.

Procedure

Twenty-four male subjects (Ss), all college students, were formed into six groups of four men. Each group met twice, once about 1½ hours following administration of LSD (this constituted the experimental condition) and once in a control meeting under normal conditions. Three of the groups received LSD prior to their first meeting and three prior to their second meeting, in order that the

length of time the Ss had been together might be controlled.

During each meeting the Ss were seated around a rectangular table with the observer at another table opposite the Ss. They were told that they would be given a problem to discuss and that the observer would record their discussion on an interaction recorder. The Ss were then instructed to read a case study concerning a human relations problem in an administrative situation, discuss it, and arrive at a group decision as to how the problem should be handled. The order of the two case studies used for the two meetings was rotated. No differences were found between the cases on any of the variables under study.

The Ss were given ten minutes to read their case summaries and take notes. At the end of this period, the summaries were collected by the experimenter, thus forcing Ss to rely upon memory and their notes in comparing their facts. Considerable time was spent in such comparisons.

Forty minutes were allowed for the group to arrive at a decision. During this time, the observer categorized the interaction of the subjects on the moving tape of an interaction recorder, using Bales's interaction categories.¹

At the end of the 40-minute period, the Ss were told that their time was up and that before filling out a questionnaire about the meeting they had ten minutes to talk informally about anything they wished. This short session, which was also categorized by the observer, was referred to as the "social session" in contrast to the case discussion, which was called the "task session." This terminology is convenient and simple but does not imply that no "task" was involved in the "social" session. The intent of these instructions was in fact to create tension and to test the ability of the Ss to handle a difficult social situation.

Following the social session, each S filled out a questionnaire which asked him (a) to rank all the Ss, including himself, on a leadership scale, (b) to indicate on a scale the degree to which he liked and disliked each of the other Ss, and (c) to predict the degree to which other Ss liked and disliked him.

This experimental procedure, the cases, the questionnaire forms, and the instructions are essentially the same as those used by Bales over a period of several years, in his studies of small groups at the Harvard Laboratory of Social Relations.

Bales' method of interaction process analysis was developed to provide a general system for classifying and comparing the behavior of groups. According to this method, the interaction or process rather than the topical content is observed and recorded. Every observed act of communication is classified into one of 12 categories, which are related to one another in a logical fashion, as may be noted in the list below. The categories are thus grouped into four general areas: *questions* (categories 7, 8, 9),

problem solving attempts (categories 4, 5, 6), *positive reactions* (categories 1, 2, 3), and *negative reactions* (categories 10, 11, 12). The first two areas are referred to together as *task behavior*, the last two as *social-emotional behavior*.

In addition, the person who performs the act and the person or persons to whom it is addressed are also recorded. Below are listed somewhat more detailed descriptions of the 12 categories. Full descriptions, scoring procedures, and other information regarding the categories and other instruments are given elsewhere.^{1,2}

1. *Shows solidarity*, jokes, raises other's status, gives help, reward
2. *Shows tension release*, laughs, shows satisfaction
3. *Agrees*, shows passive acceptance, understands, concurs, complies
4. *Gives suggestion*, direction, implying autonomy for other
5. *Gives opinion*, evaluation, analysis, expresses feeling, wish
6. *Gives orientation*, information, repeats, clarifies, confirms
7. *Asks for orientation*, information, repeats, clarifies, confirms
8. *Asks for opinion*, evaluation, analysis, expression of feeling
9. *Asks for suggestion*, direction, possible ways of action
10. *Disagrees*, shows passive rejection, formality, withholds help
11. *Shows tension*, asks for help, withdraws out of field
12. *Shows antagonism*, deflates other's status, defends or asserts self

Results

Changes in the Quantity and Quality of Interaction.—The number of acts in each of the Bales interaction categories initiated by each man was tabulated separately for the control and experimental meetings and for the task and social sessions. Such a tabulation yields for each S a *raw profile*. The total number of acts in all categories for each individual is called his *raw total output*. When the number of acts in each category is divided by the number of minutes in the session in which he participated, the resulting tabulation gives his *rate profile*, and when his raw total output is similarly treated, it indicates his *total rate*.

To show the differences between control and experimental meeting interaction, the raw profiles and raw total outputs of the 24

TABLE 1.—Composite Interaction Profiles in Percentages of 24 Subjects in Experimental and Control Meetings (Task Session)

Interaction Category	Control Meeting	Experimental Meeting	P*	
			By Rate	By %
1. Shows solidarity	1.28	9.47	0.0001	0.0001
2. Shows tension release	2.91	30.41	0.0001	0.0001
3. Shows agreement	19.10	10.09	0.10	0.001
4. Gives suggestion	11.28	7.11	—	0.02
5. Gives opinion	34.45	16.74	0.001	0.0001
6. Gives orientation	16.67	13.56	—	0.10
7. Asks orientation	2.24	3.23	0.01	—
8. Asks opinion	1.39	1.18	—	—
9. Asks suggestion	0.75	0.57	—	—
10. Shows disagreement	9.15	5.29	0.02	0.001
11. Shows tension increase	0.67	1.96	0.10	—
12. Shows antagonism	0.11	0.39	—	—
Composite raw total rate per minute	18.01	22.61	0.01	

* Differences were tested with the Wilcoxon Signed Rank test.

subjects were added together to form a composite raw profile and a composite total output for each meeting. The composite raw profiles were then converted to composite percentage profiles by dividing the number of acts in each category by the composite total output.

Table 1 compares the composite percentage profiles of control meeting task sessions and experimental meeting task sessions, while Table 2 compares the social session profiles of the two meetings. In both tables the total outputs under each condition, expressed in composite total rates, are also compared.

The first difference to be noted is that LSD produces a significant increase in total output in the task session, but not in the social session. The significance of this difference was tested by applying a Wilcoxon Signed Rank test to the 24 matched pairs of total rates. The increase seems due primarily to the very large increase in categories 1 and 2 (mostly joking and laughing) and is similar in nature to the increase in total rate from task to social session under normal conditions. Laughter is very economical of time, and it seems likely that the difference between the total rates of the control and experimental task sessions is produced by the increase in these two categories alone and does not represent any general change in the interaction level of the subjects.

Differences in total rates do raise a problem, however, in testing qualitative differences between profiles. One may be interested either in the absolute size of a particular category or in its size relative to other categories. For this reason, differences between the profiles of the two meetings were tested in two ways: first, by comparing individual rate profiles, and second, by comparing individual percentage profiles in the two meetings. Since the difference in total rate between the two meetings is not general, the tests by rate would seem to be more meaningful than the tests by percentages.†

The control meeting task session composite profile (Table 1) differs little from the composite profile of groups studied in the Harvard Laboratory (reference 2, p 272). Differences between the control and experimental meetings, however, are quite marked. Nurturant behavior, joking, and laughing (categories 1 and 2) are very much higher in the experimental meeting, and the subjects also ask more often for orientation (category 7). At the same time, the behavior of subjects under LSD seems far less oriented toward an intellectual goal. They give fewer

† The problem is complicated still further by the fact that the Bales categories are not independent. An act not scored in one category is scored in another. When the rather large factor of total output is removed, however, the intercorrelations among the categories are in fact extremely low.

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TABLE 2.—Composite Interaction Profiles in Percentages of 24 Subjects in Experimental and Control Meetings (Social Session)

Interaction Category	Control Meeting	Experimental Meeting	P	
			By Rate	By %
1. Shows solidarity	6.86	13.30	0.01	0.05
2. Shows tension release	17.45	42.35	0.0001	0.001
3. Shows agreement	9.13	4.73	—	0.10
4. Gives suggestion	0.80	1.95	0.02	0.01
5. Gives opinion	22.41	14.20	—	0.10
6. Gives orientation	29.27	11.04	0.001	0.001
7. Asks orientation	8.32	2.78	0.01	0.01
8. Asks opinion	0.73	0.90	—	—
9. Asks suggestion	0.29	0.00	—	—
10. Shows disagreement	2.04	3.38	0.05	0.10
11. Shows tension increase	2.63	3.53	—	—
12. Shows antagonism	0.07	1.80	0.01	0.01
Composite raw total rate per minute	21.61	21.96	—	—

opinions and perhaps fewer suggestions, and there are fewer agreements and disagreements.

A comparison of the social sessions of the two meetings (Table 2) shows changes which differ in some respects from changes between the task sessions. Ss even in the control meeting showed rates in solidarity, joking, laughing, asking for orientation, and tension behavior (categories 1, 2, 7, and 11) which were high relative to the task session and, of these, only the rates in categories 1 and 2 were higher in the experimental meeting than in the control meeting. Giving suggestions, disagreeing, and showing antagonism, in contrast to the task session, were more frequent in the experimental meeting than in the control meeting.

The high rates in giving and asking for orientation (categories 6 and 7) in the control meeting social session are of special interest. In task sessions, these categories are composed largely of requests for and statements of facts about the case. In social sessions, they are primarily made up of information and requests for information about the Ss themselves, such as where they come from and whom they know. Categories 6 and 7 in social sessions, then, reflect the efforts of the subjects to establish a common ground, and the high rates in these categories in the control meeting social session would seem to be symptomatic of the difficulties which normal groups experience in moving

beyond this initial state under the conditions imposed by the experimenter.

In the experimental meeting social session, the Ss seemed to feel very little necessity for establishing this kind of foundation. Evidence for this may be found not only in the fact that categories 6 and 7 are much lower than in the control meeting, but also in the fact that the Ss apparently felt more free to indulge in such active and aggressive activities as giving suggestions, disagreeing, and showing antagonism than they did in the social session of the control meeting.

The more gross changes, such as those in categories 1 and 2, tend to obscure more subtle alterations in the relationships between categories. Alterations of this sort may be teased out by constructing category indices such as those shown in Table 3. These indices are formed by placing various categories in a formula, according to some theoretical notion, and applying this formula to the raw profiles of each man. The indices shown in Table 3 were selected on the basis of having been found useful in pilot studies.

The Index of Need for Cognitive Control expresses the ratio between the three "question" categories (7, 8, and 9) and the three "problem solving attempt" categories (4, 5, and 6). It assumes that the S who asks many questions in proportion to the "answers" he gives is less able to establish cognitive control over the world around him than is the subject with a low ratio of questions to an-

TABLE 3.—Interaction Indices Computed for Each Man in Experimental and Control Meetings

Index	Formula	Task Session		Social Session	
		Direction of Difference	P	Direction of Difference	P
Need for cognitive control	$\frac{7+8+9}{4+5+6}$ *	E > C †	0.01 ‡	C > E	0.20
Inhibited negative affect	$\frac{11}{10+12}$	E > C	0.05	C > E	0.20
Concreteness	$\frac{6+7}{5+8}$	E > C	0.001	C > E	0.20

* The numbers are those of the Bales interaction categories.

† E indicates experimental meeting; C, control meeting.

‡ Using the Wilcoxon Signed Rank test.

swers. In the task session, this cognitive control is much weaker in the experimental meeting than in the control meeting, but in the social session the trend seems, if anything, to be reversed.‡

The Index of Inhibited Negative Affect defines the degree to which negative reactions (area D) are expressed only in signs of tension or withdrawal (category 11) rather than through direct aggression (category 12) or overt disagreement (category 10). In the task session, negative affect appears to be more inhibited in the experimental meeting, while in the social session it is, if anything, more inhibited in the control meeting.

The Index of Concreteness is given by the ratio of interaction in a concrete framework (categories 6 and 7) to interaction of a more abstract nature (categories 5 and 8). It is thus the ratio of fact to interpretation, reporting to editorializing, perception to conceptualization. Table 3 indicates that while the experimental meeting task session is clearly more "concrete" in this sense than the control meeting task session, the experimental meeting social session is, if anything, less concrete than its control meeting counterpart.

Subject Attitudes Toward Behavioral Changes.—It would be of some interest to

‡ Note that none of the social session differences approaches the 0.05 level of significance. This may be due in part to the unreliability of the social session indices relative to the task session indices, which are based on much larger number of acts.

know how the subjects felt about these changes in the quality of their interaction. This may be determined indirectly by asking what type of behavior was most valued by the group members in each meeting. Assuming that subjects ranked high by the group on leadership would be persons who had behaved in ways approved or valued by the group, one may infer subject attitudes toward behavioral changes from comparisons of interaction profiles of subjects ranked high on leadership with those ranked low. §

Such a comparison reveals no differences between the behavior of leaders and non-leaders in the control meeting or in the social session of the experimental meeting. In the experimental meeting task session, however, leaders have significantly (0.05 level) higher rates of agreement, suggestions, and orientation (categories 3, 4, and 6) and significantly lower rates of tension and tension release. This finding is interesting in view of the fact that the leaders are high in those categories in which the Ss as a whole are low (in comparison with the control meeting) and low in those categories in which the Ss as a whole are high. The more a subject behaves like a normal person, the higher his status in a group under LSD.

Changes in the Structure of the Group.—Festinger and others conducted a study in 1952 involving the experimental manufacture

§ The degree of agreement among subjects on these leadership rankings was no greater than is usual in small laboratory groups. Kendall's W ranged from 0.19 to 0.96 with a mean of 0.61.

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of what they called "de-individuation."⁴ This concept and the hypotheses they derived from it are closely related to the ideas of Georg Simmel, who clearly dealt with de-individuation in his theory of sociability.⁸ De-individuation is said to be characteristic of a group in which individuals do not respond to each other as individuals, but rather as a crowd or mass. Such a situation is associated with a "reduction of inner restraints." This reduction is exemplified by the woman Simmel mentions who wears a more low-cut gown to a ball than to a small, intimate gathering, or by a greater willingness on the part of Festinger's de-individuated subjects to verbalize hostile feelings toward their parents. Although Festinger seems in his theory to assume, as does Simmel, that de-individuation produces the reduction of inner restraints, his experiment is designed as if the reverse were the case, in that the "reduction" is created experimentally and de-individuation follows as an apparent consequence. No attempt will be made here to resolve this contradiction.

Since LSD seems to create a reduction of inner restraints with regard to the expression of certain kinds of affect, one might expect de-individuation to occur in a group under LSD. Although Festinger's measure of de-individuation was not obtained, the Bales technique provides a very similar one which was used to test this hypothesis. This measure is the relative number of acts addressed to the group as a whole rather than toward specific individuals.

Table 4 shows the percentage of acts addressed to the group as a whole in each session of each meeting. The percentages for the two sessions are almost identical in each meeting, but both experimental meeting percentages are significantly higher than their

control meeting counterparts. De-individuation in this sense was far more marked in the experimental meeting.

Changes in Social Perception.—Changes in social perception may be studied by examining the postmeeting questions dealing with likes and dislikes. As noted above, each S was asked both to indicate how much he liked and disliked each other subject and to predict how much each other subject liked and disliked him.

A subject who tends to give high ratings on the "like" question and low ratings on the "dislike" question is said to have a high "friendly bias." A subject who tends to predict that others will give similar ratings to him is said to have a high "projected friendly bias." On the basis of the amount of interaction in categories 1 and 2 in the experimental meeting, one might expect both friendly bias and projected friendly bias to be higher in that meeting than in the control meeting. This, however, is not the case. There is no significant difference between the two meetings on either variable.

On the other hand, since not only 1 and 2 but also categories 11 and 12 increase, one might expect higher ratings in the experimental meetings on both likes and dislikes or a general increase in affective intensity in the experimental meeting.

No such increase occurred with respect to the ratings themselves, and the predicted ratings (ie, *projected* affective intensity) were actually lower in the experimental meeting than in the control meeting. This difference is significant at the 0.05 level, using the Wilcoxon test.

A final measure to be considered is the accuracy of the Ss' prediction in the two meetings. This is easily determined by comparing a S's prediction with the rating he actually received. In this comparison, Ss in the experimental meeting were less accurate than in the control meeting. The difference is significant at the 0.01 level, using the Wilcoxon test. Some, though by no means all, of this error is presumably due to the Ss' tendency to underestimate the intensity of others' feelings toward themselves.

TABLE 4.—Percentage of Interaction Addressed to the Group as a Whole

Session	Meeting		P *
	Control	Experimental	
Task	18.7	28.8	0.01
Social	18.0	29.5	0.02

* Using Wilcoxon Signed Rank test.

Comment

These findings can perhaps be summarized in terms of two major concerns of the subjects: (a) a preoccupation with the internal stresses and events produced by the drug, such that environmental events and demands such as the task, lost much of their significance; (b) a desire to "rise above" the drug and prove their ability to function normally.

These concerns tended to conflict. Although discussions of the task were confused and uncertain, were interrupted frequently by waves of inappropriate laughter, and seldom moved beyond the reporting of facts to their organization and analysis, those most successful in behaving as if they had received no drug were chosen leaders. Since this occurred at a time when all members were deviating from normal task behavior, it is more surprising than it might at first seem that leaders would be selected on the basis of normal criteria of task effectiveness.

This value placed upon maintenance of control and resistance to the drug might also account for the inhibition of negative affect in the experimental task session and for the greater freedom and aggressiveness shown in the social session after the task and the impetus to "prove" themselves had been removed.

Preoccupation with internal events could in itself have accounted for the impairment of their ability to perceive the feelings of others or respond to them as individuals. There is an almost child-like egocentricity in the Ss' belief that the feelings they toward others were not reciprocated with equal intensity.

The nature of these internal events varied considerably. Many subjects experienced sensory distortions. During one meeting a subject looked at his hands and found them swollen and deformed. He became very frightened, and the task was temporarily abandoned. Milder distortions, such as moving or undulating furniture and walls, were common. Subjects also experienced a variety of somatic symptoms. One subject took off his shirt and climbed out on a roof in response to a feeling of constriction in his chest. A few subjects behaved in a paranoid

fashion, and one experienced severe homosexual panic. One smashed a glass in an attempt to separate real from unreal objects, while another attempted to drive his fist through a door in order to prove that his virility had not diminished. More common than these isolated dramatic incidents, however, was the presence of extreme apathy and detachment, with feelings of unreality and strangeness.

The conflict between the pressure of these feelings and the desire to function normally is expressed by the comments of the subjects themselves:

"I started to feel a little bit strange but I had this feeling—let's beat the world—show them we can solve this problem, but then we started talking about the problem and I was laughing about something."

"I know now that we talked faster and louder than yesterday but I still hadn't realized there was anything wrong . . . then P. said, 'My, we're a very good group' and I started to giggle . . . I must have laughed for twenty minutes without stopping, I couldn't control it."

"I thought I tried to keep the thing on the track . . . a little bit more than the other guys did but after a while I started to get a little bit more silly and even I began to lose interest."

"I felt myself drifting off . . . getting lost in my thoughts. Anytime I was faced with the task, I imagined that I went completely out. My face felt wooden . . . I felt completely dead."

"I felt a compulsive need to finish the problem . . . (but) the others are not getting kicked as hard as I am . . . things were both funnier and more important."

"There was nothing on my mind, no strand . . . once in a while a thought would slip through . . . I thought they were all hypocrites . . . the only time I was conscious was when I was conscious that I was laughing."

"Everything was normal, seemed the same as yesterday . . . then I got such a funny feeling in the right side of my face . . . and all of a sudden I was afraid."

One subject wrote his thoughts on a scrap of paper during the meeting:

"I realize I should participate but . . . I just want to sit back and make snide comments . . . but don't because it will impede the general discussion . . . they are all quite superficial . . . we haven't decided a damn thing . . . having a great problem saying what I want . . . this is all different from before. My whole power of reason is gone . . . but I'm fairly well controlled."

The absorption of the subjects in the personal meanings which events held for them is illustrated by one subject who cried un-

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Controllably when another subject took a pencil away from him:

"I was sort of like a little child . . . I couldn't stop crying. I was unable to concentrate on the task . . . waves of feeling kept coming up my back."

It is not difficult to see how this sort of concern with symbolic events might interfere with the ability of the subjects to perceive the attitudes and feelings of others.

Preoccupations of this kind often present a contradictory appearance. On the one hand the subject seems to manifest a loss of interest in his environment and a loss of motivation to alter it in any way. Yet at the same time he may appear affectively hypersensitive to external events. This apparent contradiction may be due to the fact that while the subject feels the effect of the event, he is concerned with and responds to the feeling rather than to the event itself. Furthermore, he may feel these effects without evidencing any need to enter into or explore his environment. In the example cited above, the S made no effort to recover his pencil, nor to determine why it had been taken. Thus, other group members may have held little significance for the individual subject, unless they acted in such a way as to impinge directly upon his feelings. Identification or "empathy," presumably requisites of accurate social perception and understanding, may have been impossible.

Summary and Conclusions

Six four-man discussion groups were studied both under normal conditions and under the influence of lysergic acid diethylamide (LSD) in order to study the effect of LSD upon group interaction. Under each condition, the Ss spent 40 minutes on an intellectual group task and 10 minutes in informal social conversation. The following results were obtained:

A. In the task session the ratio of questions to problem-solving attempts was higher under LSD than in the control meeting. Interaction was also on a less abstract, more concrete level, and negative affect was more inhibited.

B. In the social session, the subjects were more active and aggressive under LSD than

in the control meeting and spent less time exchanging information.

C. In both sessions, the subjects' interactions were more affectively toned (primarily in a manic direction) under LSD than in the control meeting, and the subjects addressed a greater proportion of their remarks to the group as a whole (rather than to specific individuals).

D. Persons chosen as leaders under LSD were those who endeavored to cope with the formal task demands and spent less time attempting to relieve internal tensions.

E. Subjects under LSD were less accurate in their perceptions of each others' attitudes toward them than in the control meeting, in part because of a tendency to overestimate the neutrality of these attitudes.

These findings were interpreted as suggesting a preoccupation with the handling of inner tensions and a consequent inability to respond to the feelings of others or to task demands.

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