

SOME RELATED FACTORS OF THE LSD 25 REACTION*

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INTRODUCTION

LSD 25 has been used to induce psychotic states¹ and stimulate interest in experimental psychiatry. Wikler² has stated that the drug effect depends on the subject's history, the dose and the situational and motivational conditions, and that in the present state of knowledge we must accept the principle of multifactorial determinism.

The most obvious factor influencing the course of the reaction is the dosage administered. However, dosage per se has not received adequate attention. The variation of LSD 25 manifestations, their similarity to "naturally" occurring psychoses, and the opportunity the drug affords for studying depersonalization have occupied a great deal of the researchers' interest. Two exceptions are noted: Forrer and Goldner³ studied the effect of doses varying from $\frac{1}{2}$ to 6 micrograms per kilogram of body weight on six schizophrenics of poor prognosis and reported the same reaction pattern of increased amiability and release of libido throughout the dosage range explored—with hallucinations beginning at the 1 microgram (gamma) level. Abramson, et al.⁴ reported that verbal responses of normal subjects to a symptom questionnaire included items which differentiated subjects receiving 0, 50, and 100 μ g. (micrograms) of LSD 25 and that the number of subjects reporting euphoric and dysphoric symptoms increases up to 51-75 μ g.⁵ In these experiments, euphoria was found to decrease and reach zero with doses of over 100 μ g.

Situational factors have found their way into the literature. Agnew and Hoffer,⁶ in a paper entitled "Nicotinic Acid Modified Lysergic Acid Diethylamide Psychosis," noted marked shifts in mood when the subject's milieu was unwittingly changed. A study reported by Rinkel, et al.⁷ states, in respect to situational factors, that hostile and affiliative relationships were distorted more often than empathic and impersonal relationships. That is, the activities of the observer and of those interacting with the subject influenced the reaction. Dosage and situational factors partially account for

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the fact that summary descriptions of the LSD 25 reaction agree that it is schizophrenia-like but varies in the subcategory of schizophrenia it resembles.

Matefi,⁸ in self-experiments, has found the reaction to be of the hebephrenic type; Bercel et al.,⁹ studying subjects in a Faraday cage, and reducing external stimulation to a minimum, report predominance of the paranoid type, whereas De Giacomo,¹⁰ using 300-500 μ g. in schizophrenics, produced catatonia-like phenomena.

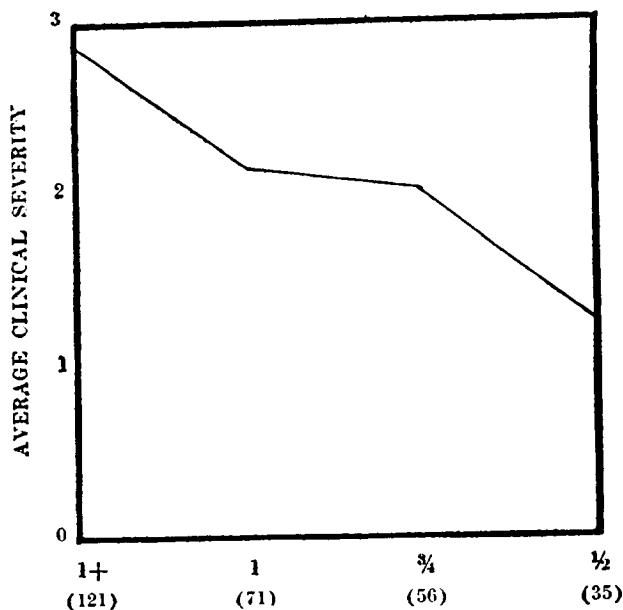
DOSAGE

The experiments to be reported here were designed by Hyde¹¹ to yield information as to the effect that social interaction would have on the LSD 25 reaction. The subject was exposed to a variety of social situations during the experimental day, in order to ascertain what influence the meeting of social expectations, other than psychological and physiological tests, would have on the type of reaction. De Shon¹² has classified the LSD 25 reaction as mostly schizophrenic turmoil.

In the present experiment, 120 nonpatient subjects receiving doses of LSD 25 ranging from $\frac{1}{2}$ to 2 μ g. per kilogram of body weight, were interviewed by the psychiatrist and assessed for severity of symptoms and psychiatric diagnosis. The relationship of clinical severity to dosage is shown in Figure 1. Six severity ratings were used. Minimal was numerically equated to 0 and severe was equated to 5.

The increase in clinical severity is related to increased dosage. The amount of change introduced by LSD 25 is approximately proportional to the amount of the drug ingested. A similar qualitative index can be obtained by the relationship of dosage to diagnosis. It is shown in Figure 2.

The type or quality of the reaction is, to a certain extent, dependent on the dosage administered. With increasing dosage a greater and greater percentage of the reactions are classified as schizophrenic, until it is found that at over 1 μ g. per kilogram of body weight all reactions are of this type. Further restriction of the type of reaction is seen from the fact that the schizophrenic turmoil reaction is the most common diagnosis at the highest dosage, and that it decreases in frequency with decreased dosage. It thus appears that, with increasing dosage, personality and



Dosages in $\mu\text{g.}$ per kg. of Body Weight

Average Dosage (in $\mu\text{g.}$'s) in Parentheses

Figure 1. Relation of Relative Dosages ($\mu\text{g.}$ to kg. of Body Weight) to Clinical Severity

other factors play a lesser role in determining the phenomena produced than they do at lower dosages.

The manic reaction is absent from the writer's results at the highest dosage; it appears at the 1 $\mu\text{g.}$ level and is optimal at $\frac{3}{4}$ $\mu\text{g./kg.}$ That it does not increase at the $\frac{1}{2}$ $\mu\text{g./kg.}$ level suggests that, at such a range, the amount of LSD 25 is not great enough to produce the reaction peculiarly associated with it. Only 28 per cent of the subjects in this level are to be classified as schizophrenic. Here, the psychiatrist used such phrases as "not simulating any psychiatric syndrome"—to specify the absence of marked reaction, or "schizoid" or "depressive" to signify a reaction of minimal strength in subjects with such personality tendencies.

Though dramatic depersonalizations have been extensively reported, as by Savage,¹³ the gradual and transitional stages that are observed with small dosages have been ignored.

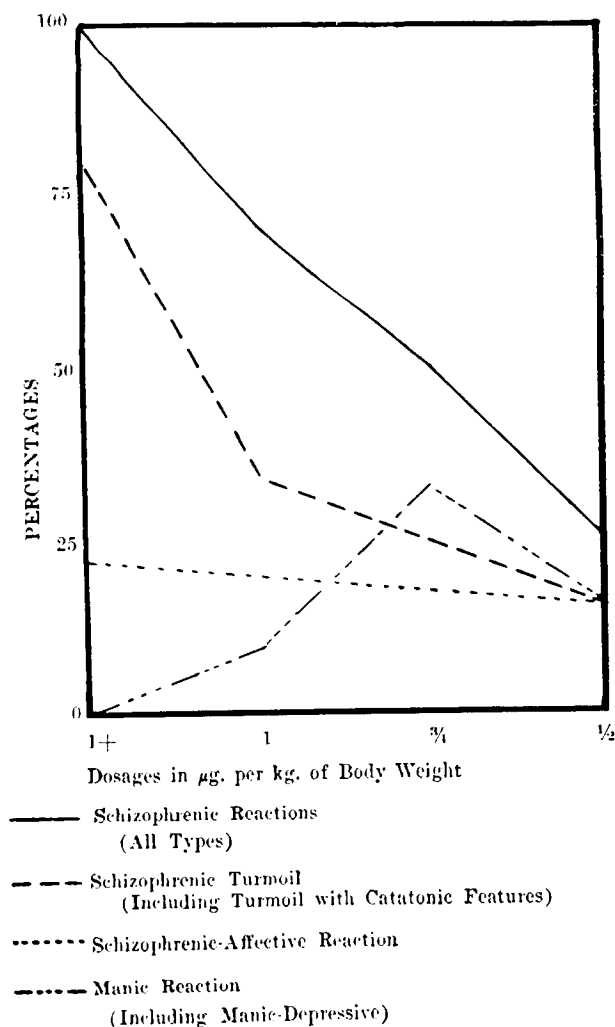


Figure 2. Relation of Relative Dosages ($\mu\text{g. per kg. of Body Weight}$) to Quality of Reaction

It has been reported that small doses of LSD 25 ($1/2 \mu\text{g./kg.}$ or less) have an effect of intoxication. The reports on $1 \mu\text{g./kg.}$ or higher give the reader the impression that the drug is the cause of psychotic symptoms such as visual distortion, disturbance in body image, and morbid withdrawal from interpersonal relationships. With small dosage, the symptom picture is dominated by

affective or "mood" changes. Somatic symptoms are relegated to a minor supporting role in both cases.

Some corroboration of this picture is attained by a symptom summary comparing five $\frac{1}{2}$ $\mu\text{g.}/\text{kg.}$ subjects with 33 1 $\mu\text{g.}/\text{kg.}$ subjects. This utilizes the symptom categories used by the psychiatrist in assessing type and severity of reaction. Neuromuscular, cardiorespiratory, gastro-intestinal, and cutaneovascular symptoms decline at very different rates as dosages are reduced (Table 1).

Table 1. Number of Symptoms per Subject

Symptom Category	1 $\mu\text{g.}/\text{kg.}$	$\frac{1}{2}$ $\mu\text{g.}/\text{kg.}$
Neuromuscular	1.48	1.40
Behavior	2.33	2.00
Cardiorespiratory	.55	.40
Affect	4.30	3.00
Visual illusions and hallucinations	1.64	1.00
Thinking and speech	2.64	1.64
Gastro-intestinal	1.06	.60
Gustatory illusions and hallucinations ..	.58	.20
Cutaneovascular	1.39	.40

Visual and gustatory illusions and hallucinations show a marked decline while affective and behavioral symptoms, though declining, are still substantial in number.

Table 2 compares symptoms culled from observers' verbatim reports of five subjects on $\frac{1}{2}$ $\mu\text{g.}/\text{kg.}$ and 25 subjects on 1 $\mu\text{g.}/\text{kg.}$

The group of gregarious symptoms—elation, friendliness, talkativeness, relaxation, and amorous behavior—actually shows a slight increase with the diminished dosage. All the other groups decline and, with one exception, decline markedly. The exception, the detachment group, has an affective connotation of a dysphoric nature and includes depression, introspection, lethargy, and seclusiveness.

Table 2. Number of Symptoms Per Subject

Symptom Group	1 $\mu\text{g.}/\text{kg.}$	$\frac{1}{2}$ $\mu\text{g.}/\text{kg.}$
1. Gregariousness	1.52	1.67
2. Anxiety and apprehension	1.20	.50
3. Irritation and hostility	.76	.33
4. Detachment	2.36	2.17
5. Perceptual distortion	2.48	1.33
6. Somatic	5.98	3.50

LSD 25 has been compared by many subjects to alcohol. With the larger doses, feelings of intoxication appear early in the reaction and are later overlaid or supplanted by psychotic symptoms. With the smaller doses, intoxication effects are predominant. A few excerpts from the protocols and interviews may serve to depict the transition from perceptual distortion to affective sentimentality. In some subjects, conflict between control and expression is expressed.

Subject 10, E 15, ($\frac{1}{2}$ $\mu\text{g.}/\text{kg.}$) who tended to withdraw from external contacts when his problem areas were in danger of being publicized, says about a situation in which co-subjects were making merry, "Well, I knew that the acid was starting to take effect, and here was John making crazy signs and making fun of Mrs. Cain. I know that if I had liquor I would have gone along with the gang and made a complete fool of myself. I was feeling like that but yet..."

Subject 11, E 16, ($\frac{1}{2}$ $\mu\text{g.}/\text{kg.}$) says of his reaction before his feelings became conflictful, "At that time I just kind of felt silly. I mean that was when I felt like I had about three drinks. I didn't feel anything in my muscles yet. My co-ordination was still perfect. It was just light-heartedness, really. My head was still clear."

Subject 8, E 13, says of his reaction, "At times there was uncontrollable laughing, but I was physically relaxed instead of tense and keyed up as per usual." Also, "Quite sensitive to relationship between people. Reaction was frank, direct, with an overtone of aggression." And, "I wanted affective conversation, not intellectual."

As the dose is diminished, the whole reaction is similar to the effects of alcohol.

Subject 3, E 4, ($\frac{1}{4}$ $\mu\text{g.}/\text{kg.}$): "I felt freer and was able to relate much more calmly and with no compulsion to choose the right words. It was more of a steady and spontaneous response." Summarizing his reaction, the same subject says, "I felt quite relaxed all day, and as I sit and type this now, there is no evidence of depression. To me the day's tasks were of less gravity, and my productions were more spontaneous and less studied."

This reaction shows a great affinity with what Masserman¹⁴ describes as the cortical depressant effect of alcohol and other drugs. The diminishing of anxiety or the dissolution of anxiety-cathected reactions is expressed.

Subject 2, E 5 ($\frac{1}{4}$ $\mu\text{g.}/\text{kg.}$): "There was a general sense of unimportance of both self and others, not an unimportance of devaluation but rather that of a loosening of previous and seemingly artificial bonds of overevaluation that seems a part of everyday life."

Subject 5, E 10: "Somewhat elated, talkative, absence of strict adherence to schedule and obligations. Lackadaisical feeling."

It has been mentioned that perceptual distortions of a gross order are not frequent with subjects receiving $\frac{1}{2}$ $\mu\text{g.}/\text{kg.}$ or less. With this dosage, distortions and unreality are not perceived with the same force as with the full dose, and may oftentimes pass as phenomena which would have occurred in a routine day.

Subject 8, E 13, ($\frac{1}{2}$ $\mu\text{g.}/\text{kg.}$) says of a supportive, affiliative observer, "I think that was when you came down and you had a little red hat on about as big as this. It was quite clear, I mean, it wasn't there, I know it wasn't there, but it still looked like you had a red, little hat on like a Santy Claus cap on the top of your head with a very broad, pleasantly grinning face, almost cat-like."

The same subject says of another investigative nonsupportive observer, "His head was rectangular to begin with and it seemed right there to become indented and to take on sort of an hourglass shape, if you know what I mean. That was the only thing."

The distortions at the low dosage level became scarcely distinguishable from routine alterations in mood and perception and may not be reported by the subject, for they are not distinctive enough to be called symptoms. Changes in perception of this magnitude may oftentimes be classified by the subject as changes in affect, for with the smaller doses, the two are so entwined as to form an indistinguishable unity.

Subject 4, E 9, ($\frac{1}{4}$ $\mu\text{g.}/\text{kg.}$) says of an authority figure who was giving a dissertation, "I felt warm toward him. His face looked younger."

Subject 6, E 11, ($\frac{1}{4}$ $\mu\text{g.}/\text{kg.}$): "A more even and less traumatic experience than full dosage—not unreal—awareness of certain responsibilities and obligations. I considered the atmosphere a permissive one but without the feeling that I wished to take advantage of it."

From this latter case one can see how a change in perception, which with a large dose might become illusion, or unreality, is termed a permissive atmosphere—and how what might, with a full

dose, be called apathy, indifference, or awayness, is perceived by this subject as a feeling that he did not want to take advantage of the situation.

With the smaller doses, the relaxation of defenses and of anxiety-laden behavior patterns is significant. The subject becomes freer in his relationship with people and tends to focus attention on their emotional needs rather than on the superficial behavior patterns demanded by social norms. Accompanying and paralleling this emotional tone, is the relaxation of ego censorship wherein the subject does not feel compelled to carry out the rituals of his routines, and his actions thereby become more spontaneous and genuine.

PROGRESSION

At any dosage level the maximum effect of LSD 25 occurs within a few hours. The change created by the drug is gradual. Scarcely perceptible at first, it increases to a maximum and then declines to reach the former level or a new equilibrium. The progression of LSD 25 effects has been pointed out by De Shon, et al.¹⁵ They divided the reaction into three phases and considered the after-effects which occurred in some subjects to be a fourth phase. Phase I was regarded as the interval between administration of the drug and occurrence of symptoms. Phase II was the height of the reaction, taking place one to five hours after administration; and Phase III was the period from the end of the height of the reaction until symptoms subsided. Of 13 cases, Phase II was found to be schizophrenic turmoil in 11. One Phase II was manic-like and one schizo-affective.

Salvatore and Hyde,¹⁶ listing and classifying symptoms over a period of eight hours from administration of the drug, demonstrated that different categories of symptoms arrived at differential peaks. They then interpreted the progressive symptomatology as being the manifestation of defense mechanisms, utilized progressively to ward off objectionable impulses and affects. They found that gregariousness and other affectively-toned behavior were followed by somatic symptoms, perceptual distortions, and feelings of unreality. They hypothesized that attempts to ward off inadmissible emotions, by somatizing and misperceiving the reality of situations, fail and that the affect returns again, clouded in the aura of unreality.

This process takes place in the space of a few hours. Individual differences in reactivity to the drug shorten or lengthen the period. A simple device, suited to demonstrating progression by the use of psychiatric diagnosis, was adapted by Hyde. It consisted of a simple histogram on which the vertical axis was graded normal, mild, moderate, severe, and maximum and the horizontal axis graduated to denote time lapsed since ingestion of the drug. Administered postexperimentally with instructions to the subjects to give evaluations of the intensity of the symptoms felt, it provided a graphic portrayal of the development of the reaction, and of the point which is experienced as peak. Discrepancy between subjective peak and diagnostic interview can be utilized to describe the reaction.

Figures 3 and 4 show the change in quantity and quality of the reaction, at varying times from the subjective maximum, as measured by severity and diagnosis. All subjects were included who received the arbitrary standard doses of 1 $\mu\text{g.}/\text{kg.}$, who drew subjective symptom curves, and who had psychiatric interviews. The

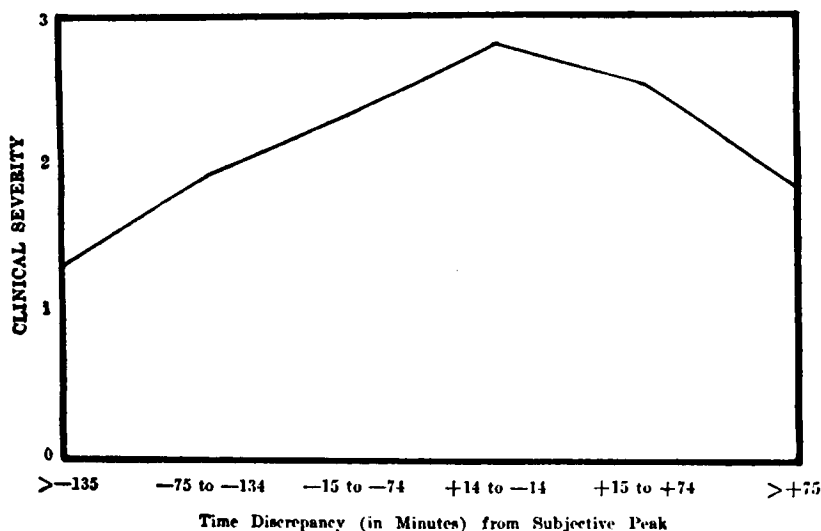


Figure 3. Relation of Clinical Severity to Time Discrepancy

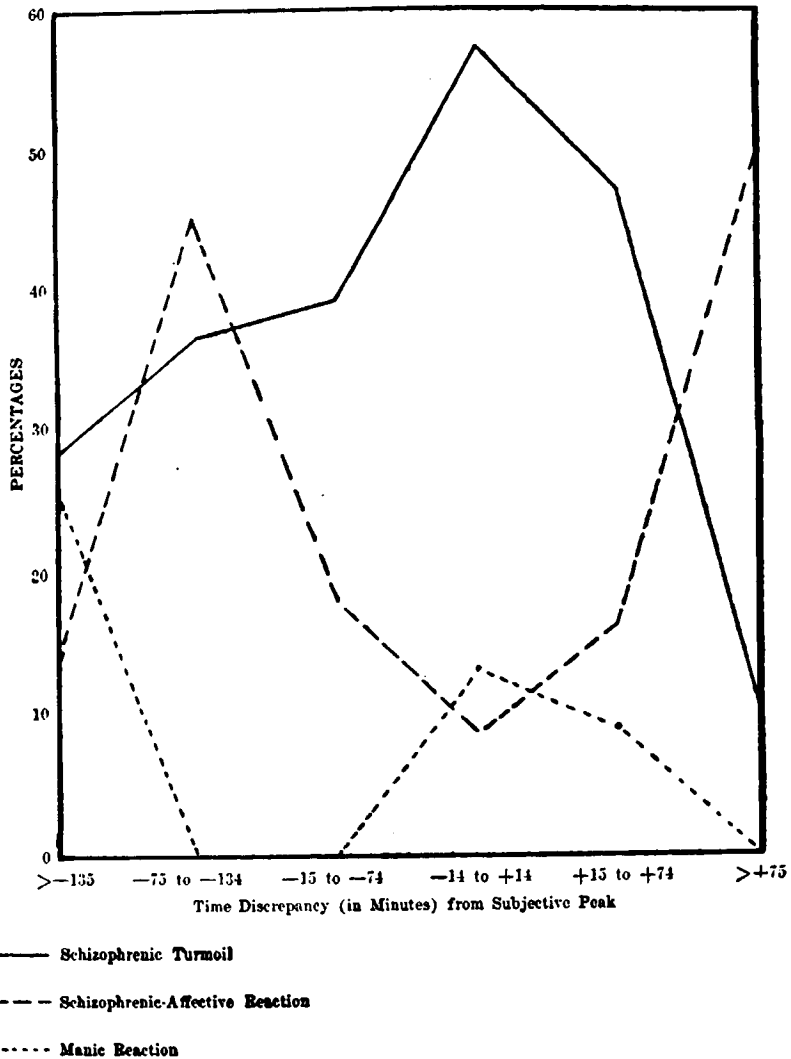


Figure 4. Relation of Clinical Diagnosis to Time Discrepancy

range of dosage* of the 78 subjects qualifying for inclusion was 53 to 107 $\mu\text{g.}$, with a mean of 72 $\mu\text{g.}$

*The mean dosage for subjects in the various time periods showed no consistent variation. It was highest (75 $\mu\text{g.}$) for subjects interviewed 135 minutes or more before their peaks, and lowest (68 $\mu\text{g.}$) for subjects interviewed during their peaks.

In the same fashion that clinical severity increased with increased dosage, it increases the closer the subject is to his subjective peak. Clinical severity is highest (2.75) for subjects interviewed at or near their peaks, and diminishes for subjects interviewed at a distance from their peaks whether before or after the peaks.

The majority of subjects, over 50 per cent, interviewed at the time indicated as subjective peak, are classified as in schizophrenic turmoil. On both sides of the peak this diagnosis becomes less and less frequent. The indication is that, in this dosage range and this experimental milieu, the reaction of the normal subjects sampled tends toward a reaction of the turmoil type.

It is of interest that the schizo-affective diagnosis has a negative relationship to the schizophrenic turmoil diagnosis. It is less apt to be found at the height of the reaction, where only 6 per cent of the subjects interviewed were so diagnosed, and becomes increasingly frequent on either side of the peak, until at both 75 minutes before and after the peak, 50 per cent of all subjects seen are classified as schizo-affective.

A tenable hypothesis from this data would be that for the "average" personality the course of the reaction would first be schizophrenic-affective, tending toward turmoil at the height of the reaction. The hypothesis is theoretically tenable, for it was the psychiatric view that the difference between the affective state and the turmoil is, to a certain extent, arbitrary; in both, there are feelings of unreality, in both there may be distortion of body image. However, the turmoil is characterized by emotional flux and upheaval, while the affective state is more consistently that of elation and/or depression. Using emotion as the criterion, one could further the proposed hypothesis by considering a manic episode to be the initial stage, before it takes a schizophrenic coloring. If this were so, one would expect personality differences between those subjects diagnosed manic at the peak and those so diagnosed at a distance from the peak. It would also explain why the diagnosis of manic is not made between the initial and peak periods.

PERSONALITY

Studies relating personality to LSD 25 reaction have not been done. The usual study pattern has been to list the symptomatology observed clinically and then add a comment as to the mechanisms

the author thinks operative in causing individual differences. Stoll,¹⁷ in the first published paper on LSD 25, called attention to the possibility of using it in psychotherapy and diagnosis. However, the seemingly natural extension of LSD 25 research into personality has not been made.

Condreau,¹⁸ speculating from clinical observation, thought that changes occurring with LSD 25 were due to an intensification of basic mental symptoms or to the caricaturing of basic personality. Becker¹⁹ held that the psychological manifestations result from impulsivity on one hand and intentionality on the other; the most striking contrast of the reaction—manic hyperkinetic, and inhibited depersonalized manifestations—being the drug correlates.

Later, clinical appraisal was interspersed with test results, comparing responses of subjects before and during the reaction. Stoll,²⁰ reporting on the Rorschach, concluded that in normals the drug produces a general loosening of mental processes similar to the clinical picture of intoxication and that "disinhibition" of affectivity and greater fluency occurs, but that precision and wealth of content are decreased. Levine, et al.,²¹ working with larger doses, characterize the Rorschach responses as indicating a disturbance in the defensive system, with pressuring into consciousness of submerged conflicts and urges. Emergence of repressed fantasies, and of autistic and deviant thinking is held to be accompanied by overpersonalization and loss of distance and greater surveillance of both inner and outer stimuli.

In 1952, Lindemann and Clark²² commented on the lack of personality studies in connection with drugs, and affirmed the need for research dealing with the individual predictability in response to drugs. Their paper offers the abstract consideration that changes in the integrative functions of the ego come about by the reduction or modification of perceptive cues.

Diagnostic studies with patients offer a beginning. Liddell and Weil-Malherbe²³ noted that after an initial phase of relaxation, an aggravation of the clinical picture ensued. Depressed patients became more retarded and depressed; schizophrenics showed withdrawal, tension, catatonic and cataleptic features. Abreaction occurred in neurotics. Hoch, Cattell, and Pennes²⁴ found that severity of reaction is correlated to chronicity of schizophrenic illness. They found that pseudoneurotic schizophrenics had the most severe re-

action to LSD 25, that deteriorated schizophrenics had the least severe, and that chronic schizophrenics reacted moderately.

Perhaps studies of personality have not been fruitful because of the well-known self-selection that occurs when one asks for volunteers to ingest drugs. The writer's own subjects have been shown to be divergent from a random, normal sample by comparing their Wechsler-Bellevue subtest scores with those presented by Rapaport²⁸ for normals and various pathological categories. The writer's subjects, test-wise, resemble acute paranoid schizophrenic patients most closely. They resemble the over-ideational preschizophrenics, neurasthenics, and obsessive-compulsives more than they do the well-adjusted sample, and resemble coarctated preschizophrenics and severe neurotic depressives as closely as they do the well-adjusted sample.

Table 3. Rank Order (Rho) Correlation Between Symptom Categories.

Mood—Sensory	-.629
Mood—Somatic	-.008
Somatic—Sensory	-.167

Within this self-selected group, however, variations do occur and can be diagnosed as a syndrome occurring under the effect of the drug. Table 3 shows the rank order correlation of the numbers of symptoms in three categories. The correlation between the number of somatic and mood symptoms is at the chance level. The slight negative correlation of somatic and perceptual symptoms would lead one to think that predisposition to one type would, to an extent, exclude the other; and the correlation between mood and sensory symptoms would lead to the belief that there is a connection between affectivity under LSD and perceptual distortion.

Those subjects who sometimes, during the LSD day displayed overt, amorous behavior were free from feelings of unreality and had fewer perceptual distortions than the group as a whole. Similarly, subjects who in the drug state displayed elation, a symptom prototypical of the gregarious symptoms because of the intensity of energy it suggests, were prominently low in symptoms of the awayness type and of the perceptual distortion type. In this group, the only two subjects who had feelings of unreality ranked first and third in the total number of symptoms displayed

during the experimental day. Another example, perhaps situational, because the research team was all male, is that of four female subjects who had outbursts of crying during their LSD day. All four had outbursts of inappropriate laughter and feelings of unreality also. Concomitantly they were low in gregarious symptoms.

The conclusion was reached that LSD 25 increases the amount of energy which the individual has to dissipate in a given amount of time. This increase in "energy" may be understood psychoanalytically as being the release of suppressed or repressed material which, before drug administration, was below the level of consciousness. This is the most common psychological explanation of how the drug operates. Busch and Johnson,²⁶ interested in the drug as a possible therapeutic agent, suggested that the drug serves to disturb the barrier of repression, while Sandison, Spencer, and Whitelaw,²⁷ using a Jungian approach, have best described the upsurge of material from the personal and collective unconscious.

Table 4, comparing individuals with small dosage and individuals with 1 $\mu\text{g./kg.}$, who have been divided as for the presence

Table 4. Average Number of Symptoms Per Subject in the Various Symptom Groups—Related to Dosage and Presence or Absence of Unreality

Mean No. Symptoms in Each Group per Subject	Dosage		
	$\frac{1}{2}$ $\mu\text{g./kg.}$	1 $\mu\text{g./kg.}$ No Unreality	1 $\mu\text{g./kg.}$ Unreality
Elation	1.67	2.33	.77
Anxiety	.50	1.17	1.23
Hostility	.33	1.00	.54
Awayness	2.17	1.75	2.92
Perceptual Distortion	1.33	1.50	3.39
Somatic	3.50	5.50	5.54
Total	9.50	13.25	14.39

or absence of unreality, may be of help. As would be expected, subjects with $\frac{1}{2}$ $\mu\text{g./kg.}$ have less symptoms than either group of 1 $\mu\text{g./kg.}$ subjects. But the expectation that each symptom group would increase as one progresses from $\frac{1}{2}$ $\mu\text{g./kg.}$ through 1 $\mu\text{g./kg.}$ with no unreality, to 1 $\mu\text{g./kg.}$ with unreality, is not fulfilled. Anxiety, perceptual distortion, and somatic symptoms do increase, but elation, hostility, and awayness do not. The difference is explained

by the fact that the division of subjects was made by choosing subjects of different reality perception. Elation and hostility increase with increased dosage, but there is a decrease when compared between individuals with the same dosage from subjects who experience no unreality to subjects who do experience it. And conversely, "awayness" behavior is more marked in individuals who experience unreality than those who do not. It appears that if the individual's behavior pattern or system of defenses is such as to make direct expression of impulses taboo, the energy is transformed into somatic or perceptual phenomena.

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REFERENCES

1. Rinkel, M.; Hyde, R. W., and Solomon, H. C.: *Dis. Nerv. Sys.*, 15:259-264, September 1954.
2. Wikler, A.: *Am. J. Psychiat.*, 112:961-969, June 1956.
3. Forrer, G. R., and Goldner, R. D.: *Arch. Neurol. and Psychiat.*, 65:581-588, 1951.
4. Abramson, H. A.; Jarvik, M. E.; Kaufman, M. R.; Kornetsky, C.; Levine, A., and Wagner, M.: *J. Psychol.*, 39:3-60, 1955.
5. Abramson, H. A.; Kornetsky, C.; Jarvik, M. E.; Kaufman, M. R., and Ferguson, M. W.: *J. Psychol.*, 39:53-60, 1955.
6. Agnew, N., and Hoffer, A.: *J. Ment. Sci.*, 101:12-27, January 1955.
7. Rinkel, M.; Hyde, R. W.; Solomon, H. C., and Hoagland, H.: *Am. J. Psychiat.*, 111:881-895, June 1955.
8. Matefi, L.: *Confinia Neurol.*, 12:146, 1952.
9. Bercel, M. A.; Travis, L. E.; Olinger, L. B., and Dreikurs, E.: *Arch. Neurol. and Psychiat.*, 75:588-611, June 1956.
10. De Giacomo, U.: *Acta Neurol. Milano*, 6: 1, 1951.
11. Hyde, R. W.: 1956 Annual Report to Society for Investigation of Human Ecology.
12. De Shon, H. J.: 1954 Annual Report to Geschickter Foundation.
13. Savage, C.: *Psychoan. Rev.*, 42:1-16, January 1955.
14. Masserman, J. H.: *Principles of Dynamic Psychiatry*. Pp. 147ff. Saunders. Philadelphia. 1947.
15. De Shon, H. J.; Rinkel, M., and Solomon, H. C.: *PSYCHIAT. QUART.*, 26:33-53, 1952.
16. Salvatore, S., and Hyde, R. W.: *Arch. Neurol. and Psychiat.*, 76:50-59, 1956.
17. Stoll, W. A.: *Swiss Arch. Neurol. and Psychiat.*, 1:45, 1947.
18. Condreau, G.: *Acta Psychiat. et Neurol.*, 24:9, 1949.
19. Becker, A. M.: *Wien Ztscher. Nerven.*, 2:402, 1949.
20. Stoll, W. A.: *Rorschachiana*, 1:249-270, 1952.
21. Levine, A.; Abramson, H. A.; Kaufman, M. R.; Markham, S., and Kornetsky, C.: *J. Psychol.*, 40:351-366, 1955.
22. Lindemann, E., and Clarke, D. L.: *Am. J. Psychiat.*, 108:561-567, 1952.
23. Liddell, D. W., and Weil-Malherbe, H. J.: *Neurol. Neurosurg. Psychiat.*, 16:7-13, 1953.

24. Hoch, P. H.; Cattell, J. P. and Pennes, H. H.: *Am. J. Psychiat.*, 108:579-584, 1952.
25. Rapaport, D.; Gill, M., and Schafer, R.: *Diagnostic Psychological Testing. II. Year Book Publishers. Chicago. 1945.*
26. Busch, K., and Johnson, W. C.: *Dis. Nerv. Sys.*, 11:241, August 1950.
27. Sandison, R. A.; Spencer, A. M., and Whitelaw, J. D. A.: *J. Ment. Sci.*, 100:491-507, April 1954.