The LSD Syndrome

— A Review —

HERBERT H. EVELOFF, M.D., *Los Angeles*

■ LSD *(lysergic acid diethylamide) is a powerful bio-active substance related to serotonin in structure. Its actions generally affect autonomic, sensory and psychological functions. Autonomic stimulation is varied. Sensory responses are usually visual, involving heightened and distorted color perception and fusion of sensory impressions. Psychological responses include a feeling that a unique experience is occurring; feelings of depersonalization; pronounced fluctuation of mood; time and space distortions; autistic phenomena; fluctuation of aggressive drives (usually reduction); and spontaneous reoccurrence of the* LSD *experience.*

The subjective responses can be related to three basic phenomena: (1) expectation; (2) loss of characteristic modes of perceptual and cognitive patterning; and (3) hypersuggestibility.

The major adverse reactions are: (1) chronic drug dependence including subsequent personality changes and depressive reactions; and (2) acute ego dissolution. These reactions usually occur in already emotionally ill people. Most of these users fall into two groups, those with unresolved identity problems and those with severe ego abnormality. The majority of adverse reactions are of the chronic drug dependence type and are usually seen in adolescents and young adults who have not negotiated the age-appropriate tasks of forming and integrating the various identities that are the composite of their life experiences.

LSD *helps alleviate these stresses via some of its psychological properties as discussed. It also provides a nidus for the formation of a subculture where goals for social, sexual and vocational achievement are lower and idiosyncratic modes of adaptation are better tolerated. A smaller group of users who have serious reactions such as psychosis, rage reactions, homicidal and suicidal ideation are usually found to have preexisting ego abnormality such as ambulatory schizophrenia, chronic impulse disorders and borderline states. Although adverse reactions most often appear to be related to pre-morbid psychopathology, this is not invariably so. Further, there is as yet no reliable method to determine who will have an adverse reaction and what the nature of that reaction will be.*

THIS ARTICLE WILL REVIEW THE LSD SYNDROME, including adverse psychological reactions. The types of people likely to use LSD and those likely to suffer untoward reactions are also discussed.

LSD (lysergic acid diethylamide) was synthesized in 1938 by Hoffman, a Swiss chemist. In 1943 he fortuitously discovered its psychedelic properties. It is a semi-synthetic amide of ergot which is effective in trace amounts. It is one of the most powerful bio-active substances known.

Its exact mode of action is yet to be discovered. It has been stated that the sensory and psychological responses noted with the drug are seen after most of it has cleared the brain, suggesting an indirect rather than a direct effect.[8] LSD resembles serotonin in structure (indole nucleus) and is postulated to interfere with serotonin metabolism.[4]

Upon ingestion, the initial reaction is one of autonomic stimulation which usually has its onset in from 20 minutes to one hour. These are most commonly pupilary dilation, sweating, pilo-erection, tachycardia (occasionally bradycardia), respiratory stimulation or depression (mild) and occasionally slight nausea.

Sensory and psychological responses usually occur without alteration of consciousness except when massive doses are taken (a toxic delirium can then be seen). This is in contrast to other substances—such as lead, narcotics, alcohol—that share with LSD the ability to produce perceptual and emotional distortions but which alter consciousness.

Tolerance to LSD occurs but is easily lost and withdrawal symptoms are absent or mild.[5] They consist of slight restlessness and irritability which may be psychological rather than physiological.

The acute responses to LSD are summarized below:[7,9]

Sensory Responses

- *Distorted Color Perception.* Colors appear to be intensified and often seem to throb and undulate as if alive. Spontaneous bursts of kaleidoscopic color can occur without any external stimulation in some subjects. These sensations are accompanied by an overwhelming sense of fascination and wonderment that almost defies description.
- *Fusion of Sensory Impressions (synesthesia).* An auditory or tactile stimulus may stimulate a color response or, less commonly, the reverse occurs.

Psychological Responses

- *A feeling that the subject is undergoing a unique experience.* There is a feeling of transcendence, of great insight, of something very revealing and meaningful occurring about the user and his relationship to the world. These revelations are often difficult to relate.
- There are a group of sensations which can be subsumed under the rubric of *depersonalization.* These feelings are variously described as being outside of one's body, of observing oneself, of being a disembodied spirit, of feeling strange. Occasionally there is a confusion of self with a sensory stimulus, "Am I hearing the music or is the music me?" Loss of body boundary is commonly seen, leading to claims of body fusion and mental telepathy.
- *There are pronounced fluctuations of mood* although the prevailing mood is usually one of pleasant reverie during the period that the drug is exerting its pharmacologic action (three to ten hours). Euphoria is not uncommon. The post drug phase is often marked by a feeling of despair.
- *Time and space distortions* are quite common. Five seconds may seem like hours and the converse may also be true. Objects may seem infinitesimally small or frighteningly huge. Two-dimensional figures can appear to have volume and depth.
- There is an *autistic withdrawal and preoccupation, even fascination, with one's own ongoing perceptions and thoughts,* although habitual users do not prefer to take LSD alone. However, at times, this preference has more to do with a need for a "sitter" or "tripmaster" to insure against a "bad trip" rather than a need for social interaction. Mental organization and control is often restored by the reassurance of such guides, although this is by no means always the case. On occasions, unfortunate reactions to LSD have resulted from the "tripmaster" reneging on the role entrusted to him.
- More often than not, there is a *reduction of all aggressive drives* even in subjects who have a long history of acting out violent impulses. Rage reactions do occur, but are seen less frequently.
- Often there is an unpredictable unheralded *return of the LSD experience* without consumption of the drug even if the last dose has been taken months before.

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Reprint requests to: UCLA Neuropsychiatric Institute, 760 Westwood Plaza, Los Angeles 90024.

• There has been a suggestion that brain damage and genetic abnormalities can occur from chronic use of LSD, but this has not been conclusively proved in man.

Three Basic Phenomena

Most of the subjective responses listed above are dependent upon or intimately related to three basic phenomena.

The Effect of Expectation

The first of these is the effect of expectation. The form and intensity of the LSD experience is in large part shaped by the mental attitude ("set") of the subject and the setting in which the drug is taken. Anything that can influence the set or setting can be instrumental in determining the subjective experience that is reported—for instance, previous knowledge of expected response; comments by friends; surroundings at time of ingestion (that is, home, psychiatrist's office, research laboratory, party). The effect of subject expectation is so profound that it alone may suppress the entire LSD experience itself, including sensory responses if the subject is decidedly skeptical or otherwise unwilling to release himself to the drug.

Loss of Cohesiveness

If the subject will allow the experience to proceed, the second basic phenomenon occurs, namely, the loss of characteristic modes of perceptual and cognitive patterning. This represents the acute response to the drug. The subject's usual apperception of sensation, space, time, thought and emotion changes dramatically. That which took a lifetime to jell into a characteristic *Weltanschauung* abruptly dissolves. Each element of the mind is released, free to float boundlessly in a three-dimensional phantasmagoria of jumbled fragments. It is as if central impulses leap across ordinarily resistant synapses and burst forth out of their accustomed channels, spilling into one another and down pathways not usually traversed. The elements of mental life freed from their moorings fuse in strange, fascinating and sometimes frightening combinations.

Hypersuggestibility

This loss of cohesiveness makes possible the third basic phenomenon—hypersuggestibility. With his reflexive modes of perception and cognition jarred loose, the user's judgment of the stimuli impinging upon him is impaired. What someone else says or what the subject thinks, be it frightening or pleasurable, can seem to be a perceptual and emotional reality. This difficulty in ascertaining the significance of ongoing phenomena is not limited to stimuli from the environment or the suggestions of others but includes the subterranean thoughts and sensations emanating from the subject's own unconscious mind. Higher order (secondary process) thinking gives way to regressive (primary process) thinking. Reality testing can become faulty. Users have been known to jump off buildings after yielding to omnipotent infantile phantasies that they could fly, or to walk into the path of oncoming cars, having suggested to themselves the idea that they were invisible and without substance.

True hallucinations are uncommon. The subject is usually aware of the real nature of his perceptions but allows himself to subjectively misinterpret them much as occurs in hypnosis. However, in certain disturbed persons a failure to maintain this kind of control can lead to panic.

Major Adverse Reactions

The major adverse reactions to LSD ingestion are chronic drug dependence (including associated personality changes and depression), and acute ego dissolution (including psychotic states, panic reactions, rage reactions and suicidal ideation).[2,3,6,10] In my experience, these adverse reactions occur principally (but not invariably) in already emotionally ill people. These can be broadly divided into two groups, those with unresolved identity problems and those with severe abnormality of the ego.

The majority of adverse reactions are of the first type mentioned, chronic drug dependence. These commonly occur in late adolescents and young adults who as a group have pronounced identity problems. While such identity problems are probably more prevalent in this generation (for reasons to be mentioned later) they are not peculiar to our times. Again, neither are the responses to these identity problems specific for this generation. There have always been troubled teen-agers who have turned to drugs but hardly any observer of the American teen life would deny that drug use is now considerably increased. It is worth while to examine the dynamics behind this dangerous escape toward drugs in general and LSD specifically.

At that point in life when the various fragments of the adolescent personality usually coalesce allowing the precipitation of well-defined social, sexual and vocational goals, these young people experience an overwhelming sense of diffusion and impotence. The prospect of leaving adolescence (whatever the chronological age) and making the commitments necessary for the attainment of mature intimacy, involvement and productivity threatens to leave unresolved dependency needs unmet.

Several considerations of our era accentuate these problems. Mass communication has made the teen-agers aware of the material rewards available to those who can master our technogical age. But it also has presented them with an enormous challenge, one that not every adolescent can master. Also, it has made them aware of the moral hypocrisy of the adult world, further robbing them of a desire to embrace adult responsibilities.

The young person who feels completely unprepared to meet the demands of the culture handles this threat to his self-esteem by declaring a moratorium in the maturational process. He searches for a group[1] with a similarly arrested development where his own inadequacies will become just one unnoticed piece of the collective mosaic of psychopathology. Such groups, while appearing superficially independent, are actually utilizing mass reaction formation in the service of denying a wish for old symbiotic parental ties; ties, which in our affluent society, often take care of more dependency needs than are optimum for normal development. To foster this denial of their dependency needs, they adopt a *modus vivendi* as manifestly different from the parental model as possible. Legitimate protests against the materialism and loss of human values which characterize much of our society are used to obscure personal despair and justify personal failures. While protesting the hypocrisy of "the establishment," they engage in worshiping their own brand of rigid ersatz values —fusion substitutes for relationships, license for love, juxtaposition for involvement, and confused idealism for dedicated conviction.

Such youngsters are highly susceptible to the most common adverse reaction of LSD, namely, drug dependence. For the potential "acid head," defenses against warding off the despair of a vacuous existence do not work. The offer, within the group or out of it, of an easy solution to the unresolved problems of attaining individuation and subsequent contact without fusion is readily accepted.

In some respects, the effect of taking LSD for the chronic user appears to resemble that obtained by other drugs. For instance, marijuana and methedrine, like LSD, can inject a euphoric diversion into a vacuous existence. However, LSD has some qualities which differ in kind or degree from other drugs. LSD has the ability to transform a wish into a concrete reality, allowing temporary gratifying "solutions" to all of the anxiety-provoking problems involved in attaining maturity. It has the ability to appear to provide instant "insight" into the complexities of life without a need to actually engage life. Also, unlike drugs such as heroin, the chronic use of LSD uniquely distorts the appraisal of the drug effect itself in that the heroin addict uncommonly obscures his awareness of a need to rely on a drug for emotional existence (if he does, withdrawal symptoms provide a painful reminder), while the chronic LSD user rationalizes and justifies his dependence on a drug as a way of life. All of these qualities set this drug apart from others and make it especially dangerous.

Aside from the satisfaction of dependency needs, the chronic user begins to get the acceptance he may not have otherwise obtained. He evaluates himself and his accomplishments uncritically and receives uncritical group endorsement for his activities, no matter how bizarre or worthless. Actually, whatever artistic, intellectual, musical, literary or other special ability he may have had, often undergoes degeneration rather than evolution.

Unfortunately, the disparity between the Disneyland of his LSD existence and the wasteland of his real life cannot be totally or eternally denied. Anxiety and depression must be continually warded off by an increased religious commitment to the group and its drug habits.

Those who took this detour from life because of a temporary impasse in the quest for ego synthesis, will eventually turn away from LSD. In my experience, this is actually the most frequent outcome for those who employ LSD.

Ego Disintegration

In addition to the adverse reaction of temporary or permanent LSD use and the already discussed related personal and social problems, this drug has been instrumental in precipitating ego disintegration such as psychotic reactions, rage reaction,

panic states, and suicide.[10] The vast majority of psychotic and similar reactions have occurred in people who had preexisting disorders of ego deficit such as schizoid personality, borderline states and ambulatory schizophrenia. Eventually such people fail to tolerate the disorganizing effect LSD has on characteristic modes of perception and cognition, and their fragile defenses collapse.

While the person who seeks a fringe group has *a priori* some capacity as a social being for interrelating and some notion of coming to terms with existence, there are those whose profound need to fuse with an external source of sustenance is so great that even the substituted symbiotic ties of the group threaten their fragile egos. The only way to remain intact at all is to keep at a distance. Unfortunately, they therefore often do not enjoy the group support that tends to act prophylactically against psychosis. With their already tenuous grasp on reality further loosened by LSD, they become overwhelmed by unconscious terrorizing phantasies and frightening sensations of non-existence. Although many of these people are actually prepsychotic or latently psychotic, it cannot be said whether or not overt psychosis would have eventually occurred without use of the drug. That is, would some sick young people have made it through the turbulence of youth without a psychotic break had they not discovered LSD?

Of the attempted and successful suicides, some attempts have occurred to ward off or end the panic of ego dissolution, while others have come as a result of a sudden "insight" into a futile life, and some have occurred in the post-LSD period when the contrast between the "high" of their LSD experience and the "low" of their existence becomes too much to tolerate. A few suicide attempts have not been attempts at all, but accidental occurrences attributed to such beliefs on the user's part that he was invincible to pain or could stop cars with a glance.

Summarizing the conclusions concerning the adverse reactions (drug dependence, personality deterioration, psychoses, suicide) they are suffered most frequently, but not exclusively, by those who have a preexisting emotional illness. There are broadly two groups. The greatest number of users who suffer adverse reactions are those who fail to resolve various identity problems and thereby do not rise above adolescence, whatever their chronological age. LSD often eventually causes great anxiety and depression because of the disparity between fulfilled wishes for achievement while "high" on the drug and the failure to achieve culturally expected goals while not taking it. They adopt a desperate *laissez faire* attitude toward themselves and others (which includes sexual activities). Unfortunately, group support and activities usually do little more than obscure their despair, rarely obviate it. As they drift farther away from the mainstream of life, their anxiety and depression fosters chronic drug use. Fortunately, the majority of those who try LSD eventually give it up.

A smaller group has more serious abnormality of ego. These people may disintegrate under the impact of the disorganizing effects of LSD, not only because of the seriousness of their already existing emotional disturbances but also because their pathologic state (for instance, schizoid traits or inadequate personality patterns) may secondarily prevent them from obtaining the group support that often sustains many other LSD users. Unfortunately, although there are some guidelines as to which type of LSD user is most likely to suffer a particular broad category of adverse reactions, there is certainly no reliable method of predicting who will or who will not have a deleterious reaction to the drug. The corollary is that no precaution guarantees even a psychiatrically normal person the safe use of this compound.

Conclusion

Most of the subjective manifestations of the LSD experiences can be related to three basic phenomena: (1) the role of pre-drug expectations; (2) a loss of characteristic modes of perception and cognition; (3) hypersuggestibility.

In the pre-drug phase, the subject's needs to experience (or not experience) any or all of the pleasurable or adverse reactions are related to those drug manifestations he will report. When he ingests the drug, its potentialities for acutely disengaging usual patterns of perception and cognition provide a variety of possible sensory and emotional experiences. In this fluid state, the subject is extremely sensitive to his own wishes and suggestions (conscious and unconscious) as well as to the suggestions of others. These suggestions can be transformed into emotional and perceptual realities. Although delusions and hallucinations do occur, the usual response is that the subject retains an awareness of the unreality of his experience.

Adverse reactions most commonly, but not invariably, occur in people who have a preexisting

emotional illness. These emotional illnesses can be divided in a larger group with identity problems and those with ego abnormalities. The role of LSD in the latter group who manifest serious adverse reactions is probably as a catalyst rather than a principal ingredient. However, the significance of LSD in this context should not be underestimated, since it has not been established whether or not such serious reactions would have occurred without such a "catalyst" present.

REFERENCES

1. Bowers, M. D., and Freedman, D. X.: "Psychedelic" experiences in acute psychoses, AMA Arch. Gen. Psychiat., 15:240, 1966.

2. Cohen, S., and Ditman, K. S.: Prolonged adverse reactions to lysergic acid diethylamide, AMA Arch. Gen. Psychiat., 8:475-480, 1963.

3. Fink, M., Simeon, J., Haque, W., and Itil, T.: Prolonged adverse reactions to LSD in psychotic subjects, AMA Arch. Gen. Psychiat., 15:450-454, 1966.

4. Freedman, D. X.: Effects of LSD-25 on brain serotonin, J. Pharmacol. Exp. Ther., 134:160, 1961.

5. Freedman, D. X., Aghajamian, G. K., Ornitz, E. M., and Rosner, B. S.: Patterns of tolerance to lysergic acid diethylamide, Science, 127:1173, 1958.

6. Frosch, W. A., Robbins, E. S., and Stern, M.: Untoward reactions of lysergic acid diethylamide (LSD) resulting in hospitalization, New Eng. J. Med., 273:1235-1239, 1965.

7. Isbell, H., Bellerville, H. F., Wikler, A., and Logan, C. R.: Studies on lysergic acid diethylamide (LSD-25), Arch. Neurol. Psychiat., 76:468-478, 1956.

8. Remmen, E., Cohen, S., Ditman, K., and Frantz, J.: Psychochemotherapy: The Physician's Manual, Western Medical Publications, 1962, Los Angeles, pp. 32-35.

9. Unger, Sanford: Mescaline, LSD, Psilocybin and Personality Change, A Review in Perspectives in Psychopathology, edited by James O. Palmer and Michael J. Goldstein, New York University Press, 1966, pp. 278-295.

10. Ungerleider, J. T., Fisher, D. D., and Fuller, M.: The dangers of LSD, JAMA, 197:389-392, 1966.

USING EPINEPHRINE WITH HALOTHANE ANESTHESIA

"Is it safe to administer epinephrine in the presence of halothane? Doctor [Ronald] Katz and his group in New York have come up with a formula in which they state that it is safe . . . to give locally injected epinephrine to the patient under halothane anesthesia provided, first, that adequate ventilation is assured. . . . If you are not properly ventilating the patient, you are building up carbon dioxide tension and producing endogenous catecholamine; the endogenous catecholamine will add itself to the exogenous catecholamine and you'll be in trouble. Second, one must administer the epinephrine in a solution of one in 100,000 to one in 200,000 only. More concentrated types of epinephrine are not indicated and can get one into trouble. Third, the dose in adults should not exceed 10 ml of one in 100,000 epinephrine in any given 10-minute period. . . .

"We feel that this is a potentially hazardous combination to use. It is difficult to be sure that the patient is being adequately ventilated, and it is difficult to be sure that the epinephrine is not being injected directly into the bloodstream, therefore causing a very high level in the circulating blood to the heart and a very intense stimulus to the heart."

—C. R. STEPHEN, M.D., Dallas, Texas
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