

Persisting Psychotic States in Adolescent Drug Users

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ABSTRACT: In each of four adolescent delinquent boys a severe prolonged mental disorder developed after use of hallucinogenic drugs. Certain clinical features were observed that may characterize this complex disorder and may have both practical and theoretical significance. Two patients demonstrated abrupt and complete transitions in consciousness between profoundly abnormal states and mental clarity and rationality. These same two patients each experienced one episode indistinguishable from cataplexy during transition of consciousness. Some users of hallucinogenic drugs suffer sleep paralysis. It is noted that the flashback phenomenon is similar both to hypnagogic imagery and to the hallucinations and illusions of psychic seizures. It is suggested that persisting psychotic states that develop after protracted use of hallucinogenic drugs may be organic psychoses manifesting intermittent or chronic organic cerebral dysfunction.

It is now established that a chronic psychotic state may follow the use of lysergic acid diethylamide (LSD). Still unsettled is the question of whether psychotomimetic drugs merely precipitate a psychotic state in "psychosis-prone" individuals or directly cause the ensuing psychosis. In particular, Cohen [1], Kleber [2], and Rosenthal [3], and, more recently, Glass and Bowers [4] and Horowitz [5] have contributed to our knowledge of these prolonged adverse reactions to the hallucinogenic drugs. As new cases are reported, earlier tentative diagnostic categories must be revised to account for the unusual clinical syndromes observed.

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In contrast to previous studies, which concerned college students, this study concerns incarcerated male adolescent delinquents who were 15 to 18 years old. The value of earlier studies was limited by lack of data on the patients' personalities prior to drug use and the onset of mental disturbance. In this study, each boy had been evaluated before he started to use drugs and was in custody when psychotic behavior first appeared. The time relationship between drug ingestion and onset of disorder could be documented with reasonable accuracy. This study does, however, have the disadvantage, common to other studies, that the drugs used may have differed from those that the user assumed them to be [2], and were used in unknown quantities and mixtures.

The patients reported herein were four adolescent delinquent boys who suffered severe prolonged mental disorder after ingesting hallucinogenic drugs. It was possible with all four boys to observe directly the onset of symptoms, clinical course, and response to treatment during a one-year period. This provided evidence of unique clinical features that may contribute to a better understanding of drug-induced persisting psychoses.

Case Reports

Case 1

Jim, a 17-year-old American Indian boy, who was in custody at a corrections facility, was referred for psychiatric evaluation because of "flashbacks" and uncontrolled aggressive behavior. When seen, the boy was standing in a hallway, breathing rapidly, screaming, and wildly looking about with an expression of terror. He fell to the floor where he was quiet, pale, and conscious, and showed no seizure activity. Within two minutes, he was able to stand and walk to his room; within five minutes, he was rational and responded to questions willingly. He said he had ingested LSD every other day during the two-month period just preceding his three-week period in custody. He had also used alcohol excessively and amphetamines occasionally. For the past two weeks he had experienced flashbacks consisting of visual images of knives, floating dead bodies, and "tombstones with my name on them"; he had heard voices laughing and vaguely threatening him, and he felt "a need to kill others before they kill me." These episodes had alternated with periods of clear consciousness when he realized other people were not intent on harming him. These episodes, infrequent initially, were now occurring in rapid succession.

Within a few minutes of providing this history, Jim became excited and hallucinated, threatened to kill the examiner, and required physical restraint. Minutes later he begged the psychiatrist to prescribe medication in order to stop the terrifying hallucinations; he said he was in fear of losing his mind.

Data in his file showed that six weeks earlier Jim had presented himself at a mental health center where he offered the lady psychologist a whiskey and asked her to permit him to choke her. Then he left. The same evening, while watching television, he abruptly attempted to choke and rape his girl friend. Just as abruptly, however, he released his victim and departed after threatening to kill her. The girl friend told police that Jim smelled of the paint lacquer that she knew he sniffed occasionally. Jim was considered "exceedingly disorganized" and "extremely unrealistic" when apprehended by his probation officer prior to incarceration.

On admission to a corrections diagnostic facility, Jim was apparently normal during the clinical interview. The general physical examination and routine laboratory tests revealed no significant abnormalities.

Past history. Jim had been known to the authorities since age 13½, when he was involved in glue sniffing, drinking, absenting himself from home, and theft. He was in custody during the 16 months immediately preceding his use of LSD. At that time, tests showed that his intellect was dull-normal and that his reading and mathematical skills reflected fourth-grade achievement. The Minnesota Multiphasic Personality Inventory (MMPI) test indicated a withdrawn, anxious young man with little self-confidence and a poor self-concept. He participated in group activities and behaved in a generally acceptable way. Custodial and professional staff did not consider him either mentally ill or emotionally disturbed.

Treatment and clinical course. Jim was first given chlorpromazine (Thorazine) by intramuscular injection; it was then given orally in gradually decreasing doses and discontinued after 10 weeks. Visual and auditory hallucinations and the delusions of persecution became less frequent and intense within one week, and subsided entirely within two months. Reexamination at intervals during a four-month period elicited no further evidence of psychiatric disturbance. Psychologic testing yielded data similar to those obtained before Jim's use of LSD. The IQ was 100 (Wechsler Adult Intelligence Scale); the MMPI test results reflected profoundly low self-esteem, alienation from significant interpersonal relationships, and a tone of despair; and the Bender-Gestalt test, which had not been done earlier, showed minimal evidence of impaired psychomotor coordination.

Two months after release from the juvenile correctional institution, Jim was accepted for military service in the United States Army.

The unique feature in this case was the rapidity and completeness of the transition between states of severe mental disturbance and apparent normality. Vivid visual hallucinations, terror, and paranoid beliefs ceased abruptly and were replaced by normal perception and calm, realistic attitudes. During one such transition, the patient collapsed to the floor in the manner of a cataplectic attack. The profoundly abnormal state reappeared later with equal abruptness and completeness.

This feature may have both practical and theoretical implications. It cannot be determined whether the patient stopped his assault on his girl friend because of such a transition in mental state or merely

because, in a state of disorganization, he was unable to proceed. In any event, the periods of apparent normality resulted in a delay in treating the incipient psychosis.

Case 2

Steven, a 17-year-old white youth, was held in custody at a corrections facility, having been considered incorrigible after committing offenses that included repeated absents from home, theft, glue sniffing, and illegal use of alcohol over a period of 4 years. While absent without leave from the institution for several weeks, Steven ingested an unknown amount of LSD; he was returned to custody in a state of acute intoxication due to hallucinogenic drugs. During the next five days he slept for approximately eight hours, refused food, disrobed, wet his bed, and cast food and urine about his room. He sang, chanted, and counted in sequence slowly and rhythmically. He tore up clothes and bedding. He assaulted attendants with fists and furniture. He called upon other lads to riot, and called upon the trees and flowers to kill people. He commanded inanimate objects to arise on the count of three.

Past history. Because Steven had lived in the institution continuously for the nine months preceding his use of LSD, detailed behavioral and psychologic data were available. He functioned in the dull-normal range of intelligence. Although by age he could be considered to be in the 11th grade, Steven's academic achievement was at the 5th-grade level. Arrogant in attitude and impulsive in behavior, he was considered a constant irritant to all he contacted. He participated in group activities and, though constantly up to disruptive mischief, he was never assaultive or destructive. MMPI test data indicated a character disorder with little anxiety and excessive use of denial and projection. Clinically, none of the custodial or professional staff considered him to be mentally ill. Physical examination and routine laboratory studies revealed no abnormalities.

Treatment and clinical course. Steven was transferred to a mental hospital where physicians made the diagnosis of catatonic excitement. Thiethixene (Navane) was administered. The catatonic excitement was replaced by catatonic stupor. Electroshock treatments resulted in return of the excited state; 20 further intensive electroshock treatments were required before Steven became rational. Trifluoperazine (Stelazine) was prescribed in small doses after thiethixene had been discontinued because of moderately severe neurologic side effects.

Steven was transferred to a corrections facility, where his behavior was apparently normal for four hours. He then experienced flashbacks in which objects such as nearby trees or room furniture loomed larger and moved toward him. He responded to these hallucinations by making abrupt evasive efforts and by throwing the furniture. On examination, Steven was oriented, and associations and affect appeared normal. He reported that the day before hospital dismissal he had ingested LSD obtained from another patient. (This statement could not be verified as fact, but hospital authorities considered it likely.) In addition to the frightening visual illusions, Steven hallucinated amusing images and took apparent delight in so doing. However, he continued to assault attendants either in response to the hallucinations or deliberately in

the knowledge that, as a mentally ill inmate, he would not be punished. The transitions in consciousness from flashbacks with behavioral response to non-hallucinated rationality occurred abruptly and completely. On one such occasion, reportedly he fell to the ground where he lay limp and motionless but conscious. The description suggested an attack of cataplexy.

He was returned to the mental hospital for further treatment. After three months his condition improved sufficiently to permit his return to a corrections facility. He has not been released on parole, however, because his behavior was typical of that which characterized him prior to the psychotic episode.

The clinical picture was typical of schizophrenic reaction. The patient's premorbid personality could be considered "psychosis-prone."

When catatonic symptoms remitted in response to treatment, flashbacks with behavioral response emerged or were induced by further ingestion of LSD. Alternations between hallucinations with disturbed behavior and nonhallucinated rationality occurred abruptly and totally. One such transition was accompanied by what might have been an attack of cataplexy.

Case 3

Michael, a 17-year-old white boy of Catholic faith who was in custody in a corrections facility, related that he had regularly sniffed paint fumes during the 1½-year period that preceded his use of LSD. He experimented with LSD for six months, and then was arrested with other drug users after having ingested what he later believed was a potentially lethal dose of a mixture of LSD, amphetamine, and mescaline. He experienced a vision of a "triangle filled with dimes," which he considered to be an expression of God's willingness to save his life. He recalled a feeling of being filled with love, which enabled him to think himself into the hurts of others, thus lessening their burdens. According to police, at the time of his arrest, Michael was kissing and embracing other young men. Moments later he pounded his own head against a cement floor.

Michael was placed in a corrections diagnostic facility. The general physical examination and routine laboratory tests were either negative or within normal limits. Michael rapidly recovered from the acute drug intoxication, but his preoccupation with "evil" and with unrealistic thinking concerned the authorities, who then arranged admission to a mental hospital. The hospital diagnosis was "acute paranoid condition." After four weeks of treatment with thioridazine (Mellaril) and haloperidol (Haldol), he was returned to correctional jurisdiction. His unusual beliefs persisted.

Further psychiatric evaluation was requested when Michael began assaulting other boys for no apparent reason.

On examination, Michael was found to be tense, restless, and oriented. He earnestly described the beliefs that had motivated his assaultive behavior. He believed the corrections facility was an obstacle placed in his path by God, but that "evil" surrounding him required an aggressive response. He said he had a special relationship and communication with God and that he was able to

communicate nonverbally with absent friends. Affect was appropriate. There was slight loosening of association in the thought process. He denied experiencing visual or auditory hallucinations.

Past history. Michael had been known to the authorities for four years before his use of LSD. His offenses included absenting himself from home, sniffing paint fumes, vandalism, and theft. Intelligence tests showed that he was functioning in the dull-normal range and that his verbal ability was much below average. Although he was then in the 10th grade, his academic achievement was at a 5th-grade level. MMPI tests administered on four separate occasions all indicated that Michael was a chronically anxious, mistrustful, inarticulate boy with a poor self-concept and capable of acting impulsively with poor judgment. His behavior affirmed the validity of the results of the tests. All who had examined him prior to his use of LSD agreed that, though Michael was a denying, unrealistic, inadequate boy, overtly he was not mentally ill.

Treatment and clinical course. Michael was treated with trifluoperazine (Stelazine). After two weeks he expressed no further delusions and denied unusual beliefs or experiences when questioned; his behavior was realistic and acceptable. Nevertheless, the treatment was continued for 10 weeks. Then, within two weeks of cessation of treatment, Michael again became delusional and acted upon delusional beliefs. He was transferred to a mental hospital. At last report, 14 months after the initial acute drug reaction, Michael still was mentally ill.

Michael never recovered entirely from the acute drug intoxication that occasioned his arrest. Treatment afforded incomplete remission of symptoms, which returned directly after phenothiazine administration was discontinued. At no time were the residual symptoms of anxiety and delusional experiences associated with perceptual distortions. This case closely resembles the cases that Cohen [1] reported as being psychotic reactions to LSD that were indistinguishable from schizophrenic reactions. This patient's pre-morbid personality could be considered "psychosis-prone."

Case 4

Norman, a 17-year-old white boy, was an 11th-grade dropout who was sentenced to a corrections facility after being convicted of car theft. His earlier offenses had included illegal use of alcohol, assault, and arson. On admission, Norman complained of episodes of nervousness accompanied by a belief that others were irritable with him and looked at him in a peculiar manner. He told of extensive use of LSD, amphetamines, mescaline, and barbiturates for three years. In regard to LSD, he described a pattern of taking each succeeding dose before the effects of the previous dose had subsided. Results of physical examination and routine laboratory tests were either negative or within normal limits.

Shortly after admission, Norman escaped but was returned to custody following hospital treatment for an overdose of aspirin. Thereafter, he func-

tioned adequately within the institution for three months; he and a companion then escaped. For three weeks they used unknown types and amounts of drugs almost daily. Norman obtained a gun and told his friend of plans to murder an acquaintance and then commit suicide. The alarmed companion assisted the police in apprehending Norman.

On examination, Norman was oriented and his thought process and affect were normal. He discussed his intended homicide victim, a man who had seduced him into homosexual activity when Norman was 10 years old. He considered suicide an alternative to homosexuality. He said, "I can't get it all together to feel like and be myself like I used to be." He expressed ideas of reference, that others looked at him peculiarly.

Past history. Psychologic test data on Norman, obtained one year before he had begun to use drugs extensively, revealed at that time that there was nothing unusual, abnormal, or bizarre in his behavior, his speech, or his conversation. His mood was stable and his emotional reactions appropriate. His intelligence was average, and school achievement was at the correct grade level. MMPI responses did not indicate any severe mental or emotional problems.

Treatment and clinical course. Despite administration of chlorpromazine, Norman's mental condition deteriorated. Mental confusion progressed to marked disorganization, together with preoccupation with thoughts of rebirth, reincarnation, and the essence of the Bible's message as derived from chapter headings only. Mild restlessness was replaced by marked agitation. He wrote letters consisting of clang associations, rhyming, and word play. Vague mistrust became definite mistrust of the motives of others, accompanied by threats to harm his alleged persecutors. At no time was he disoriented or did he experience hallucinations.

Norman was committed to a security hospital for the mentally ill. Further treatment with chlorpromazine provided remission of symptoms. When examined four months later, Norman's thought process was normal. He was not preoccupied with abnormal ideas, and there was no evidence of suicidal or homicidal ideation or intent. His thinking was, however, colored by a belief that certain staff members at the hospital enjoyed oppressing him. This improvement was maintained for six months prior to Norman's dismissal from the hospital.

Norman later enlisted in the United States Army, but was promptly discharged for "emotional problems." Within a few months, after a "hit-and-run" accident, he was arrested. His behavior during a one-week period in jail caused the authorities to obtain his admission to a mental hospital. He expressed ideas of reference. His behavior on the hospital ward was "unpredictably violent." He assaulted hospital attendants and made sexual approaches to young mentally retarded boys. There was speculation that he was obtaining illicit drugs from outside the hospital. He was again transferred to a security hospital, where the diagnosis of paranoid schizophrenia was made. At last report, 20 months after his initial psychotic illness, he remains mentally ill as evidenced by inappropriate affect, paranoid thinking, and combative behavior.

By Norman's own description, paranoid thinking was a characteristic occurrence whenever he ingested LSD. Accordingly, he considered the ideas of reference that he experienced when drug free to be flashbacks. After further use of hallucinogenic drugs, however, his

ideas of reference progressed to poorly systematized delusions of persecution in association with severe disorganization of thought process. He was never disoriented, and he never hallucinated. All symptoms except mild paranoid ideation subsided gradually, either in association with enforced drug abstinence or in response to treatment with phenothiazines. Symptoms recurred either in association with presumed further ingestion of drugs or in response to cessation of treatment with phenothiazines.

Norman's behavior may be classified as a psychotic reaction to LSD indistinguishable from schizophrenic reaction. Before his use of drugs, however, the patient had struggled with the usual conflicts and developmental tasks of adolescence with some success, albeit with acting-out behavior. The pattern of taking each succeeding dose of hallucinogen before the effects of the previous dose subside may be particularly hazardous.

Discussion

Transitions in Consciousness

The unique clinical feature of abrupt and complete transition of the mental state may be significant. The author previously has encountered this only in patients with temporal lobe epilepsy or in observing patients undergoing electrical stimulation of the temporal cortex. According to Goldensohn and Gold [6], prolonged behavioral disturbance of rapid onset and termination may occur with simultaneous abnormal electroencephalograms in patients who do not lose consciousness; these authors reported that the behavior changes lasted from 12 to 72 hours in some cases and were indistinguishable from temporal lobe seizures except for their duration.

Flashbacks

The flashback associated with earlier use of hallucinogenic drugs consists of the individual's experiencing again some fragment of the drug-induced state at a time that comes later than the accepted time limit of the drug's pharmacologic action. The fragment reexperienced most commonly involves visual hallucinations or visual-perceptual distortions, but flashbacks may be reported in any sensory modality [5].

There may be an associated cognitive or affective component to the visual flashback. Zeidenberg [7] has observed that flashbacks

are associated with five phenomena: (a) psychological states; (b) temporal lobe epilepsy; (c) iatrogenic stimulation of the temporal cortex; (d) pharmacologically induced states; and (e) special situations of sensory input. Zeidenberg has also observed that most hallucinogenic drugs are structural analogues of neurotransmitters, particularly of norepinephrine and serotonin; in his view these compounds may be taken up into synaptic vesicles and sequestered as false neurotransmitters for prolonged periods of time, long after they are undetectable by conventional pharmacologic techniques. Persistence of these substances and their intermittent release could be responsible for recurrent dissociations or chronic psychotic states.

During the same one-year period in which the 4 reported cases were seen in this particular institution, the author interviewed an additional 11 boys who presented a history of extensive drug use and flashbacks. (The total number of boys with such a history or complaint is unknown as many were not referred.) These 11 boys had verified histories of extensive use of a variety of drugs including amphetamines, LSD, mescaline, marijuana, and, rarely, heroin. All 11 described flashbacks of visual-perceptual distortions, but all considered them to be visual illusions. All but one boy reported that the recurrent unbidden images were associated with minimal or no affective component and occasioned no behavioral response.

The exception related to a boy who, two years earlier, had sustained a minor injury in an automobile accident in which his companion suffered extensive brain damage. At the time of the accident, the subject had seen his friend's lacerated, avulsed scalp, bone fragments, and pulsating cerebral cortex. His flashbacks consisted of this scene accompanied by feelings of the same revulsion and terror he had experienced at the time of the accident. However, he was aware simultaneously of the frightening hallucination and his real surroundings.

These patients who experienced only the flashback phenomenon appear to have what Hughlings Jackson termed "mental diplopia," the simultaneous awareness of the hallucination and current reality.

When, as in cases 1 and 2, this dual awareness is lost—when the patient pays attention only to the hallucinatory stimuli and behaviorally responds to its content and affective component—unrealistic behavior supervenes. Inevitably, whether the behavior is brief or prolonged, it will reflect the patient's basic personality.

With respect to case 4, it is speculated that the flashback phenomenon consisted of ideas of reference characteristic of his

earlier drug experience. Initially the boy maintained a dual awareness of this phenomenon and current reality. Over a period of weeks, however, the dual awareness was lost and paranoid delusions influenced much of his behavior.

With respect to case 3, the thought content of the persisting psychotic state represented a continuation and extension of the content of the acute drug intoxication. There was no evidence of flashback phenomena.

There is similarity among the flashbacks that occur after use of LSD, the hallucinations and illusions induced by electrical stimulation of the temporal cortex, and the hallucinations and illusions that arise as an aura to temporal lobe seizures. In each instance the hallucinations or illusions are stereotyped, brief, recurrent, and unbidden images or sensory experiences associated with some affective component and potentially associated with some disturbance of consciousness [5, 8].

Cataplexy

Two of the patients experienced episodes indistinguishable from cataplexy during transitions of consciousness. Yoss and Daly [9] regard cataplexy as being not essentially different from sleep paralysis, save for the precipitating circumstances. Kleber [2] reported the case of a patient who described sudden attacks of paralysis, with inability to move or call out, which were associated with visual-perceptual distortions characteristic of his earlier drug experience. These attacks lasted two or three minutes. Any external stimulus such as the ringing of a telephone would terminate the attack. It appears that he suffered sleep paralysis. The author has knowledge of three additional patients who experienced sleep paralysis subsequent to extensive use of hallucinogenic drugs.

Narcolepsy, cataplexy, sleep paralysis, and hypnagogic hallucinations make up the narcoleptic tetrad. Flashbacks may be analogous to hypnagogic imagery. Vivid dreams are reported frequently by persons who use hallucinogenic drugs and by narcoleptic patients.

There appears to be no evidence that narcolepsy occurs as a complication of LSD use, but clinicians should be aware of the possibility of such a complication.

Glue Sniffing

Three of the four patients with prolonged psychosis had inhaled the fumes of glue or paint with some frequency several years prior

to use of hallucinogenic drugs. None of the 11 boys who suffered flashbacks only were known to have inhaled organic solvents. This raises the question of whether the earlier use of toxic substances affecting the central nervous system sensitized the brain, so rendering the individual more vulnerable to the potential deleterious effects of hallucinogenic drugs. Since a history of glue sniffing is found frequently in institutionalized adolescent male offenders, this question requires further study.

Summary

In each of four adolescent delinquent boys, the protracted use of hallucinogenic drugs was followed by the development of a persisting psychotic state. In two of the four boys there were abrupt and complete transitions of consciousness between profoundly abnormal states and mental clarity and rationality; this clinical feature suggested intermittent organic cerebral dysfunction. The same two patients each experienced one episode during transition of consciousness that suggested cataplexy. Cataplexy is considered not essentially different from sleep paralysis save for the precipitating circumstances; sleep paralysis, therefore, may be a delayed reaction to hallucinogenic chemicals.

Similarity between drug-induced flashback phenomena and the hallucinations and illusions of temporal lobe epilepsy was also observed. The flashback phenomenon, or the severe prolonged mental disorders that develop after use of hallucinogenic drugs, may be a manifestation of intermittent or chronic organic cerebral dysfunction. These clinical observations are compatible with the theory that the hallucinogenic compounds, structural analogues of neurotransmitters, may be stored in synaptic vesicles for prolonged periods. Intermittent or delayed release of these substances could trigger a brief or prolonged reexperiencing of the earlier drug-induced state. The individual's behavioral response to the intermittently or chronically altered neurophysiologic state derives from his own individually unique personality structure.

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