Strychnine and Other Enduring Myths: Expert and User Folklore Surrounding LSD

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LSD (lysergic acid diethylamide), like many hallucinogenic, visionary, or entheogenic chemicals, is classified by the United States government as a Schedule 1 controlled substance. Such substances are deemed to have no medical applications and are not legally available for human use in the United States. As such, LSD is available to users only as an illicit "street drug" of unknown purity and potency. Many so-called "street drugs" have an associated corpus of myth, but nowhere is this more dramatic and fantastic than with LSD. Although unknown prior to its synthesis in 1938 and characterization in 1943 by Albert Hofmann (Hofmann 1983), LSD represents to many the prototypical hallucinogen. The remarkable folklore associated with LSD is perhaps to be expected, given its highly controversial nature and its powerful and profound effects on consciousness.

A particularly noteworthy aspect of LSD mythology is its existence among both users of the drug and experts in the substance-abuse field. Among professionals, some of these myths are pervasive enough to have received mention as "facts" in prominent professional publications. Although the general public and the media may be hoodwinked by misinformation, users of hallucinogens are often well-informed about the substances they use. Despite this, some myths are still widely believed by users of LSD.

Most of the LSD myths began in the politically charged era of the 1960s and have multiple origins and methods of propagation, among which have

been the media, street-user subculture, and scare tactics by the government and law enforcement. In this chapter we address the prominent folklore associated with LSD, giving particular attention to the prevalent belief held both by users and by professional experts that strychnine is a common adulterant of LSD. In addition to this prototypical myth, we reflect briefly on several other widely held beliefs.

STRYCHNINE AND OTHER ADULTERANTS

That LSD is frequently adulterated ("cut") with a number of toxic substances is a long-standing belief that has permeated user and professional networks for more than three decades, despite the lack of any supporting evidence. Prominent among the believed additions to LSD are methamphetamine (the popular synthetic street drug known as "speed") and strychnine (an alkaloid from the seeds of a tree native to India, *Strychnos nux-vomica*, historically used as a rodent poison and having nervous-system stimulant properties (Hardman et al. 1996, pp. 1689–90)). Users will sometimes attribute characteristics of an LSD experience as much to these adulterants as to the LSD itself. For example, an LSD experience may be described as "speedy" due to methamphetamine presumed to be present in the sample. LSD thought to be adulterated with strychnine is sometimes claimed to be the basis for an unpleasant experience or "bad trip," or as the source of gastrointestinal distress experienced by some users on LSD. Even *High Times* magazine – a standard reference among users – has reported that "common adulterants [to LSD] are strychnine, amphetamines and whatever else was lying around the bathtub" (Weasel 1993). In a survey administered to over four hundred university undergraduates in a required health class, students who had used LSD commonly believed that strychnine and methamphetamine were frequent adulterants, while those who had not used LSD were largely unaware of this myth (Beck 1980).

It is also widely believed among drug-treatment professionals that LSD is frequently adulterated with strychnine. Even the *DSM-IV* (*Diagnostic and Statistical Manual of Mental Disorders, 4th Edition*) – the standard reference in the United States on the diagnosis of mental disorders (including drug abuse) – mentions strychnine as an adulterant to LSD (APA 1994, p. 231). *Psychiatric Annals*, a professional journal of continuing education for psychiatrists, devoted an issue to hallucinogens in 1994. Among the numerous inaccuracies in this issue of the journal was a reference to strychnine being added to LSD in order "to increase the potency of its hallucinatory experiences" (Giannini 1994, p. 134). This article continued with a description of the pro-

cedure for the treatment of strychnine poisoning, indicating that this is likely to be an emergency medical need for anyone presenting in acute distress after having ingested LSD.

Strychnine contamination of LSD is also mentioned in leading professional books on substance-abuse treatment (Pechnick & Ungerleider 1997, p. 234), as well as recent drug-education textbooks (Carroll 1989; Hanson & Venturelli 1995; Kuhn et al. 1998). Thus educational texts continue to propagate the strychnine myth, without reference to any documented analyses or cases.

Compilations of drug slang published by the United States Department of Justice (DOJ 1994) and professional medical journals (JEM 1988) list terms that describe combinations of LSD and strychnine, such as "backbreaker," "white acid," and "four way." However, there is no evidence whatsoever that this chemical combination ever existed under any name. The extent of this belief among experts is impressive and makes the strychnine myth unique in the corpus of LSD folklore.

The strychnine myth may have been fortified by Albert Hofmann's report of an analysis (conducted in 1970) of a powder sample purported to be LSD which turned out to be nothing but strychnine (Hofmann 1983, pp. 71–72). However, all other analyses of a large number of street samples of LSD over the years have consistently revealed that products sold on the street as LSD seldom contain adulterants and have never been found to contain strychnine (Ott 1993, pp. 134–35; Grinspoon & Bakalar 1997, p. 76).

Thirty years ago, in the few cases where adulteration was detected, the adulterant was either PCP or methamphetamine. Of 581 street samples of purported LSD analyzed by Brown and Malone (1973), results showed that 491 (84.5%) contained LSD alone; 31 (5.3%) contained LSD and PCP; 11 (1.9%) were PCP alone; and 5 (0.9%) contained LSD plus amphetamine or methamphetamine. Brown and Malone stated: "We have analyzed several samples thought to contain strychnine on the basis of toxic symptoms, but in each case only LSD was detected.... None of the other groups doing street drug analyses has reported strychnine in any LSD-containing sample" (Brown & Malone 1973).

Even if, historically, adulterants were infrequently detected in street samples of LSD, this possibility has been rendered even more unlikely in recent times by the introduction of blotter paper, which has been by far the most common carrier medium for the distribution of LSD for more than twenty years. This medium evolved because the high potency of LSD demands that a reliable method be used to partition small quantities of the chemical into uniform doses. Exposing absorbent paper to solutions of known concentration works quite well for this. However, in order to produce any significant

psychoactivity, the five-millimeter-square dosage units of blotter paper cannot contain sufficient amounts of strychnine or other substances claimed to be adulterants. In addition, the very high potency and continued low cost of LSD make it unnecessary to add adulterants to enhance its effects.

In *Licit and Illicit Drugs*, Brecher claims that strychnine may have been added to LSD as a "bulking agent" and possibly to increase the immediacy of psychoactive effects (Brecher 1972, p. 376). Another reason offered for the presumed presence of strychnine in LSD is that it is required to facilitate the bonding of LSD to blotter paper. None of these are true. Other stories say that strychnine is a contaminant of the synthesis of LSD, a breakdown product of LSD, or a metabolite produced after ingestion. These are also mythos. While both strychnine and LSD are complex carbon-based compounds, their molecular structures are quite different. Strychnine is not a chemical precursor, byproduct of synthesis, degradation product, or metabolite of LSD. There simply has been no strychnine found in street samples of LSD or any reason to expect its presence.

The origin of the strychnine-in-LSD myth is obscure. It was already well established by the late 1960s. In their otherwise excellent historical review of LSD use, Lee and Shlain state: "Much of the LSD turning up on the street [in San Francisco's Haight-Ashbury neighborhood in the late 1960s] was fortified with some sort of additive, usually speed or strychnine, or in some cases insecticide. But where did this contaminated acid come from?" (Lee & Shlain 1985, p. 188) The authors go on to say that this contaminated LSD was manufactured and distributed by organized crime and came to be called "syndicate acid," a name which was at the time synonymous with bad LSD. The late 1960s were chaotic times in the hippie scene of San Francisco. Alcohol, heroin, and methamphetamine were increasingly used, and this, together with the influx of large numbers of clueless youth, was rapidly contributing to the demise of the formerly idyllic scene. The resultant chaos undoubtedly added a powerful negative component to the set and setting of the LSD experience. However, there is no evidence from that time indicating the actual presence of strychnine in LSD samples. We suspect that the strychnine myth evolved in the late 1960s to help explain negative aspects of the LSD experience related to the degenerating social scene.

There are claims from experienced users that different samples of illicit LSD may produce subtly different effects. Although such differences might be accounted for by variations of mental set and physical setting, there may also be chemical mechanisms at work. Other ergot alkaloids and chemical relatives of LSD present in an incompletely purified preparation could have psychoactive effects (Shulgin & Shulgin 1997). Breakdown products and metabolites of LSD might also contribute to such reported differences.

However, this remains speculation at this point in time. Clinical study of such possibilities has not been conducted and, indeed, would be virtually impossible to conduct at the present time, given the difficulty of doing human research with LSD and related chemicals.

From the perspective of the government, law enforcement, and the substance-abuse treatment community, the myth of strychnine as an adulterant remains a convenient scare tactic to dissuade users from experimenting with LSD. From the perspective of the user, this myth remains a convenient external explanation for those experiences that are significantly unpleasant (i.e., the "bad trips").

Tattoo Acid

Another myth has been passed around so often between the media, law enforcement, and parents' groups that it has been described as "the most insidious urban drug legend" (Brunvand 1984). This is the ever-surfacing myth of "tattoo acid." Since blotter-paper LSD is frequently illustrated with cartoon characters or other artistic designs, some folks have found them to resemble transfer tattoos. This has resulted in the periodic appearance in communities throughout the United States of anonymous fliers warning of the threat this brings to children. One such police bulletin stated: "A new danger has entered our community.... This is a new way of selling acid by appealing to our young children. A young child could happen upon these and have a fatal 'trip.' It is also learned that little children could be given a free 'tattoo' by older children who want to have some fun or by others cultivating new customers." The bulletin concludes by warning people not to handle these tattoos because "these drugs are known to react very quickly and some are laced with strychnine." (Emeryville California Police Department Bulletin of 31 March 1987).

This particular myth is the only one that has been officially discredited by the Drug Enforcement Administration (DEA). In a memorandum issued in 1991, the DEA states:

> Fliers with warnings against a claimed 'new form' of LSD have been circulating throughout the United States for more than a decade. Typically, the warnings, which are usually addressed to parents... warn of the dangers of LSD-impregnated decals or tattoos decorated with cartoon characters or other pictures designed to appeal to children.... It is claimed that, by licking the decals and applying them to the skin, a child could

> suffer an hallucinogenic high .... The warnings, which have been found on letters, posters, and fliers, have been reproduced countless times by well meaning persons, school systems, private companies, and the press. The warnings can be particularly troublesome and confusing because they do contain some accurate information about LSD, its forms, and effects.... The accidental similarity between children's decals and decorated blotter acid was probably the basis for the erroneous presumption made by some well-meaning individuals that there was a particular danger to small children. Although some high school and college age children may be purchasing blotter acid and getting high on it, no, repeat, no DEA or state or local authorities have ever, to date, reported any instance of children's decals or tattoos with LSD.... It is a hoax. (DEA 1991).

Chromosome Damage and Birth Defects

One of the preeminent myths of the late 1960s, and one that contributed significantly to the fear and condemnation of LSD, was the belief that LSD use produced chromosomal breakage, other genetic damage, and birth defects (teratogenicity). This story began with a short publication in the reputable journal *Science* in 1967 claiming that LSD added to cultured human white blood cells produced chromosomal abnormalities (Cohen et al. 1967a). The primary author of this article published a similar report in the prestigious medical journal *The New England Journal of Medicine* a few months later (Cohen et al. 1967b). The same issue of this latter journal also contained an editorial article highlighting the discovery of birth defects and genetic damage caused by LSD, emphasizing that the effect of LSD on chromosomes was similar to the damage produced by ionizing radiation (NEJM 1967). These publications were followed by a spate of work by various researchers claiming more of the same. Such findings were given front-page attention by the media and became a prominent aspect of the public perception of LSD.

Later and more careful studies demonstrated that the conclusions drawn from the initial research were ill-founded. A comprehensive review of sixty-eight studies and case reports published in the four years following the initial 1967 article appeared as a major article in *Science* in 1971. The review concluded that "pure LSD ingested in moderate doses does not damage chromosomes in vivo, does not cause detectable genetic damage, and is not a

teratogen or a carcinogen in man" (Dishotsky et al. 1971).

Unfortunately, these refutations of earlier claims were ignored by the media and government purveyors of drug information. As a result, the myth of LSD as a promoter of genetic damage is still very much alive. One of the better contemporary drug-education textbooks opens with the results from a series of true/false questions on drugs. The questions were presented to a drug education class taught by the author of the book at the State University of New York at Stony Brook. One question states that "women who take LSD during pregnancy, even once, have a significantly higher likelihood of bearing children with birth defects than women who do not take LSD." The answer is false. In a class of 223 students given this question in 1991, only six percent chose the correct answer (Goode 1993); and in a class of 200 students given this question in 1996, only nine percent answered correctly (Goode 1999). The myth lives on.

Going Crazy: Acute and Long-term Adverse Reactions

LSD, as well as many other psychoactive drugs, can produce a variety of acute (short-term, during the period of intoxication) behavioral effects. These may include anxiety, euphoria, dysphoria, paranoia, hallucinations, other alterations of perception, and so forth. Alterations of perception and consciousness are, not surprisingly, an anticipated part of the experience. In addition, the initial mental set (mood, expectations, etc) of the user may profoundly influence the nature of the experience. Someone who is depressed or anxious and takes LSD may experience an exacerbation of depression or anxiety. Someone who is in a positive mental space may have an ecstatic experience, although not necessarily so. Any single experience with LSD can include both positive and negative mood states. Even negative mood states can be psychologically beneficial, if material that emerges is therapeutically processed or integrated within a spiritual framework. This is one facet of the psychotherapeutic value of LSD and similar substances (Grof 1994; Stolaroff 1994).

Lasting (chronic) negative psychological sequelae are a different story. LSD and other hallucinogens are frequently discussed as being associated with a significant and unpredictable risk of "going crazy," as well as a haunting fear of "permanent brain damage." Such folklore includes outrageous statements like "use LSD seven times (or five times or ten times or whatever...) and you are legally insane," or "I know someone who took LSD and felt like they turned into an orange and they still feel like they are an orange." Other effects spoken of are the development of chronic anxiety, depression, paranoia, psy-

chosis, or suicidal and violent behavior, to name but a few. While we are not disputing the possibility that lasting negative sequelae of LSD use might occur in particular individuals, reviews of the clinical literature suggest that chronic problematic effects, when they do occur, are most often associated with psychological instability that was present prior to LSD use (Strassman 1984; Grinspoon & Bakalar 1997). For example, persons with borderline personality functioning (in the language of the *DSM-IV* (APA 1994, p. 654)) or latent mental disorders (e.g., having a positive family history for schizophrenia) may experience activation of symptoms from LSD use and chronic problems thereafter. Such individuals would also be at risk from exposure to a variety of other environmental stressors.

A comprehensive review by Dr. Sidney Cohen of the use of LSD in psychotherapeutic environments during the 1950s (including approximately twenty-five thousand administrations, given to five thousand recipients) reported that the incidence of acute and chronic problematic reactions was extremely low when LSD was administered under controlled therapeutic conditions to individuals not having pre-existing severe psychopathology (Cohen 1960). This argues for psychological screening of potential users (it may be safe for most people, but it is not for everyone), as well as careful attention to the set and setting of the drug session.

Human death from toxic pharmacologic effects of LSD has never been documented (Gable 1993). The pharmacologic therapeutic index (the ratio of lethal dose to therapeutically effective dose) for LSD is undoubtedly very large. There is an infamous case of some "scientific research," published in *Science* (West et al. 1962), in which an elephant who received a very large dose of LSD subsequently died. However, in this situation the elephant was also administered other potent substances, including barbiturate and antipsychotic drugs, which likely contributed to its demise.

We have heard claims that LSD sequesters in the brain, spinal cord, and body fat, and can leak out at later times – even years later! – to produce adverse effects (such as flashbacks, which are the re-experiencing of some aspects of the drug-intoxication experience in the absence of the drug). Recently we heard from a medical student that she learned this "fact" in a class at one of the country's leading medical schools. There is no basis in reality for this, as there is absolutely no evidence suggesting that LSD remains in the body for extended periods of time.

The notion of "flashback" is probably one of the more muddled concepts in the literature about hallucinogenic drugs. In their excellent discussion of this phenomenon, Grinspoon and Bakalar (1979, p. 159) have this to say: "Studies of flashbacks are hard to evaluate because the term has been used so loosely and variably. On the broadest definition, it means the transitory

recurrence of emotions and perceptions originally experienced while under the influence of the drug. It can last seconds or hours; it can mimic any of the myriad aspects of a trip; and it can be blissful, interesting, annoying, or frightening. Most flashbacks are episodes of visual distortion, time distortion, physical symptoms, loss of ego boundaries, or relived intense emotion lasting a few seconds to a few minutes. Ordinarily they are only slightly disturbing, especially since the drug user usually recognizes them for what they are; they may even be regarded lightheartedly as 'free trips.' Occasionally they last longer, and in a small minority of cases they turn into frightening images or thoughts."

One framework for thinking of flashbacks is as a kind of memory that is robust and easily activated. Another conceptualization of flashbacks is a psychodynamic one that views them as related to a re-emergence of conflictual material released from the unconscious mind during the time of the drug action and not fully processed at that time. Stanislav Grof, one of the world's most experienced LSD therapists, makes the following statement about flashbacks and other adverse reactions in his classic book on *LSD Psychotherapy*: "Sessions in which the drug activates areas of difficult emotional material and the individual tries to avoid facing them can lead to prolonged reactions, unsatisfactory integration, subsequent residual emotional or psychosomatic problems, or a precarious mental balance that becomes the basis for later 'flashbacks.'" (Grof 1994, p. 134).

The *DSM-IV* terminology for flashbacks associated with LSD use is "Hallucinogen Persisting Perceptual Disorder," abbreviated HPPD (APA 1994, pp. 233–34). The *DSM-IV* takes a particularly narrow definition that focuses on persistent visual perceptual phenomena that cause significant distress to the individual. This condition may be a real but rare occurrence among individuals who have used LSD (Abraham & Aldridge 1993). However, the condition has received only very limited study, and its claimed association with LSD use is confounded by polydrug use as well as other variables (Myers et al. 1998).

A major factor in determining the intensity – either ecstatic or problematic – of an LSD experience is the quantity of drug ingested. Along these lines it is important to note that the average dosage contained in street samples has declined dramatically since the early 1970s. While dosage units of street LSD in the 1960s were generally upwards of two hundred micrograms, the reported average dose of street samples in the 1990s has been closer to sixty micrograms (DEA 1991; Henderson & Glass 1994, p. 52).

Acute adverse psychological reactions are certainly the most significant concerns associated with LSD use. Unfortunately, these dangers are also the ones that are most enhanced by the myths and dire warnings. The LSD

experience is shaped not only by the pharmacology of the drug itself, but also by the beliefs that accompany the experience. Because of the highly suggestible nature of the LSD experience, belief in the myths can contribute to self-fulfilling prophecy and increase the likelihood of having an adverse reaction. Cohen called this the phenomenon of "excessive initial apprehension" and cited it as a significant factor contributing to bad trips (Cohen 1960). Given this, it is perhaps not surprising that the number of reported bad trips increased markedly during the media blitz of the late 1960s. After media coverage died down at the close of the decade, so did the number of negative experiences. This occurred despite the fact that the total number of LSD users was still increasing into the early 1970s (Brecher 1972; Bunce 1979; Zinberg 1984; Grinspoon & Bakalar 1997). An increasingly informed user culture and the predictably lower dosages of street LSD have been among the most significant contributors to this decline in negative experiences.

Henderson and Glass, in their book on the recent history of LSD, summarize the relationship between adverse reactions and mythos in the following way: "In the popular mythology, LSD users are prone to violent outbursts and bizarre behavior. They may jump off buildings believing they can fly, stare at the sun until they go blind, tear their eyes out, or even become homicidal. It is widely believed that an LSD user may at any moment experience a drug flashback during which any of these events may recur. The literature on LSD does document some bizarre episodes. Given the millions of doses of LSD that have been consumed since the 1950s, however, these are rare indeed" (Henderson & Glass 1994, p. 55).

Spiritual Development

A central theme of this book is the entheogenic potential of LSD and similar substances. Indigenous cultures around the world and throughout history have used psychoactive plants as sacramentals in religious rituals that have served to facilitate their connection to the transpersonal. This notwithstanding, it is a myth that the use of these substances will automatically lead to a higher degree of spiritual or religious development. Entheogen use does not necessarily make spiritual development any easier. Skillful and respectful use, with careful attention to intention, set, and setting may help to foster the spiritual path.

Conclusion

There is more to these myths than simply inaccurate information. They have had a major impact on public, scientific, clinical, and governmental

perceptions of hallucinogens as well as on user experiences. These myths were a primary factor in the termination of the clinical research thirty years ago and continue to interfere with the resumption of legitimate investigation of the therapeutic and entheogenic properties of LSD and similar substances.

Searching for the origins of these enduring drug mythologies often proves to be both a fascinating and frustrating experience that only rarely yields complete elucidation. Possessing a life of their own, these hoary myths are hardly static as they journey through space and time. Reflecting the dynamic and adaptive nature of myths, their elements often undergo changes and embellishments over time as a result of faulty memories or the emergent needs of various interest groups.

The Internet has assumed a central role in the diffusion of drug mythology. While the potential exists for the Internet to further propagate these as well as other myths to a wider population, it appears that the opposite may actually be occurring. Electronic mail exchange, newsgroup discussions, and the information-rich World Wide Web have emerged as correctors of myths that have remained largely unchallenged for decades. Web sites such as those of *Erowid* (www1), the *Multidisciplinary Association for Psychedelic Studies* (www2), *The Psychedelic Library* (www3), *The Lycaeum* (www4), and the *Council on Spiritual Practices* (www5) are exemplars of such founts of accumulated knowledge.

More than half a century after its discovery by Albert Hofmann, LSD remains one of the most powerful and profound psychoactive substances known. The folklore surrounding LSD reflects, in part, fears of this power. LSD has the potential to produce extraordinary effects on consciousness, stripping away psychological defenses and bringing users into contact with the gods and the demons of their own psyches. It deserves the utmost respect for the powerful effects it can produce. There is power enough in this truth.

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