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LSD in the Treatment of Alcoholics*

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Introduction

The early LSD research of *Osmond* and *Hoffer* in the treatment of alcoholism was based on their idea that the psychotomimetic properties of LSD could produce a delirium tremens-like state. It was hoped that such a state might have a favorable effect on the patient's drinking in a similar way as has been known for naturally occurring D.T.'s. Although their early hope was not substantiated, they found that some of their patients who had positive experiences with LSD did well thereafter. In a paper read to the New York Academy of Science in 1956, entitled, "A Review of the Clinical Effects of Psychotomimetic Agents," *Osmond* (13) proposed the hypothesis that a single overwhelming transcendental experience with psychedelic drugs might

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be beneficial to alcoholics. Within a relatively short time, *Osmond's* suggestion led to clinical studies seeking to verify this hypothesis[1]. Uncontrolled studies carried out by *Smith* (20) and *Chwelos* (3) yielded favorable impressions which subsequently led to controlled trials on alcoholic patients.

In these studies, different treatment techniques were employed. *Smart* et al. (19), *Johnson* (9), and *Hollister* et al. (8) utilized a treatment method that is perhaps best described as psychedelic chemotherapy, in which the major emphasis was on the administration of the drug itself. The amount of psychotherapy in the preparation for the session and in the post-treatment period was minimal. In a modification of this approach, *Ludwig* et al. (12) added hypnotic induction during the very limited preparation for the session and in the session itself. These studies have yielded essentially similar findings, namely, that the results of LSD therapy in this treatment context were not significantly different from those obtained in the control groups.

In the present study, psychedelic-peak therapy has been used; a treatment technique distinctly different from those described above. One of its basic characteristics and immediate goals in the drug session itself is the achievement of a peak or transcendental experience, but just as important is the intensive psychotherapy which occurs in the weeks prior to the psychedelic drug session and the follow-up therapy in the weeks after to help with the work of integration. The method of facilitating this experience has been described in detail elsewhere (see *Schlien* et al., 18; *Kurland* et al., 10, and *Pahnke* et al., 15). The preparation for the drug session involves an average of about twenty hours of intensive psychotherapy. During this period, the therapist aims at establishing close rapport with the patient and gaining intimate knowledge of the patient's developmental history, dynamics, defenses, and difficulties. In specific preparation for the session itself, the patient is acquainted with the basic effects of the drug and encouraged to trust the therapist, himself, and the situation. This is a very important part of the preparation that enables the patient to utilize the session in the optimal way – to let go voluntarily of his usual ego controls and so be completely open to whatever experiences he encounters.

The experimental drug sessions themselves, are carried out in a special treatment suite, furnished like a comfortable living room, with sofa, easy chairs, rugs, drapes, pictures, flowers, and high-fidelity music equipment. The patient's therapist and a psychiatric nurse are in constant attendance throughout the period of drug action (10–12 hours). For most of the session, the patient reclines on the sofa with eyeshades and stereophonic earphones, alternately listening to carefully selected classical music or interacting with the therapist.

The experiences that the patients have under these circumstances cover a wide range from aesthetic visions and sensations, through reliving of traumatic life experiences with a powerful abreaction and catharsis to psychedelic peak reactions. The psychedelic peak experience has been found most useful from a therapeutic point of view and the

[1] The single overwhelming experience has sometimes been referred to as "transcendental" by *Hoffer & Savage* (7,17), "psychedelic" by *Kurland* et al. (10), and "psychedelic peak experience" by *Pahnke* et al. (15).

preparation, as well as the set and setting is specifically structured in order to facilitate its occurrence. One of the major goals of the therapist during the session is to help the patient to stabilize the experience on this level.

The basic characteristics of the psychedelic experience have been described by *Pahnke* (14):

1. Sense of unity or oneness (positive ego transcendence, loss of usual sense of self without loss of consciousness).
2. Transcendence of time and space.
3. Deeply felt positive mood (joy, peace, and love).
4. Sense of awesomeness, reverence, and wonder.
5. Meaningfulness of psychological and/or philosophical insight.
6. Ineffability (sense of difficulty in communicating the experience by verbal description).

Methodology of the Present Study

In this double-blind controlled study, 135 alcoholic patients admitted to the Alcoholic Rehabilitation Unit of Spring Grove State Hospital, were randomly assigned either to a high-dose treatment group (450 mcg) or a low-dose control group (50 mcg), on a two-to-one basis (90 high dose vs. 45 low dose). All patients were treated alike during the preparation since the therapist did not know to which group the patient belonged.

Analysis showed that the high-dose group averaged 21.6 hours of therapy (exclusive of the LSD session itself), while the low-dose averaged 20.0 hours. The length of time in treatment from first to last therapy appointment was similar; the high-dose group averaged 7.3 weeks in treatment and the low-dose group averaged 6.7 weeks.

Despite randomization, the high and low-dose groups were significantly different on several important variables. In the high-dose group, 47.7% were married, 20% single or widowed, and 33% separated or divorced, while in the low-dose group, 36% were married, 4% single, and 60% divorced or separated. The low-dose group also had a large percentage of patients with five or more admissions – 18% as opposed to 3% of the high-dose group. 52% of the high-dose group had completed high school as compared to 36% of the low-dose group. Randomization, however, achieved matching on IQ, age, occupational status, and most importantly, on the pre-treatment rating of abstinence.

Results

A comprehensive psychological test battery including performance and intelligence tests, projective techniques, and personality inventories was administered just prior to acceptance into the program and one week after the LSD session. A more limited battery of tests was given at the six, twelve, and eighteen month follow-up points.

While the great majority of these psychological test results indicated significant improvement in both treatment groups from pre- to post-treatment, the high-dose group showed no significantly greater improvement over the low-dose group on any test

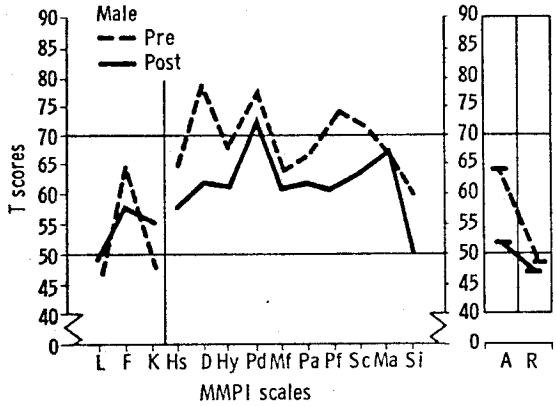

Fig. 1 Composite Pre and Post-Treatment MMPI Profiles for 38 Low Dose Patients.

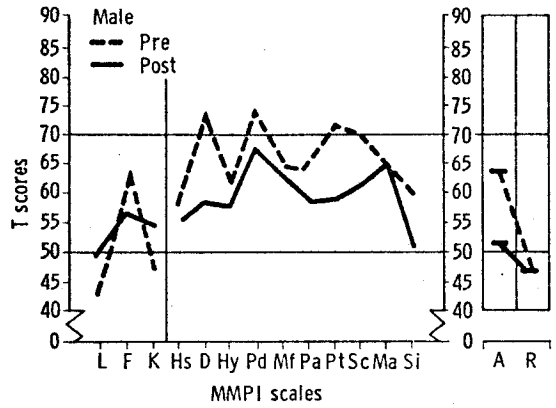

Fig. 2 Composite Pre and Post-Treatment MMPI Profiles for 81 High Dose Patients.

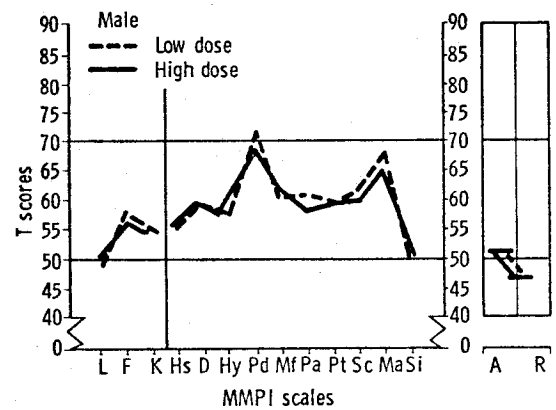

Fig. 3 Composite Post-Treatment Adjusted MMPI Profiles for High and Low Dose Patients.

variables within one week of the LSD session. As an illustration, Figs. 1 and 2 show the pre- and post-MMPI composite profiles for the low- and high-dose groups respectively, while Fig. 3 compares the adjusted post-treatment profiles of both groups. Both groups show much improvement, particularly in the Depression (D) and Psychasthenia (Pt) scales, but the high-dose group shows no clear superiority in degree of improvement over the low-dose group.

Other personality inventories, such as the Personal Orientation Inventory (POI), the Psychiatric Evaluation Profile (PEP), and the Eysenck Personality Inventory (EPI) showed similar findings. Measures of intelligence and perceptual-motor performance (including the Benton Visual Retention Test, Wechsler Adult Intelligence Scale, Raven Progressive Matrices and Imbedded Figures) showed significant improvement on some variables within both treatment groups, but again no significant differences were found between high- and low-dose treatment groups. It is important to note that no patients showed decrement in performance on IQ or evidence of organic damage pre- to post-treatment.

The results for three other tests, Holtzman Inkblot Test (HIT), Rotter Sentence Completion Test and Human Figure Drawings, which can be considered primarily projective in nature also showed no significant differences between the high and low-dose groups. However, both high and low-dose groups showed a large, significant reduction in maladjustment as measured by the Rotter Sentence Completion Test.

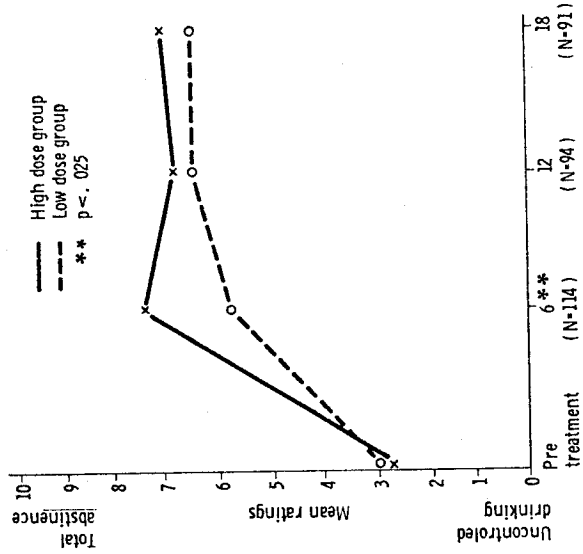

Fig. 5 *Drinking Behavior* means of High and Low Dose groups before and After LSD Treatment.

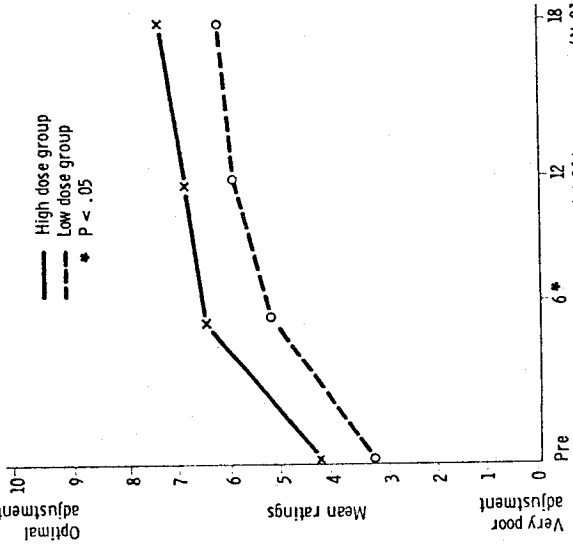

Fig. 4 *Global Adjustment* means of High and Low Dose groups before and After LSD Treatment.

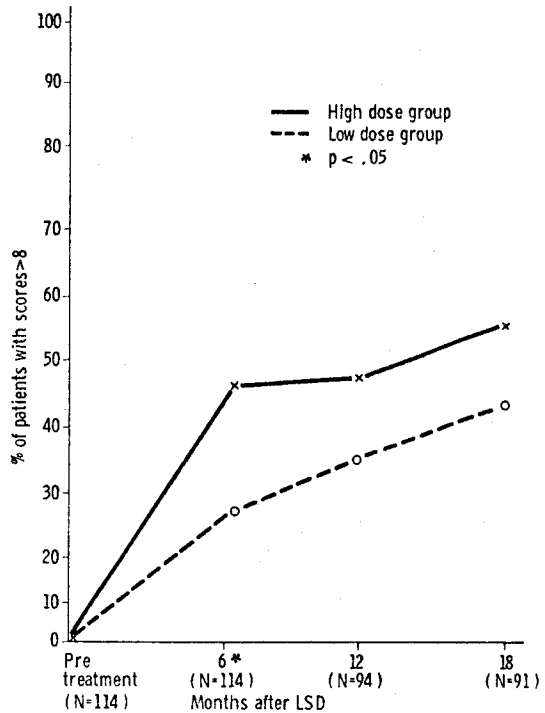

Fig. 6 Percentage of Alcoholic patients essentially Rehabilitated After LSD Treatment: *Global Adjustment.*

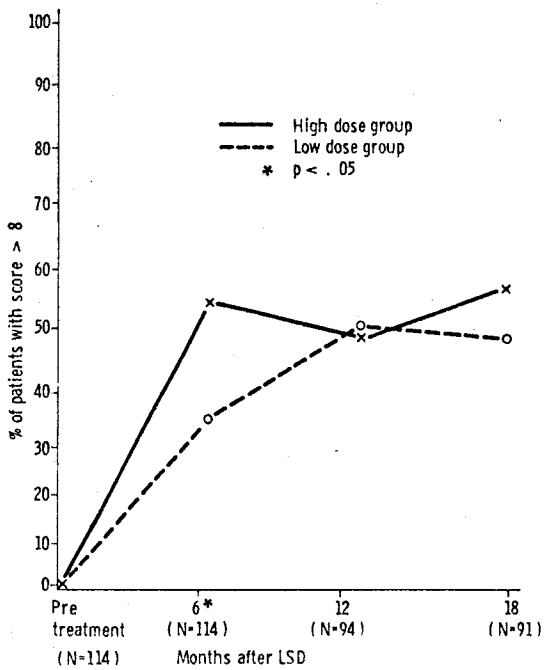

Fig. 7 Percentage of Alcoholic patients Essentially Rehabilitated After LSD Treatment: *Drinking Behavior.*

Final analyses of psychological test results at six and twelve-months follow-up and preliminary statistics at eighteen months are consistent with the above findings from the immediate post-session period in that there were no significant differences between high and low treatment groups.

Follow-up interviews and ratings of adjustment are now completed at the six-month, twelve-month, and eighteen-month checkpoints for a total of 121 of the 135 alcoholic patients who were treated with psychedelic psychotherapy. While the study design made it possible for the patients to have up to three sessions, the vast majority in both experimental and control groups (total of 117 patients) received only one treatment with LSD. The 18 patients who had more than one LSD session were not found to be different from the other 117 in psychological and social measures based on pre-treatment testing, but as a group they received more average hours of treatment. Therefore, in the interests of uniformity concerning amount of treatment, results were analyzed separately for the 117 patients who had only one LSD session (either a high or a low dose).

The percentage of these patients found and interviewed at the six-month follow-up point was 89% (104 out of 117 treated cases). Although the percentages dropped somewhat at the twelve and eighteen-month follow-up points to 80% and 78% respectively, this is considered a very good follow-up rate, realizing that many alcoholics are difficult to keep track of in the community.

The follow-up ratings of adjustment were made by an independent team of social workers. Ratings were made on each patient on a predetermined 0 to 10 behavior rating scale. The Global Adjustment rating included occupational, interpersonal, and residential factors as well as the patient's use of alcohol, with a score of zero indicating poorest adjustment and ten indicating superior adjustment. Zero on the scale measuring Drinking Behavior indicated daily alcohol consumption, and ten indicated total abstinence. Mean ratings of Global Adjustment and Drinking Behavior for the high and low-dose groups at the pre-treatment and six, twelve, and eighteen-month follow-up points are shown in Table 1.

As shown, the high-dose group shows consistently higher mean ratings than the low-dose group at all follow-up periods. However, mean change scores (post-minus pre-means) do not show as large differences between the two treatment groups. In fact, when the data were submitted to analysis of covariance which takes pre-level into consideration, 6 months after LSD was the only time that Drinking Behavior and Global Adjustment showed a significant difference between the high and low-dose groups ($p < 0.025$ and 0.05 respectively – one-tailed test). The magnitude of difference in Drinking Behavior mean scores between the groups at 6 months is 1.4 and the difference in Global Adjustment is 0.50. At 12 and 18-months, this statistical advantage of the high-dose group has disappeared, and there is virtually no difference between the two groups in mean change scores. Apparently the significant, but small advantage of the high-dose treatment holds for only six months.

The percentage of patients functioning in an "essentially rehabilitated" fashion is shown for the various groups in Table 2. A score of 8 or more on the 0 to 10 scale was considered a rigorous criterion, indicating for Global Adjustment that a patient was making "good attainment or adjustment" with regard to drinking, occupation, inter-

personal relations, etc. A score of 8 on the Drinking Behavior scale indicated some, but only minimal, departure from total abstinence. Statistical analysis revealed that there were significant differences between the high and low-dose groups in percentage of patients reaching this criterion, both in Global Adjustment and in Drinking Behavior, but again, only at the 6-month follow-up.

In regard to the most important target symptom, Drinking Behavior, Table 2 reveals that at six months after LSD, 53% of the high-dose group are greatly improved as opposed to 33% of the low-dose group. By chi square this is significant at the 0.05

Table 1 *Global adjustment:* Means of high and low-dose groups before and after LSD treatment.

Mos.After Treatment		Before Treatment	After Treatment	Change	F	p*
Six	High Dose (N = 64) 450 Mcg	4.16	6.52	+2.36		
	Low Dose (N = 40) 50 Mcg	3.28	5.13	+1.85		
	Diff. in Change Scores (High Minus Low Dose Group)			+0.51	3.76	0.05
Twelve	High Dose (N = 59) 450 Mcg	4.27	6.68	+2.41		
	Low Dose (N = 35) 50 Mcg	3.54	5.83	+2.29		
	Diff. in Change Scores (High Minus Low Dose Group)			+0.12	0.95	N.S.
Eighteen	High Dose (N = 57) 450 Mcg	4.44	7.05	+2.61		
	Low Dose (N = 34) 50 Mcg	3.47	5.97	+2.50		
	Diff. in Change Scores (High Minus Low Dose Group)			+0.11	2.10	N.S.

* By analysis of covariance (one-tailed test).

Table 2 *Drinking behavior:* Means of high and low-dose groups before and after LSD treatment.

Mos.After Treatment		Before Treatment	After Treatment	Change	F	p*
Six	High Dose (N = 64) 450 Mcg	2.83	7.02	+4.19		
	Low Dose (N = 40) 50 Mcg	2.93	5.75	+2.82		
	Diff. in Change Scores (High Minus Low Dose Group)			+2.23	4.43	0.025
Twelve	High Dose (N = 59) 450 Mcg	2.88	6.66	+3.78		
	Low Dose (N = 35) 50 Mcg	3.00	6.37	+3.37		
	Diff. in Change Scores (High Minus Low Dose Group)			+0.41	0.24	N.S.
Eighteen	High Dose (N = 57) 450 Mcg	2.95	6.77	+3.82		
	Low Dose (N = 34) 50 Mcg	2.97	6.38	+3.41		
	Diff. in Change Scores (High Minus Low Dose Group)			+0.41	0.32	N.S.

* By analysis of covariance (one-tailed test).

level (one-tailed test). This significant advantage does not obtain at 12 and 18 months after LSD. At 12 months, 47% of the high-dose patients are greatly improved as opposed to 48% of the low-dose patients, and at 18 months, 54% of the high-dose patients are so rated as opposed to 47% of the low-dose patients. The change in percentage of patients "greatly improved" in the high and low-dose groups from the six-month follow-up point to the 12 and 18-month points is in part due to the decrease in the number of patients found at these latter points. However, other calculations carried out taking the unfound cases into consideration also indicated that the advantage of the high-dose group occurs only at the six-month follow-up point.

Table 3 Percentage of alcoholic patients essentially rehabilitated after LSD treatment*.

Months Post-session	Six	Twelve	Eighteen	
Percentage of Patients Followed	89% (104/117)	80% (94/117)	78% (91/117)	
High Dose Group (450 Mcg)	44% (28/64)	46% (27/59)	53% (30/57)	Global Adjustment
Low Dose Group (50 Mcg)	25% (10/40)	34% (12/35)	41% (14/34)	
X_2	2.97	0.77	0.71	
p (one-tailed)	0.05	N.S.	N.S.	
High Dose Group (450 Mcg)	53% (34/64)	47% (28/59)	54% (31/57)	Drinking Behavior
Low Dose Group (50 Mcg)	33% (13/40)	48% (17/35)	47% (16/34)	
X_2	3.44	0.012	0.21	
p (one-tailed)	0.05	N.S.	N.S.	

* Scores of 8, 9, or 10 on a 0–10 Rating Scale.

In speaking to questions which might be raised concerning the harmful effects of LSD administration, only one adverse reaction has been observed in our entire series of well over 200 alcoholics treated with either high or low dose to date (June 1970). Furthermore, even in this one case, the reaction was reversed by conventional therapy. These observations would tend to indicate that the risk of therapy is not substantially increased by the addition of a high dose.

Discussion

The main finding of a difference at six months follow-up of 53% of the high-dose group essentially rehabilitated in regard to drinking behavior as opposed to 33% in the low-dose group is on the face of it quite substantial. However, the significance of this difference is at the 0.05 level, and from a more rigorous point of view, we would have to say that a higher level of confidence would be more convincing. Also, we must face the fact that randomization failed to match the two groups on such variables as marital

status and previous admissions, although they were matched on IQ, age, occupational status and pre-treatment abstinence. This failure of randomization may have conferred some advantage to the high-dose group. There is also the possibility that a therapist may have been more effective with the high-dose group though the high improvement rate of the low-dose group suggests that this is not true. It is also possible that the people in the high-dose group were able to take more advantage of vocational rehabilitation, etc.

On the other hand, the fact that the low-dose group did as well as it did probably reflects the intensive preparation therapy and LSD session which they received. Many of our 50 mcg sessions involved considerable abreaction and catharsis of psychodynamically charged material. The dramatic changes observed in some of our high-dose sessions suggests that for some patients the high-dose procedure is probably most beneficial, but for a considerable number of other patients the low-dose treatment was also quite helpful. In retrospect, a control group receiving no LSD would have been helpful in differentiating the exact role of psychotherapy as opposed to LSD session. In actual practice, however, these two factors, it must be pointed out, are closely interwoven and work together as a unified treatment approach.

In the context employed, the psychedelic psychotherapy was successful in helping over half of the alcoholics treated in this program as opposed to a 12% improvement rate at 18 months follow-up for comparable alcoholics in this treatment facility at Spring Grove State Hospital. This 12% factor is from a prior study and does not represent a concomitant comparison control group. It would also appear that there may be a correlation between the psychotherapist's skill and its contribution to the meaningfulness of the drug experience session. However, this is an issue requiring further investigation.

Finally, it is our impression that the overall clinical achievements of only one psychedelic peak experience and its maintenance for a period of several months in these types of patients is an observation that cannot be discounted. This will require further study of those factors that may yield additional enhancements that can intensify and extend the duration of the therapeutic effect. A variety of approaches should be tried, including the use of LSD as an aid to psychotherapy at many different dosage levels.

Acknowledgements

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Summary

The use of LSD in the treatment of alcoholism has led to many claims concerning the drug's efficacy. Efforts to verify these reports in controlled studies have been difficult because of the unique effects of LSD. Despite this formidable methodological obstacle a number of investigations have been carried out. A critique of these is presented followed by our own research experience in a double-blind, controlled study with 135 chronic alcoholics. In our investigation LSD was employed only as an adjunct to psychotherapy, and most patients received only one session with LSD. Our method is called psychedelic peak therapy because during the actual administra-

tion of LSD the aim is to achieve a positively profound and insightful experience, hopefully yielding beneficial personality and attitudinal changes. Dosage was 450 micrograms for the experimental group and 50 micrograms or the control group. Both groups were treated within a hospital setting and were followed at 6, 12, and 18 months to assess post-hospital adjustment. The high dose group showed a statistically significant advantage over the low dose group on drinking behavior and global adjustment at the end of 6 months, but this initial gain was attenuated so that by the end of 12 to 18 months of follow-up there were no significant differences between the groups, although the overall level of improvement was considerably better for both groups than the usual improvement for other alcoholics in the same setting without any form of LSD-assisted psychotherapy. These results have indicated that further research is needed in order to discover how to sustain and maximize the initial therapeutic benefits we have observed.

Zusammenfassung

Der Gebrauch von LSD in der Behandlung des Alkoholismus hat zu vielen Thesen hinsichtlich der Wirksamkeit dieses Stoffes geführt. Bemühungen, die Richtigkeit von Berichten durch kontrollierte Studien zu bestätigen, waren schwierig wegen der einzigartigen Auswirkungen von LSD. Trotz diesem beträchtlichen methodischen Hindernis sind eine Menge Untersuchungen durchgeführt worden. Eine Kritik dieser Untersuchungen wird dargestellt, ergänzt durch unsere eigenen Forschungserfahrungen aus einer Doppelblindkontrolluntersuchung an 135 chronischen Alkoholikern. Bei unserer Untersuchung wurde LSD nur zusätzlich zur Psychotherapie verwendet, und die meisten Patienten erhielten nur in einer Sitzung diese Droge. Unsere Methode bezeichnen wir als „Psychedelic peak therapy": es ist das Ziel während der Verabreichung des LSD, ein bestimmtes tiefempfundenes und einsichtsvolles Erlebnis zu erreichen in der Hoffnung, heilsame Veränderungen der Persönlichkeit und ihrer Haltung zu erzielen. Die Dosis betrug 450 Mikrogramm bei der Versuchsgruppe und 50 Mikrogramm bei der Kontrollgruppe. Beide Gruppen wurden unter Krankenhausbedingungen behandelt, und in Abständen von 6, 12 und 18 Monaten folgten kontrollierende Nachuntersuchungen, um die Anpassung nach der ersten Behandlungsphase abschätzen zu können. Die höher dosierte Gruppe zeigte eine statistisch bedeutsame Überlegenheit gegenüber der niedrig dosierten Gruppe im Trinkverhalten und in der Gesamtanpassung nach 6 Monaten. Nach 12 bis 18 Monaten jedoch wurde dieser Anfangserfolg vermindert, so daß es keine auffälligen Unterschiede zwischen beiden Gruppen mehr gab, obwohl die Besserung insgesamt bei beiden Gruppen wesentlich stärker war als die übliche Besserung bei anderen Alkoholikern unter gleichen Bedingungen, allerdings ohne Therapieunterstützung durch LSD. Diese Ergebnisse haben unterstrichen, daß weitere Forschung notwendig ist, um herauszufinden, wie man die von uns beobachteten therapeutischen Anfangsvorteile optimal stützen und verstärken kann.

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Disulfiram Effect on Depression and Paranoid Score, 5-hydroxyindoleacetic Acid and Vanillylmandelic Acid Excretion in Urine

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The alcohol sensitizing effect of disulfiram (tetraethylthiuram disulfide, Antabus) is well known, even though the exact cause for this effect is not yet clarified *(Jacobsen* 1967). Only after *Goldstein* et al. (1964) had established disulfiram influence upon catecholamine (CA) metabolism, was more interest shown towards this substance. In animal experiment it is possible to solely reduce norepinephrine (NE) brain level without also reducing dopamine (DA) brain level *(Goldstein* and *Nakajima* 1967).

Reserpine *(Harris* 1957) and α-methyl-dopa *(Gillespie* et al. 1962), which can reduce NE and DA as well, can bring about a depressive symptomatic upon humans. These and many other observations upon humans and animal experimental results led to the NE hypothesis of depression, where a NE metabolism disturbance in the central nervous system (CNS) could be assumed *(Bunney* and *Davis* 1965, *Schildkraut* 1965, *Matussek* 1966).

Does disulfiram produce similar psychic changes like reserpine and α-methyl-dopa? Also with small dosages of disulfiram and also without the alcohol-disulfiram-reaction it came to various psychotic behaviour changes. A majority of these disulfiram psychosis consists of paranoid or depressive reactions (review of literature: *Angst* 1956, *Liddon* and *Satran* 1967). These clinical observations on the one hand and the NE brain level decrease after disulfiram in animal experiments on the other hand, caused us to check the effect of disulfiram upon the depressive and paranoid score. We had undertaken these examinations upon alcoholics which had anyhow received disulfiram, rather than upon volunteers, because of the possible disulfiram side effects. Furthermore it seemed important to us to determine 5-hydroxyindoleacetic acid (5-HIAA) urine excretion during disulfiram treatment as disulfiram is assumed to influence 5-hydroxytryptamine (5-HT) metabolism *(Feldstein* and *Williamson* 1968). The vanillylmandelic acid (VMA) urine excretion was also measured to see whether or not the given disulfiram dosage had the expected influence upon CA metabolism.