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Dimensions of the LSD, Methylphenidate and Chlordiazepoxide Experiences* **

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Summary. Through the retrospective use of the 156 item DWM Card Sort, the experiences from a single intravenous dose of 200 mcg of LSD, 75 mg of methylphenidate (Ritalin) and 75 mg of chlordiazepoxide (Librium) were compared in a population of 99 chronic male alcoholics treated in an "LSD setting" in a double-blind study. Surprisingly, 96 of the 156 items proved significantly different among the 3 groups. LSD was unique in producing Sensory and Perceptual Distortions (including Hallucinations or Illusions), and Mystical, Religious or Paranormal Sensations. However, contrary to expectation, LSD did not uniquely produce the traditional "therapeutic" experience, but appeared to be surpassed in that area by methylphenidate. Both drugs also produced some anxiety, while chlordiazepoxide produced relaxation, and enhanced music appreciation.

Key-Words: Lysergic Acid Diethylamide or LSD — Methylphenidate or Ritalin — Chlordiazepoxide or Librium — Psychopharmacology — Alcoholism and Drug Therapy.

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** An Appendix has been submitted for publication to the American Documentation Institute, a Section of the Library of Congress.

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Introduction

A great deal has been written about the importance of "set and setting" in producing the therapeutic LSD experience, whether it be of transcendental, cathartic or abreactive nature (ABRAMSON, 1967; LING and BUCKMAN, 1965; MALITZ, 1966; SAVAGE *et al.*, 1964; SCHOEN, 1964). Much less has been written about the therapeutic methylphenidate (Ritalin) experience (LING and BUCKMAN, 1966), and almost nothing about chlordiazepoxide (Librium) therapy except as an anti-anxiety agent. It surely can be appreciated that the three drugs have different pharmacological properties: LSD is probably the most famous of the psychedelics; methylphenidate is considered a mild stimulant; and chlordiazepoxide one of the longer acting anti-anxiety agents. Ostensibly these drugs, having markedly different pharmacological properties, should produce different psychological effects even when administered in the same environment.

But in deference to the influence of "set and setting", so important to the effects of specific drugs and/or placebos, the question of what reactions these three drugs would elicit in the present study became important, especially since this was to be a double-blind experiment in which no one—neither doctors nor subjects—would know which drug was being administered. In fact, all *S*s were oriented to expect only an LSD experience. Stated more succinctly, the question became: would an intravenous injection of a substance *thought to be LSD* produce an LSD reaction, when "set and setting" remained identical for all subjects—even though the drug were not the expected LSD but either methylphenidate or chlordiazepoxide? The answer to this question became an adjunctive part of our controlled study to evaluate LSD as a therapeutic agent in the treatment of alcoholism. There have been several encouraging reports about LSD as an effective drug with alcoholics (ABRAMSON, 1967; KURLANDER *et al.*, 1967; O'REILLY and FUNK, 1964; BELDEN and HITCHEN, 1963), but very few studies have been reported with control groups, the most outstanding being a negative study by SMART *et al.*, 1967; and there is no large completed double-blind study to our knowledge.

Method

To determine the response to LSD as distinct from the other two drugs, we treated 99 men, all of whom were at an alcoholism rehabilitation camp in California[1]. The men who volunteered for treatment were selected after a comprehensive screening procedure, which included psychological testing, psychiatric evaluation, and physical examination

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to eliminate severe depressives, psychotics, chronic drug users (including any history of LSD usage), mental retardates, and those with hazardous physical disabilities. The qualified volunteers were assigned to one of three drug treatments (200 mcg of LSD, 75 mg of methylphenidate or 75 mg of chlordiazepoxide), on a random basis. Methylphenidate was chosen as one control treatment because it could mimic some of the effects of LSD in this dose range; and chlordiazepoxide as the other because it is primarily an anti-anxiety agent or mild tranquilizer, and therefore a good contrast for the other two drugs. In addition, all three drugs could be injected intravenously. Neither treatment doctors, volunteer helpers, nor subjects knew which drug was administered, or how many drugs were involved in the study. The administrant physician did not participate in the treatment, but was available for possible emergencies or drug complications which might have necessitated breaking the code. (No such emergency occurred.) All subjects were given an orientation talk which made them familiar with the wide variety of experiences they might encounter with LSD. Questions from the subjects as to the administration of drugs other than LSD were handled by describing the many possible effects of LSD. The use of drugs other than LSD was denied by the investigators.

One week after the orientation talk, and directly *before* the drug experience, the subjects were given the DWM Card Sort (DITMAN *et al.*, 1968) in order to assess the expectancies of the men regarding the approaching drug session; and the following morning, directly *after* the drug session, the DWM Card Sort was administered again, in order to determine what, in fact, the men had experienced on their treatment day. The DWM Card Sort consists of 156 descriptive statements chosen to represent most aspects of the LSD experience. These 156 items are classified into 7 categories:

1. Strong Pleasant Emotions (21 items);
2. Self Understanding (20 items);
3. Religious or Mystical Feelings (14 items);
4. Parapsychological Sensations (10 items);
5. Sensory and Perceptual Alterations (52 items);
6. Strong Unpleasant Emotions (29 items);
7. Evaluation of the Experience (10 items).

Each item was rated by each subject on a 5-point scale, by being placed into one of 5 piles, each pile being rated as follows:

1. Very Much Like the Experience;
2. A Little Like the Experience;
3. Neither Like nor Unlike the Experience;
4. A Little Unlike the Experience;
5. Very Much Unlike the Experience.

In this paper only the post-treatment data are presented. With these data, using one-way analysis of variance, it was possible to learn if there were statistically significant differences between the LSD, methylphenidate and chlordiazepoxide experiences.

Results

There were, for the 156 items in the DWM Card Sort, 96 F-ratios significant beyond the .05 level, 69 beyond the .01 level, and 47 beyond the .001 level of significance. Clearly, in this double-blind study, even though "set and setting" remained constant for all subjects, there were found vast differences in the specific psychopharmacological effects of the 3 drugs for this population of alcoholics.

Table 1. *Number of significant differences from t-tests between pairs of drugs*

Pairs of drugs	$p < .05$	$p < .01$	$p < .001$
LSD vs. M	62	46	32
LSD vs. C	82	60	36
M vs. C	42	20	9

By contrasting each pair of drug groups (by 3 *t*-tests on each of the 156 items) we also found that the 3 drugs are not equally different from each other. LSD differed significantly from the other 2 drugs on considerably more items, particularly where extreme differences (beyond the .001 level) are noted. See Table 1. (In this, and all other tables, *M* is the abbreviation for methylphenidate and *C* for chlordiazepoxide.)

As might be expected, LSD far outranked the other drugs in the category of Sensory and Perceptual Distortions. This category contains 3 subgroups: Visual, Somatic, and Other Distortions. The means of the LSD group on all 10 Visual Distortion items differed from the other drugs beyond the .01 level of significant—and 9 of the items beyond the .001 level. (See Table 2. Please note that in this, and all other tables, means are computed from the 5-point scale ratings, where 1 equals "Very Much Like the Experience" and 5 equals "Very Much *Un*like the Experience".)

Turning to the subcategory of Somatic Distortions (21 items), LSD again outranked the other drugs—but not exclusively, as Table 3 illustrates, since occasionally methylphenidate either outranks or challenges LSD, as in the items: *I felt as if I were floating in space; I felt like I was shaking or trembling, etc.*

On the third subcategory (Other Sensory and Perceptual Distortions, consisting of 15 items) 11 statements evoked significantly different drug reactions. Table 4 reveals that, again, LSD far outranked the other

Table 2. *Visual distortions*

p	Statement	Mean position of the 3 drugs		
		M	LSD	C
$p < .001$	Walls or other objects seemed to be breathing	4.70	2.63	4.52
	The walls and floors moved and flowed	4.30	2.33	4.38
	With my eyes closed I saw multicolored moving designs	4.23	2.03	3.93
	Objects seemed to glow around the edges	4.40	2.48	4.17
	Colors seem brighter	3.50	1.95	3.28
	I had "x-ray vision"	4.70	3.48	4.46
	Other peoples' faces seemed to become changing masks	4.43	3.05	4.21
	My eyesight seemed blurred	3.60	2.60	3.86
	I saw music	4.30	2.98	4.00
$P < .01$	I kept seeing things after I'd stopped looking at them	4.37	3.25	3.79

Table 3. *Somatic distortions*

P	Statement	Mean position of the 3 drugs		
		M	LSD	C
$P < .001$	My "I" or "self" seemed to leave my body	4.27	2.30	4.24
	I felt like I was floating in space	3.17	1.93	4.31
	I felt like I was shaking or trembling	2.30	2.35	4.14
	One side of my body felt different from the other side	4.40	3.13	4.48
	I had peculiar sensations on my skin at times	3.53	2.50	4.17
	I became another object or person and yet remained myself	3.86	2.53	3.96
	My body seemed to change size all on its own	4.43	3.25	4.35
	My body seemed to grow younger or older all on its own	4.57	3.45	4.35
	I felt paralyzed	4.33	3.53	4.59
	I felt unsteady and uneasy	2.60	2.65	3.89
$P < .01$	This was like a bad (alcohol) hangover	3.57	3.03	4.38
	I had nausea, headache or other physical pain which dominated the experience	3.93	3.43	4.55
	My hands and feet felt light, or like they were not attached to my body	3.77	2.90	3.97
	I felt choked or found it hard to breathe	3.77	3.25	4.41

Table 4. *Other sensory and perceptual distortions*

P	Statement	Mean position of the 3 drugs		
		M	LSD	C
$P < .001$	My mind was flooded with thoughts	1.37	1.98	3.46
	My sense of smell became more acute	4.27	2.75	4.10
	I had a craving for food	4.53	3.60	2.55
	I had difficulty talking	3.60	2.35	4.00
	Music affected my mood much more intensely than usual	3.60	1.90	2.83
	My thoughts kept shifting rapidly from one idea to another	1.57	2.23	3.25
	Everything seemed to bright, too harsh, too loud	4.20	3.25	4.48
	I can remember very clearly everything that happened to me during the experience	1.23	2.15	1.55
	I lost interest in what I started to say so that a sentence was left unfinished	3.13	2.53	3.93
$P < .01$	I had intense swings from "high" to "low"	3.23	3.00	4.14

Table 5. *Illusions or hallucinations*

P	Statement	Mean position for the 3 drugs		
		M	LSD	C
$P < .001$	Solid objects changed their shapes and even disappeared	4.67	2.53	4.00
	I heard things that I knew were not real	4.53	3.10	4.14
	My own face in a mirror looked quite different; it even turned into different faces	4.40	3.25	4.28
$P < .01$	Sounds seemed to affect what I saw	4.90	4.30	4.66

drugs on 6 of these items, such as: *My sense of smell became more acute*, and *Everything seemed too bright, too harsh, too loud.* However, methylphenidate was also predominant in such items as: *My mind was flooded with thoughts, I can remember very clearly everything that happened to me during the experience. My thoughts kept shifting rapidly from one idea to another*—items all characteristic of strong mental activity. Chlordiazepoxide produced significantly less intense mood swings than the other drugs; its only distinction in this category.

Similar to Sensory and Perceptual Distortions is the small (6 item) category, Illusions or Hallucinations. Again we find, not surprisingly,

that LSD elicited far more intense reactions than the other drugs on 4 of the 6 statements. (See Table 5.)

Turning now to another area of experience, Mystical or Religious Sensations (14 items), we find that 6 of these statements show a significant difference at the .01 level or beyond. These are listed in Table 6 and shows again that LSD produced far stronger sensations of this nature than the other drugs—which surely can have been anticipated from the wealth of literature on LSD and the mystical or religious experience. Related to mysticism, perhaps, are Parapsychological Sensations; and in this category of 10 items, 3 attain significance at the .01 level or beyond. (Please refer again to Table 6.)

Table 6. *Mystical or religious sensations*

P	Statement	Mean position of the 3 drugs		
		M	LSD	C
$P < .001$	I felt in contact with wonderful, unknown forces in the Universe	4.27	2.66	4.17
	I saw all the mysteries of the Universe in certain objects	4.40	3.13	4.21
	I had levels of thought I can't express in words	2.23	1.93	3.35
$P < .01$	Hours went by like seconds—or one second seemed to last forever	1.87	2.17	3.00
	I learned what it is like to be really dead	4.53	3.88	4.68
	I felt like we are all one in this Universe	3.52	2.50	3.31
	Parapsychological sensations			
$P < .001$	Past, present and future seemed all to be one	3.20	2.30	3.90
	I felt as though I were travelling in time	3.57	2.65	4.14
$P < .01$	I could make an object turn into something else just by wanting it to	3.52	2.50	3.31

Of considerable interest to those psychotherapists wishing to use a drug as an adjunctive treatment is the following finding: all 7 items which proved statistically significant in the Self-Understanding category (21 items) are statements traditionally considered therapeutic in nature—and 6 of the 7 items demonstrated that the methylphenidate experience ranked higher than the LSD experience. See Table 7.

In this context, it perhaps should also be mentioned that another 6 items which could also be classified as therapeutic achieved significance between .05 and .01 probabilities. And again, methylphenidate in four of these statements achieved a higher rating than did LSD. See Table 8.

Table 7. *"Therapeutic" items. (Taken from the self-understanding category)*

P	Statement	Mean position of the 3 drugs		
		M	LSD	C
$P < .001$	I was especially talkative	1.23	2.93	2.76
	I kept thinking of my problems	1.57	2.95	2.35
	I felt like talking it out	1.17	2.20	1.93
	I had the feeling I had much work to do to set me straight	1.33	2.33	2.45
$P < .01$	I actually seemed to return to certain moments in my childhood and experience myself there	2.60	2.95	3.93
	Things I remembered threw new light on my problems	1.73	2.10	2.97
	I now have a new feeling regarding my family and marriage	2.40	2.33	3.45

Table 8. *"Therapeutic" items beyond the .05 level of significance*

P	Statement	Mean position of the 3 drugs		
		M	LSD	C
$P < .05$	I saw myself as I really am, and I did not like what I saw	2.50	3.18	3.72
	This experience had no therapeutic value	3.73	3.88	2.83
	I have been greatly helped by the experience	1.57	1.85	2.38
	My conscience bothered me	2.47	3.25	3.39
	I felt morefree	1.60	2.35	2.35
	I felt as if I had been reborn	3.30	2.70	3.69

In view of the recent unsupervised and non-medical use of LSD which has resulted in an epidemic of "bad trips" sometimes ending in suicide, psychosis, and/or acute anxiety attacks, it is of considerable interest that LSD ranked highest in the category of Strong Unpleasant Emotions—particularly in the subcategories of Anxiety and Paranoia. It would be well to point out, too, that while the methylphenidate experience was felt to be therapeutic by the subjects, it also included considerable Anxiety when given intravenously in 75 mm dosages. Table 9 shows that 10 of the 16 Anxiety items were significant beyond the .01 level. LSD generated significantly more anxiety on 5 of these items, while on the remaining 5 items, both LSD and methylphenidate produced considerably more anxiety than chlordiazepoxide. Also, of the 6 items, in the Paranoia category, LSD contributed significantly more of this negative state on 2 items than either of the other drugs. However,

Table 9. *Strong unpleasant emotions*

P	Statement	Mean position of the 3 drugs		
		M	LSD	C
	A. Anxiety			
$P < .001$	I felt on the fringes of sheer horror	4.37	3.30	4.68
	I became afraid I might die	4.67	3.58	4.72
	I felt anxious or tense	2.23	2.45	3.52
	I felt something dreadful was about to happen	4.10	3.30	4.52
	I tried to fight off what was happening	4.33	3.25	4.38
	I felt confused	2.63	2.63	3.93
$P < .01$	I felt upset and distraught	3.33	2.90	4.24
	I felt separated from everyone and everything	3.70	2.63	3.66
	I was easily distracted and not able to control my thoughts	2.87	3.13	4.03
	Certain things did frighten me	3.27	2.70	4.10
	B. Paranoia			
$P < .001$	At times I had the sensation of someone spying into my mind	4.53	3.35	4.28
$P < .01$	I resented what was being done to me	4.80	4.13	4.72

it should be observed that on both of these Paranoia items, the average reaction was definitely toward the "*Unlike* the Experience" rating.

Finally: of the 156 items, only 7 were both uniquely and significantly characteristic of the chlordiazepoxide experience. And all of these items were trivial in that they relate to the *absence* of a strong sensation, or are characteristic of the relaxing effects to be expected from this anti-anxiety drug. However, one item reveals the unexpected finding that the chlordiazepoxide group experienced almost as much appreciation of music as did the LSD group, thus: *I felt the beauty and meaning of music as never before.*

Discussion

There is an ever increasing variety of potent consciousness-changing substances appearing in the world today, and these substances produce a wide variety of experiences. Much needed is an instrument which will allow the dimensions of these changes to be explored *without the instrument* itself *contaminating the experience.* The 156 item DWM Card Sort used retrospectively. has shown itself to be a valuable tool for this vital area of study. In the present instance, the Card Sort clearly differentiated the 3 drug experiences under observation.

In fact, our findings in certain areas were unexpected, and puzzling. One area is, of course, the therapeutic domain which has been frequently

described as part of the LSD experience. In our population the reported therapeutic effects of methylphenidate at least rival—and often surpass—those of LSD. In this context, it should be mentioned that methylphenidate has been used in combination with LSD for psychotherapy with good results by LING and BUCKMAN (1963). But a strong word of caution: while methylphenidate appears to have the therapeutic properties of ventilation, catharsis and abreaction (including the re-experiencing of childhood traumata)—it should be stressed that it can engender strong behavioral dependence which makes it dangerous as a drug for therapy if not used under the strictest medical supervision (Moss and DITMAN, 1968).

The second finding. As was to be expected, LSD accounted chiefly for the marked changes in the areas of Sensory and Perceptual Distortions (including Hallucinations or Illusions); and also accounted for the major changes in the fields of Religious or Mystical, and Paranormal Sensations. However, occasionally methylphenidate surpassed LSD on such items as: *Hours went by like seconds, or one second seemed to last forever; I felt like I was floating in space; I could make an object turn into something else just by wanting it to; and I actually seemed to return to childhood and experience myself there.* These statements seem to have the flavor of the mystical or paranormal—both of which have become increasingly important areas of experience to the drug (ab)users, who apparently are turning more and more to oral and intravenous injections of stimulants such as the amphetamines (particularly methedrine) phenmetrazine (Preludin), and methylphenidate (KIHLBOM, 1967; CONNELL, 1967; MARUSAK, 1967; Moss and DITMAN, 1968) in order to obtain a "high" without the danger of the LSD "bad trip", so common to the non-medical use of LSD. It would seem that the search is on for the "trip", the "high" or the psychedelic experience, but without the famous psychedelic drug, LSD, which has been made illegal in many areas of the world. This search for intoxicants, not yet illegal, has extended to ingredients like Hawaiian wood rose, morning glory seeds, and even the banana peel—presumably because, from their ingestion, mystical and paranormal sensations can be obtained. However, almost all of these ingredients, like methylphenidate, can create anxiety when not used in a medical setting (where the anxiety can be explored and analyzed; or if not, can be terminated by the administration of another drug). In fact, the indiscriminate usage of these herbs and drugs cause severe mental and emotional turmoil often necessitating psychiatric treatment. In a paper by DITMAN *et al.* (1967) such drug users were studied; and it was found that the majority of hospitalized and out-patient subjects had experimented with many such drugs, and were classified as "multi-drug" users.

The anti-anxiety drugs, however, seem not to produce these effects, at least as measured by the DWM Card Sort. In the present study it was found that chlordiazepoxide calmed the subjects, without arousing any sensory or perceptual distortions, or mystical sensations. Nor did the drug seem to aid in Self-Understanding. In fact, its only positive contribution seems to have been to produce relaxation and to create in the subject a deeper appreciation and understanding of music — in this one respect like the LSD experience.

Finally: it should be emphasized that these results were derived from a retrospective Card Sort administered the day after one single 8 hour session, where all subjects (chronic alcoholics) believed they were receiving LSD. Whether the apparently therapeutic methylphenidate and LSD experiences will actually lead to beneficial changes in these men, particularly in relation to their drinking behavior, remains to be seen when the follow-up studies are completed over the next months. And, since the methylphenidate experience was actually reported to be more "therapeutic", we wonder if, in the ensuing follow-up of our subjects, it will prove to be the more valuable drug . . .?

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