The Subjective Dimensions of the Drug Experience

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Although there are numerous sources in which drug experiences are categorized and described[15,19] as well as published narrative accounts of personal drug experiences[1,6,12,14] relatively little formal quantitative investigation of the dimensions of the subjective experience has been reported.[5,10,13] These latter investigations have developed structured questionnaires oriented toward predetermined categories or types of experience.

In the research proposed herein, a psychophysical method, similarity estimation, is used to ascertain the dimensional structure of the subjective experience without the use of *a priori* categories or rating scales. Hopefully, this approach should permit the resultant dimensions to emerge from the data rather from the experimenter's conceptions. There is, however, a significant problem in the naming of the dimensions discovered in such an investigation. The interpretation of the factors will in itself be subject to influence from the experimenter's conceptual framework. Although there may be some constructive value in the interpretative process by relating the obtained dimensions to those found in other research, the possibility of introducing experimental bias is also a very real one. In this series of investigations we shall attempt to verify hypotheses concerning the meaning of factors by empirical means.

In addition to enriching our understanding of the subjective experience of drugs (as well as shedding light on an individual's motivations for seeking the drug experience), the identification of reliable, consensually-shared dimensions might enhance efforts at classification of drugs in a more precise way than has heretofore been possible. For an extreme example, consider marijuana: the classification of marijuana has perhaps been the most controversial of the non-prescribed illegal, but widely-used drugs. The Harrison Act[15] classified it as a narcotic. No reputable medical authority or behavioral scientist accepts this designation. It has also been described as a hallucinogen, but this classification also has been disputed. With the use of regional varieties native to the United States, it is most unlikely that individuals would hallucinate. Yolles[28] has reported that assays of cannabis plants from the midwest yield no detectable tetrahydrocannabinol (THC), which is thought to be the active substance producing the drug experience. Potency may be a determining factor of classification; Mexican and Southeast Asian varieties are said to be five to eight times more potent than cannabis native to the United States.[4,15]

Marijuana is also considered to be a mild psychedelic. Since this class of drugs is rather loosely defined, it is difficult to ascertain whether it belongs to this group. With the possible exception of those forms of use which involve preparing a concentration of resin from the female plant (in drug user's parlance, this is referred to

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as "hash"), it would seem that marijuana does not have the profound effects on cognition, perception, and personality characteristic of psychedelic drugs. There do appear to be some gross similarities in the structure of some of the compounds isolated from the resin[24] and psychedelic drugs.[21] Myers[18] offers that " . . . the effects of marijuana, both operationally and in its mechanism of action, correspond exactly to those of other sedatives and anesthetics . . . " Myers,[18] Fort[7] and Base, Saifi & Bhaqwat[2] have pointed out that cannabis can, at different stages, have an excitatory, as well as a depressant effect. The latter study was based on observations on dogs administered cannabis indica. Animal studies reviewed by Gershon[8] have also shown some interesting paradoxical effects: THC potentiates the effects of barbiturates, as well as potentiating the effects of amphetamines. Therapeutic effects have been ascribed to marijuana and THC: psychotropic and anticonvulsant properties[8,9,18,23]—and antispasmodic properties were observed on various tissues of several species of animals.[3]

Various authorities have indicated that the effects of marijuana and psychedelic drugs are markedly affected by situational and personality factors.[7,16,17,22] Thus, it appears that the effects of marijuana and its active ingredients are both complex and controversial in terms of research findings, as well as with respect to the mythology surrounding this drug. Perhaps user's response offers a useful approach to classification. Although based on subjective reports, if the reports show some consensual judgment, some clarification of the classification problem may emerge.

Although reports of subjective experience have long been devalued in terms of their scientific merits, and findings from questionnaire approaches have been largely disappointing, the use of multidimensional psychophysical scaling methods may result in dimensions of

TABLE 1

SIMILARITY ESTIMATIONS AND CORRELATIONAL SIMILARITIES*

Drug-Narcotic Name Stimuli	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Hash	100	43	12	11	-42	-28	-43	34	-17	85	-26	8	8	-27	1
2. Opium	43	100	-34	-18	-11	-18	-24	35	48	52	-17	-19	-38	-19	-26
3. Hard Liquor	27	11	100	67	-54	-64	-67	-47	-42	-14	-57	44	93	-67	64
4. Barbiturates	39	24	58	100	-30	-47	-49	-42	-26	-26	-44	- 2	59	-55	88
5. Speed	15	18	10	24	100	46	64	7	53	-36	26	-56	-58	42	-42
6. LSD	20	21	7	19	44	100	87	37	-13	1	91	-52	-68	96	-46
7. MDA	14	14	4	14	50	70	100	20	13	-24	70	-52	-67	87	-51
8. THC	43	39	15	13	27	42	30	100	6	57	34	-42	-52	36	-26
9. Cocaine	16	48	10	18	49	10	30	26	100	-11	-23	-39	-46	- 9	-37
10. Non-Kansas Pot	77	49	31	18	12	34	14	54	21	100	8	2	-25	0	-29
11. Psilocybin	15	20	9	16	27	72	48	36	8	36	100	-43	-61	92	-39
12. Kansas Pot	23	16	35	13	4	6	6	9	6	29	9	100	58	-45	5
13. Beer	34	10	80	43	7	3	3	11	5	12	4	50	100	-68	66
14. Mescaline	24	18	6	12	38	79	69	42	19	29	76	12	5	100	-54
15. Thorazine	23	17	44	74	12	14	9	29	10	16	18	15	55	8	100

*Note: So as to conserve tabular space, the complete similarity estimation and correlational similarity matrices have not been presented; only one-half of these symmetrical matrices are presented in this table. The mean similarity estimations are below the major diagonal (unity values) and the correlational similarities are above this major diagonal. All decimals have been omitted.

TABLE 2
ROTATED JUDGMENT FACTORS

Drug-Narcotic Name Stimuli	I	II	III	IV	h^2
Hash	.22	.85	-.15	-.03	.81
Opium	.26	.65	.50	.20	.78
Hard Liquor	.56	-.15	-.51	-.49	.85
Barbiturates	.34	-.11	-.10	-.88	.92
Speed	-.38	-.39	.67	.17	.78
LSD	-.96	-.05	.05	.19	.97
MDA	-.82	-.30	.26	.27	.89
THC	-.43	.68	.20	.08	.69
Cocaine	.23	-.06	.89	.27	.93
Non-Kansas Pot	-.02	.93	-.14	.20	.93
Psilocybin	-.92	.02	-.09	.17	.89
Kansas Pot	.58	-.13	-.68	.37	.94
Beer	.61	-.23	-.58	-.41	.92
Mescaline	-.93	-.06	.03	.29	.96
Thorazine	.29	-.11	-.22	-.88	.91
Amount of Variance Accounted for:	34%	19%	18%	17%	88%

considerable potential worth for the measurement and classification of psychological phenomena. The method of similarity estimation has not heretofore been utilized in research on the drug experience.

Hopefully these approaches will yield some understanding of an individual's motivations for drug use. With this understanding, some consideration of alternatives to drug use which might satisfy these needs can proceed on a sound basis.

SOME RESULTS OF PILOT STUDIES*

STUDY I

In the initial investigation eight male high school and college students with extensive drug experience completed the set of similarity judgments. In a follow-up study, an especially constructed semantic differential was given to one female and eleven male drug users, also mostly students. The stimuli used in both tasks were: hash, opium, hard liquor, barbiturates, speed, LSD, MDA, THC, cocaine, non-Kansas pot, psilocybin, Kansas pot, beer, mescaline, and Thorazine.® In addition, heroin was rated on the semantic differential scales.

Similarity Estimations.—Each judge (J) made 105 single similarity estimations (all pair comparisons for 15 simuli) on a "percentage identity" scale which ranged from 0 (zero) to 100 (one estimation for each pair comparison of the stimuli). Table 1 contains the "group" similarity matrix based on the averaged (arithmetic means computed across the eight Js) similarity estimations and the Stone-Coles correlational similarity matrix based on these same data.[26,27] The correlational similarity matrix was factor analyzed using a principal components solution with unity in the diagonals (when the limiting eigenvalue was set to unity) and was rotated to a varimax criterion. Table 2 contains the results of the factor analysis. The four factors extracted accounted for 88% of the judgmental variance.

The highest positive and negative factor loadings for

TABLE 3
ROTATED FACTOR LOADINGS

Semantic Differential Scales					
beautiful–ugly	*.89456*	.00802	.05641	.05022	-.10740
clear–confusing	*.68606*	.10618	-.00849	-.23538	-.13346
active–passive	.37379	*.74584*	-.00368	-.00787	.12105
exciting–calming	.02379	*.86708*	.09814	.12635	.08177
creative–uncreative	*.72615*	.27870	.01336	.03311	-.19733
rough–smooth	-.27089	.16321	.04037	-.26839	*.71264*
tense–relaxed	.10382	*.72181*	-.32327	-.20389	.12503
good–bad	*.83044*	-.09698	.23710	.07437	-.04159
pleasant–unpleasant	*.85991*	-.14983	.05057	.07042	-.14999
high–low	*.69972*	.32464	-.15506	.00904	.08805
insightful–dull	*.87349*	.21354	.00804	.02608	-.04903
refreshed–weary	*.78939*	.28489	.00199	-.11447	.05905
light–heavy	.02939	-.01884	.05253	*-.78993*	.06331
bright–dull	*.77127*	.34822	.07151	.16111	-.18163
tasty–bland	.38021	.13298	.38031	.30394	.06756
strong–weak	-.45091	-.07221	*.56591*	-.42665	-.03166
fast–slow	.32463	*.82072*	-.05266	.07666	-.06653
safe–dangerous	.20285	-.09666	*.86258*	-.03080	-.00603
loud–soft	-.08901	*.57506*	.10284	.45855	*.50121*
rough-delicate	-.10016	.05441	-.04760	.10472	*.86371*
colorful–colorless	*.69490*	.28701	.06957	.21193	-.28834
Amount of variance accounted for:	37.3%	15.5%	6.9%	6.3%	5.4%
				TOTAL	71.4%

each dimension were presented and discussed with mental health professionals, behavioral scientists, physicians, and drug users (known to one of the authors) for assistance in interpretation of the meaning of the factors. The following variables appear to be the best interpretations for Factor I: pleasant-unpleasant, good trip-bad trip, and psychedelic vs. other drugs. Although Factor II is not as clearly bipolar as Factor I, the suggested variables, marijuana products vs. other drugs and calming-exciting, both fit in well with the data. Factor III appears to be a dangerous-safe dimension. Factor IV may be a depressant-other dimension, or it

may, as is often the case with the smallest factor, be uninterpretable.

STUDY II

Semantic Differential.—Twelve subjects (Ss), mostly college students with extensive drug experience, participated in this study. Twenty-one semantic differential scales were used to rate each of the 16 drug stimuli. The obtained matrix was factor analyzed by the method of principal components using unity in the diagonals. Factors were extracted with a limiting eigenvalue of unity. A varimax rotation was performed. The rotated factor loadings may be seen in Table 3.

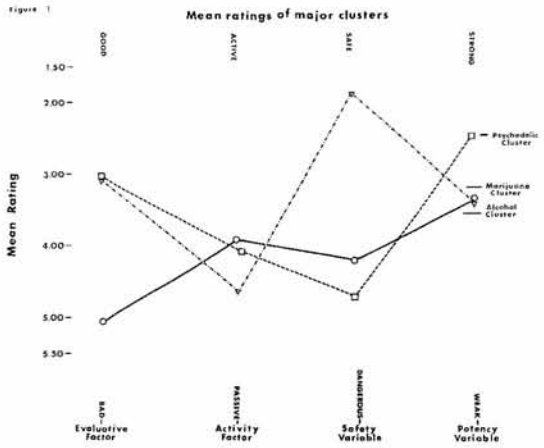
Factor I appears unequivocally to be an evaluation factor. Both its size and the content define such a dimension. Factor II also can be interpreted in a straightforward manner: the defining variables seem clearly to indicate an activity dimension. By far, the highest loading for Factor III is the dangerous-safe variable. The strong-weak scale also loads relatively high on Factor III, but other scales (e.g., rough-delicate) commonly defining a potency factor did not load heavily. Since the correlation between the variables defining Factor III was low ($r = -.36$) and it was judged that both might be important in describing a drug, it was decided to use each of these variables separately rather than combine them into a factor score. Neither Factor IV nor Factor V was clearly interpretable; hence, these were not treated in subsequent analyses.

For Factors I and II factor scores were computed by assigning unit weight to each variable with a factor loading $>.50$ and dividing the sum by the number of variables (see Table 4).

One way of clarifying the classification of drugs is by their profiles. With larger sample sizes, more sophisticated multivariate analysis techniques such as Q-type factor analysis or a multiple discriminant analysis could be utilized. Because of the small samples, Tyron's

TABLE 4

Drugs	Evaluative Factor	Safe–Dangerous Variable	Weak–Strong Variable	Activity Factor
Kansas Pot	4.54	1.50	5.50	4.81
Non-Kansas Pot	2.30	1.41	2.50	4.60
Beer	5.05	3.75	3.58	4.28
Heroin	3.85	6.16	2.00	5.43
Hash	2.41	1.83	2.41	4.83
Opium	2.94	4.50	2.08	5.60
Hard Liquor	5.11	4.66	3.16	3.60
Barbiturates	4.88	5.83	3.00	5.30
Speed	2.44	5.58	1.91	1.68
LSD	2.00	3.91	1.66	3.35
MDA	2.26	3.91	2.50	2.98
THC	3.11	2.75	3.16	4.28
Cocaine	3.09	5.25	2.58	3.33
Psilocybin	2.08	3.75	2.41	3.63
Mescaline	2.17	3.66	3.00	3.55
Thorazine	5.01	4.58	3.41	5.63



graphic method of cluster analysis was applied.[20] The means of each drug on the two factors and two variables from the semantic differential data were plotted. (See Figure 1). The profiles of the drugs can be grouped into meaningful clusters. With a four-point profile, there are three solpes, and by chance one could expect eight possible patterns since each of the three solpes could be + or -. Three of the possible patterns do not occur (++-,—,+--). Non-Kansas Pot, Kansas Pot, Hash and THC all have the -+- pattern and seemed similar with respect to elevation with the possible exception of Kansas Pot which is judged as lower on the Evaluation factor and weaker on the Weak-Strong dimension. Thus the marijuana products constitute a cluster by themselves and distinct from psychedelic drugs. This separation is compatible with findings from psychopharmacological studies.[11,25] From the standpoint of the experienced user, marijuana products are judged as relatively good, more calming than the psychedelic drugs, very safe and of moderate potency. Eight drugs show a --+ pattern: LSD, Psilocybin, Mescaline, MDA, Cocaine, Opium, Heroin, and the Barbiturates. Speed, which shows a +-+ pattern, might also be grouped with this cluster which appears to designate those drugs considered "heavy" or "hard" by users.

The psychedelic cluster appears to have several subclusters (see Figure 2). Although Opium, Heroin, and the Barbiturates have the same —+ pattern as the psychedelic drugs, the lower elevation of these profiles is such as to suggest they should be clustered separately, possibly with the inclusion of Thorazine® which has a -++.

Speed and Cocaine show similar profiles: even though the solpes differ in one segment, they are very similar in the elevation of each variable. The principal difference of this subcluster from the psychedelic drugs is that they are judged as much more dangerous.

Beer and Hard Liquor do not seem to fit any of the above clusters, but they may be grossly similar as to level even though their profiles differ somewhat: +++ and +-+, respectively.

Relationship between data from the similarity estimations and the semantic differential.—Table 5 contains the correlations of the four factors extracted from the similarity data and the two factors and two variables from the semantic differential data. When one considers that both Studies I and II were conducted with small numbers of Ss (8 and 12, respectively) using different instruments (similarity judgments and semantic differential scales) the interrelations of factors from the two studies are remarkably high. Factor I of Study I is mostly highly related to the Evaluation Factor of Study II, but it is also significantly related to the Activity factor and the Weak-Strong variable. Thus, Factor I of Study I appears to be defined by drugs that are good, active, and strong. Collectively, these studies would indicate this cluster of drugs with high positive loadings produce a pleasant experience (good trip), but they may or may not be safe.

Factor II of Study I is most highly related to the safe-dangerous variable. Considering that marijuana products (with the exception of Kansas Pot) cluster with respect to high positive loadings, it would seem that these are judged safe; and Speed, comparatively dangerous. Perhaps because of the small number of Ss, the expected correlation of Factor II, Study I with the activity factor of Study II is not statistically significant (r = .49). Replication with a larger sample of Ss who perform both tasks is indicated to confirm this hypothesis. The relationship is in the expected direction: drugs loading positively on Factor II, Study I have low ratings on the activity factor. Thus, Factor II of Study I appears to be primarily comprised of drugs judged to be

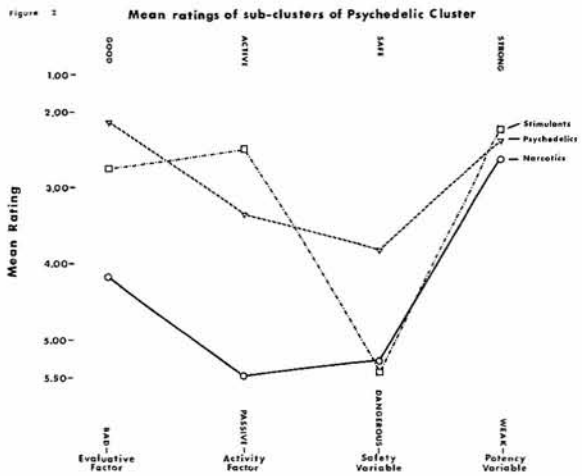


TABLE 5
INTERCORRELATIONS OF FACTORS EXTRACTED FROM SIMILARITY DATA WITH FACTORS AND VARIABLES FROM SEMANTIC DIFFERENTIAL DATA

I	1.00							
II	0.08	1.00						
III	-0.37	0.04	1.00					
IV	-0.50	0.19	0.40	1.00				
Evaluative	0.79**	-0.33	-0.55*	-0.75**	1.00			
Safety	-0.01	-0.59*	0.47	-0.40	0.22	1.00		
Weak-Strong	0.52*	-0.20	-0.65*	-0.16	0.66**	-0.36	1.00	
Activity	0.54*	0.49	-0.42	-0.45	0.46	-0.27	0.37	1.00
	I	II	III	IV	Evaluative	Safety	Weak-Strong	Activity

*P<.05
**P<.01

safe, calming and good.

Factor III seems to be comprised of drugs which could be characterized as strong, good, and stimulating, but relatively dangerous (Cocaine and Speed vs. Beer and Kansas Pot). The hypotheses were only partially supported: the direction of the correlation was as predicted, but it was non-significant, possibly because of the small number of Ss. Crossvalidation is indicated.

The correlations of Study II factors and variables with the Factor IV of Study I indicate that Factor IV is comprised primarily of drugs (Barbiturates, Thorazine®, Hard Liquor), which are "bad, dangerous, and depressing." Those using psychedelic drugs, the amphetamines and marijuana show a disdain for barbiturates and Thorazine® referring to them as "downers." They also feel that this class of drugs is principally useful to modify the effects of other drugs (taken in combination or sometimes serially) to come down from a high.

SUMMARY

The findings of Study II were more complex than anticipated, but provided some support for the hypotheses of Study I. The semantic differential factors of evaluation and activity and the weak-strong and safe-dangerous dimensions can yield drug profiles which are helpful in classifying drugs from the standpoint of the drug user. Marijuana and marijuana products do not cluster with the psychedelic drugs. Although both psychedelic drugs and marijuana are judged to be "good," they are judged to be considerably safer than psychedelic drugs and much more calming as opposed to exciting. They are also characterized as weaker.

Considering especially the remarkably contradictory and controversial literature over the classification of marijuana, classification from the standpoint of the user yields quite unambiguous information.

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