

Psilocybin-induced Autonomic, Perceptual, and Behavioral Change

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A recent communication (1) reported that it was possible to induce through the oral administration of 160-200 µg/kg psilocybin a variety of psychopathological responses in a sample of self-selected, healthy, unpaid volunteers which was homogeneous with respect to age (median age 23.2 years), socio-economic background (white, middle-class, college-educated), taste sensitivity, and intuition as well as introversion (as assessed by the *Jungian Myers-Briggs* Type Indicator) (2).

The aim of this paper is to point out that the extent of psychodysleptic drug-induced psychopathology can be predicted from the magnitude of the dispersions (S.D.) on simple perceptual tasks performed without any drug, and to present preliminary evidence for a dissociation between an autonomic function and drug-induced psychopathology, as well as to bring forward the results of further analysis of the data obtained from this sample.

The total sample of 15 subjects (9 males and 6 females) was divided into psilocybin reactors and nonreactors using the Minnesota Multiphasic Personality Inventory. Subjects were administered the individual (card) form of the Minnesota Multiphasic Personality Inventory (MMPI) during the week before (T_1), during - i. e., at the time of drug-peak (T_2), and during the week following (T_3) oral ingestion of 160-200 µg/kg psilocybin. Drug-MMPI reactivity was calculated using the sum of the squared differences (D^2) of thirteen K-corrected MMPI T-scores at pre-drug (T_1) and drug-peak (T_2).

D^2 analysis yielded drug-MMPI reactivity scores ranging from 77 to 2888. Subjects achieving difference scores greater than 1000 and T_2 profiles clearly characteristic of an acute psychotic state were categorized as reactors while those with difference scores less than 500 and T_2 profiles similar to their pre- and post-drug mental states were designated as nonreactors. This classification into drug-MMPI reactors and nonreactors was made irrespective of the sex of the subjects.

One of the more important results showed a significant relation between the subjects' performance on a simple perceptual - gustatory and visual - task with or without the drug on the one hand and the extent of psychopathology induced by the drug on the other (see Table 1).

A comparison of pre-drug with psychodysleptic drug-induced behavior in our sample of 15 volunteers is displayed in Figure 1. The medians and ranges for each of 13 MMPI scales (of K-corrected T-scores) are given for pre-drug (T_1) and drug-

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Tab. 1* Rank orders of MMPI drug-reactivity to psilocybin, taste threshold retest variance under pre-drug conditions, degree of spatial distortion retained, and degree of change in brightness preference.

N = 15 Subjects	MMPI drug-reactivity: $\Sigma [d^2(T_1-T_2)]$	Taste retest variance: magnitude of change in molarity between first macro-taste threshold and semimicro-retest (both under pre-drug conditions)	Degree of spatial distortion retained: (phorometer base-up) (T_2 divided by T_1)	Degree of change in brightness preference from pre-drug to drug-peak (T_2 minus T_1)
	K-corrected T-scores			
	Column 1	Column 2	Column 3	Column 4
W. R., ♂	15	15	11	15
D. D., ♂	14	8	13	12
R. M., ♀	13	11	10	9
B. N., ♀	12	9	9	14
V. M., ♀	11	10	6.5	10
D. S., ♀	10	1	2.5	5
H. M., ♂	9	13	12	6
S. H., ♂	8	14	15	4
S. S., ♀	7	5.5	1	8
S. A., ♀	6	3	4	7
A. M., ♂	5	7	2.5	11
S. J., ♂	4	5.5	8	13
B. T., ♂	3	12	14	1
K. T., ♂	2	3	6.5	3
H. S., ♂	1	3	5	2

* All perceptual data were obtained as a result of forced choice procedures. Spearman correlation coefficients (r_s) are corrected for tied ranks. All p values are for two-tailed tests. Rank 15 is always assigned to greatest positive values.

Supplement to Tab. 1 Correlations for males and females

Tab. 1 a** ♂

Column 1	Column 2	Column 3	Column 4

Tab. 1 b** ♀

Column 1	Column 2	Column 3	Column 4

** For Columns 1 to 4 see Tab. 1.

Tab. 1 Rank order of MMPI drug-reactivity to psilocybin, measured by the sum of the squared differences of thirteen K-corrected T-scores across sexes - D^{2*} - (Column 1) positively correlated with the magnitude of taste retest variance measured without any drug (Column 2) and with the degree of brightness preference retained between pre-drug (T_1) and drug-peak (T_2) conditions (Column 4). The magnitude of taste retest variance without any drug is also positively correlated with the degree of spatial distortion retained between T_1 and T_2 conditions (Column 3).

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peak (T_2). The drug induced a wide variety of change; we find fluctuations of the range for each scale from T_1 to T_2 , and the upper limit being extended for seven scales (L, K, Hs, Pa, Pt, Sc, Ma) with the greatest increase in the Sc (Schizophrenia) scale, whether this increase is measured as positive change from T_1 to T_2 or as elevation at T_2 .

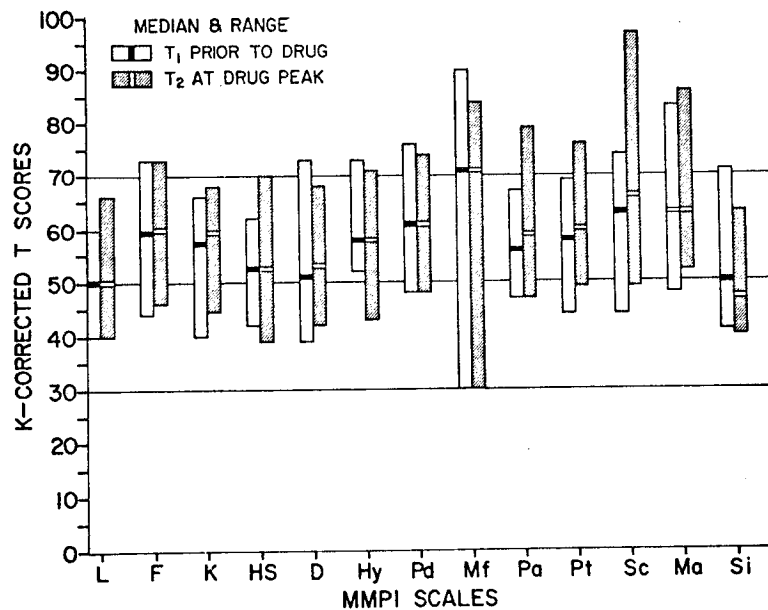


Fig. 1 160 μ g/kg psilocybin induced behavioral change in 15 volunteers – 9 males and 6 females – with a median age of 23.2 years as measured by the MMPI; a comparison of medians and ranges of K-corrected T-scores for 13 MMPI scales is shown for pre-drug (T_1) and drug-peak (T_2) conditions.

Relations between Perceptual Performance and Drug-Induced Behavior

In Table 1 rank orders and *Spearman* rank order (r_s) correlations are presented showing that psychodysleptic drug-induced behavioral change, i. e., drug-MMPI reactivity, is significantly related to the magnitude of taste retest variance under pre-drug (T_1) conditions and the degree of change in brightness preference (3) from pre-drug to drug-peak ($T_2 - T_1$). A significant relation also exists between two of the perceptual variables, i. e., between magnitude of taste retest variance and degree of spatial distortion retained (4) as measured with the phorometer¹ base up (T_2 divided by T_1). Clearly, there is an association between performance on certain perceptual tasks and what we have designated as drug-MMPI reactivity. Of particular interest is that not only can the magnitude of taste retest variance – which requires a time-consuming

¹ The phorometer is used to measure spatial distortion thresholds. A subject binocularly views a horizontal black line against a white background through a pair of counter-rotating prisms. While prism power is added, the subject is asked to report the first just noticeable bending of the black line.

procedure (5, 6) – predict the degree of drug-MMPI reactivity, but also the dispersions (S.D.) of spatial distortion threshold values at T_1 – involving a short and simple perceptual task – are of predictive value with respect to both (a) mean spatial distortion threshold in diopters (Δ) at T_1 and (b) another indicator of psychopathology, the Goldberg score (7) at T_2 (see Figure 2). The Goldberg score is composed of selected MMPI scales and provides discrimination along a neurotic-psychotic continuum (see footnote of Figure 2 caption).

In summarizing the results displayed in Table 1 and Figure 2 it can be stated that there is a close association between perceptual performance and behavioral pattern, the latter well known to be accentuated by psychodysleptic drugs such as psilocybin.

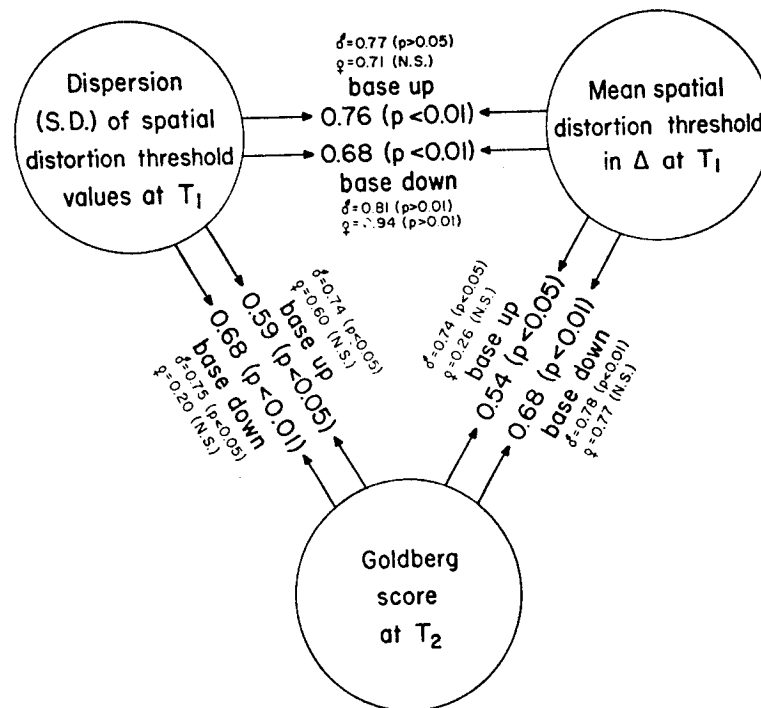


Fig. 2 Illustration of the association of psychodysleptic drug-produced psychopathology with pre-drug performance on a simple perceptual task: *Spearman* rank order correlations between (1) mean spatial distortion threshold in diopters (Δ) and (2) dispersion of spatial distortion values, both under pre-drug conditions, with (3) Goldberg Formula scores* – measuring extent of psychopathology – at drug-peak. It should be emphasized that the rank orders of the Goldberg formula scores and the MMPI drug-reactivity scores are also significantly related (see Table 2), $r_s = .68$, ($p < .01$).

The use of pre-drug performance on a simple perceptual task to predict drug-induced psychopathology should be restricted to males. Although the entire group of subjects ($N = 15$) displays significant correlations, the significance is due mainly to the males' contribution.

* Since the Goldberg Formula – $(L + Pa + Sc) - (Hy + Pt)$ – attempts to provide maximum discrimination along a neurotic-psychotic continuum, scores of 50 and above are indicative of psychosis.

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LSD, and mescaline and calling to mind *Piaget* and *Morf's* "les isomorphismes partiels entre les structures logiques et les structures perceptives" (8). In the prediction of extent of psychopathology from perceptual performance (see Figure 2), the measure used is the Goldberg score, which, it should be noted, is significantly related to another measure of psychopathology at T_2 - namely, drug-MMPI reactivity ($r_s = .68$, $p < 0.1$). However, the Goldberg formula has been validated on male populations only while the MMPI is valid for either sex.

Figure 3 illustrates within our group of subjects the relation of sex to drug-MMPI reactivity and T_2 Goldberg score. It is evident from Table 1 and Figure 3 that our female subjects as a group display less variation in their drug-induced behavioral responses than do the males. That the extremes of the ranges for the total group (N = 15) on each measure in Figure 3 are due to the males can be seen by comparing the ranges for each sex (N ♂ = 9, N ♀ = 6). However, the medians of the males are

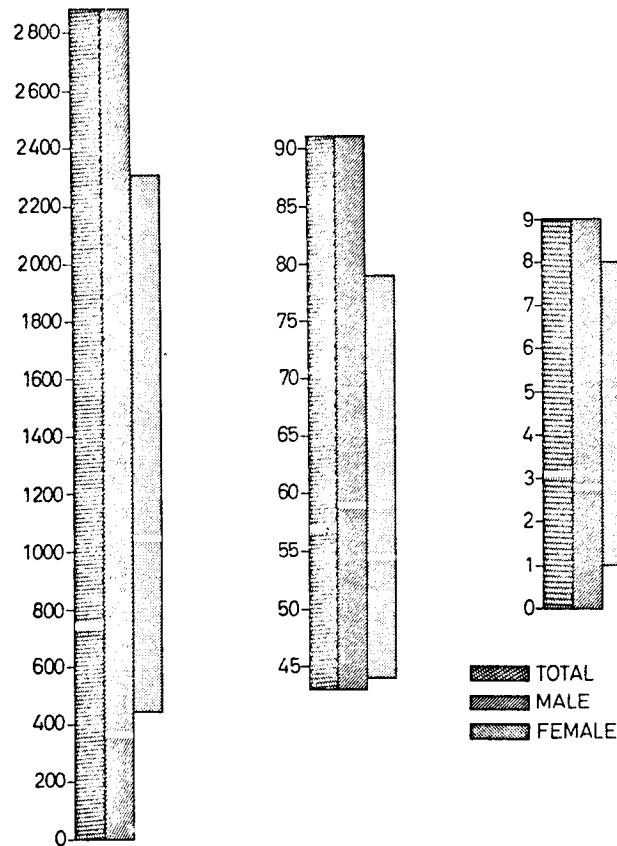


Fig. 3 160 μ g/kg psilocybin induced sex-dependent differential personality response as measured by medians and ranges of (1) MMPI drug-reactivity ($\Sigma = d^2 [T_1 - T_2]$), (2) Goldberg Formula score ($[L + Pa + Sc] - [Hy + Pt]$) at drug-peak (T_2) and (3) a single MMPI scale: Si drug-response ($Si [T_1 - T_2]$).

lower for drug-MMPI reactivity and higher for T_2 Goldberg score than those of the females. The differential sex response of our subjects is also well illustrated in the T_1 to T_2 change for a single MMPI scale, Si (Social Introversion). Here, too, the width of the range is again due to the males, but their median is below that of the total sample and almost half the value of the median of the females. These sex differences can also be demonstrated by *Spearman* rank order correlations between Si drug-response and (1) T_2 Goldberg score: $r_{s\delta} = -.17$ (N.S.), $r_{s\phi} = .93$ ($p < .05$) and (2) degree of change in brightness preference from T_1 to T_2 : $r_{s\delta} = .08$ (N.S.), $r_{s\phi} = .93$ ($p < .05$) (compare with Table 1). Furthermore, only for the females are there significant positive relationships between Si drug-response and (1) dispersions (S.D.) of spatial distortion threshold values at T_1 and (2) mean spatial distortion threshold in diopters (Δ) at T_1 ($p = .05$, *Fisher* exact probability test) when each subject's score for each of these variables is dichotomized as high or low.

That this last set of relations – using Si drug-response – yields a sex-associated pattern different from that obtained when the Goldberg score at T_2 is used with the same set of perceptual measures (see Figure 2) would indicate that one of our measures of drug-induced psychopathology, the Goldberg score at T_2 , is generally less suitable for females than it is for males, or that it is particularly less suitable for our self-selected female volunteers for whom c her MMPI measures of drug-induced psychopathology may be of more predictive value.

However, when drug-MMPI reactivity is used as the measure of extent of psychopathology, the influence of sex appears to be negligible upon the association between this variable and various perceptual measures (as well as upon the associations between the perceptual measures themselves). Correlations and their respective probability values are given (in Tables 1, 1a, 1b) for drug-MMPI reactivity (Column 1), taste threshold retest variance under pre-drug conditions (Column 2), degree of spatial distortion retained (Column 3), and degree of change in brightness preference (Column 4), for the total group of subjects (Table 1), males separately (Table 1a), and females separately (Table 1b).

For the sake of completeness and to enable other investigators to compare their results with ours we should like to define our self-selected volunteer sample in terms of the *Myers-Briggs* type indicator (2) – based on *Jungian* personality types – and the Minnesota Multiphasic Personality Inventory.

On two of the four scales, i. e., four of the eight dimensions of the *Myers-Briggs* type indicator, 14 of 15 subjects are intuitors, and 2 of 5 are introverts. A clear-cut sex difference is obtained only along the thinking-feeling dimension: all of the females are feelers, whereas all but one of the males are thinkers.

The personality characteristics of our volunteers based on their pre-drug MMPI profiles are taken verbatim from a report of Dr. *P. A. Marks*, Chief of Clinical Psychology:

Male. The average male volunteer is a frank, self-satisfied, and relatively well-adjusted individual who is neither excessively defensive against psychological weaknesses nor unduly willing to admit to fault in self, family or circumstance. Somewhat unconventional and idealistic, he is intellectually well above average; has a wide range of interests, especially aesthetic; is concerned with philosophical and moral issues; is socially perceptive, more creative and shows a greater sensitivity to his environment and warmer feelings toward others. He

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prefers people over things and inanimate objects and typically dislikes mechanical and scientific activities. The average male volunteer is perceived by others as psychologically complex, inner-directed, ambitious, clever, curious, imaginative, effeminate, enthusiastic and energetic. Although authoritarian and assertive, he is neither hostile nor overly aggressive, preferring to side-step troubles and make concessions to avoid unpleasantness. His test profile is characteristic of college students excelling in academics, majoring in Arts and Science, who have a deep concern for humanity.

Female. The average female volunteer resembles the male as a frank, relatively well-adjusted individual who is neither excessively defensive against psychological weakness nor unduly willing to admit to fault in self, family or circumstance. Unlike the male, however, she is worrisome, high-strung, emotional, tense and striving. Although intellectually well above average and interested in people and aesthetics, she underachieves in college and should show erratic scholastic performance. The average female volunteer is conversational, idealistic, enthusiastic, and versatile. At the same time she is immature, impulsive, somewhat irresponsible, rather shallow and superficial, has "easy morals", and fluctuating ethical values and little self-consciousness. The average female volunteer profile characterizes college students who though intellectually able underachieve in academic work, often present behavior problems and are noted for especially enthusiastic attempts to reform social practice in view of their rather superficial concern for humanity.

A few words should be said about another relation, that between large perceptual variability and greater extent of drug-induced psychopathology. The variable performance in general of schizophrenic subjects is a well documented phenomenon. In acutely ill mental patients the large variability, specifically in the perception of just noticeable taste differences (jnd) is related to lack of behavioral improvement, i. e., static status, whereas improving patients display both smaller jnd variability and consistently decreasing jnd size (an increasing taste acuity). This increased perceptual acuity, present despite the continued damping effect of the administered tranquilizers, resembles the increased perceptual acuity of healthy volunteers under psilocybin-induced arousal (9). The possibility of predicting extent of drug-induced psychopathology from extent of variability on a perceptual performance under pre-drug conditions in healthy volunteers (see Figure 2) may then be connected with the above results obtained from acutely ill hyper-aroused schizophrenics.

Dissociation between Drug-induced Autonomic Function and Psychopathology

Increase in pupil size after the administration of psychodysleptic drugs is a most reliable autonomic response which follows a dose-response relationship (10, 11). Surprisingly, while all 15 subjects displayed at T_2 an increase in pupillary size as well as other vegetative signs of the "excitation syndrome" (12) the pupillary increase was unrelated to the extent of psychopathology (see Table 2) whether measured by the Goldberg formula ($r_s = -.18$) or drug-MMPI reactivity ($r_s = -.11$). However, drug-induced perceptual change was significantly related to extent of drug-induced psychopathology (see Table 1).

Pupillary reactions are autonomic reflexes, or integrated movements with underlying sympathetic and parasympathetic, excitatory and inhibitory factors; specifically, the dilator muscle is innervated by the sympathetic path originating from the great sympathetic centers in the ventral hypothalamus. In view of the intricate involvement between pupillary movement and nervous system, the dissociation between extent of

Tab. 2

N = 15 Subjects	Degree of drug induced increase in pupil diameter Column 1	Magnitude of standard deviation of spatial distortion threshold at T ₁ phorometer base down Column 2	phorometer base up Column 3	Taste retest variance Column 4	Magnitude of Goldberg formula scores at T ₂ Column 5	MMPI drug- reactivity scores Column 6
W. R., ♂	6	8	11	15	14	15
D. D., ♂	6	15	14	8	15	14
R. M., ♀	11.5	3	2	11	8	13
B. N., ♀	9.5	12	10	9	13	12
J. M., ♀	6	10	6	10	11	11
D. S., ♀	14	9	9	1	3.5	10
H. M., ♂	2	14	7	13	10	9
S. H., ♂	9.5	11	15	14	12	8
S. S., ♀	14	6	4.5	5.5	2	7
S. A., ♀	11.5	7	13	3	6	6
A. M., ♂	6	4.5	8	7	3.5	5
S. J., ♂	14	4.5	4.5	5.5	5	4
B. T., ♂	6	13	12	12	9	3
K. T., ♂	2	1	3	3	7	2
H. S., ♂	2	2	1	3	1	1
$r_s = .68 (p < .01)$ $.59 (p < .05)$ $.72 (p < .01)$ $.68 (p < .01)$						
$r_s = .00$ $.11$ $-.17$ $-.18$ $-.11$						

Tab. 2 Spearman correlation coefficients (r_s) illustrating on the one hand, the lack of relation between the autonomic variable – pupil diameter increase – (Column 1) and perceptual and behavioral variables (Columns 2–6) and the presence of significant correlations between the perceptual and behavioral variables, on the other. Rank orders listed are: degree of drug-induced increase in pupil diameter (Column 1), magnitude of the standard deviation of the spatial distortion threshold measurements made at pre-drug with phorometer base down (Column 2) and phorometer base up (Column 3), magnitude of taste retest variance under pre-drug conditions (repetition of Column 2 in Table 1 (Column 4), magnitude of Goldberg formula score at drug-peak (Column 5), and MMPI drug-reactivity (repetition of Column 1 in Table 1 (Column 6).

drug-induced autonomic activity and psychopathology (see Table 2) is all the more remarkable. *Claridge* and *Hume* have found such an LSD-induced "initial dissociation between perceptual and autonomic functions" which is later overshadowed by anxiety (13). A study by *Levene*, et al. also reports marked behavioral differences in a set of identical schizophrenic twins although their autonomically mediated responses are quite similar (14). The dissociation between perceptual performance and autonomic functioning we have found in our subjects can be further specified in that: drug-induced pupil size increase is unrelated to any measurement involving (a) spatial distortion thresholds as either threshold means or dispersions at T_2 or as $T_2 - T_1$

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change (4); (b) the degree of change in brightness preference (3); and (c) the magnitude of taste threshold retest variance without any drug.

This dissociation between drug-induced autonomic function on the one hand and perceptual performance and/or extent of drug-induced psychopathology² on the other is still impressive if we divide our sample into reactors and nonreactors using their drug-MMPI reactivity scores. Non-reactors are subjects with difference scores less than 625 and T₂ MMPI profiles similar to their pre- and post-drug profiles, whereas reactors display difference scores greater than 625 and T₂ profiles clearly characteristic of an acute psychotic state (15). Difference scores of 510 and 740 in our sample demarcate the weakest reactor from the strongest nonreactor.

Tab. 3

		Magnitude of standard deviation of spatial distortion threshold at T ₁		Taste retest variance without any drug	Magnitude of Goldberg formula scores at T ₂	MMPI drug- reactivity scores
		Phorometer Base down	Phorometer Base up			
MMPI DRUG	Reactors N = 8	-.47*	-.02*	-.33*	-.42*	-.04*
	Non- Reactors N = 7	.54*	.43*	.31*	-.04*	.81 (p < .05)

* N. S.

Tab. 3 *Spearman* rank order correlations (r_s) between degree of drug induced increase in pupil diameter and three perceptual as well as two behavioral variables.

Table 3 lists separately for reactors and nonreactors the *Spearman* correlation coefficients illustrating especially in reactors the lack of association between degree of drug-induced increase in pupil diameter on the one hand and perceptual and behavioral variables on the other. Nonreactors, i. e., subjects who do not display psychopathology in response to psychodysleptic drug administration, show only one significant correlation. It can be concluded, therefore, that not only does (1) the dissociation between drug-induced autonomic change and extent of psychopathology and (2) the significant relations between perceptual and behavioral variables hold for the entire group of subjects but is also retained within the categories of MMPI drug-reactors and non-reactors.

The dissociation between an autonomic function and the perceptual-behavioral variables can be appraised as the resultant of two sequential processes: (1) central nervous system activity, specifically, drug-induced arousal – of which the pupil size

² The one report which would contradict our contentions (10) is based upon an admittedly suggestive 56 item questionnaire given to 22 to 40 year old Negro male former drug addicts institutionalized for violation of U.S. narcotic laws. This same author admits to the questionnaire's being insensitive to a dose increase of psilocybin from 86 to 114 µg/kg (Scientific Exhibit Abstract, Am. Psychiat. Assoc., April 27-30, 1959, Phila.).

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increase is a reliable indicator – and (2) the individual's symbolic interpretation of that arousal. What is "objectively" measured as extent of psychopathology is the re-presentation of the symbolic interpretation of an individual's central nervous system activity. Each experimental subject interprets his central nervous system activity in the light of his total past, which is the history of his genotype and phenotype, and their interactions between themselves and their environments. The fifteen different behavioral reaction patterns of our volunteers as assessed by the MMPI are, then, fifteen different symbolic interpretations of a 160 µg/kg psilocybin induced arousal.

A similar dissociation between autonomic reaction and perceptual performance has been found by *Silverman and McGough* (16) when investigating the response to insulin of 45 subjects who were also classified according to their performances on the *Rod and Frame* test (17). Field Independent subjects responded with significantly higher pulse rate and higher systolic as well as lower diastolic blood pressure than the middles and the Field Dependent subjects. Field Dependent subjects, on the other hand, showed more random spontaneous autonomic activity, suggesting lack of adaptability – which within our frame of reference would correspond to larger standard deviations on perceptual tasks – coupled with an excessive amount of autonomic arousal (18). The general relations between autonomic function and perceptual performance in the Field Independent and Field Dependent subjects resembles those which prevail in our drug-MMPI nonreactors and reactors (see Table 3).

The similarity between Field Independent subjects and nonreactors as well as that between Field Dependent subjects and reactors is strengthened by comparing the relation of the F and K scales on the MMPI in Field Independent and Field Dependent college students (19) with our nonreactor and reactor subjects (1). From visual inspection of the respective MMPI profiles it is evident that in both the Field Independent and the nonreactor subjects K is always higher than F, whereas the converse – F always higher than K – is found in the Field Dependent and the reactor subjects.

Witkin and Oltman's characterization of Field Dependent persons as being both overresponsive indiscriminately to many stimuli as well as underresponsive in situations requiring high levels of arousal is strongly reminiscent of *Petrie's* "reducers" – a category involving personality characteristics relevant to the control of perceptual intake and processing; specifically, "reducers" have greater tolerance for pain and a greater need for sensory stimulation (20). Field Independent subjects, on the other hand, resemble *Petrie's* "augmenters" who need less sensory input and are less tolerant to pain. There also appears to be a similarity between *Petrie's* "reducers" and our drug-MMPI reactors – and of course Field Dependence – as well as between "augmenters", our drug-MMPI nonreactors and Field Independence.

Field Dependent persons are prone to use the frame of reference provided by the social context and their feelings strongly influence their thought and perception. This is congruent with their inability to "keep things separate" in perception, as body separate from field, or rod separate from frame, whereas Field Independent persons can maintain their discreteness of feeling and of ideas (18). That these descriptions also resemble the personality dimensions of our drug-MMPI reactors and nonreactors

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is evident from the evaluation of our subjects on the *Myers-Briggs* Type Indicator (1, 2). Nonreactors have more of an intuitor than sensor component when compared with reactors and nonreactors have also more of a thinking than feeling component when compared with reactors.

We regard the dissociation between the autonomic variable and behavior as resulting from the sufficiently complex organization of the (human) system. Non-linear, superadditive "sophisticated" behavior of such systems cannot be located within a specific part of the system since it is inherent in and a property of the complexity of the whole system. We can illustrate the foregoing with *Woodger's* example of the equimo, a system arising from the combination of horse and man (21) which we would describe as a sufficiently complex system. The equimo can display new non-linear superadditive behaviors, e. g., fox hunting ability, which cannot be localized within a specific part of the system since it is inherent in and a property of the complexity of the whole system. An attempt to correlate, for instance, the pupil sizes or the galloping rate of the equimo with its fox hunting ability is a classical example of a "psychophysical correlation", that is, the unjustifiable attempt to relate the linear functioning of part of the system's structure with non-linear behavior resulting from the complexity of the whole system.

What is a sufficiently complex system? In contrast with a "simple" amoeba with a rigid program of responses we conceive of a sufficiently complex system as one wherein the system's interaction with the environment becomes part of the program – as in metazoa. It is then in these self-programming systems that behavior manifests itself as "detached", non-localizable, and as a symbolic interpretation of the system's interaction with its environment.

Acknowledgement

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Summary

Autonomic, perceptual, and behavioral changes induced by 160 µg/kg psilocybin were studied in a homogenous sample of 15 self-selected college educated male and female volunteers. The subjects were rank ordered as to the extent of drug-induced psychopathology using their Minnesota Multiphasic Personality Inventory pre-drug to drug peak differences scores. Extent of variability on simple perceptual tasks – in gustation and vision – is significantly related to extent of drug-induced psychopathology, whereas drug-induced pupil-size increase – a reliable autonomic variable – is unrelated to drug-induced psychopathology, which, in our terminology, is equated with a subject's symbolic interpretation of his own central nervous system activity.

Zusammenfassung

Nach Psilocybin kommt es zu Veränderungen der vegetativen Funktionen, der Wahrnehmungsfunktionen sowie zu psychopathologischen Auffälligkeiten. Bei 15 männlichen und weiblichen Freiwilligen (Studenten) wurden die Wirkungen von 116 µg/kg Psilocybin (oral) untersucht. Die Intensität der psychopathologischen Veränderungen wurde für jede Versuchsperson dadurch charakterisiert, daß aus Befunden mit dem Minnesota Multiphasic Personality Inventory (MMPI) vor und nach Psilocybin-Applikation ein Differenzwert gebildet wurde. Nach der Größe der Differenzwerte wurde für die Versuchsperson eine Reaktivitäts-Rangreihe aufgestellt.

Unabhängig davon wurde außerdem in Versuchen ohne Psilocybin die individuelle Reagibilität der einzelnen Versuchspersonen bestimmt. Das geschah durch die Bestimmung der Retest-Variabilität in Versuchsanordnungen, die Leistungen der visuellen Wahrnehmung und der Geschmackswahrnehmung erfassen.

Die Größe der Retest-Variabilität korreliert signifikant mit der Intensität der durch Psilocybin hervorgerufenen psychopathologischen Veränderungen. Als Indikator für die Reagibilität des vegetativen Systems wurde schließlich noch die durch Psilocybin hervorgerufene Pupillenerweiterung registriert. Zwischen dieser, den Funktionszustand des vegetativen Systems zuverlässig charakterisierenden Größe und der Intensität der vom Psilocybin hervorgerufenen psychischen Veränderungen bestehen keine Beziehungen. In unserer Terminologie stellt das Ausmaß der psychopathologischen Veränderungen durch Psilocybin das Symbol für die interpretierende Aktivität des zentralen Nervensystems dar.

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