

BASIC FUNCTIONS INVOLVED IN THE PSYCHOTHERAPEUTIC EFFECT OF PSYCHOTOMIMETICS

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The effects of psychotomimetics on the human being have been studied intensively for more than 20 years. Nevertheless, a unified theory of these effects remains to be developed. This symposium shows, as the LSD conference held in Long Island in 1965 had indicated, that despite continued excellent single research, we can still hardly speak of the specific effect of psychotomimetics on human behavior. Research in the field is thus faced with a definite problem. Even the historic descriptions of the effects of magic plants on the Siberian shamans; of peyotl, teonanacatl and yage rites; as well as descriptions of scientists who have recently taken part in them ^{8, 17}; show how broad a spectrum of effects confronts us.

Of course, the use of psychotomimetic drugs by primitive cultures combines and mixes the various components of the drug-induced experiences with which we have become familiar i.m., e.g. the drugs were used to induce religious-mystical experience, the capacity for prophecy, and to cure a variety of medical conditions, and the incidental activation of psychotic states was observed. These modes can be separated by the methods of modern research. In fact, we are now able to more or less choose at will which of the typical forms a given session with psychotomimetics is to take in the human. This is possible because:

1. The active chemicals, originally suitable only in crude mixtures of alkaloids, are now available. They, of course, are more effective and potent than the mixtures contained in the "magic plants".
2. Accurate control of dosage and hence of potency is now possible.
3. From the behavior standpoint, specific suggestive methods for inducing and structuring the desired behavior under the drug state have been developed.

Godfrey and Unger have clearly pointed out the importance of "set and setting". Thus, intensive preparation of the patient determines whether a session will develop along the lines of psycholytic therapy, that is with a psychodynamic content, or of psychedelic therapy, with the essential cosmic-mystic and transcendental experiences. The following chart illustrates the spectrum of human psychotomimetic effect, comparing applications in primitive cultures to uses today:

<i>Primitive cultures</i>	<i>Present state</i>
1. Use in religious rites Teonanacatl = God's flesh Native American Church ^{8, 17}	Psychedelic therapy Cosmic-transcendental experience
2. Psychotherapeutic influence	Psycholytic therapy Psychoanalytic categories
3. Prophetic effects ^{11, 17}	Parapsychological research ²
4. Secularized: Wild feasts ¹⁴	Misuse, "Kicks" "LSD movement" ¹³

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5. Disorganizing effect

Experimental psychoses ^{1, 3, 6}

6. —

Enhancement of creativity

The set and the setting have already been mentioned as the principal variable at our command. Another potent variable is the dosage. Psychedelic therapy requires extremely high doses, as does the reliable production of full-blown experimental psychoses i.m. 400 micrograms of LSD or 40 milligrams of psilocybin being common ^{6, 7}. The intoxication—the paranormal state—of psycholytic therapy and some other effects, like enhancement of creativity, is reached with a quarter to a half of the psychedelic dose. The kind of psychotomimetic agent used, that is, its chemical structure, turns out to be a nearly negligible variable in terms of the experiences produced. The differences are simply with respect to onset, duration and dosage. Only the anticholinergics like ditran have quite a different mode of action.

Our division of the spectrum of effects of psychotomimetics into six categories is still quite coarse, but it can serve to separate the different sets of experiences observed by investigators. Most authors working in this field agree that the effect of the same dose of the same drug on the same individual can still vary enormously. The unpredictability becomes particularly clear in experiments where set and setting are based on a minimum of stimuli (say a darkened room, with no specific preparation of the subject). The results are often surprising. The same experimental subject may be euphoric in one session, then depressive and suicidal in the next. Another will have a paranoid impression of being hypnotized, then experience a wild dream state, and in another session go into catatonic-like stupor. Even a psychedelic session can produce almost pure transcendental material at one time, but one sees psychotic anxieties or childhood conflict material of psychodynamic interest breaking through in the next session.

If there is to be a way out of this contradictory multiplicity, which often seems even chaotic and senseless, it must emanate from a new vantage point. I shall try an approach based on a model which attempts to bring all the differing and changing effects of psychotomimetics in man into line (or, as one says in German, under a single hat). The model—for the scope of a short paper—can only be outlined in the form of a number of theses; it should be considered as a sort of working hypothesis.

Thesis 1: The effects of psychotomimetics on the human brain are fundamentally different from those of all other known psychotropic agents. They differ from antidepressants and tranquilizers and involve different patterns of cerebral functions, leading to thoroughly novel phenomena and categories of experience, both quantitatively and qualitatively.

Thesis 2: This means we cannot study the effect of the drug in isolation, but must rather include the receiving organ, the brain, in which many of the variables of behavior reside. The brain and the drug become, so to say, a single functioning unit.

Thesis 3: The impairment and loss of the controls governing normal behavior, and the appearance of a new kind of behavior quite differently regulated, is associated with a characteristic alteration of central functions. It is this alteration which then supports—or underlies—the particular categories of drug-induced experience such as cosmic-mystic experience and psychotic reaction. We will call this induced functional state of the brain the psychotoxic basal syndrome. Some of its properties have been described repeatedly ⁶:

- a. General *reduction of higher cerebral functions*, e.g. critical distinction, abstract and sequential; regression in the sense of Jackson and Ey.
- b. General passivity manifested in a tendency toward indifference to the environment, and psychomotoric inactivity as well as a diminished outwardly directed activity in ego functioning.
- c. Qualitative *change in consciousness*, similar to the threshold or prestate of sleep, including withdrawal from the environment, loss of sense of reality and extreme concentration on inner stimuli. This category of consciousness is known from such conditions as trance, meditation and hypnosis.

This regressive change of normal brain function is replaced by an *intense autonomous inner-psychic excitation*: an overstimulation of affects and instinctual behavior in relation to the dose—"affect-intensification" of Gestalt, "*effet hyperthymisant*" of Divry, *et al.* This justifies the term "*internal stimulus excitation*" within the regressed psychic system. This overstimulation finally even "captures" the sensory apparatus of the central nervous system, and is manifest in optical, acoustic and tactile hallucinations. If a high dose of the psychotomimetic is used, the internal excitation leads to overdriving (in the sense of an audio system) of the psyche. "Facilitating units" in this sense may be activated by the drugs.

Thesis 4: The enhanced internal stimulus generation is connected with a progressive irradiation into or even hypersynchronization of neighboring "dynamic centers" and channels by lowering thresholds. Marked examples are synaesthesia and the broad stream of speeding and emotionally laden associations overflowing the normal channels of the thinking process. The amplitude of the internal stimuli can no longer be conducted and consumed by the normal channels of the psychic system. Thus, paranormal conditions can occur in the form, for instance, of unboundingly intensified feelings of joy or psychotic conditions with highly intensified anxieties.

In order to explain specific psychotoxic factors connected with psycholytic and psychedelic therapy, we will need a key basic assumption, which we borrow from Tinbergen's and Lorenz's work in the study of instincts and the field of motivation:

Thesis 5: The numerous complicated brain-mediated variables of behavior have their biological representations which can be thought of as specific "functional centers" for activity patterns. It must be assumed that such systems of "centers"—whatever their precise neurophysiological substrates—are patterned during learning and development. Such patterning occurs for all kinds and levels of motivations from the instinctual to the patterns of the conscious and higher goals and ideals. During development, there would be—so to speak—an "imprinting" of motivations represented in these functional centers. These biological representations have a degree of functional autonomy; i.e. they basically could operate without outer stimuli and have a "pressure" of their own. We compare these centers with those described by ethologists. We assume an internal priming as the energetic origin of internal motivation. These centers seem to be capable of dynamic charging and discharging. The charging would be accomplished by an internal process, while the discharging would be linked to the consummatory act which can be any strong emotional experience, hallucination or motoric action, comparable with the innate releasing system of Tinbergen.

Thesis 6: In the drug-induced states, it is primarily these dynamic centers which are activated—so to say—by inner stimulation. Even under the condition of normal psychology the dynamic centers lie in reserve, but it is the internal psychic overdrive and irradiation that causes them to be experienced as a qualitatively new phenomenon. For instance, the human ability to experience sorrow is distorted to deep depression, that of pleasure to ecstatic experience of joy, normal human sympathy becomes a cosmic-mystic feeling of oneness, normal fear becomes psychotic anxiety, and the capacity for motoric expression becomes the catatonic-like excitement of the experimental psychosis. Normal recollections of childhood are "overdriven" and appear as the full feeling of being a child, known in psycholytic therapy. Hallucinations appear in this model as overdriven fantasies.

Thesis 7: Over and above this abnormal intensification of experience, the overdrive of the dynamic centers by internal stimulus generation has another effect. The highly charged dynamic systems become dominant and control all of psychic activity, that is, these dynamic systems now have the function of regulating the entire range of experience and behavior. As compared with the normal human, whose behavior can be controlled, corrected and motivated by outer stimuli, this state forces control by the intensified inner stimuli. This parallels the condition known in ethological research as vacuum activity. For example, a starling always kept indoors will be led by its overcharged hunting instinct to go after an hallucinatory insect caused by internal priming. This

overdriven appetitive behavior attempts to find a consummatory act to discharge its need. This is the animal parallel of sensory deprivation in man. Inner stimuli take the part of the missing outer stimuli now governing the entire psychophysical system. An illustration of this control of the entire human system is given by a pathological case of depression, in which the deeply experienced melancholy as the "basic affect" selects and regulates all other psychic and even physical functions, down to vegetative functions like sleep, nourishment and elimination, which—as the psychic system—are all depressively inhibited.

Two final theses complete our operational model for the effects of psychotomimetics:

Thesis 8: Much like the nutritive and sexual drives, the autonomy of the dynamic control centers is implemented by an accumulation of energy up to a certain peak which is then followed by the discharge in the form of appetitive behavior and the final consummatory act in the form of the mentioned overdrive of behavior (which may be hallucinatory). Seen subjectively, this discharge is the experience itself, while objectively it is the control process of the system involved. If the energy was spent in discharge, a rival control system for another category of experience can use its retained capacity to gain controlling power. The multiplicity of control systems must be thought of as competing for control of behavior due to the consumption of their energy. This process lies at the basis of the constantly changing experiences under psychotomimetics. We have frequently observed that a lack or inhibition of discharge can lead to extreme discomfort and the ongoing experiences persist rather than develop. The toxic activation can also be supported or enhanced by specific outer stimuli. Directed key stimuli can trigger a new system to discharge its energy. Continuation of a very strong outer stimulus can hinder all other systems from becoming active in motivating behavior. This domination of the ongoing experience can occur in any of the categories of psychotomimetic experiences which were previously listed.

Thesis 9: A specific situation is given in the ecstatic joy of cosmic-mystic experience essential for the psychedelic session. High dosage and input overloaded by constantly applied strong outer stimuli like exciting music can overdrive the dominating experience. It is as if the intense joyful input resonates and irradiates to the core of the so-called "pleasure center"¹⁰ which now becomes the dynamic control system. The reason for such a picturesque analogy lies in the observation that there is apparently no consummation and the intense experience of joy persists 8 hours and more without apparent exhaustion or marked fluctuations.

Having returned to the problem originally posed, I hope that this coarse operational model for the effects of psychotomimetic substances in man can explain our ability to induce and inhibit particular categories of psychotomimetic experiences, as if we were dealing with a computer whose storage and working capacity we could program with key stimuli. It may further supply a broad framework, a kind of model, for explaining the multiplicity of psychotomimetic reactions and permitting certain operational predictions to be made.

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