## Selective Enhancement of Specific Capacities Through Psychedelic Training

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The following article is an overview of the paper:
Harman, et. al., in *Psychedelic Reports* 19, 211-27, 1966,
"Psychedelic Agents in Creative Problem-Solving: A Pilot Study."

(This article discusses exploratory work that was interrupted early in 1966 when the Food and Drug Administration, as a strategy in combating the illicit-use problem, declared a moratorium on research with normal human subjects. In view of the preliminary nature of the work, it would not under ordinary circumstances have been submitted for publication. However, because of the significance of the hypotheses, and because they are consistent with experience gained in a previous study of four hundred subjects who received psychedelics in a therapy context, and because of the hope that when it is again possible to resume psychedelic research the non-medical applications will get long-overdue attention, the decision was made to release these results in their present, unfinished form.)

Amid much controversy over the place of psychedelic chemicals in contemporary culture, we have quietly entered a third phase of the research on human uses of these agents.

The first phase, typically identified in the literature by the use of the adjective "psychotomimetic," was characterized by dominance of *a priori* structured models. Seriously underestimating the effects that such preconceptions might have on the content and aftereffects of the subjective experience, researchers variously reported that psychedelics mimicked mental illness (when given in a setting that provoked it), illuminated Freudian theory (when administered by a competent Freudian), evoked Jungian archetypes (when administered by a sensitive Jungian), substantiated the tenets of behavior therapy (by increasing suggestibility and modifiability), and demonstrated the soundness of the existential approach.

The second phase, adopting Osmond's neologism "psychedelic," was

characterized by an emphasis on allowing the drug session to run its natural course, in an attempt to minimize the influence of the conceptions and interpretations of the therapist or monitor. Care was taken to provide such expectations, rapport, and environment that the experience would be as non- threatening as possible. Opinions varied as to what constitutes optimum set and setting, and subjects and experimenters varied. As a consequence, reported effects range from ecstasy to psychosis, from community to isolation, from greatly enhanced mental and perceptual abilities to greatly impaired abilities. From this work emerged a variety of psychotherapeutic applications, well summarized by Hoffer (1965), as well as widespread, mainly illicit, use with sensual, philosophical, and transcendental goals.

Growing out of this informal experimentation and clinical research, largely as a consequence of suggestive spontaneous occurrences, the possibility gradually emerged that specific kinds of performance might be selectively enhanced by deliberate structuring of psychedelic-agent administrations. Thus a third phase of psychedelic research began. Whereas, in the first phase, experiences tended to be controlled and delimited—never mind if inadvertently—by preconceptions of experimenter and subject, and in the second phase they tended to be more uncontrolled and wide-ranging in scope, now the emphasis was to be on deliberate selection of specific aspects of the psychedelic experience and of specific parameters of functioning.

As these experiments on specific performance enhancement through directed use of the psychedelics have gone on in various countries of the world, on both sides of the Iron Curtain, and as, furthermore, some, at least, of the informal exploration has been in defiance of existing laws governing use of the psychedelic agents, publicly available information on results is scant and scattered. In the remainder of this chapter we shall discuss one pilot study in which the particular type of performance chosen for attention was creative problem-solving ability. The implications of the work are, we believe, much broader than this particular application. Indeed, the basic assumption underlying setting up the project, and not negated by any of our observations during the course of the research, is that, given appropriate conditions, the psychedelic agents can be employed to enhance any aspect of mental performance, in the sense of making it more operationally effective. While this research was restricted to intellectual and artistic activity, we believe the assumption holds true for any other mental, perceptual, or emotional process. The psychedelic agent acts as a facilitator, an adjunct to the situation it facilitates, neither good nor evil, efficacious nor powerless, safe nor dangerous.

Reports in the literature on psychedelic agents that deal with effects on performance are inconclusive or contradictory. Changes in performance levels have been intensively investigated, both during and after the drug session. Instrumental learning has been found to be impaired during the drug experience in some studies, enhanced in others. Similarly, contradictory results have been noted for color perception, recall and recognition, discrimination learning, concentration, symbolic thinking, and perceptual accuracy (Mogar, 1965a).

In some of the research, where impairment was reported, the drug was used as a stresser with the intention of simulating psychotic performance-impairment. Practically all of the formal research in which improved performance was claimed subsequent to the drug experience has been in a clinical context. Performance enhancement during the drug experience has been sporadically reported in both experimental and clinical research, but not in general where the psychotomimetic orientation was dominant.

Our experience in clinical research (Mogar and Savage, 1964; Fadiman 1965; Savage et al., 1966) had been amply convincing with regard to the possibility of long-term performance enhancement through employment of the psychedelic agents in a clinical setting. We also had much evidence with regard to the subtlety and pervasiveness of the influence of set and setting. Furthermore, although they had not been deliberately sought, there were numerous spontaneous incidents of what appeared to be temporarily enhanced performance during the drug experience itself. These observations led us to postulate the following propositions:

- 1. Any human function, as generally elicited, can be performed more effectively. This amounts to an acknowledgement that we do not function at our full capacity.
- 2. The psychedelics appear to temporarily inhibit censors that ordinarily limit the mental contents coming into conscious awareness. The subject may, for example, discover his latent ability to form colored imagery, to hallucinate, to recall forgotten experiences of early childhood, to generate meaningful symbolic presentations, etc. By leading the subject to expect enhancement of other types of performance—creative problem solving, learning manual or verbal skills, manipulating logical or mathematical symbols, sensory or extrasensory perception, memory and recall—and by providing favorable preparatory and environmental conditions, it may be possible to improve the level of functioning in any desired respect.
- 3. Both objective and subjective indicators of mental performance are appropriate to use in establishing whether there has indeed been an improvement (or impairment) of performance.

As <u>Table 1</u> indicates, commonly observed characteristics of the psychedelic experience seem to operate both for and against the hypothesis that the drug session could be used for performance enhancement. In this research we attempted to provide a setting that would maximize those characteristics that tend toward

improved functioning, while minimizing those that might hinder effective functioning.

For several reasons we chose to focus our efforts on creative problem solving. One was its obvious utility, an important consideration at that juncture because of the increasing pressure for stricter regulation of the psychedelics by those who doubted that they were good for anything at all. Another factor was that many of the observed spontaneous occurrences had been of this sort. Finally, because of extensive recent research activity in the field of creativity, a number of relevant objective measures were available for use. Interest centered on three questions:

- 1. Can the psychedelic experience enhance creative problem-solving ability, and if so, what is the evidence of enhancement?
- 2. Can this result in enhanced production of concrete, valid, and feasible solutions assessable by the pragmatic criteria of modern industry and positivistic science?
- 3. Working with a non-clinical population and with a non-therapy orientation, would there nevertheless result demonstrable long-term personality changes indicative of continued increased creativity and self- actualization?

#### **Procedure**

The subjects in these experiments were twenty-seven males engaged in a variety of professional occupations (sixteen engineers, one engineer-physicist, two mathematicians, two architects, one psychologist, one furniture designer, one commercial artist, one sales manager, and one personnel manager). Nineteen of the subjects had had no previous experience with psychedelics. The following selection criteria were established:

- 1. Participant's occupation normally requires problem-solving ability.
- 2. Participant is found to be psychologically stable as determined by psychiatric interview- examination.
- 3. Participant is motivated to discover, verify, and apply solutions within his current work capacity.

Each group of four subjects met one another during an evening session several days before the experimental day. (In one of the groups, one subject had to be eliminated, which left only three.) The proposed sequence of events during the experimental session was explained in detail. This initial meeting also served the function of allaying apprehension and establishing rapport and trust among the members and the staff.

Subjects were told that they would experience little or no difficulties with distractions such as visions, involvement with personal emotional states, and so on.

The instructions emphasized that the experience could be directed as desired. Direct suggestions were made to encourage mental flexibility during the session. An excerpt from those instructions is quoted below:

Some suggestions on approaches:

Try identifying with the central person, object, or process in the problem. See how the problem looks from this vantage point.

Try asking to "see" the solution, to visualize how various parts might work together, to see how a certain situation will work out in future, etc.

You will find it is possible to scan a large number of possible solutions, ideas, data from the memory etc., much more rapidly than usual. The "right" solution will often appear along with a sort of intuitive "knowing" that it is the answer sought. You will also find that you can hold in conscious awareness a number of ideas or pieces of data processes simultaneously, to an uncommon extent.

You will find it is possible to "step" back from the problem and see it in new perspective, in more basic terms; to abandon previously tried approaches and start afresh (since there is much less of yourself invested in these earlier trials).

Above all, don't be timid in the ambitiousness with which you ask questions. If you want to see the completed solution in a three-dimensional image, or to project yourself forward in time, or view some microscopic physical process, or view something not visible to your physical eyes, or re-experience some event out of the past, by all means ask. Don't let your questions be limited by your notion of what can and what cannot happen.

Approximately one hour of pencil-and-paper tests were administered at this time. Subjects were told that they would take a similar battery during the experimental session. To insure that the problems to be worked on were appropriate for the purpose, each participant was asked to present his selection briefly. By the end of the preparation session, participants were generally anticipative and at ease. They had been given a clear picture of what to expect, as well as information on how to

cope with any difficulties that might arise.

The session day was spent as follows:

- 8:30 Arrive at session room
- 9:00 Psychedelic material given. Mescaline sulphate (200 mg).
- 9-12 Music played, subjects relaxed with eyes closed
- 12-1 Psychological tests administered
- 1-5 Subjects work on problems
- 5-6 Discussion of experience; review of solutions.

Participants were driven home after this. They were given a sedative, which they might take if they experienced any difficulty in sleeping. In many cases, however, they preferred to stay up until well after midnight, continuing to work on insights and solutions discovered earlier in the day.

Each subject wrote a subjective account of his experience within a week after the experimental session. Approximately six weeks after the session, subjects were administered questionnaires that related to (1) the effects of the session on post-session creative ability and (2) the validity and acceptance of solutions conceived during the session. These data were in addition to the psychometric data comparing results of the two testing periods.

## Subjective Reports

The literature on creativity includes analytical description of the components of creative experience, the personal characteristics of creative individuals, and the distinguishing features of creative solutions. From the participants' reports, it was possible to extract eleven strategies of enhanced functioning during the session. The relationship of these strategies to enhanced functioning should be self-explanatory. Those readers interested in the relationship of these aspects to current research and theory on creativity can refer to the detailed technical discussion in Harman, McKim et al. (1966).

The factors are listed below with representative quotations from the subjects' reports.

## 1. Low Inhibition and Anxiety:

"There was no fear, no worry, no sense of reputation and competition, no envy, none of these things which in varying degrees have always been present in my

work."

"A lowered sense of personal danger; I don't feel threatened any more, and there is no feeling of my reputation being at stake."

"Although doing well on these problems would be fine, failure to get ahead on them would be threatening. However, as it turned out, on this afternoon the normal blocks in the way of progress seemed to be absent."

#### 2. Capacity to Restructure Problem in Larger Context:

"Looking at the same problem with (psychedelic) materials, I was able to consider it in a much more basic way, because I could form and keep in mind a much broader picture."

"I could handle two or three different ideas at the same time and keep track of each." "Normally I would overlook many more trivial points for the sake of expediency, but under the drug, time seemed unimportant. I faced every possible questionable issue square in the face."

"Ability to start from the broadest general basis in the beginning . . . "

"I returned to the original problem.... I tried, I think consciously, to think of the problem in its totality, rather than through the devices I had used before."

## 3. Enhanced Fluency and Flexibility of Ideation:

"I began to work fast, almost feverishly, to keep up with the flow of ideas."

"I began to draw . . . my senses could not keep up with my images . . . my hand was not fast enough . . . my eyes were not keen enough . . . I was impatient to record the picture (it has not faded one particle). I worked at a pace I would not have thought I was capable of."

"I was very impressed with the ease with which ideas appeared (it was virtually as if the world is made of ideas, and so it is only necessary to examine any part of the world to get an idea). I also got the feeling that creativity is an active process in which you limit yourself and have an objective, so there is a focus about which ideas can cluster and relate."

"... I dismissed the original idea entirely, and started to approach the graphic problem in a radically different way. That was when things started to happen. All kinds of different possibilities came to mind...."

"And the feeling during this period of profuse production was one of joy and

exuberance.... It was the pure fun of doing, inventing, creating, and playing."

#### 4. Heightened Capacity for Visual Imagery and Fantasy:

"Was able to move imaginary parts in relation to each other."

". . . it was the non-specific fantasy that triggered the idea."

"The next insight came as an image of an oyster shell, with the mother-of-pearl shining in different colors. I translated that in the idea of an interferometer-two layers separated by a gap equal to the wave length it is desired to reflect."

"... As soon as I began to visualize the problem, one possibility immediately occurred. A few problems with that concept occurred, which seemed to solve themselves rather quickly.... Visualizing the required cross section was instantaneous."

"Somewhere along in here, I began to see an image of the circuit. The gates themselves were little silver cones linked together by lines. I watched the circuit flipping through its paces...."

"I began visualizing all the properties known to me that a photon possesses and attempted to make a model for a photon.... The photon was comprised of an electron and a positron cloud moving together in an intermeshed synchronized helical orbit.... This model was reduced for visualizing purposes to a black and white ball propagating in a screw-like fashion through space. I kept putting the model through all sorts of known tests."

#### 5. Increased Ability to Concentrate:

"Was able to shut out virtually all distracting influences."

"I was easily able to follow a train of thought to a conclusion where normally I would have been distracted many times."

"I was impressed with the intensity of concentration, the forcefulness and exuberance with which I could proceed toward the solution."

"I considered the process of photoconductivity.... I kept asking myself, "What is light?" and subsequently, "What is a photon?" The latter question I repeated to myself several hundred times till it was being said automatically in synchronism with each breath. I probably never in my life pressured myself as intently with a question as I did this one." "It is hard to estimate how long this problem might have taken without the psychedelic agent, but it was the type of problem that might never

have been solved. It would have taken a great deal of effort and racking of the brains to arrive at what seemed to come more easily during the session."

#### 6. Heightened Empathy with External Processes and Objects:

"... the sense of the problem as a living thing that is growing toward its inherent solution."

"First I somehow considered being the needle and being bounced around in the groove."

"I spent a productive period . . . climbing down on my retina, walking around and thinking about certain problems relating to the mechanism of vision."

"Ability to grasp the problem in its entirety, to 'dive' into it without reservations, almost like becoming the problem" "Awareness of the problem itself rather than the 'I' that is trying to solve it"

#### 7. Heightened Empathy with People:

"It was also felt that group performance was affected in . . . subtle ways. This may be evidence that some sort of group action was going on all the time."

"Only at intervals did I become aware of the music. Sometimes, when I felt the other guys listening to it; and it was a physical feeling of them listening to it."

"Sometimes we even had the feeling of having the same thoughts or ideas."

#### 8. Subconscious Data More Accessible:

"... brought about almost total recall of a course that I had had in thermodynamics; something that I had never given any thought about in years."

"I was in my early teens and wandering through the gardens where I actually grew up. I felt all my prior emotions in relation to my surroundings."

#### 9. Association of Dissimilar Ideas:

"I had earlier devised an arrangement for beam steering on the two-mile accelerator which reduced the amount of hardware necessary by a factor of two....

Two weeks ago it was pointed out to me that this scheme would steer the beam into the wall and therefore was unacceptable. During the session, I looked at the schematic and asked myself how could we retain the factor of two but avoid steering into the wall. Again a flash of inspiration, in which I thought of the word "alternate." I followed this to its logical conclusion, which was to alternate polarities sector by sector so the steering bias would not add but cancel. I was extremely impressed with this solution and the way it came to me."

"Most of the insights come by association."

"It was the last idea that I thought was remarkable because of the way in which it developed. This idea was the result of a fantasy that occurred during Wagner [Note: the participant had earlier listened to Wagner's 'Ride of the Valkyries.'].... I put down a line which seemed to embody this [fantasy].... I later made the handle which my sketches suggested and it had exactly the quality I was looking for.... I was very amused at the ease with which all of this was done."

#### **I0. Heightened Motivation to Obtain Closure:**

"Had tremendous desire to obtain an elegant solution (the most for the least) ."

"All known constraints about the problem were simultaneously imposed as I hunted for possible solutions. It was like an analog computer whose output could not deviate from what was desired and whose input was continually perturbed with the inclination toward achieving the output."

"It was almost an awareness of the 'degree of perfection' of whatever I was doing."

"In what seemed like ten minutes, I had completed the problem, having what I considered (and still consider) a classic solution."

#### 11. Visualizing the Completed Solution:

"I looked at the paper I was to draw on. I was completely blank. I knew that I would work with a property three hundred feet square. I drew the property lines (at a scale of one inch to forty feet), and I looked at the outlines. I was blank.

Suddenly I saw the finished project [Note: the project was a shopping center specializing in arts and crafts]: I did some quick calculations . . . it would fit on the

property and not only that . . . it would meet the cost and income requirements . . . it would park enough cars . . . it met all the requirements. It was contemporary architecture with the richness of a cultural heritage . . . it used history and experience but did not copy it."

"I visualized the result I wanted and subsequently brought the variables into play which could bring that result about. I had great visual (mental) perceptibility; I could imagine what was wanted, needed, or not possible with almost no effort. I was amazed at my idealism, my visual perception, and the rapidity with which I could operate."

#### Results: Subjective Ratings

As mentioned above, several weeks after the experimental session all participants were asked to complete a brief questionnaire. Here they rated their experience with respect to nine characteristics relevant to enhanced functioning. Items were rated on a five-point scale from MARKED ENHANCEMENT (+2) through NO CHANGE (O) to MARKED IMPAIRMENT (-2). The average ratings are listed in <u>Table 2</u>. These data, too, seem to substantiate the hypothesis of enhancement of both verbal and non-verbal skills.

#### Results: Psychometric Data

Test-retest scores on some of the measures used showed dramatic changes from normal to psychedelic-session conditions. Most apparent were enhanced abilities to recognize patterns, to minimize and isolate visual distractions, and to maintain visual memory in spite of confusing changes of form and color. Specific tests used included the Purdue Creativity, the Miller Object Visualization, and the Witkin Embedded Figures. This last test has been reported to be stable under a variety of experimental interventions including stress, training, sensory isolation, hypnosis, and the influence of a variety of drugs (Witkin et al., 1962). With these twenty-seven subjects, enhancement was consistent (p<.01), and in some cases improvements were as great as 200 per cent. (For a fuller description of the psychometric evaluation, see Harman et al., 1966.)

#### Long-term Results

The practical value of obtained solutions is a check against subjective reports of accomplishment that might be attributable to temporary euphoria. The nature of these solutions varied; they included: (1) a new approach to the design of a vibratory microtome, (2) a commercial building design, accepted by the client, (3) space probe experiments devised to measure solar properties, (4) design of a linear electron accelerator beam-steering device, (5) engineering improvement to a magnetic tape recorder, (6) a chair design, modeled and accepted by the manufacturer, (7) a letterhead design, approved by the customer, (8) a mathematical theorem regarding NOR-gate circuits, (9) completion of a furniture-line design, (10) a new conceptual model of a photon, which was found useful, and (11) design of a private dwelling, approved by the client.

Table 3 outlines the initial results of attempting to apply the solutions generated in the experimental sessions back into the industrial and academic settings of the subjects. (These data were obtained by questionnaire and follow-up interview six to eight weeks after the session.) A quote for a follow-up report written several months after the session is typical of the relative usefulness and validity of the session-day solutions: "In the area of ionospheric source location and layer tilt analysis, I was able in the weeks following the session to build on the ideas generated to the extent of working out the mathematics of the schemes proposed, and of making them more definite. The steps made in the session were the correct ones to start with . . . the ideas considered and developed in the session appear as important steps, and the period of the session as the single most productive period of work on this problem I have had in the several months either preceding or following the session."

Many subjects in the follow-up interview reported changes in their modes of functioning that were continuous with the enhancement reported for the session itself (e.g., continuing visualization ability). Table 4 lists the result of a questionnaire dealing with changes in work effectiveness.

The results given in <u>Table 4</u> indicate that approximately half the subjects reporting were still noticing some change in their performance level several months after the experimental session. These results are particularly interesting in view of the relatively low dosage and the fact that no suggestion was made at any time that continuing changes of this nature were expected. The deliberate anticipation of enhanced performance level, the incitement to a high degree of motivation, and use of a sheltered and non-critical atmosphere—none of these were directly suggestive of long-term personality changes or permanent therapeutic benefit. Yet a certain amount of such change seems to have occurred. One implication is clear: We are dealing with materials and experimental situations that have long-term effects; it would be foolhardy and irresponsible to treat this kind of research as if it were

isolated from the fabric of the subjects' lives.

#### **Comments and Speculations**

We had originally intended to follow this pilot study with a controlled experiment employing a double-blind design, in which a fraction of the subjects receive an active placebo. This would have addressed the question of whether suggestion alone could account for the performance enhancement. Because of interruption of the research program by government fiat, this extension was never carried out. The need for controlled hypothesis-testing research in this perplexing area of chemical facilitation of mental functioning has become a common plea, and rightly so. But equally needful of furthering is the exploratory sort of research that aims at invention of conceptual models and hypothesis construction. Because of the controversy surrounding use of the psychedelic agents, this latter type of research is even more likely to be slighted.

In the research described, we employed naive subjects. There are clear methodological virtues accruing from the use of untrained subjects. However, when the central question is not one of pharmacological effects, but rather the degree to which certain processes can be facilitated, the more experience the subjects can gain the more we are likely to learn about the process. Thus we would urge the desirability of further investigations employing a series of sessions for each subject.

A similar comment holds with regard to selection of subjects. Clinical studies already referred to indicate that those subjects who are more stable and productive beforehand 4 tend to "benefit considerably from the psychedelic experience along the lines of self-actualization, richer creative experience, and enhancement of special abilities and aptitudes" (Savage et al., 1966). Subjects for this pilot study were deliberately selected to be persons with known reputations as creative individuals. In general, we would expect the outcomes of this kind of research to be more fruitful with gifted rather than "merely normal" subjects.

In contrast with reports of other researchers, we experienced little difficulty in getting subjects to work on psychological tests. Many studies seem to indicate a temporary debilitating effect of psychedelics on higher cortical processes. It seems to us that variables that affect results on these kinds of tests include attitude and motivation as well as ability. We found that discussing this problem with subjects in the preparatory meetings eliminated any tendency in the experimental session to shrug off the tests as meaningless or to resist them as disconcerting. In short, on the tests, as well as in problem solving, by establishing an anticipation of improved performance, we seemed to obtain results that support it.

Assuming that these findings are eventually substantiated by additional research, they find their most obvious application to problem solving in industry, professional practice, and research. Here the procedure could play a role similar to that played by consultants, brainstorming, synectics, and other attempts to augment and "unstick" the problem solver's unsuccessful efforts. A quote from one of our subjects illustrates the possibilities:

"I decided to drop my old line of thinking and give it a new try. The 'mystery' of this easy dismissal and forgetting did not strike me until later in the afternoon, because I had many times before this session indulged in this line of thinking and managed to work up the whole thing into an airtight deadlock, and I had been unable to break, much less dismiss, this deadlock. The miracle is that it came so easy and natural."

A much more important application in the long run, we believe, is the use of the psychedelic agents as training facilitators to gradually upgrade the performance level of already effective personnel. This would require establishment of accepted training procedures and certification provisions for those qualified to use them. This may seem to be a utopian projection from our present state, but we live in an age of rapid change, and it is perhaps not out of the question within a decade.

Among consequences of this line of exploration, the most significant of all, in our estimation, is the gaining of new knowledge of the mysterious higher processes of the human mind, the framing of new and more productive research questions, and the eventual effect on our image of man—of what he can be, and of what he is, of the vast potentialities he has seemingly only begun to tap.

#### TABLE 1

#### SOME REPORTED CHARACTERISTICS OF THE PSYCHEDELIC EXPERIENCE

(as found in the literature and in subjects' reports)

## Those supporting creativity

### 1. Increased access to unconscious data.

- 2. More fluent free association; increased ability to play spontaneously with hypotheses, 2. Ability to consciously direct metaphors, paradoxes, transformations, relationships, etc.
- 3. Heightened ability for visual imagery and fantasy.
- 4. Relaxation and openness.

### Those hindering creativity

- 1. Capacity for logical thought processes diminished.
- concentration reduced.
- 3. Inability to control imaginary and conceptual sequences.
- 4. Anxiety and agitation.

- 5. Sensory inputs more acutely perceived.
- 6. Heightened empathy with external processes, objects, and people.
- 7. Aesthetic sensibility heightened.
- 8. Enhanced "sense of truth," ability to "see through" false solutions and phony data.
- 9. Lessened inhibition, reduced tendency to censor own by premature negative judgment.
- 10. Motivation heightened by suggestion and providing the right set.

- 5. Outputs (verbal and visual communication abilities) constricted.
- 6. Tendency to focus upon "inner problems" of a personal nature.
- 7. Experienced beauty lessening tension to obtain aesthetic experience in the act of creation.
- 8. Tendency to become absorbed in hallucinations and illusions.
- 9. Finding the best solution seeming unimportant.
- 10."This-worldly" tasks seeming trivial, and, hence, motivation decreased.

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#### **TABLE 2**

## MEAN SUBJECTIVE RATINGS OF FACTORS RELATED TO ENHANCED FUNCTIONING

(all ratings refer to behavior during the session) n = 27

Values	Mean	S.D.
1. Lowering of defenses, reduction of inhibitions and anxiety	+1.7	0.64
2. Ability to see the problem in the broadest terms	+1.4	0.58
3. Enhanced fluency of ideation	+1.6	0.69
4. Heightened capacity for visual imagery and fantasy	+1.0	0.72
5. Increased ability to concentrate	+1.2	1.03
6. Empathy with external processes and objects heightened	+0.8	0.97
7. Empathy with other people heightened	+1.4	0.81
8. Data from "unconscious" more accessible	+0.8	0.87
9. Enhanced sense of "knowing" when the right solution appears	+1.0	0.70

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#### TABLE 3

# OUTCOME OF PROBLEMS ATTEMPTED IN EXPERIMENTAL SESSION

## ONE MONTH AFTER SESSION DATE

new avenues for investigation opened	20
working model completed	2
developmental model to test solution authorized	1
solution accepted for construction or production	6
partial solution obtained being developed further or being applied	10
no further activity since session	1
no solution obtained	4
total number of problems attempted*	44

<sup>\*</sup> Many subjects attempted more than one problem during the session.

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**TABLE 4** 

## **WORK PERFORMANCE SINCE SESSION (n=16)**

key	-2	-1	0	+1	+2
1. Ability to solve problems	0	0	8	8	0
2. Ability to relate effectively to others	0	0	8	5	3
3. Attitude toward job	0	0	7	8	1
4. Productivity	0	0	9	5	2
5. Ability to communicate	0	0	10	5	1
6. Response to pressure	0	0	7	8	1

key: -2 marked impairment; -1 significant impairment; 0 no change;

+1 significant enhancement; +2 marked enhancement

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