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E. M. Krupitsky

A. Ya. Grinenko

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KETAMINE PSYCHOTHERAPY: RESULTS AND MECHANISMS

E. M. KRUPITSKY AND A. Ya. GRINENKO
LENINGRAD REGIONAL DISPENSARY OF NARCOLOGY
ST. PETERSBURG, RUSSIA

1. Introduction

A review of the literature suggests that the psychedelic experience may have beneficial effects in the following ways: contribute to the cathartic process, stabilize positive psychological changes, enhance personal growth and self-cognition, provide insight into existential problems such as the meaning of one's self and surrounding world, increase creative activities, broaden spiritual horizons, and help to harmonize relationships with the world and other people (Grinspoon & Bakalar, 1979; Krupitsky & Grinenko, 1992; Strassman, 1995). All of these beneficial effects can be very auspicious for promoting a sober life.

Psychedelic psychotherapy was shown to have potential benefit for alcoholism treatment in the 1960s, but different methodologies made it difficult to generalize across studies. The requisite development of appropriate sophistication for these studies was not possible in the 1970s, because their use was strictly limited. However, at about this time, ketamine and ketamine-like anaesthetic agents were shown to elicit "psychedelic" emergent phenomena in patients. This property of ketamine was exploited by our use of ketamine-assisted therapy for alcoholism. Ketamine has certain advantages over other psychedelics as an adjunct to psychotherapy. It is safe and short-acting (the psychoactive effects lasting about an hour). In addition, ketamine is not scheduled like other psychedelics (i.e., not prohibited). In lower doses (about one sixth to one tenth of that usually used in surgery for general anaesthesia), it induces profound psychedelic experiences.

2. KPT Method

2.1. First Stage

Three main stages in our method of Ketamine Psychedelic Therapy (KPT) can be distinguished (Krupitsky et al., 1992).The first stage is preparation. In this stage, preliminary psychotherapy is carried out with patients. During these psychotherapeutic sessions it is explained to the patient that the removal of their dependence on alcohol will be induced in a special state of consciousness in which they will have deep experiences that will help them to realize the negative side and results of alcohol abuse, and the positive side of sobriety. Such realizations and sharp experiences of the negative aspects of alcoholism and the positive side of sobriety will cause a subsequent psychological unacceptability of alcohol abuse and a stable orientation towards sobriety. We also explain to the patients that during the psychedelic session important insights concerning the meaning and values of their lives and their personality problems will take place which will be very auspicious for their new sober lives. We tell the patient that they will enter some unusual states of consciousness and that they may feel detached from their bodies. We also instruct them to surrender fully to the experience. At the ketamine sessions, people often experience the separation of consciousness from the body and the dissolving of the body ego, so it is very important to prepare patients carefully for such an unusual experience.

During several preparatory psychotherapeutic sessions, it is emphasized also that personally significant mental concepts concerning the negative aspects and consequences of the patient's alcoholism have been forced out of consciousness into subconsciousness. The patient is told that during the session

these concepts will manifest themselves in his or her consciousness in peculiar symbolic forms, in emotionally saturated visions (hallucinations). The conscious recognition of these concepts along with the painful experience of the negative aspects of alcoholism will eventually result in the patient's psychological rejection of alcohol abuse and the establishment of a stable set of sobriety.

We also explain to our patients that the psychedelic session will allow them to see and sense the subconscious roots of their alcohol problems in colorful symbolic form. By experiencing these forms, they will come to understand that the alcohol problems of their lives are directly related to deeply rooted personality problems and are often the consequence of the latter. Moreover, we attempt to explain to the patients that the psychedelic session may induce important insights concerning the resolution of their problems and the reorientation of their system of values, their notions of self and the world around them, and the meaning of their lives. All this may entail profound positive changes in their personality that will undoubtedly be important for their shift to a sober lifestyle.

This information is not presented to the patient in the form of a didactic monologue from a psychotherapist. The abstract "psychotherapeutic myth" is not simply explained to the patient; it is discussed and embroidered with specific concrete content during a dialogue. The therapist pays close attention to such points as the patient's personal motives for treatment and sobriety, goals for a sober life, ideas about the cause of the disease and its consequences, suggestions as to what hinders sobriety and what favors it, and so on. An individually concretized "psychotherapeutic myth" is formed during this dialogue. It becomes the most important therapeutic factor responsible for the psychological content of the second stage of KPT. It is also very important to create a specific atmosphere of confidence and mutual understanding between the psychotherapist and the patient during the first stage of KPT.

2.2. Second Stage

The second stage is the ketamine session itself. During this procedure, aethimizol (1.5%, 3ml, i.m.) is injected into the patient, after this bemegride (0.5%, 10ml, i.v.), and then ketamine (Krupitsky, 1992). We use ketamine doses from 2-3 mg/kg, i.m. We prefer the intramuscular route because the effect is more gradual, and the psychedelic experience lasts longer. With an intravenous injection, the effect lasts only about fifteen to twenty minutes, but after an intramuscular injection, it lasts from about forty-five minutes to an hour. Bemegride enhances the emotional experiences and visions produced by ketamine (Krupitsky, 1992), and aethimizol promotes the stable fixing of experiences in long-term memory (Smirnov & Borodkin, 1979). Moreover, both of these drugs (aethimizol and bemegride) are analeptic drugs which enhance cortical activity, and thus widen the opportunities for psychotherapeutic dialogue with the patient during the ketamine session. In the last several years we have begun to prescribe a central calcium channel antagonist (nimodipine, 60 mg a day, orally) before the KPT session to improve the patients' memories of their psychedelic experience, because it was shown that calcium channel antagonists reverse the memory disturbances produced by ketamine in rats (Saha et al., 1990). In our study on this subject, we have also shown that nimodipine improves memory of the ketamine session (about psychotherapeutic suggestions and psychedelic experience) (Krupitsky et al., 1995).

With special background music, the patient having a KPT session is exposed to psychotherapeutic influences. The content of these influences is based on the concrete data of the patient's anamnesis (case history), and is directed toward the resolution of the patient's personality problems and toward the formation of a stable orientation towards sobriety. We try to create a new meaning and purpose of life in our patients during this session.

The specific character of our KPT method allows us to carry out a special psychotherapeutic dialogue with the patient undergoing the psychedelic experience. We emphasize the positive values and

meaning of a sober lifestyle and the negative aspects of alcohol abuse during this dialogue, which has a specific personal orientation for each patient. It is also very important to carefully direct the patient's psychedelic experiences by the verbal influences and the influence of background music towards the symbolic resolution of personality conflicts and final cathartic peak experiences.

Moreover, at certain moments in the psychedelic session (usually at moments of highly intensive hallucinatory experiences), the patient is given an opportunity to smell alcohol. The introduction of the smell of alcohol during the session is intended to bring alcohol-related themes into the patient's psychedelic experience and also to enhance a negative psychedelic experience, thus forming in the patient a profound general aversion towards alcohol, as well as enhancing the negative emotional coloring of the alcoholic themes in the patient's psychedelic experience itself.

The second stage of KPT is conducted by two physicians, a psychotherapist and an anaesthesiologist, because some complications and side-effects (e.g., increased blood pressure, convulsions, depression of breath) are possible, though exceedingly rare.

As with other psychedelics, music also enhances the ketamine experience. So we carry out ketamine sessions against a background of music especially conducive for the ketamine session.

After forty-five minutes to an hour, the patient slowly comes back from the experience. During the recovery period, which takes about one or two hours, the patient begins to gradually feel ordinary reality returning. At this point in the session, the patient usually begins to describe the experience; we then begin some discussion and interpretation of it. After the session, the patient rests, and is then asked to write down a detailed self-report of the experience that evening.

2.3. Third Stage

In the third stage, group psychotherapy is carried out with the patients given KPT the previous day. During this session, the patients discuss and interpret the individual personal significance of the symbolic content of their psychedelic experience with the psychotherapist. This discussion is directed toward helping the patients correlate their psychedelic experience with their personality problems and other problems in their life (most of all, those connected with alcohol abuse), and thereby to realize and solidify their desire for a new sober life. We are also trying, at this stage, to help our patients accept new attitudes towards themselves and the world around them, new values, and a more spiritual worldview produced by the ketamine psychedelic experience. The uniquely profound and powerful psychedelic experience often helps them to generate fresh insights that enable them to integrate new, often unexpected, meanings, values, and attitudes about their individual selves and the world. We gather these patients into a group the day before and after treatment, because when they share their experiences together, it is usually more powerful.

3. Clinical Study of the Efficacy of KPT on Alcoholism

One hundred and eleven male alcoholic patients were treated by the KPT method. These patients were chronic alcoholics who could not control their drinking. Their age ranged from 23 to 56, with an average age of 36.5 ±0.7 years. Their alcohol withdrawal syndrome had been previously formed for an average of 5.3 ±0.5 years. The KPT procedure followed the three-month treatment course at a psychiatric hospital. These three months are the first phase of therapy, during which we treated their alcohol withdrawal syndrome and any related anxiety or affective disorders or somatic disorders. Then, we started rational- cognitive individual and group psychotherapy, in order to establish a mental set of sobriety and a negative attitude toward alcohol. However, we go beyond the problem of alcohol abuse to explore broader issues, including the patient's life history, relationships, and worldview.

Later, patients included in the ketamine program are told that they will undergo a new treatment which will allow them to see into and feel the deep subconscious roots of their problems. We help our patients understand that their alcohol problem is perhaps only a superficial symptom—the manifestation of more deeply rooted problems. The patients were all voluntary and gave written informed consent for the KPT procedure.

The control group was composed of 100 male alcoholics who could not control their drinking. The average age was 38.4 ±0.81 years, and their alcohol withdrawal syndrome had been previously formed for an average of 6.8 ±0.54 years. These patients underwent the same three-month treatment course at the same hospital, but received only conventional, standard methods of treatment. There were no significant differences between the experimental and control groups in age or severity of alcoholism.

To determine the efficacy of the treatment, we collected follow-up information about all of the patients who had taken part in this study one year after their release. According to the data, abstinence of more than one year was observed in 73 out of 111 people (65.8%) who had undergone the KPT. Thirty people (27.0%) had relapsed. We could not obtain data on eight patients (7.2%). In the control group of 100 patients whose treatment consisted only of conventional methods, only 24 patients (24%) remained sober for more than one year. Thus, the data from the follow-up study demonstrated that ketamine-assisted psychedelic therapy increases the efficacy of conventional alcoholism treatment.

It was also possible to collect two-year follow-up data for 81 of the patients who had undergone KPT. According to these data, abstinence of more than two years was observed in 33 of the 81 patients (40.7%), whereas 38 patients (46.9%) had relapsed. We could not obtain two-year follow-up data on 10 patients (12.4%). It was also possible to collect three-year follow-up data for 42 patients who had undergone KPT. According to these data, abstinence of more than three years was observed in 14 out of these 42 patients (33.3%), whereas 24 patients (57.2%) had relapsed. We could not obtain three-year follow-up data on 4 patients (9.5%). The two- and three-year follow-up results provide additional evidence of the high efficacy of KPT.

Several months after they had been released from the hospital, most of the patients treated by KPT stated that it had contributed significantly to their sobriety. For instance, seven months after he was released, patient Ch-ko reported, "The experience related with the KPT session (very vivid) is imprinted in my mind and is a kind of 'taboo' on drinking . . ."

4. Study of KPT Underlying Mechanisms

4.1. Psychological Underlying Mechanisms

4.1.1. KPT Influence on Personality

4.1.1.1. MMPI

All patients in the experimental group were administered the Minnesota Multiphasic Personality Inventory (MMPI) (adapted in Russia by Sobchik, 1990) before and after KPT.

According to the MMPI data, our analysis of psychological changes in the experimental group testifies to positive dynamics in the patients' MMPI profiles (Table 1). Specifically, after KPT the indices decreased for a majority of the main MMPI scales. The most statistically significant decreases in the profile were on the scales "hypochondria," "depression," "hysteria," "psychasthenia," "schizophrenia," "sensitivity-repression," and also on the Taylor Manifest Anxiety Scale. At the same time, the estimate on the "ego strength" scale increased. On the whole, such favorable psychological dynamics testify that after KPT the patients became more sure of themselves and their possibilities and their future, less

Table 1
The KPT Influence on the MMPI Personality Profile.

MMPI filling time	MMPI scales (T-marks)																		
	L	F	K	Hs	D	Hy	Pd	Mf-m	Pa	Pt	Sc	Ma	Si	At	S-R	Es	Ag	Eo	Hy_2
Before KPT	50.0 ±1.67	61.9 ±2.12	52.1 ±1.37	55.7 ±1.67	65.7 ±2.16	53.2 ±1.59	65.8 ±1.86	60.2 ±1.33	58.1 ±2.24	59.6 ±1.63	61.0 ±2.02	56.5 ±1.82	55.4 ±1.18	56.9 ±2.04	58.7 ±3.15	42.8 ±1.49	41.4 ±1.14	46.1 ±1.01	45.3 ±0.97
After KPT	+ 52.9 ±1.25	58.9 ±1.44	+ 54.5 ±1.29	+ 52.5 ±1.56	++ 60.2 ±2.01	+ 50.8 ±1.02	64.9 ±1.90	60.2 ±1.37	55.9 ±1.90	+ 56.1 ±2.01	++ 56.4 ±2.05	56.1 ±2.01	54.5 ±1.14	+++ 51.7 ±1.85	++ 50.9 ±3.07	++ 46.6 ±1.30	40.9 ±0.99	46.5 ±1.08	46.3 ±0.88

Notes:
1) L - Lie; F - Validity; K - Correction; Hs - Hypochondriasis; D - Depression; Hy - Conversion hysteria; Pd - Psychopathic deviate; Mf-m - Masculinity- femininity male; Pa - Paranoia; Pt - Psychasthenia; Sc - Schizophrenia; Ma - Hypomania; Si - Social introversion; At - Iowa manifest anxiety (Taylor); S-R - Sensitivity-Repression; Es - Ego strength; Ag - Aging; Eo - Ego overcontrol; Hy_2 - Need for affection.

2) Statistical significance of differences between MMPI marks before and after KPT (Student's *t*-test):
(+) $p < 0.05$, (++) $p < 0.01$, (+++) $p < 0.001$.

anxious and neurotic, and more emotionally open. Against the background of these general tendencies, we also saw in the majority of cases some essential individual variations (e.g., concerning changes on such scales as "masculinity-femininity," "paranoia," "hypomania," "sensitivity-repression") that reflected, as a rule, a certain harmonization of the patients' personality profiles.

4.1.1.2. Ego Defense Mechanisms

Thirty-seven patients in the experimental group were also examined with Plutchik's test, the "Life Style Index" (LSI) (Plutchik & Conte, 1989), to assess changes in the structure of psychological ego defenses. It was established that there occurred a decrease in the regression defense mechanism after KPT (from 28.6 ±3.1, to 20.6 ±2.2; $p < 0.01$), indicating that patients became more mature and responsible for themselves after KPT. Other Ego defense mechanisms (suppression, substitution, etc.) did not significantly change.

4.1.1.3. Locus of Control

Thirty alcoholic patients (average age, 40.1 ±1.8 years) treated by KPT were examined with the Locus of Control Scale (LCS) developed by J. Rotter (Phares, 1976) and adapted in Russia by Bazhin et al. (1993). All patients were assessed with the LCS twice: before and after KPT.

It was established that locus of control in the personality of alcoholic patients became significantly more internal after KPT (from 11.1 ±4.8, to 30.3 ±5.3; $p < 0.01$), indicating that patients became more sure about the ability to control and manage different situations in their lives; they became more responsible for their lives and their future after KPT.

It is important to note that changes in all the personality tests (MMPI, LSI, and LCS) were in agreement with each other, and that all of these changes were very positive and auspicious for a sober life.

4.1.2. Psychosemantic Changes

4.1.2.1. A Study with the Color Test of Attitudes and Personality Differential

We also studied changes in the psychosemantic domain induced by KPT. The study used the data from 69 alcoholic in-patients treated by KPT in our hospital (average age, 37.2 ±1.04 years). The patients were examined before and after KPT with the Personality Differential (PD) (Bazhin & Etkind, 1983, a personality-oriented version of Osgood's semantic differential, Osgood et al., 1957), and also with the Color Test of Attitudes (CTA) (Etkind, 1980).

Both the PD and CTA were organized such that one could define peculiarities of the alcoholic patients' personality attitude systems. The combination of PD and CTA allowed us to assess, to a certain extent, changes of attitude which occurred both at the conscious (PD) and subconscious (CTA) levels after KPT. Using these tests for the above-mentioned purpose allowed us to analyze the following spheres of personality attitudes: the attitude toward oneself, to one's close relatives, to the ideal image of self, to a psychotherapist, and to one's own alcoholic disease, to the images "Me sober," "Me drunk," "Me in the future," to "a man completely abstained from alcohol," and to "a man who is able to control his drinking." The CTA was administered in the following manner: at first a patient was requested to arrange the 8 colors of Lüscher's test in order of correspondence (similarity) to each of the above-mentioned images. Then the patient was requested to arrange the same colors in order of preference (by degree of preference). After that, to quantitatively assess the attitude to the definite

image, the resemblance of the order (the position of the colors) of the two allotments was compared. In the first, the patient arranged the 8 colors of Lüscher's test in the order of correspondence to the image: from the "most similar, suitable" to the "most different, unsuitable"; in the second allotment (the same for all images), the patient arranged the same colors in order of preference. By comparing the resemblance of these two allotments (one regarding the image and one in the order of preference) it is possible to assess the nonverbal (unrealized) attitude toward each of the images.

The analysis of the CTA results (Table 2) revealed that after KPT significant positive changes occurred in the nonverbal emotional attitude to a psychotherapist, to close relatives, to the ideal image of self, and to the image "Me sober." At the same time, the attitude toward the image "Me drunk" became more negative. According to the PD data, significant positive changes occurred after KPT only with respect to the attitude toward the person himself (Table 2).

After KPT, a considerable decrease in differences between certain indices of the CTA and PD occurred with respect to the same images (Table 2). This decrease reflects the reduction of the difference between the verbal (realized) and nonverbal (unrealized) assessments of personal attitudes. This reduction was mainly related to the change in the CTA indices and appeared to be strongest for the sphere of attitudes toward a psychotherapist, relatives, the image "Me sober," and the ideal image of self.

Thus, KPT produced considerable and significant positive changes in the domain of personality attitudes, which took place due to the transformation of nonverbal (unrealized) emotional attitudes. KPT also resulted in a decreased level of dissonance between isosemantic indices as measured by the CTA and PD, which could be interpreted as a reduction of dissonance between verbal/conscious and nonverbal/unconscious thoughts and feelings regarding alcohol use and personality characteristics and relationships.

Also of note, according to the CTA data, strong positive changes occurred in patients' nonverbal (unrealized) assessments of the attitudes toward a psychotherapist, to close relatives, to the image "Me sober," and to the ideal image of self. This means that the patient has internally grown to emotionally accept these images and, in turn, the attitudes toward sobriety connected with them. Thus, KPT for alcoholism may be of benefit by transforming unconscious attitudes, particularly those related to sobriety. Also the enhancement of the relationship with the therapist may have enhanced transference issues which may also have had a therapeutic effect.

A special note should be made of the discrepancies between the verbal and nonverbal estimates of a patient's personal attitudes registered before KPT. These discrepancies obviously reflect the presence of an essential discord between the conscious and unconscious estimates of a person's attitudes. This discord reflects a peculiar difference between the subject's unconscious and conscious mind, and possibly characterizes the ambivalence of the person's position and the disagreement between what is declared at the verbal level and what takes place at the level of the immediate emotional experience. Such discord may give rise to psychological discomfort, internal tension, and difficulties in communication with the environment, that is, to the reduction of a person's adaptation, which eventually leads to alcoholism relapse. Therefore, the reduction of such discord due to KPT should be considered as an achievement for favoring a patient's psychological sobriety.

It is important to note that the reduction of differences in verbal and nonverbal assessments of personality attitudes which occurred due to KPT (as well as the harmonization of the MMPI profile owing to the KPT) may be considered to result from the awareness (often in some symbolic form) and partial resolution of some important internal conflicts and personality problems that are connected with alcohol abuse and its consequences. This is confirmed both by the patients' statements during the psychedelic session and by their self-reports written after the session. One might conclude that to the degree that the discord between conscious and unconscious attitudes is decreased, as suggested by PD

Table 2
The KPT Influence on the Verbal and Nonverbal Emotional Attitudes

Images	CTA(%)		PD(%)		Δ (CTA-PD)%	
	before KPT	after KPT	before KPT	after KPT	before KPT	after KPT
1. The ideal image of self	38.57 ±2.93	* 30.25 ±4.00	6.69 ±1.60	6.41 ±0.67	31.88 ±2.93	* 23.84 ±3.73
2. "Me" now	46.31 ±4.00	38.78 ±4.00	21.31 ±3.07	* 15.63 ±1.20	25.00 ±3.73	23.15 ±3.47
3. "Me" before treatment	83.53 ±3.20	85.38 ±2.67	42.34 ±3.47	44.78 ±3.60	41.19 ±3.60	40.60 ±3.33
4. Alcoholism	82.38 ±3.47	86.66 ±3.73	79.97 ±2.40	81.53 ±2.80	2.41 ±2.13	5.13 ±1.60
5. Psychotherapist	46.31 ±3.73	** 30.66 ±4.00	8.03 ±1.20	9.69 ±1.60	38.28 ±3.33	** 20.97 ±3.33
6. Close relatives	42.53 ±4.00	* 34.56 ±4.12	15.94 ±3.07	18.75 ±3.07	26.59 ±3.33	* 15.81 ±4.00
7. "Me" sober	29.90 ±3.02	* 23.81 ±3.06	15.64 ±1.77	13.06 ±1.69	14.26 ±3.60	10.75 ±3.06
8. "Me" drunk	62.16 ±4.15	* 71.96 ±4.42	38.41 ±3.65	44.40 ±4.17	23.75 ±5.14	27.56 ±4.82
9. "Me" in the future	29.73 ±2.87	29.22 ±3.74	12.14 ±1.76	10.48 ±1.57	17.59 ±3.15	18.74 ±3.16
10. A man completely abstained from alcohol	32.26 ±3.82	28.21 ±3.14	12.28 ±1.71	11.04 ±1.47	19.98 ±3.73	17.17 ±3.12
11. A man who is able to control his drinking	48.81 ±4.87	48.75 ±5.05	35.91 ±3.31	34.23 ±3.53	12.90 ±5.01	14.52 ±5.16

Notes:
1) CTA - Color Test of Attitudes; PD - Personality Differential
2) Statistical significance of differences between the values before and after KPT (Student's *t*-test):
(*) $p < 0.05$; (**) $p < 0.01$.

and CTA scores, internal conflicts are resolved, which may therefore reduce the pathological need to drink.

Thus, this complex psychological research shows that KPT results in a change in the personality of alcoholic patients which promotes sobriety. Regarding that change, the processes occurring at the unconscious level play a considerable role.

4.1.2.2. A Study with Repertory Grids (Kelly Matrices)

This study was carried out with 10 alcoholic patients treated with KPT. The repertory grid technique allowed us to assess subtle changes in patients' self-concept (self-identification) caused by KPT.

For this purpose, we employed the so-called technique, "assessment repertory grids" (Kelly Matrices) (Fransella & Bannister, 1977). The grids were arranged so that their 11 elements were replaced by various aspects of the patients "ego" and other significant persons ("Me now" ["Me at present"], "Me in the past," "Me in the future," "Ideal image of self," "Wife," "Mother," "Father," "Recovery alcoholic," "Drunkard," "Psychotherapist," and "A man who gets on in life"). As for the constructs, 12 pairs of categories (construct poles) were preset to describe characteristics of the patient's personality and value orientations ("Responsible-Irresponsible," "Self-controlled–Impulsive," "Strong-willed–Weakling," "Active–Passive," "Self-confident–Lacking in self-confidence," "Independent," "Striving for health," "Striving for high living standards," "Striving for social recognition," "Striving for self-perfection," "Striving for family life," and "Wise"). We employed two techniques for filling in the repertory grids. According to the first (conventional) one, a patient placed each of the elements at a certain point of the calibrated scales preset by the construct poles (assessed each element with all construct scales). We specially developed the second technique to measure changes in nonverbal (and in this sense, less reflexive) psychosemantics. This involved the following procedures: A patient first arranged the 8 colors of the Lüscher test in the order of correspondence (similarity) to each of the grid elements (from the most similar, suitable color to the most different, unsuitable one). Then, the patient arranged the same colors in the order of correspondence to the poles of each of the constructs. Comparing the similarities of the positions of the colors in the two allotments (by the correspondence to a certain element and by the correspondence to the poles of a certain construct), we quantitatively estimated the closeness of this element to the poles of the given construct. The second ("color") technique allowed us to obtain nonverbal (and to a considerable extent, unrealized, based on the unaware emotional assessments) estimates of the elements in terms of the categories of the given constructs.

All 10 alcoholic patients were given verbal and color repertory grids before and after KPT. We then calculated mean verbal repertory grid (MVRG) and mean color (nonverbal) repertory grid (MCRG) scores for all 10 patients. The final 4 MVRG and MCRG (2 before and 2 after KPT) were processed by the standard programs of repertory grid computer-assisted analysis (Fransella & Bannister, 1977), and then semantic spaces of the personality were built (Figures 1 and 2). The semantic space of the personality (built on the basis of multidimensional assessments of elements with constructs) shows semantic interrelationships and interconnections between elements and/or constructs of the repertory grid.

The results of this study demonstrated some positive changes in the semantic space of the personality of alcoholic patients, particularly in the space of personality characteristics of the color repertory grids. The image "Me now" was close to the image "Drunkard" and far from the group of such positive images as "Recovery alcoholic," "Ideal image of self," "Wife," "A man who gets on in life," and others in the semantic space of the MCRG before KPT (Figure lA). After KPT the image "Me now" became close to the group of positive images described above and far from the image "Drunkard" in the space of MCRG (Figure lB). At the same time, the image "Drunkard" became closer to the image

Figure 1
Semantic Space of the Mean Color Repertory
Grid of Alcoholic Patients

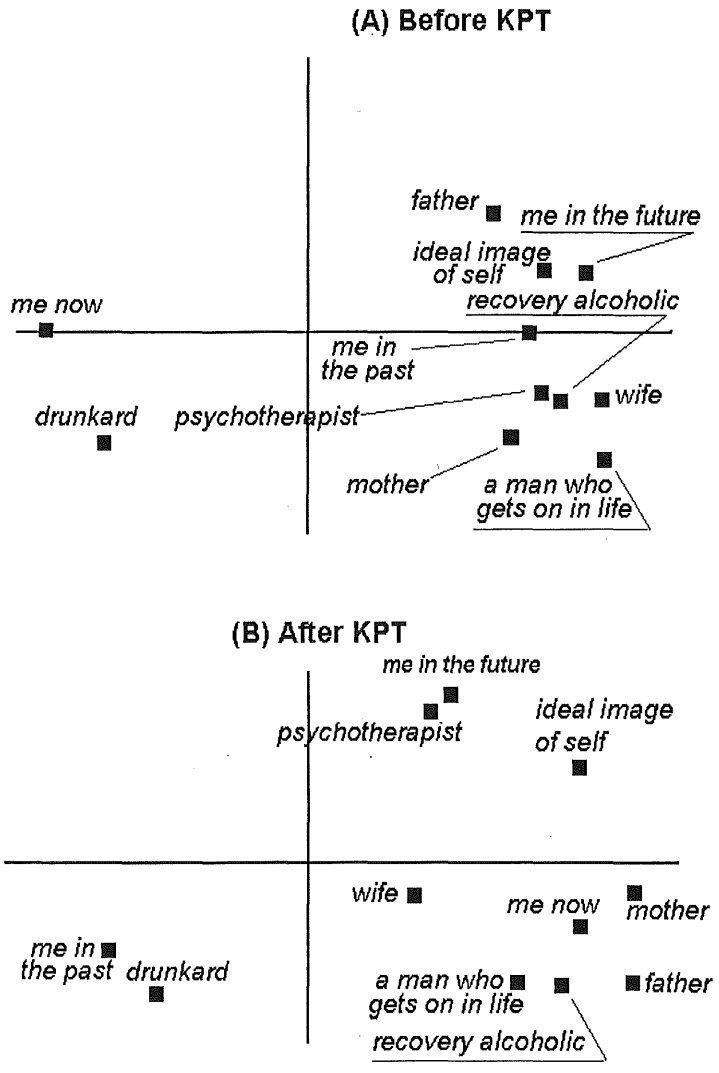
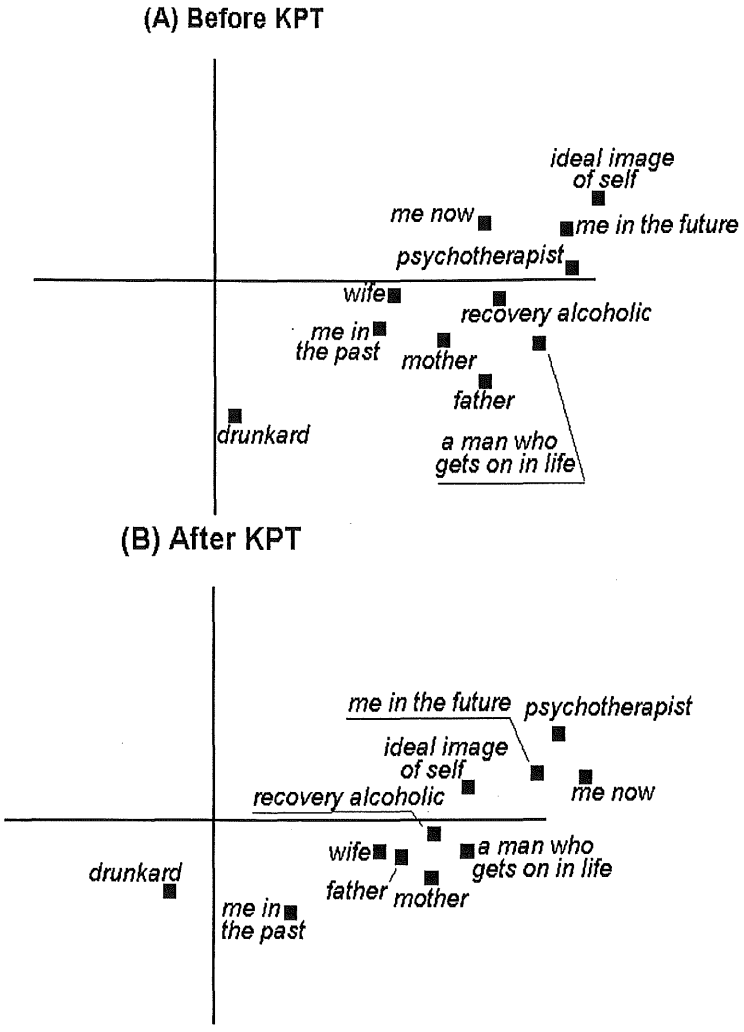


Figure 2
Semantic Space of the Mean Verbal Repertory Grid of Alcholic Patients



"Me in the past." These data testify that alcoholic patients emotionally perceived (identified) themselves as drunkards before KPT. After KPT their emotional perception of themselves changed; they emotionally identified themselves with recovery alcoholic and other positive images in the semantic space of personality characteristics and value orientations, and identified themselves as drunkards only in the past.

The changes in the verbal repertory grids were not as significant as in the color repertory grids (Figures 2A and 2B). Only the image "Drunkard" became a bit more distant from the group of positive images and closer to the image "Me in the past." It is interesting to note that patients identified themselves with the positive images at the level of verbal self-identification in the semantic space of personality characteristics and value orientations even before KPT, whereas they identified themselves in the same way at the level of nonverbal (unaware, mostly emotional) perception only after KPT. This means, first, that KPT creates a profound nonverbal self-concept associated with sobriety, and second, that KPT brings about the attainment of similarity (resemblance) of verbal (realized) and nonverbal (unaware) perception by the patients of their individual selves and the world.

These data testify that KPT positively transformed mostly the nonverbal (unaware, mainly emotional) perception of alcoholic patients of their individual selves. Thus, it is possible to conclude that KPT positively transformed mainly the emotional self-identification (self-concept) of alcoholic patients.

4.1.3. Content Analysis Data

We also carried out a content-analysis of the psychedelic experiences written down by our patients after their KPT sessions. These descriptions (see Appendix) often had common plots: a violent movement in various types of tunnels and corridors; the experience of the separation of consciousness from the body; a symbolic experience of death and rebirth; identification with inanimate objects; fear of an apocalyptic end to the world; a sensation of losing one's self image; suffering from loneliness; a rupture of relations with one's family; a feeling of being lost in the Universe; a sensation of lack of self-control; feeling dependent upon a frightening chaotic movement; falling through space; a terror of closed space and no exit; an unexpected exit and rebirth associated with an oceanic feeling and becoming part of the Universe; a feeling of being connected with a Supreme Power or God; and the awareness of the reality of other dimensions or worlds no less real than ours. Ketamine produced (in the same person) diverse experiences ranging from spiritual enjoyment to fear and even horror. All of these experiences were extremely intense, clear and compelling. Many people also reported difficulty in expressing their experiences in words.

Despite the common topics in patients' experiences, the themes were almost always individually specific, and reflected, in symbolic form, the individual's case history and personality problems (see Appendix). Supported by group psychotherapy, patients were able to interpret more clearly what they had experienced during their session, initially in symbolic form, and address the personal psychological problems that were uncovered during the ketamine session. Such an interpretation had particularly to do with problems associated with alcohol dependence, and the positive prospects for a sober life; that is, patients attributed the negative aspects of the ketamine session to alcohol and the beneficial effects of the ketamine session to the idea of a sober life. This provided favorable psychological conditions for the patients to feel, reflect upon, and accept the personal implications of a sober lifestyle. Moreover, after KPT the patients reported a sensation of "catharsis" and "resolution" of a whole series of their psychological problems associated with alcohol dependence ("What has accumulated in me, i.e., everything associated with drinking, burst out of my consciousness, my soul. I feel relieved."—patient V.S.). The reflection upon and processing of their psychedelic experiences undoubtedly was an important mechanism in preventing relapse, and in forming and solidifying attitudes and behaviors conducive to sobriety.

It is of interest to note that a content analysis of the written self-reports of 108 male alcoholic patients whose personality characteristics were defined by the MMPI, demonstrated a number of statistically reliable correlations between some MMPI scales and the content of the psychedelic experience described in self-reports. For example, the scores of the hypochondria scale (HS) were correlated with such characteristics of patients' self-reports as the "feeling of separation of consciousness from the body," "fear," "rapid movement (in the labyrinths)," "memories about friends," "positive attitude toward a psychotherapist," "feeling of flight," etc. The scores of the psychopathic deviation scale (Pd) were correlated with such characteristics of self-reports as "feeling of separation of consciousness from the body," "curiosity," "depersonalization experience" (losing Ego), "cosmic experiences," etc. The hypomania (Ma) scale was correlated with 14 characteristics of patients' self-reports, psychopathic deviation (Pd) with 10 characteristics, hypochondria (HS) with 8, depression (D) with 6, hysteria (Hy) with 5, social introversion (Si) with 5, masculinity (Mf-m) with 3, schizophrenia (Sc) with 3, psychasthenia (Pt) with 3, and paranoia (Pa) with 1. Thus, one may conclude that the ketamine psychedelic experiences are to a certain extent determined by the personality characteristics of the patients.

In addition, we have demonstrated a relationship (statistically reliable correlations) between the content of the ketamine session experiences and the MMPI profile changes caused by KPT. This means that the content of the ketamine session experiences, to a certain extent, determines the personality changes caused by KPT.

We also found that the more negative the experiences during the ketamine session, the longer the remission period. This underscores the importance of the negative aspects of alcoholism being addressed directly by the deep levels of mind during the ketamine session. The enhanced recollection of negative effects may prevent the psychological defenses of information suppression in consciousness deemed important in alcoholism (Gaboyev, 1989). In this case, a patient either denies the illness or the internal representation of the illness has no emotional component. Thus the role of the therapist is to de-suppress ideas regarding the disease, which we believe KPT is successful in doing.

4.1.4. Effect on Life Values

Thirty patients administered the LCS (see 4.1.1.3) were also given the Questionnaire of Terminal Life Values (QTLV) developed by Senin (1991) and based on Rokeach's approach to human values and beliefs (Rokeach, 1972, 1973). Patients were given the QTLV twice: before and after KPT.

This study demonstrated a number of significant positive changes in patients' values as a result of KPT (Table 3). KPT enhanced the importance of such life values as creativity, self-perfection, spiritual contentment, social recognition, achievement of life purposes, and individual independence. These changes were mostly expressed in such areas of life values actualization as family, education, and social life (Table 3). It is evident that such a positive transformation of the patient's life values system brings about enhanced motivation for a sober life and favors sobriety.

4.1.5. Effect on Grasping the Meaning of Life (Purpose in Life).

Ten alcoholic patients (average age, 41.1 ±2.4 years) were studied before and after KPT with the Purpose-in-Life Test (PLT) elaborated by Crumbaugh (1968) and based on Frankl's (1978) concept of a human being's aspiration for the meaning of life. The PLT was adapted in Russia by Leontiev (1992) in the Department of Psychology of Moscow State University.

Table 3
KPT Influence on the Life Values

Time of assessment	Life values								Areas of life values' actualization				
	Social recognition	High standard of living	Creativity	Active social contacts	Self-perfection	Achievement of life purposes	Spiritual contentment	Individual independence	Professional	Educational	Family	Social life	Hobbies
Before KPT	27.5 ±1.0	31.4 ±1.6	25.6 ±1.4	28.0 ±1.3	28.2 ±1.4	28.3 ±1.4	30.1 ±1.4	26.7 ±1.1	51.2 ±2.2	45.3 ±2.4	46.3 ±1.8	38.8 ±1.9	44.2 ±2.1
After KPT	* 31.1 ±1.1	32.1 ±1.2	* 29.6 ±1.4	31.4 ±1.3	** 33.6 ±1.4	* 33.1 ±1.3	** 34.7 ±1.0	** 30.8 ±1.0	56.0 ±1.4	* 52.5 ±2.3	* 51.6 ±1.5	** 46.3 ±2.0	49.2 ±2.1

Note:
1) Statistical significance of differences between the values before and after KPT (Student's *t*-test):
(*) $p < 0.05$; (**) $p < 0.01$.

This study indicated that KPT causes a significant increase in the index of grasping the meaning of life in alcoholic patients (from 89.7 ±5.7, to 115.3 ±3.2; $p < 0.01$). Before KPT, the index of grasping the meaning of life was below the average normal level, but after KPT it was higher. These changes indicate that after KPT patients were able to better grasp the meaning of their lives, and their life purposes and perspectives. Life became more interesting, more emotionally saturated, and filled with more meaning after KPT. The patients felt themselves more able to live in accordance with their concept of the meaning of life and life purposes as a result of KPT. Such changes favor sober life, particularly from the standpoint of Frankl's approach, which considers alcoholism to be an "existential neurosis"—a consequence of losing the meaning of life, and the appearance of a specific "existential void" (Frankl, 1978); KPT, we believe, is able to fill in this void, at least to some extent.

4.1.6. Effect on Spirituality

We have studied the influence of a profound mystical (transformative) experience during KPT on the level of spiritual development of alcoholic patients. For the assessment of the changes of spirituality, we used our own Spirituality Scale based on a combination of the Spirituality Self-Assessment Scale developed by Charles Whitfield, who studied the importance of spirituality in alcoholism therapy in Alcoholics Anonymous (Whitfield, 1984), and the Life Changes Inventory developed by Ken Ring to estimate the changes in values and purposes of life produced by near-death experiences (Ring, 1984). We have studied three groups of people with our Spirituality Scale: (1) 25 alcoholic patients before and after KPT (average age, 37.8 ±1.3 years); (2) 21 alcoholic patients before and after a 15-day autogenic training program (technique of deep relaxation and self-hypnosis) (average age, 40.9 ±1.7 years); (3) 35 healthy volunteers before and after a four-month meditation course (average age, 37.9 ±1.6 years). It was demonstrated by our Spirituality Scale that the increase in the level of spiritual development of our alcoholic patients due to KPT was comparable to the increase induced in healthy volunteers by a special course of meditation, and was much greater than the changes in spiritual development induced in alcoholics by a program of relaxation training and self-hypnosis (Table 4). It is evident that the increased spiritual development induced by KPT in alcoholic patients is very auspicious for sobriety. Moreover, the results of the study of KPT's influence on spirituality testify that KPT is much more than simply the creation of an attitude in alcoholic patients toward a sober life. These results testify that KPT brings about profound positive changes in life values and purposes, in the attitudes toward various aspects of life and death, and, in turn, in the alcoholics' worldview. Many reports suggest religious or spiritual conversion as an important factor in "spontaneous" recovery from drug abuse, and Alcoholics Anonymous programs have a distinctly spiritual/religious orientation (Corrington, 1989; Grof, 1990; Whitfield, 1984). A therapy that enhances the likelihood of a conversion type experience therefore might have utility in the treatment of substance abuse. Psychedelic drug-assisted psychotherapy may represent one method to elicit spiritual/religious experiences in patients with chemical dependence.

Thus, the enhanced spirituality in patients after KPT might be an important element of the therapeutic action. Regarding spiritual experiences induced by ketamine, it is interesting that many of the patients who prior never thought about spirituality or the meaning of life now reported having profound religious transformative experiences. At the ketamine session, people often experienced the separation of consciousness from the body and the dissolution of the body ego. For many patients, the fact that they could exist without their bodies, as pure consciousness or as pure spirit, was a profound insight. Some of them said that as a result of their experience, they understood the Christian notion of the separation of the soul and the body. Some people reported contact with God, and after returning to ordinary consciousness, they felt sure that they had had contact with a higher power. Many patients reported the existence of other dimensions or other worlds that are parallel to ours and seem as real or even more real than our own. Some patients experienced the expansion of consciousness to encompass the whole universe, whole cosmos, etc. They often said something like: "I ceased to exist,

Table 4
The KPT Influence on Spirituality (in comparison with other influences)
According to the Spirituality Scale

Meditation Group		KPT Group		Autogenic Training (self-hypnosis) Group	
The amount of answers testifying to:		The amount of answers testifying to:		The amount of answers testifying to:	
spiritual growth	absence of spiritual growth	spiritual growth	absence of spiritual growth	spiritual growth	absence of spiritual growth
28.1 ±0.8	12.9 ±0.9	21.3 ±0.8	19.7 ±2.1	1.8 ±0.1	39.2 ±0.1

I disappeared, yet still, just my consciousness existed. It was like I became the whole universe or the whole cosmos" (see Appendix).

It seems ironic that so many of our patients, through their own experience, were converted to a more spiritual approach to life, despite living in a country where people have been brought up for generations with atheism. We suppose that our positive clinical results in maintaining sobriety were not achieved simply because we were more successful in establishing a set of sobriety and a deeper negative attitude toward alcohol, but rather because of changes in the values, relationships, and worldview of these patients. They began to see other purposes, other values, other meaning and pleasures in their lives, and this was the main reason for their sobriety.

Thus, the changes in the psychological test battery show that the patients grew more self-confident, more sure of their abilities and in their future, less anxious and neurotic, more balanced, more emotionally open and self-sufficient, and more responsible for their life and future.

We observed a transformation of patients' emotional attitudes, a decrease in the level of self-disharmony, anxiety and internal tension, discomfort, and emotional isolation, along with an improvement of self-assessment and the appearance of a tendency to overcome the passive position of their personalities. We observed a certain positive transformation of the patients' system of life values and meaning, and even some worldview changes. All of these changes favor sober life.

In conclusion, then, we believe that the efficacy of KPT can be interpreted from psychodynamic, hypnotherapeutic/suggestive, and spiritual approaches.

4.2. Underlying Biochemical Mechanisms

We also carried out biochemical investigations of the underlying mechanisms of KPT. We took blood samples from 21 male alcoholic patients one day before and during the ketamine session to determine dopamine, GABA, and serotonin concentrations in blood, monoamine oxidase type A (MAO-A) activities in blood serum and MAO type B (MAO-B) in blood platelets, and ceruloplasmin activity and β-endorphine content. The dopamine concentration was determined by Kogan's method (Kogan & Netchayev, 1979); GABA by the method of Sutton and Simmonds (1974); serotonin by the method of Loboda and Makarov (Kolb & Kamyshnikov, 1976); MAO-A activity by the method of Stroyev and Gusak (1983); and ceruloplasmin activity by Moshkov's method (Moshkov et al., 1986). Blood platelets were excreted by the usual method (Baluda et al., 1980) and then MAO-B activity, with benzylamine as substrate, was determined (Voloshina & Moskvitina, 1985). β-endorphine level in blood serum was determined with radioimmunoassay (Ayrapetov et al., 1985).

The results of the biochemical investigations (Table 5) show that during the ketamine session there occurred a real decrease in the activity of MAO-A in blood serum and MAO-B in blood platelets, and that there was an increased dopamine level in the blood. Serotonin and GABA concentrations were not altered significantly. The increase in ceruloplasmin activity was statistically significant and the β-endorphine level increased during the KPT session (Krupitsky et al., 1990).

The changes in neurotransmitter metabolism have some notable aspects. First, they allow some opinions about the underlying neurochemical mechanisms of ketamine psychedelic action to be formed (Krupitsky et al., 1990). For example, an increase of ceruloplasmin activity causes a correspondent increase of the conversion of monoamines into adrenochromes which have hallucinogenic activity. This is particularly related to the conditions of the inhibited MAO activity and increased dopamine level. It is of interest that such conditions are typical for the action of many hallucinogens (Hamox, 1984; McKenney et al., 1984).

Table 5
The Changes of Biochemical Indices During KPT Session.

Indices	Before KPT	During KPT
Serotonin (μg/ml)	0.035 ±0.001	0.037 ±0.001
Dopamine (ng/ml)	117.9 ±5.6	141.3 ±7.8**
GABA (ng/ml)	39.6 ±1.9	39.6 ±2.2
MAO-A (μmol/l•h)	10.47 ±0.68	7.87 ±0.73**
MAO-B (nmol/mg•h)	80.49 ±4.70	67.15 ±4.31*
Ceruloplasmin (mg%)	21.7 ±0.9	24.3 ±1.2*
β-endorphine (pmol/l)	10.30 ±0.93	15.25 ±1.65**

Note:
1) Statistical significance of differences between values before and during KPT (Student's *t*-test):
(*) $p < 0.05$; (**) $p < 0.01$.

Second, the fact that the pharmacological action of KPT effected both monoaminergic and opioidergic systems, that is, those neurochemical brain systems which are involved in the development (pathogenesis) of alcohol dependence, is an important outcome of this biochemical investigation. It is possible that precisely this fact causes, to a certain extent, the efficiency of this method.

4.3. Underlying Neurophysiological Mechanisms

Another direction of our research was EEG computer-assisted analysis of the underlying mechanisms of KPT for alcoholism. We carried out EEG recordings in seven male alcoholic patients (average age, 35.0 ±4.4 years) before, during, and after their ketamine sessions, placing 16 electrodes according to the international 10/20% scheme. Ear electrodes were used as the reference. After analog-digital conversion, standard programs for computer-assisted spectral EEG analysis (fast Fourier transformation) and topographic mapping of EEG (EEG topography) were employed.

According to the data of the EEG computer-assisted analysis, we discovered that ketamine increases delta-activity (by 1.5-2 times) and particularly theta-activity (3-4 times) in all regions of the brain cortex (Figure 3 and Table 6). This is evidence of limbic system activation during ketamine sessions, as well as evidence of the reinforcement of the limbic-cortex interaction. The reinforcement can also be considered, to a certain extent, as indirect evidence of the strengthening of the interactions between the conscious and subconscious levels of the mind during KPT.

Our EEG results are very consistent with the results of studies of neurophysiological underlying mechanisms of ketamine action in animals. In particular, it was suggested that ketamine blocks thalamocortical projections and at the same time activates limbic structures (Kayama, 1973). This means ketamine blocks transmission via the thalamus into the cortex of incoming signals from all sensory modalities, including signals from the outer world and one's own body (e.g., pain, proprioception).

In these circumstances, the cortex interaction with activated limbic structures is significantly enhanced, or, to put it another way, the cortex is just "shunted" onto the limbic structures, which are known to be involved in the processes of emotion, motivation, memory, and subconscious experiences and perception (Simonov, 1987). There is also a body of evidence that the major underlying mechanism of ketamine action on the brain is the blockade of the N-methyl-D-aspartate (NMDA) receptors, which are mostly located in the cortex and hypocampus, and involved in the processes of integration and transmission into the cortex of incoming signals from all sensory modalities (Krystal et al., 1994; Oye et al., 1992). Thus, a significant reduction of sensory transmission and activation of autonomous cortex-limbic interactions may be an important underlying mechanism of ketamine psychedelic action. Also, there are some data indicating that interaction between the frontal cortex and the limbic brain is particularly important for the ketamine action on the brain. For example, it has been demonstrated in positron emission tomography (PET) studies that ketamine results in a specific hyperfrontal metabolic pattern in the human brain associated with psychedelic experiences (hallucinations and ego-dissolution) (Vollenweider et al., 1994). Also, frontal lobotomy reduces the psychedelic response to phencyclidin (which is very similar to ketamine) in schizophrenic patients (Itil et al., 1967). Thus, it is possible to conclude that ketamine activates interaction between brain structures associated with cognitive processing of information (frontal cortex) and structures involved in the processes of emotion, motivation, memory, and subconscious experiences and perceptions (limbic structures).

Such enhanced interaction may be an important neurophysiological mechanism underlying the phenomenology of ketamine psychedelic experiences, and also the dramatic psychological changes caused by those experiences.

Figure 3
EEG Power Spectrum Map

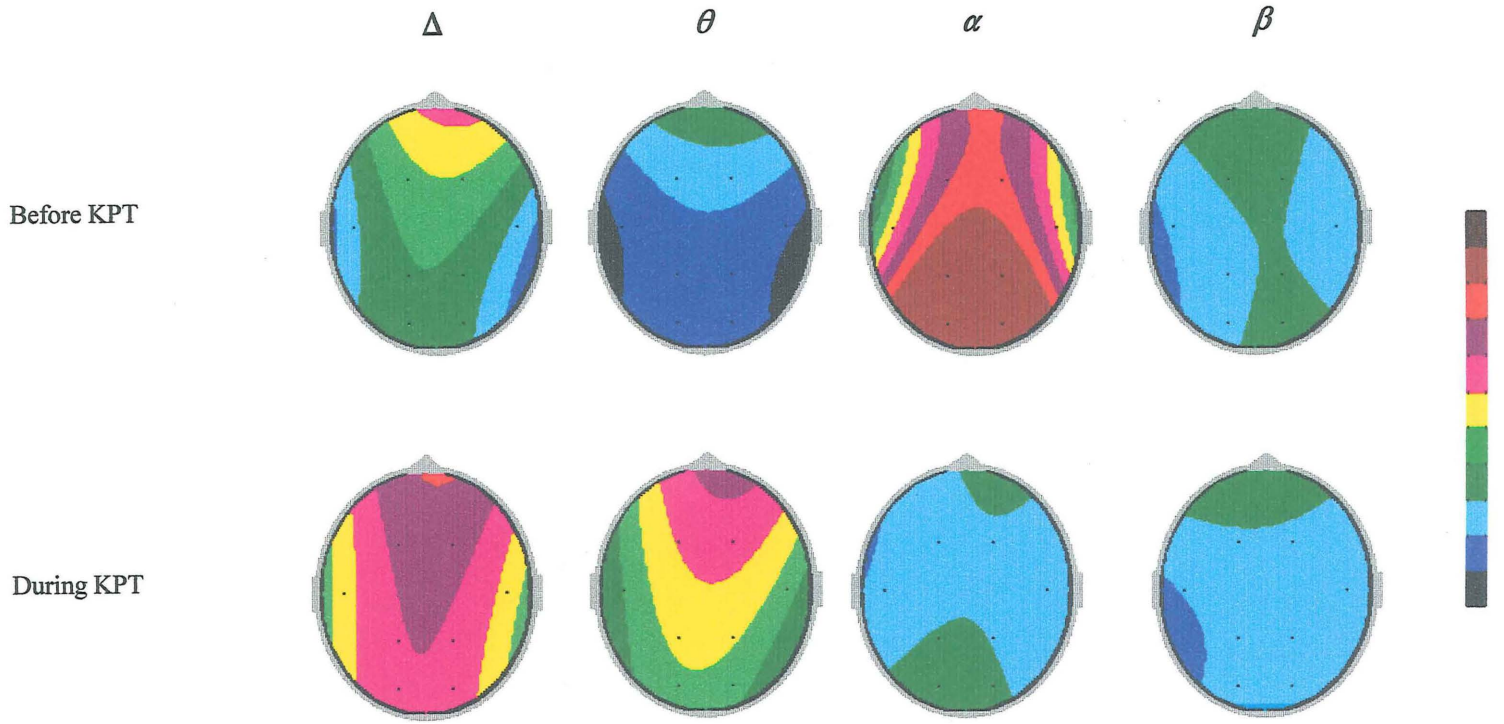


Table 6
EEG Power Spectrum Modulations During KPT Session.

Hemisphere	Electrodes positions (brain regions)	Before KPT session				During KPT session				After KPT session			
		EEG diapazones power (%)				EEG diapazones power (%)				EEG diapazones power (%)			
		delta (δ)	theta (θ)	alpha (α)	beta (β)	delta (δ)	theta (θ)	alpha (α)	beta (β)	delta (δ)	theta (θ)	alpha (α)	beta (β)
Right hemisphere	Frontal (F-R)	24.7 ±2.4	12.8 ±4.5	45.3 ±3.4	17.2 ±2.9	35.1 ±3.1	37.5 ±3.5	14.1 ±3.1	13.3 ±2.3	26.6 ±4.3	11.5 ±3.2	47.9 ±6.5	14.0 ±1.7
	Parietal (P-R)	18.6 ±4.2	7.6 ±1.9	56.9 ±7.2	16.9 ±5.1	37.0 ±3.8	32.5 ±3.3	17.0 ±5.4	13.5 ±2.3	20.9 ±4.8	7.5 ±1.3	58.5 ±6.6	13.1 ±2.3
	Occipital (O-R)	15.3 ±3.6	7.1 ±2.6	62.7 ±9.0	14.9 ±4.5	36.9 ±3.8	31.0 ±4.1	17.2 ±4.9	14.9 ±2.8	13.9 ±2.1	6.3 ±1.8	68.0 ±3.8	11.8 ±1.5
	Temporal (T-R)	22.2 ±2.4	9.2 ±2.1	49.7 ±6.3	18.9 ±4.7	36.8 ±2.2	32.9 ±3.3	16.1 ±5.5	14.2 ±2.4	23.1 ±4.7	9.2 ±2.0	54.2 ±7.5	13.5 ±2.1
Left hemisphere	Frontal (F-R)	26.1 ±2.7	12.1 ±4.2	46.3 ±6.1	15.5 ±2.1	37.4 ±3.9	34.4 ±3.0	14.1 ±3.1	14.1 ±2.6	26.0 ±3.7	11.5 ±3.2	47.3 ±8.2	15.2 ±2.5
	Parietal (P-R)	20.5 ±4.5	7.9 ±2.4	59.2 ±7.3	12.4 ±1.9	38.1 ±4.6	33.8 ±4.3	16.0 ±3.7	12.1 ±1.4	20.6 ±1.9	7.5 ±1.1	58.5 ±12.4	13.4 ±2.3
	Occipital (O-R)	17.5 ±5.5	7.0 ±3.0	60.0 ±7.5	15.5 ±1.3	38.7 ±4.4	28.1 ±2.8	19.3 ±3.7	13.9 ±3.2	16.0 ±2.1	6.5 ±1.2	65.9 ±3.1	11.6 ±1.2
	Temporal (T-R)	24.9 ±3.7	9.8 ±3.2	50.6 ±4.9	14.7 ±2.1	40.2 ±5.1	34.3 ±4.5	13.7 ±1.6	11.8 ±1.8	24.5 ±3.4	11.4 ±1.4	49.8 ±2.9	14.3 ±2.2

Note:
1) The increasing of delta- and theta-activities and decreasing of alpha-activity are statistically significant in all brain regions during KPT sessions.

5. Conclusion

We have been working with KPT since 1985 and have since used KPT to treat more than 1000 alcoholic patients without any complications (such as protracted psychoses, flashbacks, agitation, or ketamine abuse). Thus, KPT seems to be a safe and effective method of treatment for alcohol dependence. It seems to be an especially powerful tool in Russia, where there was no psychedelic revolution in the 1960s, where no one knew what "psychedelics" meant, and where no one could imagine these drugs being used for fun or recreation—circumstances making KPT seem particularly unusual and powerful in Russia.

6. Separate Clinical Studies of KPT for Drug Dependence, Personality Disorders, and Neuroses

6.1. Clinical Observations

Our clinical observations suggest that KPT might also be helpful for the treatment of other kinds of drug dependence (heroin, ephedrine). In these cases, we injected small doses of ketamine, repeatedly, which allows for the maintenance of a constant verbal relationship with the patient. It is important to be careful when applying KPT to drug addicts. However, we believe that KPT might induce in some drug-abusing patients psychotherapeutic effects similar to those we have seen in working with alcoholics.

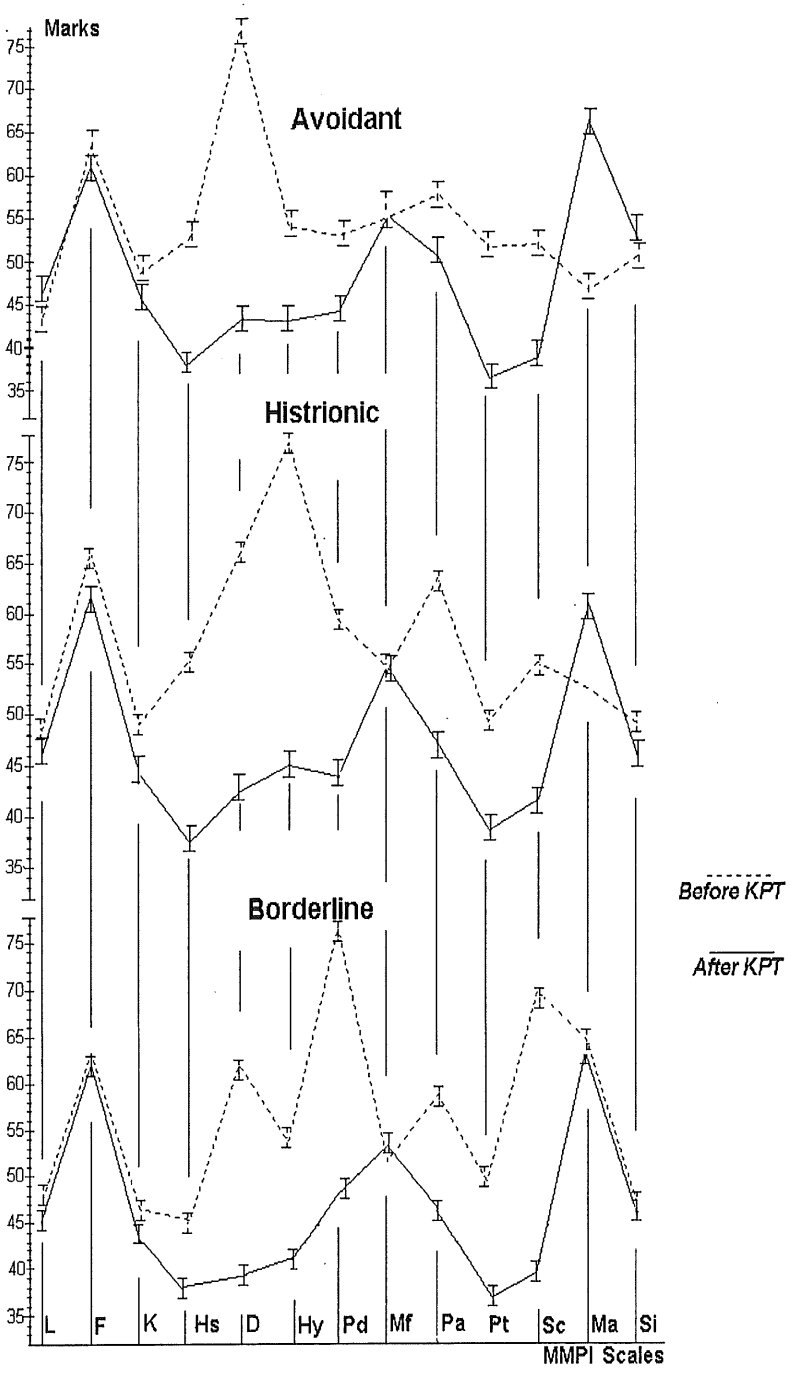
Ketamine psychedelic therapy turned out to be effective for the treatment of personality disorders in alcoholic patients (Ivanov et al., 1995). Sixty four alcoholic patients with different personality disorders (avoidant, 20 patients; histrionic, 21 patients; borderline, 23 patients) were treated with KPT. Clinical data (Bekhterev Psychoneurological Research Institute rating scales) and psychological (MMPI; Spielberger State-Trait Anxiety Scale; T. Leary test of interpersonal relationships) studies showed the differential efficacy of ketamine psychedelic psychotherapy in the different groups of patients. KPT turned out to be very effective in patients with avoidant personality disorders, less effective in patients with histrionic personality disorders and least effective in patients with borderline personality disorders. It should be noted that KPT positively influenced the personality characteristics assessed by the MMPI in all groups of alcoholic patients with personality disorders (Figure 4).

The potential of ketamine-assisted psychedelic therapy is not restricted to the treatment of addiction. According to data from our pilot study (20 patients; 7 male and 13 female), ketamine-assisted psychedelic therapy is also quite effective in treating neurotic disorders. This research has demonstrated that the efficacy of ketamine psychotherapy differed with various forms of neuroses: psychedelic therapy turned out to be most effective in treating neurotic (reactive) depression and post-traumatic stress disorders, and least effective in treating obsessive-compulsive and phobic neuroses. Hysterical neurosis appeared to be most resistant to psychedelic therapy.

6.2. Psychosemantic Fields of Patients with Neurotic Disorders: A Study with Repertory Grids (Kelly Matrices)

We carried out specific research into the influence of ketamine psychotherapy on the psychosemantic fields of 14 patients with neurotic disorders. For this purpose, we again employed the technique of the so-called "assessment repertory grids" (Kelly Matrices) (Fransella & Bannister, 1977). The grids were arranged such that their 12 elements were replaced by various aspects of the patients' "ego" and other significant persons (e.g., "Me now," "Me in the future," "Me in the past," "Ideal image of self," "Neurotic patient," and "Healthy man"). As for the constructs, 14 pairs of categories (construct poles) were preset to describe characteristics of the patient's psychological state and traits of character which were significant from the standpoint of humanistic psychology (e.g., "A man/woman who is feeling

Figure 4
Personality Changes in Alcoholic Patients
With Personality Disorders (MMPI Data)



inner tension, anxiety—A man/woman who is feeling him/herself in peace and quiet," "A man/woman who is seeing meaning in his/her life—A man/woman who supposes his/her life has no meaning at all," "A man/woman who is feeling him/herself responsible for his/her life—Fatalist"). We employed two techniques for filling in the repertory grids. According to the first (conventional) one, a patient placed each of the elements at a certain point along the calibrated scales preset by the construct poles (assessed each element with all construct scales). The second technique we specially developed to measure changes in nonverbal (and in this sense, less reflexive) psychosemantics. This involved the following procedures: first, a patient arranged the 8 colors of the Lüscher test in order of correspondence (similarity) to each of the grid elements (from the most similar, suitable color to the most different, unsuitable color). Next, the patient arranged the same colors in the order of correspondence to the poles of each of the constructs. Comparing the similarities of the positions of the colors in the two allotments (by the correspondence to a certain element, and by the correspondence to the poles of a certain construct), we quantitatively estimated the closeness of this element to the poles of the given construct. The second ("color") technique allowed us to obtain nonverbal (and to a considerable extent, unrealized, based on the unaware emotional assessments) estimates of the elements in terms of the categories of given constructs. All 14 neurotic patients were tested with verbal and color repertory grids before and after KPT. Then we calculated mean verbal repertory grid (MVRG) and mean color (nonverbal) repertory grid (MCRG) scores for all 14 patients together. The final 4 MVRG and MCRG scores (2 before and 2 after KPT) were processed using the standard programs of repertory grid computer-assisted analysis (Fransella & Bannister, 1977); next, semantic spaces of the personality were built (Figures 5 and 6). The semantic space of the personality (built on the basis of multidimensional assessments of elements with constructs) shows semantic interrelationships and interconnections between elements and/or constructs of the repertory grid.

The results of this research demonstrated that after ketamine-assisted psychedelic therapy, the neurotic patients showed, as a rule, positive changes in the estimates of their individual selves. These changes concern both verbal and nonverbal estimates, and evidence a certain reduction of neurotic symptoms (Figures 5 and 6). For example, before KPT, in the semantic space of MCRG, the image "Me now" was far from the images "Ideal image of self," "Me in the past," "Me in the future," and "Healthy man," but close to the "Neurotic patient" (Figure 5A). At the same time, such images as "Ideal image of self," "Me in the past," and "Healthy man" were close to each other. This means that before KPT patients felt they were healthy in the past, but not now. After KPT, in the semantic space of the MCRG image "Me in the past" was close to the image "Neurotic patient," but these two images were far from the group of images "Ideal image of self," "Me in the future," "Me now," and "Healthy man" (the last four images were close to each other) (Figure 5B). This means that after KPT patients felt they were neurotic in the past, but healthy now, and would continue to be healthy in the future. Similar positive tendencies took place in MVRG after KPT (Figures 6A and 6B). These data provide evidence of significant positive changes after KPT both in verbal (realized) and nonverbal (unaware, mostly emotional) self-perception of neurotic patients. Thus, it is possible to conclude that KPT positively transformed the self-concept of neurotic patients both at the level of verbal reflection and emotional perception.

7. Appendix: Patients' Self-Reports

The process by which therapeutic interventions during the KPT session induce therapeutic attitudes can best be illustrated by several representative self-reports from patients describing and interpreting their experiences. These self-reports were written down by the patients on the day after the ketamine session, and then discussed during the final group session, several days after the patients' ketamine experiences.

Figure 5
Semantic Space of the Mean Color Repertory
Grid of Neurotic Patients

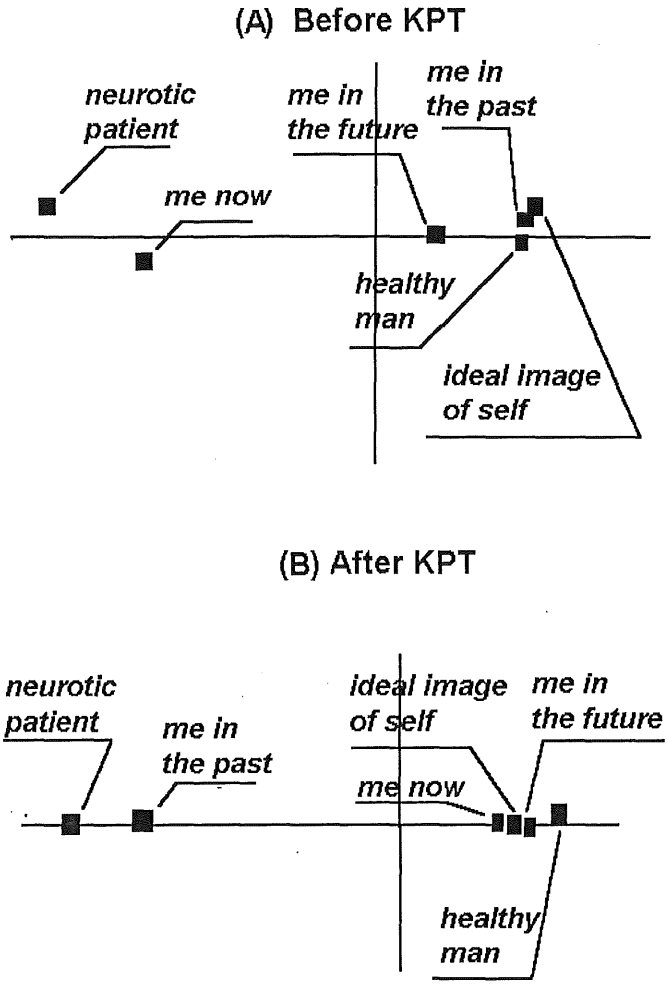
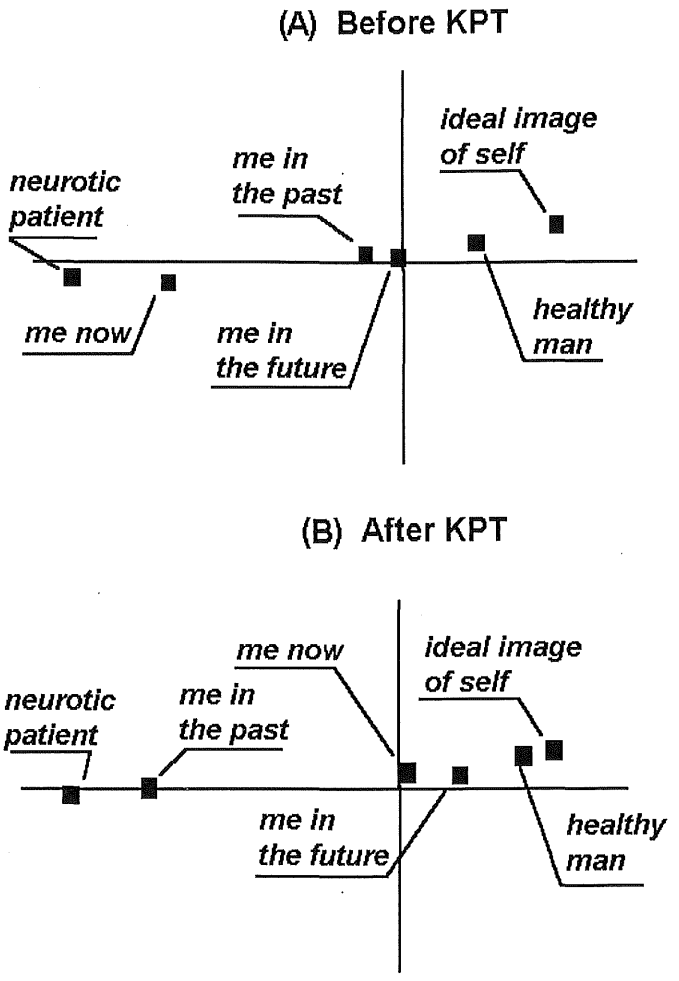


Figure 6
Semantic Space of the Mean Verbal Repertory
Grid of Neurotic Patients



Patient P.Kh.:

> I found myself inside a gigantic tunnel whose mouth reached a terrifying height, and there, on the top, was nothing . . . A red capsule spiraled rapidly to the top along the surface of the tunnel. And I was in this capsule, or even this capsule was myself and it was I who was rushing towards nothing. But at the same time, I regarded myself in a detached spirit, as if I were split apart . . . Abruptly, I found myself on the top of the tunnel. What I saw made me shudder with horror. A horrible, dark, and cold abyss gaped in front of me. It was as if I were in an open space, infinite and impossible to perceive. Each cell of my body felt the horror of this abyss. One more turn and I would find myself in this obscurity and drop and drop endlessly . . . Even after the procedure, when I remembered this, it made me feel uneasy . . . But there was no other turn. Everything got mixed up, went round, and this whirl took me upward . . . I felt that I was rushing at a high speed along some glass tunnel; through the glass I could see somebody's face and somebody asked me if I would drink. I answered that no, I wouldn't . . . I came to understand that this gaping abyss where I would be completely alone would be my fate, if I would not give up drinking.

Patient A.S.:

> Sticky masses began to attack my body, to melt it. Fear invaded me. Everything around me was in a whirl. One thing overlapped another. I felt the odor of alcohol. I felt excruciating aversion, fear, presentiment of death. Bright objects replaced one another at a crazy speed, everything went round, and I went round too. It seemed to me that I would never get out of this nightmare, that I was slowly and painfully dying, that I, my entire self, would melt in this black mass, but my brain would go on working. That I would feel, think, not live, but suffer . . . Some voice was talking about alcohol. I felt a strong aversion . . . Everything I saw resulted from my hopeless life, my alcoholism. As if the trash accumulated in me during years and years went out of me during an hour. I do not want it to repeat; I am afraid of this nightmare . . . I would never forget it . . .

Often the negative experiences and visions induced by KPT were immediately associated with alcohol:

> I lost myself. I felt bewilderment because I lost myself, my body. Then it was death. Death, a calm flight downward through dense gray-and-white clouds. And suddenly rebirth. At somebody's command I saw a series of terrifying pictures, red background. They moved horizontally, picture by picture, independently of each other. They depicted the sad scenes of "the alcoholic life." Filth, broken bottles, corpses, horrible faces, drunk grimaces. It was absolutely clear that this would be my future, the future of people like me (if we did not give up drinking). The desire to tell everybody as soon as possible where this would lead us was also horrible to feel. Fast movement by some strange vehicle, a kind of train. And here the disgusting smell of alcohol, then the oath of sobriety. Dissatisfaction that everything should be done some other way. People must know about my oath and hear it . . . (patient V.Z.)

A piece of cotton moistened in alcohol always induced in patients pronounced negative experiences and strong aversions:

> . . . everything around me started rotating. I felt weightless and cold. I heard the doctor's voice: "Your fear is a result of vodka. It is vodka that has led you to the

> edge of the abyss." And I felt the disgusting odor of vodka that constantly accompanied the whole procedure . . . (patient G.G.)
>
> I got to feel the smell of vodka. The aversion was so strong that it would be impossible to describe it . . . (patient A.K.)
>
> When I was allowed to smell a piece of cotton moistened in alcohol . . . I felt a fear for myself, my future, children. I felt I would go crazy or die of vodka . . . (patient D.F.)

Often, the hallucinatory experiences of the patients concerned their relatives, wives, or children:

> Then I was asked several times: "Your daughter's name is Inna? Do you love her?" Then my daughter and I started flying over whitish-green rocks. There were strange creatures all around us. They were dreadful, vague. Again I was allowed to smell and taste vodka. My body fell to pieces; one of its parts flew with my daughter and the creatures. So, I lost my daughter and found myself in blood. I was choking, spitting the blood out. Again I heard the voice; it told me that it all was due to vodka, that it was me who had let it be so . . . I would not see my daughter, I lost her . . . (patient S.L.)
>
> I saw my parents, wife, and children. They didn't approach me; they passed by, paying no attention to me . . . (patient S.Ya., who was afraid of losing his family)

The psychedelic experiences often involved the psychotherapist who tried to help the patient reach something desirable, get out of the nightmare, etc.:

> I could see that the doctor helped me to get out of these flows . . . Again, thinking of my family. Certitude that I would find my way to my people if I gave up drinking . . . (patient A.K.)

Due to such features of the psychotherapist's role, the patients attached great importance to the specific contact with the psychotherapist established during the procedure:

> I remember the beginning of our talk with the doctor, when he asked me not to lose the contact with him. I've got such a feeling that the contact was there during the whole procedure and it was positive and favorable . . . (patient V.G.)

Many patients mentioned that the words pronounced by the psychotherapist during KPT sounded unusual and especially powerful, and were very ponderable and significant. Some words differed from their usual sounding; they induced a pronounced emotional reaction:

> Most of all, I was annoyed by the word "vodka," more exactly, two letters "dk." A very inconvenient combination, this "dk." And just this combination almost physically tortured my consciousness." (patient V.K.)

It is of interest that the psychotherapist somehow was able to help the patients go from the horrible visions of their hallucinatory experiences to more clear and calm ones:

> They made me smell alcohol, it induced aversion. I remember crying: "I don't want it," "I won't drink." Then I began to dissolve in time and space; only my brain remained and it rushed about some narrow labyrinth. Bright flashes of light, dead ends, wherever you go. I felt a desire, an urge to get out of this space . . . Then,

> something like black-out, stop, flash, and a door to a new world . . . In the doorway I saw a doctor and somebody else . . . (patient S.L.)

The patients' experiences induced by KPT were not always negative. Sometimes they had a positive emotional coloring. Moreover, they were often associated with the sober life:

> Fast flight somewhere downwards. And at once I was going by some vehicle to a new, rose-colored world. Calm movement, warm bright yellow and pink colors. Pleasant feelings, interest, curiosity. It is probably that sober world where everything is all right, where there is no room but for smiles, calm movements, and the joys of life. (patient V.Z.)

By the presentation of alcohol and appropriate verbal influence, the therapist was able to, as a rule, turn such positive emotional experiences into negative ones.

Patients of higher intellectual levels and sensitivity generally had more vivid, colorful, diverse, and personality-relevant experiences which profoundly impressed them. Here are more examples of such patients' reports:

Patient P.F.:

> In my whole body music starts playing in synchrony with the switched-on taperecorder. I've got an irresistible feeling of being carried away. I try to resist it with all of my forces, but can't. It's as if a train disappears in the tunnel and you are flying after it into this black abyss and can't resist it. The music is deafening; your whole body obeys it. It is as if your body is pulsating in unison with the music. And you are flying in pitch-darkness, and at the same time you are hearing the doctor's voice telling you about aversion to alcohol, about the sober life and so on. Then, a flash of light. You are always moving and feel as if you are a ball among other balls rolling along the corridor lined with similar balls. Always dead ends, turns, flights, and drops; turning into a cube with smooth edges. The illumination and color of the corridor where you are rolling also changes. Or, suddenly everything is ruined by a wave, and you are going with the wave along the corridor. Then, everything bumps into something. The splash reaches the sky, and you become a brilliant white point flying in space. Then you burst into thousands of splashes, and again turns, nooks, flights and drops, but always in a rush and always ahead, ahead . . . Abruptly, everything starts going round, becomes a small point. This point turns into a golden hair, and the whole Universe turns out to be hanging by it. You see it clearly. You are feeling the responsibility for everything alive and this depresses you. Then everything turns into silvery stars forming a dome and you are one of the stars. Then the whole dome collapses and turns into one dot. A gold splash appears against the blue background. It turns into a flower. The flower opens and there, in the flower, I see my son, and somebody's voice is saying: "That is most important."

Everything the patient experienced was then interpreted by him (with the help of the therapist) in order to solidify positive attitudes toward a sober life, family, responsibility for his son and his upbringing, etc.

Patient S.K.:

> I felt that my legs did not move and my body started stretching and falling down at a crazy speed. My consciousness concentrated at one point and became a part of the scene. I was flying to infinity along something like channels that interlaced and joined one another (everything was brightly-colored: orange, red). Gradually this crazy dance grew slower. I found myself in some closed space. At that moment an unconscious fear invaded me. Fear that I would never get out of this state, the state of being a part of something and not myself. The space where I was started filling with a solid foam. I was cornered. At the last moment, when I saw that I couldn't get away, that the space I occupied was the only free spot, I heard something splash and felt myself free. Everything around became understandable (I thought that it was impossible to live the way I had lived). My family came distinctly to my mind . . . Now it was as if my consciousness was over the things that were under me. Everything below looked like some brown layers: as if a clot of brown dough scattered in the air and came down to the earth and covered it all over. It seemed to be my past life. Again, a strong fear overwhelmed me as I was pulled to this brown mess. All of me rose against it. I deeply desired to live, to live as everybody else, and never see this nightmare again. And my desire won. At this point I felt as if I opened my eyes and regained my sight. I saw a window, a green tree and the blue sky . . .

Everything the patient had seen and felt in this case (as in all other cases) was discussed and interpreted by him with the help of the psychotherapist, in order to work out and solidify the positive attitude toward a sober life.

Patient V.K.:

> As soon as I had been brought to the state of unconsciousness, I started sliding in a curve on the vertical plane. The latter was distinct and represented a blue line against the clearly visible and illuminated background. The thought: Somewhere there is a point which is important for you, which you should not miss, since it is a matter of life or death. I slid for quite a long time, but I never met this point. Abruptly, I found myself in a cave on the top of a high granite rock . . . The rock rose high about the ocean that exactly resembled the thinking ocean of Lem's "Solyaris." The ocean was brownish-crimson, swirling, and looked like the upper parts of cumulus clouds, as seen from an airplane before the sunset. The cave had an entry which without any reason seemed black. The ocean was several hundred meters below the cave, and I could distinctly imagine that sooner or later I would fall down and it would swallow me up. I didn't feel my body, but in the cave some ellipse-shaped, orange concentrate of thoughts, my thoughts, was pulsating. The thoughts were: the Universe is infinite in space and time; we are all mortal; the space, the ocean will always be, but thoughts will die and nonexistence will come . . . I felt hopeless and was surprised only at one thing: why the thought to live persists, to live endlessly. Several scenes of my life passed before my eyes. They were from my childhood and youth, everything in sad, reddish-brown colors. Several times the thought, but not the body, appeared at the exit of the cave and I could understand that I was about to fall down into the ocean, but I would not fall down and again would return into the cave. And again hopelessness and the sense of doom . . . All of this went on for a very long time . . . Gradually I began to come back to reality . . . It was not a dream and I didn't want to sleep; it was simply a desire to lie calmly. I was thinking of my experience and gloomily analyzing it. I

> also thought about the questions I had been asked during the procedure . . . In my opinion, I had heard everything, about alcohol, the attitude towards it, its consequences and about "the finale" and my feelings . . . My general condition: perfect physical state, strangely depressed psychological state (without any reason), a desire to somehow analyze my past life, some dull ache at the thought about past years, and some sharpened homesickness . . . The attitude towards alcohol or anything similar: fear, a vague fear of everything that could disturb my distinct and clear consciousness and return it to something like what I had previously experienced. Be it some drink or injection or pills, it made no difference. If only the sober state were not disturbed, not even a little . . .

Many patients, like V.K., stressed that KPT induced in them a pronounced negative attitude toward anything that could change their state of consciousness (whether alcohol or something else), a desire to maintain this state of clear consciousness, sobriety, serenity, and balance.

Some reports revealed the fact that, though the patients' experiences during their ketamine sessions were not immediately associated with their alcoholism problems, their experiences still catalyzed some changes in their attitudes towards their ego and the world around them, changes that might result in a sober life. For instance, the report of patient M.B. (courtesy of Dr. O.V. Goncharov):

> Now I know why both the head and the earth have the form of a ball . . . The bends of the cerebral hemispheres look like mountains and rivers, basins and seas. There, inside me, are the zones of warmness and coldness, coolness (indifference?) and heat (passion?); and there also are (like in the cosmos) the zones of exhausted atmosphere. I felt it physically; I lived through it. I made a voyage around the world and, at the same time, rolled down the mountains of my own subconscious. Sometimes you feel at ease, but sometimes spaces suddenly fall down on you and you risk choking under their weight. The voyage, it is the insight into your ego; it is when you feel that you are the Universe; it is the impossibility of turning away, of going away, because all of this is you yourself, and you are given nothing else. The voyage is, on the one hand, your confinement to yourself, but, on the other hand, a step into the cosmos which is in you yourself, however paradoxical you find it.
>
> If not for the voyage, I would always remain a can swollen with my own emotions, these aggressors eager to blow you and the whole world up. During the voyage and especially during the recovery period, I got the feeling that the world was flexible, plastic, ready to interact. And it was only up to you what you would build of its soft materials responding to the glistening flow of your sensations. The voyage, it is at once a dream and reality. It is the work of feelings and intellect. You are astonished at your own mediocrity and narrow-mindedness and at the cosmos that is also in you. You want to become different, spiritually richer, brighter, so that your further voyage could bring you new impressions, could reveal new worlds. You'd like to penetrate further, deeper into yourself and the universe, to test yourself once again . . . Only after the voyage, you begin to discover with surprise that there are people who "know" everything as it is to be; you begin to be indulgent to those who will never know, to sympathize with them. You are learning to distinguish many things, and get surprised at how you could live without this knowledge . . . After some time, you are able to quietly enjoy the fact that you are, though, just a little bit different, and that at any moment you can stop, look inside yourself and recall . . .

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Author's Address: E. M. Krupitsky, Research Laboratory, Leningrad Regional Dispensary of Narcology, 19/1 Novo-Deviatkino, Vsevolozhsky District, St. Petersburg 188661, Russia. (E-mail: kru@lond.spb.su)