factor analysis. Factor analysis selects covariant patterns of symptoms, but does not define groups of patients. Moreover, it is based on correlation rather than description, and does not correspond to the diagnosis of medical illness. Medical illnesses usually have largely overlapping pictures, with a relatively few discriminating symptoms which tend to be lost in an investigation based on correlations alone.

I suspect that, rather than representing a disease entity, factor scores on our autonomous factor (Factor I) in some sense represent the degree to which a patient has developed somatic concomitants to her illness. This somatic component may be related to serotonin or norepinephrine depletion or some other unknown mechanism and may or may not have a psychological precipitant. Factor scores on our self-pitying pattern (Factor II), on the other hand, may represent modification of the symptom picture by pre-existing neurotic personality features. It is apparent that these conditions may coexist and that most depressed patients will show some varying degree of each. It is also evident from clinical experience that the same patient will show changes during the course of her illness. For instance, she may appear more "endogenous" with the development of more somatic symptoms as the illness progresses.

Mr. Garside emphasizes bipolarity of factor loadings as indicating a demonstration, in some sense, of a separation of the population. However, the mere presence of positive and negative values going into the score does not imply a bimodal distribution of patient factor scores. Moreover, a bimodal distribution might be achieved with a unipolar scoring system as well as with a bipolar one. Patient distribution depends on the characteristics of the patient population rather than on the scoring system. Consider that any item with a negative loading can be reworded to produce the positive loading (i.e., "guilt" loading $-\cdot 40$ can be changed to "lack of guilt" loading $+\cdot 40$). Thus the polarity of any factor can be manipulated by simply rewording the questions, while the shape of the patient distribution curve will of course remain entirely identical.

It is asked in Mr. Garside's letter that we rotate the axes of our first and second factors by 31 degrees and publish the distribution of patient factor scores on the rotated second factor, to ascertain whether the distribution is bimodal. I have done so, using the item loadings he provided for me. The number of patients in each cell, running from 2·0 standard deviations from the mean to minus 2·0 standard deviations from the mean by intervals of 0·5 standard deviations is: 2, 4, 7, 23, 19, 16, 11, 11, 3, 4. Thus, using the rotated factor, I do not find evidence of bimodality in our population. (Indeed if a discrimination by any factor were to have clinical meaning it should be testable by any investigator in his own patient population.)

I feel that attempts to definitively divide the depressive population by symptom correlations will only lead to disappointments. They can, however, aid other investigators to choose relatively homogeneous groups of patients for selective studies, which we may hope will eventually lead to a greater understanding of depression.

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DRUG TREATMENT OF DEPRESSION

DEAR SIR,

The conclusion of the trial by Dr. Hunter and his colleagues (*Journal*, June, 1967, p. 667) that trimipramine and amylobarbitone are no more effective than a placebo in the relief of depression and neurotic illnesses should not dissuade clinicians from continuing to use these drugs.

The result of a cross-over study in which one patient receives two active drugs and a placebo, i.e. in which the patient acts as his own control, is only likely to be valid:

(*a*) if the clinical condition of the patient remains static;

(*b*) if the drug is given for a length of time which is likely to achieve a clinical result;

(*c*) if the effect of a preparation is limited to the period of its administration.

None of these conditions are satisfied in this trial.

1. The patients chosen, being new admissions suffering from neurotic and depressive illnesses, would be likely to have fairly short-term breakdowns which could well be influenced by the hospital environment.

2. As each drug was only given for a period of two weeks, the anti-depressive medication in particular had not sufficient time to effect a measurable improvement.

3. The possible improvement from the trimipramine could well have taken place in the period following its administration.

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HALLUCINOGENS vs. PSYCHOTHERAPY

Dear Sir,

There are many old reports by Spanish and Mexican historians concerning the widespread use of hallucinogenic mushrooms by Aztecs and other natives in Mexico. Bernardino de Sahagun (9), a Spanish historian who lived in Mexico from 1529 to 1590, describes "certain little black mushrooms which inebriate and cause hallucinations and excite lust". Orozco y Berra (17) in 1870, discussing the work of Motolinia, explained that these "divine mushrooms" or teonanacatl, produced a state of intoxication with frightening hallucinations that confused the mind.

Interest was renewed when in 1936 R. J. Weitlaner (22) discovered these mushrooms being used among the Mazatecs in Huautla de Jimenez, Oaxaca, Mexico. Again, in 1957, Wasson and Wasson (23) reported some tribal groups in Southern Mexico still practising the ingestion of hallucinogenic mushrooms in their religious ceremonies. Following this, Hein (11) cultivated and identified these mushrooms as belonging to genera *Psilocybe* and *Stropharia*; and Hofmann (13) isolated the crystalline substance psilocybin responsible for the hallucinogenic and psychotropic effects, and elucidated its structure (14).

Numerous studies have been done on the psychological effects and possible therapeutic value of psilocybin. Delay *et al.* (2, 3, 4, 5, 6, 7, 8), after many trials with patients and normal subjects, have defined psilocybin as a "psychodysleptic" substance which causes hallucinations, dream-like states, recall of effective memory, and changes of mood. It seems to produce excitement alternating with apathy, to stimulate memory of traumatic experiences and to remove inhibitions evoking cathartic recall. Delay also reported a successful treatment of one case suffering compulsive psychoneurosis, "bringing back an unrestrained and extremely violent abundance of memories . . . " (7). Rummels (19) compared psilocybin with known tranquillizing drugs and found that it produced a pleasant relaxation state. Stevenin and Benoit (21) found it very useful in one case of "lack of emotion and imagination", in which each of the interviews under psilocybin had a particular emotional nuance influencing the patient's attitude. Douche (10) published a report on the successful treatment of one case of long-standing hysteria; he used two i.m. administrations of psylocibin, bringing on a strong affective crisis, and the hysterical disorders of gait disappeared completely during the next few days. Heimann (12) also reported the usefulness of psilocybin in a neurotic patient with gait disturbances. Roubicek and Drvota (18) found psilocybin produced a marked improvement in a compulsive neurotic refractory to psychotherapy, insulin and tranquillizers. Hollister (15) reported that psilocybin evoked a dreamy introspective state at dose levels which did not produce predominant somatic effects, nor marked impairment of mental function. Sercl (20) found euphoria produced by psilocybin to be a great aid to psychotherapy in a group of 15 neurotic patients. David and David (1) found it to produce euphoria, "some regression with loosening of the ego protection mechanisms", and increased insight; Lothar Knauth (16) found that psilocybin caused a general relaxation, visual hallucinations and manifestations of auto-sufficiency. No schizophrenic-like states were induced, all subjects having absolute control over their action when necessary. There was no difficulty in communication, though the sense of auto-sufficiency was such that there was very little desire, or none, for verbal communication.

At the Department of Pharmacology, University of Mexico, we administered psilocybin to nine male volunteers whose ages ranged from 23 to 55 years, and who, as far as was known, had never been under psychiatric care nor suffered any mental disorder. Psilocybin was administered in doses from 130 to 225 mcg/kg., and interviews took place before, 30 min., and 90 minutes after the drug was administered. Blood pressure, pulse rate and pupillary size were recorded at approximately the same intervals. Observations of the volunteers were carried out up to four hours after psilocybin administration. The setting was neither "therapeutic" nor medical, but purely experimental, the study being carried out in a Department of Pharmacology.

All of the volunteers showed marked mood changes, described by them as: "internal happiness", "marvellous good health", inner "peace and tranquillity", "the most agreeable sensation they felt in their lives". Each of them felt this was a unique experience they had never had before, except for one who related his feelings to orgasm. The state of well being, always present, was usually associated with introspection. They also reported an increased interest and capacity for communication with others, and developed "trust" in the experimenter. Three subjects with timid personalities experienced a complete dis-