

## MARIJUANA INTOXICATION: FEASIBILITY OF EXPERIENTIAL SCALING OF LEVEL

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### ABSTRACT

Experienced users report psychological factors can markedly alter their response to marijuana, so quantity of drug ingested may not be an adequate measure of the psychological construct of the "level of intoxication" of the altered state of consciousness produced by marijuana. Users show a highly reliable set of experiential criteria for scaling level, suggesting the usefulness of this psychological approach as an alternative and/or supplement to a pharmacological approach.

The pharmacological paradigm which is almost universally used in studying marijuana intoxication assumes that the action of the drug is a direct function of the chemical nature of the drug interacting with the structure of the nervous system and body. Thus, one studies variations in behavior and experience as a function of the quantity of the drug ingested. Variability across subjects (prominent in human experimentation) is handled by classical statistical approaches as error variance, and averaged out.

Informal interviews and an extensive questionnaire study of experienced marijuana users [1, 2] suggest this paradigm is too limited; psychological factors, such as the subjects' moods, personalities, expectations, social settings, etc., will markedly alter the experiential effects. At one extreme, users frequently report they can "come down," (temporarily eliminate all perceivable experiential effects of marijuana on themselves) if necessary to cope with the environment. At the other extreme, many psychological techniques exist for increasing the intensity and quantity of effects [2], and some users can even feel "high" from smoking marijuana from which about all THC has been removed [3]; calling this a placebo effect bypasses the issue

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that important psychological effects have occurred which are not related to drug dosage.

### Marijuana Intoxication as an ASC

An alternative paradigm is to conceive of marijuana *intoxication* as an altered state of consciousness (ASC), a qualitatively and quantitatively different Gestalt of experiential, neurological, and psychological subsystems which comprise a state of consciousness. An ASC is a *psychological construct*, a hypothetical construct about an internal psychological state that is a more primary determiner of the observable consequences of marijuana use than quantity of marijuana ingested. The active ingredient(s) in marijuana is then conceived of as the usual and primary method of bringing about the transition from a normal state of consciousness (SoC) to an ASC, but the transition process and the final nature of the ASC are greatly modified by (poorly understood) psychological factors. Thus, if we want to study the effect of being *intoxicated* with marijuana, an ASC, on various aspects of behavior or experience, simply knowing the quantity of THC ingested by a human subject is of limited value; we need to know the extent to which the subject's SoC has been altered. Might we be able to assess the degree of alteration of the ASC, its "depth" or "level" more directly?<sup>2</sup>

Suppose we asked an experienced<sup>3</sup> and intelligent observer to estimate the depth or level of the ASC produced by giving him a drug like marijuana. Interviews indicate a variety of things he might do to make this estimate: a) he could simply count the *number* of unusual effects he was experiencing; b) he could estimate the experiential *intensity* of some single effect that he considered critical or representative; c) he might use a more sophisticated, weighted summing of selected effects or all effects; d) he might "intuitively" just estimate on some numerical scale, a procedure found very useful in estimating the depth of the hypnotic state [4]; e) he might estimate the intensity of some sort of Gestalt quality of the ASC; or f) he might use his past experiences about progressions of effects with increasing quantities of the drug or *minimal thresholds* for effects to estimate his level by noting the presence or absence of critical effects at critical levels of intensity. Interviews indicate that this last method is widely used among experienced marijuana users. We have investigated the reliability of this shared knowledge and contend that it suggests the feasibility of directly estimating the intensity of the ASC produced by marijuana.

<sup>2</sup> Studying the particular ways in which the action of the active drug ingredients of marijuana is modified by psychological factors is very important, but is not of concern in the present paper.

<sup>3</sup> Reports of experienced users must be considered, as reports of naive users will be full of effects and contaminations from coping reactions (attempts to cope with novel phenomena).

In 1968, an extensive questionnaire was completed by 150 experienced marijuana users. Possible experiential effects of intoxication were described in the questionnaire, and users indicated (on 5 point scales) how frequently they experienced each effect and the minimal or threshold level of intoxication necessary for the experience to be possible. The users were a predominantly young (76% were 19-30) highly educated group (67% were college students). Most (67%) lived in California. Among them they had accumulated approximately 421 years of experience of marijuana use, approximately 37,000 episodes of inducing this ASC. The results of this study have been extensively reported elsewhere [1, 2].

### Scaling Eight Phenomena

This earlier study provided extensive data on minimal level of intoxication for almost all phenomena of marijuana intoxication for the “normal” social use of experienced users. The present study assessed the reliability of level scaling for a sample of the phenomena. Eight phenomena were chosen which represented the whole range of minimal levels found in the earlier study. We tried to choose only phenomena which were frequently experienced, but this was not possible at the higher levels of intoxication. Thus five phenomena were characteristic (50% experience usually or very often), two were common (50% experience usually, very often, or sometimes), and one was rare (75% experience rarely or never). The phenomena, along with abbreviations used for them below, are listed in order of increasing minimal level of intoxication (as determined in the earlier study).

- a) I can hear more subtle changes in sounds; e.g., the notes of music are purer and more distinct, the rhythm stands out more (*Sounds Clearer*, characteristic).
- b) Taste sensations take on new qualities that they don't have when straight (*New Tastes*, characteristic).
- c) I often forget to finish some task I've started, or get sidetracked more frequently than when straight (*Easily Sidetracked*, characteristic).
- d) Time passes very slowly; things go on for the longest time, e.g., one side of a record seems to play for hours (*Time Slows*, characteristic).
- e) My memory span for conversations is somewhat shortened, so that I may forget what the conversation is about even before it has ended—even though I may be able to recall it if I make a special effort (*Memory Shortened*, characteristic).
- f) Some of my inner trips, my eyes-closed fantasies, have been so vivid and real that, even though I know logically they couldn't be real, they feel real; they are as real as ordinary waking—life experience (*Inner Reality*, common).

- g) I have lost all consciousness of my body during fantasy trips, i.e., gotten so absorbed in what was going on in my head that my body might as well not have existed for a while (*Lose Body Contact*, common).
- h) I get dizzy or nauseated, so much that I wonder if I will get sick (*Dizzy*, rare).

The eight phenomena were described, as above, on a brief questionnaire, with instructions to rank them as to minimal level on an 8-point scale of intoxication. The scale had its lowest point defined as the minimal level at which the user could tell that he was intoxicated with marijuana, the top point being the highest level of intoxication he or she had ever experienced. Users had the option of skipping phenomena which they had not personally experienced, and/or rating several phenomena at the same level.

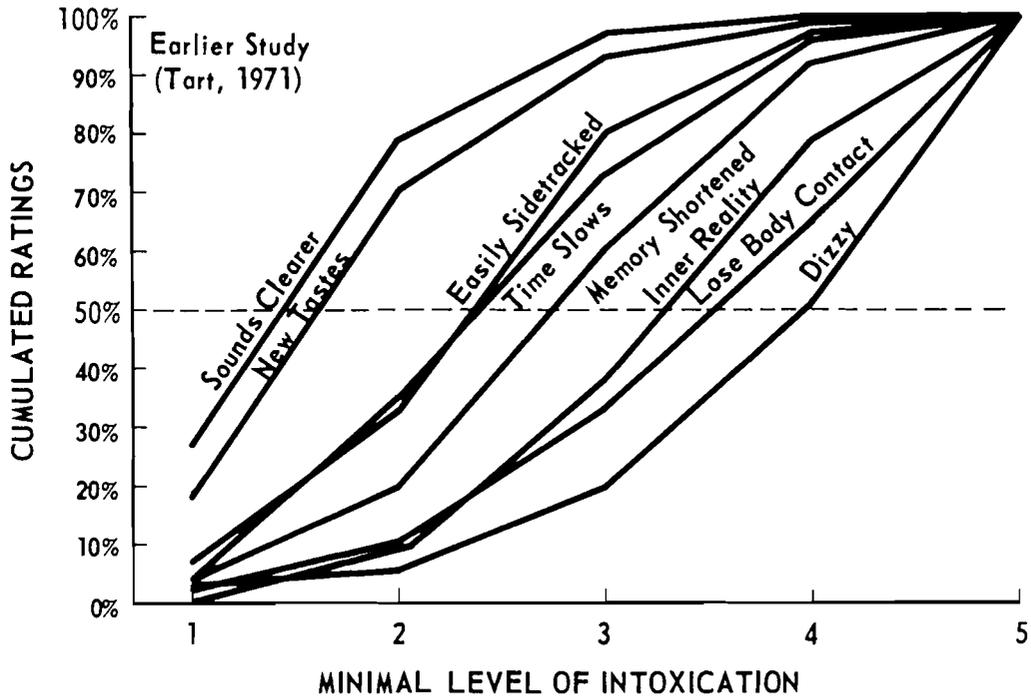
### Subjects

As we expected high agreement with the earlier study's findings, we deliberately made no attempt to match characteristics of the subjects of the present study with those of the original, as agreement among subjects with only some characteristics in common would indicate that they were more a function of the ASC induced by marijuana than of particular subject populations. Subjects for this study were obtained by asking for volunteers in two large classes at our university, one a class of the senior author dealing with the psychology of consciousness, the other a class of a colleague in art history. Data was collected before any information relevant to the present study had been taught. Only experienced (at least a dozen uses) marijuana users were asked to volunteer. They returned the completed questionnaires anonymously.

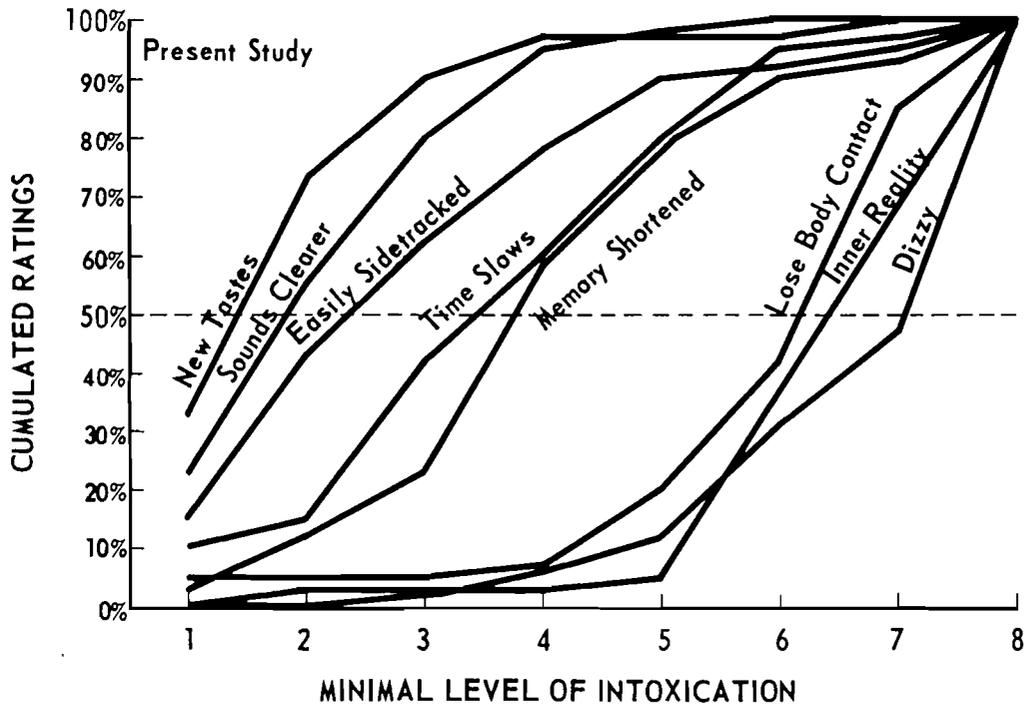
Forty usable questionnaires were returned. The present respondents were younger and had used marijuana more frequently and for a longer period of time than those of the earlier study. Using an approximation like that of the earlier study [2] the present group had accumulated 153 years of approximately 15,000 episodes of experience with this ASC.

### Results

If we take the ordering by modal minimum level for the eight phenomena of the earlier study as a standard, and compare each new respondent's individual ordering against it, there is a high degree of consistency among experienced marijuana users. The mean of the individual rank order correlations is .73, and almost half (48%) of the subjects show a correlation greater than .80 with the standard. Only 12% of the subjects show correlations of less than .40 with the standard.



(a) Earlier study results [2]



(b) Present study results

Figure 1. Cumulated response curves for minimal levels of intoxication. Data from the earlier studies are above, while those of the present study are below. Note that in a few instances points have been displaced slightly to the right in plotting to eliminate confusion between intersecting curves.

The cumulative response curves for the eight phenomena are plotted in Figure 1 (a and b). Although the studies differed in having a 5-point scale for the earlier and an 8-point for the present one, expanding the 5-point scale to the same horizontal extent as the other one makes comparison straightforward.

In the earlier study, minimal thresholds steadily increased in the order of Sounds Clearer, New Tastes, Easily Sidetracked, Time Slows, Memory Shortened, Inner Reality, Lose Body Contact, and Dizzy. In the present study this ordering is generally preserved. If we take the (extrapolated) point at which 50% of the users indicate minimal threshold, the present and earlier orderings show a rank order correlation of .95, with slight reversals of the New Tastes-Sounds Clearer ordering and the Lose Body Contact-Inner Reality ordering. Some respondents added notes that their rating of Dizzy was unreliable as they had rarely or never experienced it; if this effect is dropped from the calculations, the correlation is still .93. These are considerably higher degrees of reliability than those reported for most widely used psychological tests.

### Discussion

Some of this high reliability may arise from socially shared preconceptions of what marijuana intoxication should be like, but most of the users interviewed for the earlier study gave the impression that they had developed their own methods of scaling in order to estimate the quality of marijuana offered for sale, rather than by hearing about how other users scaled their level of intoxication. The degree of social influence on these judgments certainly warrants investigation, however.

Working within the paradigm of marijuana intoxication as an ASC, then, rather than within the classical pharmacological paradigm, we consider these results to be a preliminary demonstration of the feasibility of direct, experiential scaling of the level of the hypothesized construct, the ASC produced by marijuana.

Further work should ascertain more precisely the processes used by subjects for scaling and the relationships between such scalings of level and other experiential, behavioral, and physiological aspects of marijuana intoxication. That such high reliability of level scaling exists among ordinary, non-scientifically trained users of marijuana also suggests that even higher reliabilities of observations could be attained by trained observers, laying a foundation for a possible state-specific science [5] of the ASC of marijuana intoxication.

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