

INDIVIDUAL DIFFERENCES IN THE RECALL OF A
DRUG EXPERIENCEI. H. PAUL, Ph.D.,¹ ROBERT J. LANGS, M.D. AND HARRIET LINTON BARR, Ph.D.²

INTRODUCTION

In a study of the way subjects recalled what they had experienced under the influence of LSD-25 (5) it was found that certain aspects of the experience tended to be "subtracted" or forgotten, and some were "added" or confabulated. The dropped or forgotten aspects tended to be those that were ego-alien and threatening, some of them referring to a frightening sense of passivity or loss of control, and others centering on what might be conceptualized as a loss of ego boundaries or a partial dissolution of the sense of self. The added or confabulated aspects fell into two groups: those dealing with affects, and those dealing with changes in the perceived meaning of events. The aspects of the drug reaction that were concrete, easily identified, and likely to have occurred before in more or less normal states of consciousness were generally well recalled.

While the differences in recall were significantly associated in this way with different aspects of the experience, they were also associated with significant individual

differences. These Ss could be separated into three groups according to the relative degree to which they showed the three types of recall. About a third showed a marked propensity to diminish the experience in retrospect, forgetting or denying having had many of the experiences they had reported under the drug. Another third tended to enlarge more and diminish less, adding features they had not reported under the drug. And the remaining third showed comparatively little modification of either type and gave a relatively accurate recall of their drug experience. The present report is a continuation of the writers' efforts to uncover the determinants of these individual differences.

It has already been reported that the individual differences in recall reflect the kind of experience the drug has induced (5). The accurate recallers (*Recallers*) experienced the smallest drug effect, particularly the least impairment of controls, of coping ability and of reality contact; they reported relatively little unpleasant affect and were particularly unlikely to report the fear that they might go crazy. Somatic symptoms and a sense of elation were the only effects that they reported as often as the other Ss. Those who tended to drop or forget aspects of the drug experience (*Subtractors*) had experienced much change in their perception of the environment but little change in themselves. Their recall showed a complex pattern of alterations: they remembered even less change in themselves as well as less impairment of controls and coping ability than they had reported; their recall of their relationship to the environment continued to reflect the perception of new meanings in objects or events, but at the

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same time they remembered less loss of meaning and loss of reality contact, thus altering the balance so that the acquisition of new interpretations of stimuli or events played a larger role in recall than it had in the original report. Those Ss who enlarged the experience in retrospect (*Adders*) had the greatest drug effect in the first place, reporting the most marked changes in their self-experience and in their perception of the environment, as well as impairment of controls. The changes in themselves and in the environment were maintained in their recall, but they reported more impairment of controls or coping ability and a much greater affective reaction.

Since it was based on a retrospective questionnaire that was not accompanied by a systematic inquiry into discrepancies, the research method did not allow determination of the mechanisms which underlay the changes in recall. It was clear, however, that a large part was played by re-evaluation: looking back at certain features of the strange experience, Ss, again in a normal waking state of consciousness, evaluated them differently than they had in the drugged state of consciousness. In the earlier report the writers examined this issue in detail. But there were also indications that some genuine forgetting and confabulating took place, too. For one thing, it was mainly the most intense and unusual experiences that were subjected to adding and subtracting, and these experiences seemed to constitute a threat to S's sense of self. A likely hypothesis, then, is that adding and subtracting also reflected defensive operations in the face of such threatening experiences. One test of this hypothesis lies in investigating differences among the groups of Ss with respect to their stable cognitive functioning and personality structure, and that is the goal of the present study.

If it is found that the *Subtracters*, *Adders*

and *Recallers* differ in the way they ordinarily recall connected verbal material, in their earliest memories, and in their basic personality make-up, and if these differences seem to coordinate with their way of recalling the drug experience, then it can be concluded that we are not dealing with individual differences that are specific to the drug reaction and its recall, and neither are we observing the effects of retrospective re-evaluation alone. Instead, the mode of recalling the drug experience can be understood as a function of S's cognitive style and personality structure.

PROCEDURES AND RESULTS

The procedures of the present study have already been described in detail in two previous reports (4, 5). Details of the method and procedures are presented there. For present purposes the following summary may suffice.

Subjects were young male professional actors who responded to an ad in their trade newspaper for a study of an unspecified drug. Fifty Ss passed an initial screening for marked psychopathology and were accepted for the experiment. They were seen for testing and experimentation on three consecutive days. On the second day (the experimental day) 20 Ss were given a tap-water placebo and 30 were given 100 gamma of LSD-25. The main instrument used to assess their experimental day reaction was a 74-item questionnaire administered four times during the day, while a retrospective questionnaire given on the post-experimental day assessed their recall of the experience.

Examination of the retrospective questionnaires of the drug Ss resulted in the isolation of the three groups already described: a group of nine *Subtracters*, who dropped relatively many items and added relatively few; a group of seven *Recallers*, who showed comparatively little modification of either type; and a group of eight

Adders, who added relatively many items and dropped relatively few.³ In our earlier report (5) the quantitative and qualitative aspects of the three modes of recall were investigated in detail, and the differences among the groups in their experimental day questionnaires were explored. The present report will focus on differences among these three groups of *Ss* in recall of connected verbal material, in their earliest memories and in their personality structure.

RECALL OF VERBAL MATERIAL

Individual differences in recall of verbal material were investigated by a method, called the *theme-list technique*, that was devised during a series of experiments on memory styles (6, 7). This method assesses ability to retain verbal material as well as a particular manner or style of remembering, *importing*. A loosely connected set of passages that forms the plot outline of a story (a theme-list) is presented to *S*, and his initial task is to learn and reproduce it. He then composes an original story based on the theme-list, after which he recalls the original theme-list a second time. The first reproduction provides measures of retention-ability (accuracy and completeness of recall) along with measures of intrusions and distortions; the second reproduction provides a measure of importations—further intrusions from the intervening composed story. A substantial body of research has demonstrated that retentionability and importation tendency both represent stable, general and independent parameters along which people differ (8).

³ The *Adders* added from six and one-half to twelve and one-half new items, while other *Ss* added six or fewer, and *Subtracters* dropped from ten and one-half to nineteen and one-half items, while other *Ss* dropped ten or fewer; both cutoff points are at the midpoint of the range of variation found in the sample. Four of the original group of 30 drug *Ss* were not given the retrospective questionnaire, and two others were not included because their scores were borderline with respect to adding or dropping.

Because one of the aims of the larger study was to test the drug's effects on the retention of drive-related and neutral verbal material, four theme-lists were constructed, two of them containing drive-related material (sexual and aggressive) and two containing neutral material. An attempt was made to equate each drive theme-list with a neutral one as its control. The corresponding themes in each contain the same number of information units (or idea units), as well as similar sentence construction, ambiguities, gaps and plot twists. Each theme-list has seven themes and a total of 25 information units.⁴

The theme-list was read to *S* twice in succession, with instructions to listen carefully in order to recall the material later. Immediately following the presentation a five-minute distracting task was administered, and then *S* gave his first reproduction. Following this he was asked to make up an original and creative story that was based on the theme-list (taking about ten minutes). After he was finished, he was asked to recall the original list of themes a second time. A third recall was obtained the next day, approximately 24 hours later. Each of the three recalls was preceded by instructions that emphasized accuracy and completeness. Some support and encouragement was given if needed, but never any cues or hints. A verbatim transcript of the reproductions and the story was taken.

Subjects were tested once in the morning and once in the afternoon on both pre-test and experimental days. The four theme-lists were presented in several pre-established, balanced orders, with one major restriction: that a drive theme-list and its neutral control were always given on the same day. Thus, on each of the two days every *S* had a drive and a neutral theme-list, but the order varied from *S* to *S*.

Each reproduction was scored for accu-

⁴ The theme-lists, along with a more detailed account of the method, are presented elsewhere (9).

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TABLE 1
Mean Scores on the Theme-List Reproductions

	Accuracy Scores			No. Intrusions			No. Importations			No. Words in Composition		
	Adders	Subtracters	Recallers	Adders	Subtracters	Recallers	Adders	Subtracters	Recallers	Adders	Subtracters	Recallers
Pre-test day theme-lists												
Drive	28.3	33.6	25.4	2.6	1.6	1.9	3.4	1.3	2.6	284	275	281
Neutral	27.5	29.8	23.7	2.1	0.9	1.0	3.1	2.0	2.1	209	258	271
Total	27.9	31.7	24.5	2.4	1.2	1.4	3.3	1.7	2.4	246	267	276
Experimental day theme-lists												
Drive	24.0	29.1	22.1	2.9	1.1	1.1	3.0	2.3	2.4	222	261	201
Neutral	20.5	18.6	19.4	3.2	1.7	2.4	2.6	1.6	2.1	162	154	208
Total	22.3	23.8	20.8	3.0	1.4	1.8	2.8	1.9	2.3	192	208	205

racy and intrusions,⁵ and the length of the composed story was measured by word count. Accuracy was scored on a three-point scale: two points for a word-perfect information unit, a score of one for a synonym and for a closely related meaning, and zero for an error or omission. Intrusions and importations were tallied on an information-unit (not a word) basis. Two experienced examiners scored all reproductions independently and blindly, and discrepancies were eliminated afterwards by discussion.

RESULTS

1) *Pre-test day performance:* Table 1 shows that the groups differ consistently in accuracy of retention. Regardless of which theme-lists are being considered, the *Subtracters* have the highest scores, the *Recallers* have the lowest, and the *Adders* fall

in between; all of the differences, assessed by *t*-tests, are significant at beyond the .05 level. Table 1 also shows that the *Adders* give the most intrusions and importations while the *Subtracters* give the fewest; the differences between *Subtracters* and *Recallers* fall somewhat short of significance, while the differences between *Adders* and the other two groups on both intrusions and importations are significant at beyond the .05 level. None of the differences between the groups in length of story is significant.

Under ordinary conditions, then, the *Subtracters* are the best recallers, while it is the *Recallers* who, seemingly paradoxically, are the poorest. The *Adders*, who fall in between in accuracy, give the most intrusions and importations, and therefore show the importing style of remembering.

With regard to drive-versus-neutral content, there is only one significant inter-group difference: the *Adders* told significantly shorter stories on the neutral theme-lists ($p < .05$), while the other groups showed no significant difference in their stories to the drive and neutral theme-lists. This suggests that the *Adders* showed some responsiveness to the drive content, while the other *Ss* showed none.

2) *Experimental day performance:* Each

⁵ A distortion score was also applied, but it turned out to be significantly correlated with the other measures. Accuracy, intrusions and importations, however, are independent measures. (For pre-test theme-lists the following non-significant *r*s were found: accuracy $\times$ intrusions = $-.07$, accuracy $\times$ importations = $-.10$, intrusions $\times$ importations = $+.27$; for experimental day theme-lists only one correlation is significant, accuracy $\times$ importations = $+.34$, while accuracy $\times$ intrusions = $+.01$, and intrusions $\times$ importations = $+.15$.)

TABLE 2

Twenty-four Hour Recall of the Theme-lists: Mean Accuracy Score Decrement—Forgetting—Expressed as a Per Cent of the Original Accuracy Score

	Adders	Subtracters	Recallers
Recall of pre-test theme-lists			
Drive	31.1	12.6	6.0
Neutral	24.7	18.4	7.3
Total	27.9	15.5	6.7
Recall of experimental day theme-lists			
Drive	15.9	12.5	+11.8*
Neutral	24.3	27.8	1.8
Total	20.1	20.2	+5.0*

* The + sign indicates an improvement in accuracy.

group shows a significant decrement in accuracy scores under the drug ($p < .01$) and the length of their stories decreases, too; but they show no significant changes in intrusions or importations (while each group shows an overall rise in number of intrusions, it falls somewhat short of statistical significance). On accuracy the groups achieve virtually identical mean scores; however, the *Subtracters*, having started from a higher pre-test baseline, show the greatest decrement. The decrement scores themselves are highly variable and so they fail to yield any significant inter-group differences. If, however, each *S* is taken individually to see whether he showed a substantial drop in accuracy under the drug, it is found that the *Subtracters* show a greater effect than the other two groups. On the morning of the experimental day, when the drug had its greatest effect, six of the nine *Subtracters* showed a substantial drop in accuracy, while only three of the eight *Adders* and two of the seven *Recallers* showed such a drop. In the afternoon, three *Subtracters* continued to show a drop, while only one *Adder* and no *Recaller* did. The drug, then, seems to have made a stronger impact on the *Subtracters* than upon the others, but this impact, as will be seen

below, was restricted to the neutral theme-list.

Under the drug it made a significant difference whether it was a drive or a neutral theme-list that was being learned.⁶ On accuracy, the drug had a greater overall effect upon the neutral theme-lists, and this differential effect was most marked among the *Subtracters*. The *Subtracters* demonstrated the same degree of drug effect on the drive theme-lists as the other groups; on the neutral theme-lists they had a marked drop in accuracy as well as in composition length. At the same time, each group showed a reversal of its pre-test pattern in that more intrusions were given on the neutral than on the drive theme-lists (this difference, however, is only significant for the *Recallers*). Importations continued to show no significant differences among drive and neutral theme-lists, although for the *Subtracters* there was an interesting reversal of their pre-test pattern that approaches significance ($p = .08$). More importations were given on the drive theme-list, perhaps reflecting the fact that they told longer stories on it than the other groups. The drug thus seems to have exerted a larger differential effect upon the *Subtracters*.

3) *The 24-hour recall*: Table 2 presents the degree of 24-hour forgetting, expressed as a percentage based on the post-composition recall of the day before. On the experimental day, in recalling the pre-test theme-lists, it was the *Adders* who forgot the most, the *Recallers* the least, and the *Subtracters* fall in between; the differences among the groups are significant at beyond the .05 level. The *Adders*, who had the most intrusions and importations in their pre-test recalls, also showed the greatest number of further importations (not shown in Table 2), but the differences among the groups fall short of significance.

⁶ A study of all *Ss*, drug and placebo, has revealed that the drug's deleterious effect upon the learning of the theme-list was significantly greater on the neutral theme-lists (9).

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On the post-test day, in recalling the experimental day theme-lists, the *Adders* and *Subtractors* forgot the same amount, while the *Recallers* demonstrated a small, but significant, improvement. The improvement, however, is restricted to their recall of the drive theme-list, while the *Subtractors* show a substantial drop (for them) in the neutral theme-list. Six of the seven *Recallers* improved on their drug-day recall of the drive theme-lists, while only three of them improved on the neutral one. At the same time three (of nine) *Subtractors* improved on the drive theme-list and none did on the neutral one, while only one *Adder* improved on each kind of theme-list. Thus, certainly for the *Recallers*, and probably also to some extent for the *Subtractors*, it made a difference which drug-day theme-list they were recalling. In recalling the pre-test theme-lists, however, it made no significant difference to any group whether a drive or a neutral theme-list was being recalled.

In summary, then, the *Recallers* forgot the least across 24 hours, the *Adders* most. The *Subtractors*, by forgetting a substantial amount of the neutral theme-list, continued the differential effect they showed under the drug.

THE EARLIEST MEMORY

One's earliest memory has substantial significance in relation to his personality, and research has confirmed the clinical impression that such memories generally reflect major areas of conflict and important defensive organizations (1, 3, 10). Earliest memories were obtained from the present *Ss* because the writers were interested in seeing how the memories would be affected by the drug. For the present purposes, however, the focus will be on the differences among the three groups in their pre-test day earliest memories, their drug-day earliest memories, and the nature of the changes between them.

The earliest memory was elicited by saying, "I want you to go back into your childhood, as far back as you possibly can—and

tell me your very first memory—the earliest thing you can remember in your life." The question was asked the same way on both pre-experimental and experimental days (the second time *S* was not asked to recall the memory he had given the day before). Memories were scored using the method of Langs, Rothenberg, Fishman and Reiser (2) in which the manifest content is rated for a wide range of categories. All memories were scored independently and blindly by two experienced examiners, and a consensus was reached by discussion wherever necessary.

RESULTS

Earliest memories were obtained from seven *Adders*, eight *Subtractors* and seven *Recallers*. Differences among the groups were assessed by comparing the number of scores on each item for one group with those for the other two, and applying two-tailed chi-square tests to these differences. While a significant number of differences between the groups did not appear (the small *Ns* and the large number of scoring categories were factors), the differences that did appear seemed meaningful and therefore worth reporting. Table 3 presents the findings significant at beyond the .10 level for either the pre-test or drug day memories.

1) *Pre-test day*: Women, specifically "mother," were present in the *Adders'* memories to a greater extent than in the other two groups; no *Subtractor* reported his mother in the memory. More *Subtractors* had a memory in which someone was in a pleasant or innocuous role, and in which someone was alone. But at the same time they also reported more memories in which the subject of the memory was in the role of harming or damaging and in which someone was receiving harm or actually suffering. *Recallers* were highest in having the subject of the memory observing and looking; they were lowest with regard to the subject interacting with others in the memory; but they also had the fewest persons who did not move in the memory.

Item	Pre-test Day			Drug Day		
	Adders (N = 7)	Subtracters (N = 8)	Recallers (N = 7)	Adders	Subtracters	Recallers
Women present	6*	3	2	5	3	2
Mother present	5	0*	2	3	1	2
Men present	4	2	3	0*	3	4
Father present	2	1	2	0	0	3*
Environment is friendly, helpful	5	6	4	7†	3†	5
Anyone in a pleasant, innocuous role	3	7†	2	3	3	2
Someone receives harm or is suffering	1	4†	0	2	3	0
Subject in role of harming, damaging	0	3†	0	0	2	0
Someone is alone	2	6*	1	2	4	1
Subject interacts with others	5	5	1†	7	4	3
Subject is passive	2	1	2	5*	1	1
Subject is an observer, is looking	2	1	5†	4	1	4
Memory tends to be ideational with little action	4	6	3	7	2*	6
Absence of movement in persons present	6	6	2†	6	7	1*
Use of negatives	3	2	2	6	1*	4
Contact with reality is complete, good	5	6	5	2	7*	2

† $p = .10$, " " " .

	Adders	Subtractors	Recallers
Entirely new memory reported	5*	0*	2
Age of subject changes	4*	1	1
Contact with reality lessened	3	0†	3
Change in ideational-motor balance	1†	7*	3
Overall high on content added	6†	2†	4
Overall high on content dropped	2	5†	0†

† $p = .10$, " " "

2) *Drug day*: A comparison of the drug-day memories reveals that the *Recallers* were the only group having father present. The *Adders* most often told of the subject in interaction with others and the environment as supportive, as well as the subject in a passive role. The *Subtractors* are striking in frequency of memories in which the environment is unfriendly and unhelpful, further emphasizing the paranoid-like element. In regard to contact with reality, the *Subtractors* were judged to be best. They also used least negatives while the *Adders* used the most.

3) *Changes from pre-test to drug day:* Differences between pre-test and drug-day findings may be due to alterations brought about either by reporting a new first memory or by some revisions in the memory first reported. Such alterations may be in the direction of adding new dimensions or by dropping content previously included. Table 4 presents some of the major changes.

This change was across the age of the subject's memory (most general and by the addition of dimensions. *Adders* (e.g., the presence of a to a lesser extent than No *Subtractors* reported under the drug, but a shift in ideation toward more ideation. *Subtractors* showed adding content under the same time they had scoring items dropped dropping of personal persons receiving at the environment as there was also a less which the subject of with others and in memory reflected a environment. The significant adding or d

Adders, then, showed no significant effects of alterations and no significant differences in items when the participants were asked to recall memories are concerned. They showed the only significant effect of content. The *Substitutors* group that showed no effect of content, but they showed a significant stability of content. They emphasized the past, their pre-test memories, and at the same time the judged content improved while the *Adders* showed no improvement. The *Recallers* showed a significant dropping, or even significant

As part of his past study of which the a part, S submitted biography and took psychodiagnostic tests intensively interviewed member of NYU's

This change was accompanied by a shift in the age of the subject at the time of the memory (most generally to an earlier age) and by the addition of a number of content dimensions. *Adders* also dropped content (e.g., the presence of men and mother) but to a lesser extent than did the *Subtracters*. No *Subtracters* reported a new first memory under the drug, but their memories did show a shift in ideational-motoric balance (toward more ideational and more motoric). *Subtracters* showed the least amount of adding content under the drug, and at the same time they had the greatest number of scoring items dropped. The latter include dropping of persons in helpful roles, of persons receiving aid, and of reflections of the environment as friendly and helpful; there was also a lessening of the extent to which the subject of the memory interacted with others and in the extent to which the memory reflected a strange and ambiguous environment. The *Recallers* showed no significant adding or dropping under the drug.

Adders, then, showed the greatest degree of alterations and the least stability of items when the pre-test and drug day memories are compared. Further, they showed the only significant adding of new content. The *Subtracters* were the only group that showed significant dropping of content, but they also showed significant stability of content. Their changes further emphasized the paranoid-like features of their pre-test memories, but at the same time the judged contact with reality improved while the other groups worsened. The *Recallers* showed no significant adding, dropping, or even stability of items.

PERSONALITY STRUCTURE

As part of his participation in the larger study of which the present investigation is a part, *S* submitted a freely written autobiography and took a standard battery of psychodiagnostic tests. In addition, he was intensively interviewed twice by a staff member of NYU's Research Center for

Mental Health. These data were the basis of personality ratings and case studies that were subsequently prepared without reference to *S*'s reactions in the experiment. Personality assessment findings were expressed in two independent ways: personality ratings and a diagnostic evaluation.

PERSONALITY RATINGS

These were obtained as follows: The staff of the Research Center was divided into teams of two, and each team was assigned a pair of *Ss*. Both team members independently worked through a folder on *S* containing his autobiography, Rorschach, Thematic Apperception Test, Wechsler-Bellevue Intelligence Scale and interviews, and attempted to create in his own mind a consistent picture of *S*'s personality, expressed in terms of scales of personality ratings.⁷ Ratings were made on nine-point scales with respect to 142 variables that covered the areas of motives, defenses, thought processes, inner states, identity, and interpersonal behavior. Ratings completed, the two members of the team discussed their differences and agreed upon a final set of consensual ratings. When all ratings on all *Ss* were completed, the separate variables were intercorrelated and submitted to a syndrome analysis in order to reduce the number of variables by combining some of them. The final number of rated variables was 93.

RESULTS

The findings are based on comparisons of each group with the other two groups, both in combination and separately. Instead of presentation in tabular form, the findings are organized in descriptive accounts made up of those rated variables that differentiate among the groups at beyond the .05 level of significance.

⁷All raters share a common psychoanalytic theory of personality, and all have had some training and experience in personality evaluation.

The comparisons yield a distinctive pattern of personality attributes for the *Subtractors*, who are significantly different from the other two groups combined for 18 of the 93 variables: they differ significantly from the *Adders*, taken alone, on 12 variables and they differ from the *Recallers* alone on 11. The following personality attributes that typify the *Subtractors* may therefore be regarded with a high degree of confidence.

The *Subtractors* show strong strivings for independence; they act independently and on their own initiative. These strivings also take the form of rebellion against authority and defiance of conventional values. They express a good deal of hostility and verbal aggression in their relationships with men in general and paternal figures in particular. They are oversensitive to challenge and threat, and anticipate being exploited. At the same time they see themselves as unwanted and unloved, and are often angry or impatient with themselves. In their social relationships they are socially perceptive and responsive to interpersonal nuances, but also lack poise and they become rattled in social situations.

The *Subtractors* are also distinctive in the use of intellect. They identify themselves as intellectuals and show a strong interest in being well informed; they use intellectualization as a defense and use it effectively: they analyze problems skillfully, actively and accurately; their thinking shows little evidence of naiveté. A supplementary finding is that their I.Q. scores are significantly higher than those of the other Ss ($p < .01$).⁸ The *Subtractors*

⁸The groups differ in intelligence. On the Wechsler-Bellevue, the *Subtractors* achieve a mean I.Q. of 133.4, the *Adders* a mean of 123.7 and the *Recallers'* mean is 118.9. The difference between the *Subtractors* and *Recallers* is significant at the .001 level, the difference between the *Subtractors* and *Adders* reaches only the .10 level of significance, and the difference between the *Adders* and *Recallers* is not significant. It should be noted, however, that the differences in memory style presented in this report are not an artifact, resulting from differences in general intelligence. First of all, the groups do not differ significantly in the

also show a striving for creative outlets, have a wide range of interests and enjoy reading and study; they are original and imaginative in their concepts and have a rich fantasy life.

The ratings do not present as distinctive a picture of the *Adders* and *Recallers*. The two resemble each other (and contrast with *Subtractors*) in their suggestibility and acceptance of authority, their lack of hostility towards paternal figures, the fact that they do not readily become angry with themselves, and their lack of much push for understanding and creative outlets. Beyond this, however, they show some important differences. If for each group the variables on which they either differ from the other two groups combined or are the only group that differ significantly from the *Subtractors* are considered, two rather divergent pictures emerge.

The *Recallers* characteristically use repression as a defense. They have a narrow range of interests, their thinking is stereotyped and concrete, they are uninspired in their thinking, and show little fantasy. They are not particularly skillful or active in analyzing problems, but instead show ordinary, unremarkable reasoning. They have lower I.Q. scores than the other groups ($p < .05$). While they are not perceptive or responsive to interpersonal nuances, they are relatively poised in social situations. They are concerned with status, wishing to be admired by others. They are also unlikely to use the defenses of isolation or undoing, or to suffer conflict over homosexual thoughts or behavior.

The *Adders* are distinctive for being de-

two Wechsler-Bellevue scales that directly involve memory, Digit Span and Information, although they do differ significantly in regard to six of the other nine scales. Secondly, inspection of the data for selected subjects matched for I.Q. (five *Subtractors*, five *Adders* and four *Recallers*) shows that the discrepancies in memory among groups are at least as great as for the full sample, although with the smaller *N* the differences fail to reach statistical significance.

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THE DIAGNOSTIC

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pendent, for relying on others for help and security, and for complying with paternal figures in particular. They are trusting, neither anticipating exploitation nor being hypersensitive to threat, and therefore show little hostility or resentment in their relationships. They do, however, have a good deal of pent-up, unexperienced anger, which at times emerges in sadistic fantasies. Their thinking is naive, and they do not see themselves as intellectuals or use intellectualization as a defense. Perhaps most significant for the present purposes is the fact that they are not defensive; under stress they do not retreat to a guarded position or try to conceal their feelings and thoughts.

THE DIAGNOSTIC SUMMARY

Because Ss had been assessed by different pairs of examiners with varying experience and acumen, and because the inter-judge reliability in diagnosis is rarely very high, the examiners who made the personality ratings were instructed to base their judgments as much as possible on concrete evidence. Reliance on inference and on clinical judgment was therefore minimized, and it was decided to make a supplementary assessment that maximized it by providing for each S a diagnostic summary that formulated his personality structure in succinct and theoretically coherent terms.

In order to promote consistency a single examiner (IHP) performed the assessment and, for reasons of expediency, restricted himself primarily to Ss' Rorschach protocols. Using a frame of reference deriving mainly from Rapaport, Gill and Schafer (11) and Schafer (12), the examiner studied each Rorschach protocol for its indications of the structural aspects of personality, for character structure as reflected in syndromes of defenses and controls. A basic character type for each S was identified along with additional character components, and a summary was written that referred to the more conspicuous defenses, to phobic, depressive and paranoid features, to think-

ing disturbances, and to special problem areas. An evaluation of level of personality integration was also made (roughly, an index of degree of psychopathology). The diagnostic assessment was done "blind"—the examiner had no knowledge of the group to which an S belonged.

Character type was classified in four categories: obsessive-compulsive, inhibited obsessive-compulsive, hysterical or narcissistic.⁹ A few Ss seemed best diagnosed as "mixed-neurotic" (obsessive-compulsive and hysterical), and a few others might have been diagnosed as "schizoid" or "immature." But the relatively small number of Ss led to the decision to "force" all Ss into one of the four basic types.

RESULTS

Table 5 shows the distribution of the groups among the four diagnostic categories. With regard to basic character, most of the *Subtractors* were obsessive-compulsive, equal numbers of *Adders* were obsessive-compulsive and narcissistic, and all the *Recallers* but one were inhibited obsessive-compulsive (even the single exception is obsessive-compulsive and was described in his summary as "on the inhibited side"). The predominance of the inhibited obsessive-compulsive character type among the *Recallers* is significant at the .01 level (Fisher's Exact Test).

As for character components, the most

⁹ It is infeasible to present in this paper a complete account of the way these diagnostic categories were defined. The reader can find such an account in Rapaport, Gill and Schafer (11) and in Schafer (12). Briefly, the obsessive-compulsive and hysterical classifications are used in their generally understood senses. An inhibited obsessive-compulsive, however, is not simply an obsessive-compulsive who is inhibited, but an individual who relies primarily on those obsessive-compulsive defenses and traits that are particularly inhibiting. Thus he is likely to be rigid and constricted and not possess much capacity for introspection. The narcissistic character is extroverted and outgoing, and shows openness of content and has relatively free access to his feelings and impulses. He is ego-centric and exhibitionistic, and likely to lean on the defenses of isolation of affect, acting out and externalization.

TABLE 5
Diagnostic Classification of the Three Groups

Diagnostic Classification Level	Subtractors (N = 9)	Adders (N = 8)	Recallers (N = 7)
Obsessive-compulsive			
Basic character type	4	3	1
Major character component	2	0	0
Minor character component	0	1	0
Does not appear at all	3	4	6
Inhibited obsessive-compulsive			
Basic character type	2	0	5
Major character component	0	1	1
Minor character component	0	1	0
Does not appear at all	7	6	1
Hysterical			
Basic character type	2	2	1
Major character component	6	3	2
Minor character component	1	3	3
Does not appear at all	0	0	1
Narcissistic			
Basic character component	1	3	0
Major character component	2	0	0
Minor character component	3	3	1
Does not appear at all	3	2	6
Schizoid			
Major character component	0	4	0
Minor character component	2	3	2
Does not appear at all	7	1	5

noteworthy finding (significant at the .02 level) is that four of the *Adders* (half the group) showed major schizoid features, while not a single member of the other groups did. Table 5 also reveals that the *Subtractors* tended to have major hysterical features. At the same time, a majority of the *Subtractors* had minor narcissistic features, while a minority of the *Adders*, and none of the *Recallers*, did.

If the three levels of analysis shown in Table 5 are combined, it is seen that the *Subtractors* and *Adders* each have six Ss with narcissistic features, and the *Recallers* only one (and in him they were minor: $p < .05$). For the *Adders* these features tend to comprise the basic character structure, while for the *Subtractors* they are largely minor. Although the groups do not differ in the number showing hysterical features,

for all but one of the *Subtractors* such features are of major proportions. The *Subtractors* also show the most obsessive-compulsive features, and these, too, tend to be of major proportions. The *Adders* are the only group with major schizoid features, and only one *Adder* shows none at all (difference from the other two groups is significant at the .02 level).

The evaluation of level of personality integration answers the question: How well put together is the individual? This was graded on a four-point scale, ranging from well integrated (4) to poorly integrated (1). The *Subtractors* are the best integrated group (mean, 2.7), the *Adders* the most poorly integrated (mean, 1.1), and the *Recallers* fall in between (mean, 2.1). However, the difference between *Subtractors* and *Adders* reaches only borderline statistical significance ($p < .10$, t -test).

An examination of the written summaries indicates some important differences among the groups, but only a few comparisons reach statistical significance. The *Recallers* were found to use fewer defenses than Ss of the other two groups ($p < .05$), and a narrower range of defenses; the only defensive style typical of this group is guardedness or evasiveness. The *Subtractors* are likely to appear more paranoid than the other groups ($p = .08$), and seven of the nine *Subtractors* show marked aggressive trends (not noted in any other S, $p < .01$). The *Adders* tend to be more egocentric and more sado-masochistic, and are more likely to show extreme reliance upon intellectualization (not significant). Three Ss showed a serious thinking disturbance, and all were *Adders*. Finally, none of the *Recallers* were found to have phobic features, while four *Adders* and four *Subtractors* showed them ($p = .07$).

To summarize, then: The *Recallers* are inhibited obsessive-compulsives, constricted and guarded, not introspective or reflective and not emotionally outgoing or responsive. The *Subtractors* are characterized by a

major hysterical work of a well-integrated character structure, aggressive and. The most complicated *Adders*, perhaps poorly integrated, striking commonness of schizoid

DISCUSSION

The present study of individuals in the hospital experiences and was guided by the conscious, or "sociated with active functioning crucial variable brought out two of the drug experience person having the view that such a phenomenon action between the stable personality.

In the written variables that ences were examined certain aspects tended to be forgotten or distorted or confabulated across the individuals and the wide variations. In the presented whittings of the Ss as well as concerning.

The correlation measures of and between modes of recording impressive. It responses possess distinct

major hysterical component in the framework of a well-integrated obsessive-compulsive character structure; they are notably aggressive and have paranoid tendencies. The most complicated picture is that of the *Adders*, perhaps because they are the most poorly integrated of the groups. Their most striking common characteristic is the presence of schizoid features.

DISCUSSION AND SUMMARY

The present investigation of the way individuals in the waking state recall their experiences under the influence of LSD-25 was guided by the thesis that state of consciousness, or "ego state," because it is associated with alterations in mode of cognitive functioning, should prove to be a crucial variable in remembering. The study brought out two major factors: the nature of the drug experience and the nature of the person having that experience. It supports the view that any complete formulation of such a phenomenon must include an interaction between state of consciousness and the stable personality structure of the subject.

In the writers' previous report (5) the variables that overrode individual differences were examined. It was found that certain aspects of the drug experience tended to be well recalled, others to be forgotten or denied, and others to be added or confabulated—and that these trends cut across the individual differences among *Ss* and the wide differences in their drug reactions. In the present report findings are presented which emphasize the contributions of the stable personality structure of *S* as well as certain of his modes of remembering.

The correlations between the various measures of remembering and personality, and between these measures and the three modes of recalling the drug experience, are impressive. It is easy to sense in these correspondences ways in which the groups possess distinguishing and coherent patterns

of attributes. Still, the fact that these correspondences are *ad hoc* emphasizes the need for replication before the findings can be subjected to any comprehensive theoretical analysis. Instead of attempting a theoretical integration at this point, it may therefore be sufficient merely to summarize the findings for the three groups by presenting a composite picture of the *Subtractor*, the *Adder* and the *Recaller*, and to allude to theoretical possibilities in these summaries.

The *Subtractor* is an obsessive-compulsive character with hysterical features. He is well integrated and effectively defended. He tends to use intellectual defenses, and shows strong strivings for independence. He is creative, sensitive and intelligent, and is capable of retaining verbal material accurately and without intrusions and importations. But he is likely to show hostility toward others and toward himself and to use paranoid-like defenses in the face of a tendency to feel unloved, threatened and exploited. His drug experience contains notably few changes felt as occurring within himself but abounds in alterations of his way of experiencing and relating to the environment. Further, as documented in the previous report, the manner in which he reports many of his drug experiences indicates that a process of denial is at work. Under the drug his propensity to diminish his experience is reflected in the fact that he drops aspects of his earliest memory, and that he shows a differential drop in accuracy of retention on a neutral verbal stimulus. His drug-day earliest memory, however, maintains the level of reality contact it had under his normal state of consciousness. Thus his defenses are likely to be adaptive in the face of the threatening nature of the drug experience: his retrospective reconstruction of that experience further reflects that fact. His recall accentuates the image of an unimpaired and unchanged self and de-emphasizes the previously reported loss of meaning and loss of contact

with the environment; i.e., the regressive experiences that he did have are to a great extent excluded in his retrospective reconstruction. In many respects, then, his behavior may be said to be adaptive in the face of the threatening nature of the altered state of consciousness and his particular personality make-up may be said to serve that adaptation optimally.

The *Adder* is narcissistic and schizoid and may show a thought disturbance. In contrast to the *Subtractor* he is poorly integrated, uses a wide variety of defenses but does not seem to be able to use them effectively. He is dependent, naive, trusting and passive-receptive. He shows an importing style of remembering characterized by a tendency to make intrusions from prior experiences when he is recalling verbal material, and he does so both in short-term and long-term remembering. His reaction to the drug is severe. He reports a wide range of effects, including changes in bodily feelings, loss of controls, and changes in his perception of the environment. He also shows changes in his earliest memory, especially the addition of new material, and he shows substantial forgetting of verbal material learned the day before. Similarly, his recall of the drug experience is characterized by forgetting and confabulating, more notably by the latter. Among the reactions he recalls, as well as those he adds, many are of a threatening and archaic nature: the *Adder* is likely to confabulate experiences such as intense affect, suspiciousness and impairments in adaptation. The findings suggest that he is characterized by a certain openness between different states of consciousness, or else that he can tolerate regressive phenomena because he is not unfamiliar with them.

The *Recaller* is an inhibited obsessive-compulsive character, who generally experiences little manifest anxiety and has a narrow range of rigid yet quite effective defenses. He is not particularly intelligent,

his thinking is concrete and stereotyped. He is poor in short-term retention and probably in learning, but capable of good long-range recall. Thus his ability to recall the drug experience is matched by his ability to recall verbal material learned the day before. His earliest memory reveals a passive receptivity along with a kind of static and inhibited quality, and it remains stable under the drug. Under the impact of the drug he reports somatic symptoms and some elation but comparatively little else. His limited drug effect suggests that the inhibition and rigid controls typical of his normal state of consciousness were maintained under the drug. His drug experience, therefore, was not particularly unusual or threatening and this fact, along with his general ability to recall his restricted experiences well, may account for his ability to recall the drug experience accurately.

The findings of this study provide support for the assumption that the distinctive individual differences in ways of recalling the drug experience are broader than the specific reaction to the drug and its recall. The personality findings permit the inference that the changes in recall are not wholly due to the effects of retrospective re-evaluation. Instead, the modes of recalling the drug experience probably involved substantial elements of forgetting and confabulating, and these modes seem to be a function of the individual's cognitive style and personality structure.

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