CONSCIOUS CONTROL OF DREAMING:
I. THE POSTHYPNOTIC DREAM

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Thirteen highly hypnotizable Ss each spent 2 nights in the laboratory. Before going to sleep, they were deeply hypnotized and instructed to dream about a stimulus narrative in every Stage 1-rapid eye movement (REM) dream of the night. A second stimulus narrative was used for the other night in counterbalanced order. Dream reports were obtained from Stage 1-REM awakenings. All Ss but one showed some effects, and the mean effect across Ss ranges from 2 to 4 elements of the stimulus narratives clearly appearing in the dreams. The peak effect ranged from 0 to 24 elements. Thematic analysis indicated that 8 of the 13 Ss reported at least one dream in which the stimulus narrative was a dominant content organizer. The number of stimulus narrative elements appearing in the dream reports was positively correlated with hypnotizability, more specifically with factors of hypnotizability characterizing an ability to function in an altered state of consciousness and negatively with the compulsive, inhibitory aspects of hypnotizability. Hypnosis is clearly helpful, but may not be necessary to achieve deliberate control of dream content. Such control may have important therapeutic and growth applications.

As long ago as 1912 (Schrötter, 1912), and possibly earlier, it was reported that suggestions given to a hypnotized S could influence the content of dreams reported from the subsequent nights’ sleep, that is, that posthypnotic suggestion could influence the content of nocturnal dreaming. Until the advent of the EEG and rapid eye movement (REM) monitoring technique, however, there was no certainty that retrospective morning reports actually represented any changes in Stage 1-REM dreams, as has been discussed more fully elsewhere (Tart, 1964, 1965). Tart (1962, 1964) and Stoyva (1961, 1965), working independently, found that posthypnotic suggestion would influence content of dreams when such reports were gathered from awakenings during and immediately following Stage 1-REM dreaming sleep. Stoyva generally used relatively simple suggestions and found that many Stage 1-REM dreams of most highly hypnotizable Ss were highly influenced by these suggestions. He also found that hypnotic suggestion was roughly twice as effective as waking suggestion. Tart used much more complex suggestions as to what the dreams should be about, and found substantial influences on dream content in about half of the highly hypnotizable Ss used. In both Stoyva’s and Tart’s studies, no obvious instances of Freudian distortion were found: the dreams either were obviously about the experimental suggestion or not about the suggestion at all, although free association techniques were not used used to pick up subtle symbolic and dynamic effects.

Aside from indicating that some Ss may have their dreams influenced by posthypnotic suggestion, little more is known about the phenomena of the posthypnotic Stage 1-REM dream. The present study replicates Stoyva’s and Tart’s work, assesses the magnitude of the effect more adequately, and investigates some of the components of hypnotic susceptibility and depth which affect the response to posthypnotic suggestions to dream about a specified topic. The results are discussed in terms of techniques for the deliberate control of dreaming.

METHOD

Subjects

By means of a sequential selection process, 13 undergraduate students (4 males and 9 females, ages 17–25 yr.) were selected as Ss who were highly hypnotizable.
Posthypnotic Dream Nights Procedure

On each of two separate evenings, separated by at least a week, each S reported to the laboratory approximately 1 hr. before bedtime. Scalp electrodes were attached with bentonite paste and collodion for recording the sleep EEG. Recording channels were right frontal to vertex and vertex to right occipital. REMs were measured by means of a semiconductor strain gage taped to one eyelid (Baldridge, Whitman, & Kramer, 1963; Tart, 1963b).

The E hypnotized S by whatever method S preferred until the following criteria were met: first, that S could experience a vivid visual hallucination with his eyes closed; second, that his self-reported depth of hypnosis was at least 30 on the North Carolina self-report scale of hypnotic depth (Tart, 1962; 1963a; 1967). Nine of the 13 Ss participated in studies of operant control of EEG rhythms (Tart, 1969b), and all were administered the Stanford Profile Scales of Hypnotic Susceptibility (SPSHS; Weitzenhoffer & Hilgard, 1963), so Ss were well adapted to working in the laboratory before their sleep sessions.

Stimulus Narratives

Two stimulus narratives were used for inducing posthypnotic dreams. Approximately half of the Ss received Stimulus Narrative 1 on their first night and Stimulus Narrative 2 on their second night, while this order was reversed for the other Ss. The narratives were selected to be detailed, interesting, pleasant, and emotionally involving. Each was adapted from a short story by Krishnamurti (1960, pp. 122-123, 4-7). Stimulus Narrative 1 was as follows:

It had been raining continuously for a week: the earth is soggy, and there are large puddles all along the path you are walking along. The water level has risen in the wells, and the frogs had been having a splendid time, croaking tirelessly all night long. Now, however, it is slowly clearing up. There are patches of blue sky just overhead, and the morning sun is scattering the clouds. It will be months before the leaves of the newly washed trees will again be covered with fine, red dust. The blue of the sky is so intense that it makes you stop and wonder. The air has been purified, and in one short week the earth has suddenly become green. In this morning light, peace lies upon the land, as you walk along the forest path.

A single parrot is perched on a dead branch of a nearby tree and you stop to look at it. It isn't preening itself, and it sits very still, although its eyes are moving and alert. Its color is a delicate green with a brilliant red beak and a long tail of paler green. You want to touch it, to feel the color of it, but if you move it will fly away, so you, too, stand perfectly still, eyes fixed upon the parrot. Though it is completely still, a frozen green light, you can feel that it is intensely alive, and it seems to give life to the dead branch on which it sits. It is so astonishingly beautiful that it takes your breath away, and you dare not take your eyes off it, lest in a flash it be gone. You have seen parrots before, but this single bird seems to be the focus of all life, of all beauty, of all perfection. There is nothing but this vivid spot of green on a dark branch against the blue sky. There are no words, no thoughts in your mind; you aren't even conscious that you aren't thinking. You hardly even blink, although the intensity of it almost brings tears to your eyes. Even blinking might frighten the bird away!

But it remains there, unmoving, so sleek, so slender, with every feather in its place.

3 A one-page outline describing the procedure of the Special Training Sessions has been deposited with the National Auxiliary Publications Service. Order Document No. 01109 from National Auxiliary Publications Service of the American Society for Information Science, C/o CCM Information Sciences, Inc., 909 Third Avenue, New York, New York 10022. Remit in advance $5.00 for photocopies or $2.00 for microfiche and make checks payable to: Research and Microfilm Publications, Inc.

4 A one-page outline describing the instructions for the posthypnotic dream nights has been deposited with the National Auxiliary Publications Service. Order Document No. 01109 from National Auxiliary Publications Service of the American Society for Information Science, C/o CCM Information Sciences, Inc., 909 Third Avenue, New York, New York 10022. Remit in advance $5.00 for photocopies or $2.00 for microfiche and make checks payable to: Research and Microfilm Publications, Inc.
Five minutes pass as you stand completely still yourself, never taking your eyes from this still vision, but these minutes cover the day, the year, all time: in these few minutes all life is, was, will be, without an end, without a beginning. It is not an experience to be stored up in memory, a dead thing to be kept alive by thought, which is also dying: it is totally alive, and so cannot be found among the dead.

And after this five minutes of eternity someone calls from a house near the path and the dead branch is suddenly bare.

Then you awaken . . . .

Stimulus Narrative 2 was similar in emotional tone and setting. It has been presented elsewhere.4

Demand Characteristics

Orne (1959, 1962) and Rosenthal (1966) have shown that the explicit demands and expectations of the E can have substantial effects on the outcome of psychological experiments, especially those involving hypnosis, in which Ss seem to be unusually sensitive to the expectations of the hypnotist. One approach to the problem of demand characteristics involves elaborate double blind procedures and simulating control Ss (see, e.g., Orne 1969; Orne & Evans, 1965, 1966; Troffier & Tart, 1964). Because Ss in this experiment had volunteered for long-term participation in many experiments, it was felt that this kind of approach, involving a climate of elaborate deception, would not be suitable. Therefore, the approach taken was to set up a relationship with Ss which encouraged frankness and honesty. It was constantly stressed to Ss that the investigator and his assistants were looking at the phenomenon from the outside and that only they, the Ss, could observe the most important effects of hypnosis, their own experiences, and thus it was vital that Ss describe their experiences and reactions as accurately and honestly as possible. It was also stressed that the investigator and his assistants were persuasive talkers who had ideas of their own that they liked to push, but that they had an even stronger commitment to understand what was really happening, and so Ss were urged to correct the investigator and his assistants whenever they felt their responses and experiences were being misinterpreted. They were further told that even though we gave them quite positive suggestions about exactly what they might experience and how they would behave, things might not always work this way, and we wanted to know about it when they did not. The Ss did occasionally offer corrections to E's interpretations, so we feel that this atmosphere was successfully established.

The overall procedure, then, was to treat Ss as explorers or colleagues working with the investigating team. This was also the reason that amnesia was not induced for the posthypnotic suggestions on the posthypnotic dream nights, even though it had been induced in the earlier studies of Stoyva (1961, 1965) and Tart (1962, 1964).

RESULTS

Method of Scoring Posthypnotic Compliance

The basic question of the present study is the extent to which the stimulus narratives affected the reported dreams. Each stimulus narrative was broken down into units comprising either discrete actions that the dreamer performed or discrete descriptive statements about what was present or what was taking place in the dream. This yielded 40 descriptors for Stimulus Narrative 1 and 43 descriptors for Stimulus Narrative 2. These descriptors are quite similar to the action units used by Tart (1962, 1964) earlier.

Two judges were used for scoring the dream reports, an undergraduate student not majoring in psychology and the sleep laboratory technician who had a BA degree in psychology. Judge A was blind as to which stimulus narrative was supposed to be associated with which dream, and Judge B was not blind. The basic directions for scoring were to give each descriptor 1 point if it was clearly present in the dream and ½ point if it seemed to be present in modified form. These points were then added to yield a total compliance score for each dream report.

Each judge scored every dream report obtained in the study against both stimulus narratives, without knowing which stimulus narrative was intended to go with which dream. Thus half the dreams were scored against the wrong stimulus narrative to serve as a control for possible overlap between spontaneous dream content and the stimulus narratives. For the dream reports scored against the proper stimulus narrative, the judges correlated .98 with each other (Pearson r). The judges' ratings were then averaged for each dream report.7

4 A one-page description of Stimulus Narrative 2 has been deposited with the National Auxiliary Publications Service. Order Document No. 01009 from National Auxiliary Publications Service of the American Society for Information Science, c/o CCM Information Sciences, Inc., 909 Third Avenue, New York, New York 10022. Remit in advance $5.00 for photocopies or $2.00 for microfiche and make checks payable to: Research and Microfilm Publications, Inc.

5 In practice, 3 Ss were run some time after the original 10 were run, in order to find Ss for other experiments who could show substantial posthypnotic dreaming effects. The judging reliabilities described here are based on analyses of the first 10 Ss' dream reports. Because of the extremely high communicability of the judging system, only one judge rated the dream reports of the three additional Ss, and her judgments are used in all further analyses along with the pooled judgments which are used for the first 10 Ss.
Note.—Thirteen Ss in all entries.

Table 1 summarizes the main results, in the one case by stimulus narrative and in the other case by first or second night in the laboratory. There were a total of 95 awakenings from Stage 1-REM dream periods, yielding 78 dream reports. This figure of 82% recall is quite comparable to what is reported under various laboratory conditions for Stage 1 recall (Foulkes, 1966).

For Stimulus Narrative 1, there were 43 recalled dreams. The mean effect for each S (total score of an S's dreams divided by the number of his reported dreams) ranged from 0 to 6.7, with a mean of 2.61. The control scoring, in which dreams reported in response to Stimulus Narrative 1 were scored blindly against Stimulus Narrative 2, showed a mean of only .41, and the difference in means is highly significant by a t test for correlated measures ($t = 3.44$, $df = 12$, $p < .002$, one-tailed). For Stimulus Narrative 2, there were 35 recalled dreams, with mean scores per S ranging from 0 to 15.9 and the mean of these scores being 4.21. Compared to the control scoring, with a mean of .44, the difference is again highly significant ($t = 2.81$, $df = 12$, $p < .01$, one-tailed).

This type of analysis deals with the average size of the effect on Ss. The maximum effect or peak performance of each S is also of interest, especially in terms of evaluating the maximum potential of the posthypnotic dream effect. The peak effect, using the score of the dream report receiving the highest rating for each S, ranged from 0 to 24.5, with a mean of 6.1 and 7.0 for Stimulus Narratives 1 and 2, respectively.

It was not expected that one narrative would be more effective than the other, since they were chosen to be rather similar. An analysis of variance by nights and narrative shows no significant main effects or interaction (highest $F = .98$, $df = 1/24$, $ns$).

To illustrate the type of dream reported in response to the posthypnotic suggestions, two examples are presented, both in response to Stimulus Narrative 1. For the first example, the averaged scoring of it by the judges was 3.25:

Technician: "Martha, can you recall any dreams?"
S: "Yes. We went to—my great grandfather and I went to a field—to pick up wood to bring for the fire and as we were going away we got chased by some cattle that lived on the farm and it was kind of fun because they were just calves and they were fooling around with us but they were sort of frisky and everything. And as we were carrying the firewood away, there was a bird in the trees. A green bud—I didn't look at it—but it just kept saying, 'Oh, you're taking it away,' and it just kept announcing the fact that we were taking the wood and it bothered me in a way because I was afraid of being caught by someone or something like that. There was—the fields were in this—the land was relatively barren. It was kind of dry and the trees had no foliage on them and the fields were dry and there was a lot of dead wood about and everything was rather still—there was no..."
life really around except there was this cattle—there were two calves who were kind of fooling around and running about, but they were kind of far away and we left them as we were walking away from them to take the firewood to the truck we encountered the bird as we were almost to the truck. And the farmhouse was nearby, that’s why I was worried about being caught. But it wasn’t really an unpleasant feeling, it was just sort of let’s hurry because here’s the bird announcing that we were taking firewood. I think that’s about it.”

Technician: “Okay, fine. Did you have any feelings or anything like that? You mentioned the fright—anything else about the day or anything?”

S: “Oh, I really felt free. It was such a nice feeling because it was such a nice day, even though there was no foliage in the trees and it was kind of a barren atmosphere. It was just so pleasant. I don’t know how to explain it. Everything was so clear and really crisp—not crisp like fresh and cold, but like sharp outlines and everything like that. It was really beautiful to be there. That’s why it was so pleasant, I think. I just had this feeling of real happiness there. I think that’s all.”

The second example is one of the better dreams, with the averaged ratings of the judges being 14.0.

Technician: “Peggy, can you remember any dream?”

S: “It’s really broken. There I was talking to my roommate and then I was looking at bugs, and then there were things about legs and sticks, then I was walking along the path and there were puddles on each side—it had been raining for a long time, and the frogs were croaking, and it was getting sunny and the sky was all blue and I walked along and there was a parrot, and I just watched the parrot and he was so green, I just got lost, and I started thinking—Oh, then I thought of something else and I never went back to the parrot. I wasn’t finished dreaming when you called me, was I?”

Technician: “I think so, Peggy. Maybe not, but I think so. Can you think of anything else?”

S: “Because I can’t remember if there was anything maybe it just stopped. Oh, I guess it was just green. I was watching the parrot and it was just the greenness and either I went on from there or I just stopped there at green. That’s about the last thing I can remember.”

Technician: “Okay, and how did you feel?”

S: “Really disoriented. I felt—it was really kind of strange—skipping around from talking to my roommate in one scene and then seeing bugs and legs and sticks—I don’t even know how I got on the path....”) is fairly frequent, as if a spontaneous dream theme is suddenly disrupted and the suggested stimulus narrative takes control.

**Differences between Nights**

Given that dreaming in accordance with posthypnotic suggestion is a novel procedure for Ss, it is likely that there might be some learning from the first to the second night in the laboratory, and/or the effect might be reduced on the first night if Ss were not completely adapted to the laboratory. An analysis of variance showed no effect by nights ($F = .66, df = 1/24, ns$), but looking at the raw scores suggests that Ss may be divided into two types, those who show a fair amount of effect and those who show virtually none. If Ss are ranked ordered by either mean effect per S or peak effect per S, the same Ss end up in the first six rankings in both orderings. Most of the suggestion of an increase in performance from first to second night comes from these top Ss.\(^8\) The mean effect went from 4.80 to 7.68 from Night 1 to Night 2, but again the difference is suggestive but not significant ($t = .982, df = 5, p < .20$, one-tailed). The same result holds from looking at peak effect, which went from 9.75 to 13.58 ($t = .944, df = 5, p < .20$, one-tailed).

By inspection, the posthypnotic effect was essentially equally distributed over all Stage 1-REM periods of the night, that is, there was no clear tendency for early or late Stage 1-REM periods to produce dreams showing more posthypnotic effect.

**Thematic Analysis**

The above descriptor technique for scoring degree of effect of the posthypnotic suggestions is rather atomistic, and occasionally gives quite low scores to a reported dream which is clearly

\(^8\)Two of the poorer Ss (average effects of .7, 1.3, .6, and 2.5 for Stimulus Narratives 1 and 2, respectively) felt that they had been under considerable tension from outside sources on their posthypnotic dream nights, and asked if they could participate on a third night. Another stimulus narrative was used from an earlier unpublished study by Tart and Dement, with procedures otherwise identical. The Ss continued to show the same low level of performance (mean effects of .5 and .2, respectively).
dominated by the theme of the stimulus narrative. As a more global, if less precise, method of assessing the effect of the posthypnotic suggestions, two new judges, both trained at the MA level in psychology, were asked to independently rate each dream report against its stimulus narrative in terms of the following categories: (a) central—the major theme of the dream is the same as the major theme of the stimulus narrative; (b) mixed—there is more than one major theme in the dream, but one of these is clearly organized around the stimulus narrative; (c) tangential—the dream has clearly been influenced by the stimulus narrative but in an incidental or tangential fashion; and (d) negligible—there is no element or theme of the stimulus narrative appearing in recognizable form in the dream, even allowing for minor transformations.

The rank-order correlation between the two judges' ratings was .85, a satisfactory degree of reliability. If the two judges' ratings are averaged and results for the two stimulus narratives combined for an overall estimate of effect, 42% of the reported dreams were rated central, mixed, 12% tangential, and 21% negligible. As both central and mixed ratings represent strong effects, they may be combined to indicate strong effects of the stimulus narratives in approximately two thirds of the reported dreams.

Applying this to the individual Ss, we find, using the more conservative judge's ratings, that 2 of the 13 Ss showed only negligible effects, while 8 showed central or mixed effects. No differences between nights or narratives were apparent.

**Magnitude of Posthypnotic Effect and Various Measures of Hypnotic Susceptibility**

Hypnotic susceptibility seems to be composed of a number of specific dimensions (Hilgard, 1965), as well as an overall component. A series of analyses, comparing these components with both the mean effect (each S's mean over both nights) on the dreams and the S's best dreams were carried out in order to investigate possible relationships. Table 2 presents the rank-order correlation coefficients between these various measures. Two-tailed tests of significance were used as there was no a priori prediction of the direction of relationships. Significance is indicated at the 10% level, since this is an exploratory analysis.

There are high positive correlations between the C-experiential score and the total score on the extended SPSHS. The correlation of the posthypnotic dream measures with C-behavioral is positive, but not significant. This is predictable on purely statistical grounds, for the S selection process severely restricted the

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<td>.42</td>
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<td>-.42</td>
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<tr>
<td>Loss of Motor Control</td>
<td>-.33</td>
<td>-.51*</td>
</tr>
</tbody>
</table>

Table 2

**Note.**—Rank-order correlations are used; n = 13 in all cases.

- *p < .10, two-tailed.
- **p < .05, two-tailed.
- ***p < .01, two-tailed.

For example, the first example above was only rated 3.25 units by the descriptor analysis, yet it is clearly organized around the theme of the stimulus narrative.
range of variation for C-behavioral. The extended SPSHS and C-experiential scores are not so restricted: in the present sample, extended SPSHS scores ranged from 29 to 63 and C-experiential scores from 73 to 132.

Among the subscales of the extended SPSHS, there is a significant positive correlation with the Positive Hallucination subscale, and a high but not significant positive correlation with the Agnosia and Cognitive Distortion subscale. Fairly high negative correlations are found with the Loss of Motor Control subscale and the Amnesia and Posthypnotic Compulsion subscale, although these do not reach significance.

**Hypnotic Depth and Posthypnotic Dream Performance**

It was hypothesized before beginning the study that a high degree of compliance with the stimulus narrative would be a function of a deep hypnotic state. The previous analysis, comparing the degree of posthypnotic compliance to various measures of hypnotic susceptibility, partially confirms this hypothesis. However, hypnotic susceptibility is a long-term measure, and numerous variations in the momentary depth of hypnosis may take place, as discussed more fully elsewhere (Tart, 1970a). A measure of hypnotic depth at the time the posthypnotic dream suggestions were given would be a more appropriate test of the hypothesis.

The state reports obtained on the North Carolina Scale constitute a measure of momentary depth for our purposes here. A state report was obtained from each S immediately following the completion of the posthypnotic dream suggestion. A state report was also obtained before administering the suggestions, although this tended to vary from 5-7 min. before the suggestions were completed. As self-reported depth may change significantly over a period of 5-7 min., it is not clear which state report would be the most appropriate to use, so analyses were performed using not only the state reports before and after the posthypnotic suggestions, but also on the mean of these two reports for each S, assuming that if any change occurred it was linear over that period of time. It was also noted in looking at the raw data that some of the Ss who had done rather poorly in terms of their posthypnotic dream performance tended to show a drop in state report from before to after the posthypnotic suggestions, so another analysis was performed using the magnitude of change in the two reports.

Table 3 indicates the rank-order correlations between the various state report measures of hypnotic depth and the posthypnotic dream performance, using both mean performance and best performance, analyzing separately for the 2 nights in the laboratory. Nine of the 16 correlations are significant in the predicted direction at the 10% level, one-tailed. In general, the state report immediately following the posthypnotic suggestion seemed to be the most consistently good predictor.¹³

Note that these analyses are not independent, so the interpretation of these results should be limited to noting a strong suggestion of some sort of positive relationship between self-reported hypnotic depth and posthypnotic dream performance, with the nature of that relationship being unclear at the present time.

¹³The above analyses are based on a statistical assumption that the self-scaling of hypnotic depth is identical across Ss. This is a questionable assumption, especially as many of the Ss were giving state reports that were beyond the defining phenomena given in the original state scale instructions (reports ranged from 23 to 62). A more conservative assumption would be that a given S would be consistent in his scaling from one session to another, but that this would not necessarily imply total comparability of scaling across Ss. The relationship between self-reported depth at the end of the posthypnotic dream suggestions and subsequent dream performance may then be tested with a t test for correlated observations. On the night with the higher state report following the instructions, the mean dream score was 4.82, while on the other night it was 2.00, a significant difference (t=2.45, df=12, p<.025, one-tailed).


**DISCUSSION**

The present study confirms the earlier studies of Stoyva (1961, 1965) and Tart (1962, 1964) by indicating that posthypnotic suggestions to dream about specified stimulus narratives have a significant effect on the dreams of many highly hypnotizable Ss.

In considering the magnitude of the posthypnotic dream effect by the descriptor analysis, we note that on the average it is rather low, with mean number of details ranging from about 2½ to about 4½ per S, out of a possible 40-43 details. On the other hand, the peak effect can be quite a bit higher: in this study the mean peak effect was about seven details, which is approximately 16% of the stimulus narrative, and the highest peak for any given S was 24.5 details, which is 57% of the stimulus narrative.¹⁴

This scoring method is quite similar to the action unit scoring technique used earlier by Tart (1964) and allows a comparison of the magnitude of the effects obtained in the present study with the earlier study. Bearing in mind differences from the earlier study (in the earlier study Ss were not as well adapted to the laboratory, they had amnesia for the posthypnotic suggestions, they only had 1 night of posthypnotic dreaming, and the stimulus narrative was both shorter, 23 possible units, and emotionally unpleasant), we nevertheless note that the magnitudes of the effects obtained are quite similar. In the present study, the mean effect per S ranged from 2.6 to 4.2, and in the earlier study the mean effect was 2.3. The range in the earlier study was 0–13, 0–24.5 in the present study. The mean of the best score of Ss ran from 6 to 7 in the present study and was 12 in the previous study. More Ss in

¹⁴This type of analysis, namely, number of descriptors appearing in the reported dreams, is highly conservative if one thinks of the results in terms of statistical significance of the posthypnotic effect. A laborious but highly sensitive type of analysis of the effect could be carried out using Hall and van de Castles' normative data (Hall & van de Castle, 1966) on the frequency of appearance of various elements in dreams. Thus for Stimulus Narrative 1, the elements of "bird," "puddle," "frogs," and "rain" appear in Hall and van de Castles' 1,000 normative dreams with frequencies of .005, .002, .002, and .008, respectively. The appearance of one or several elements in the reported dreams would thus lead to fantastic significance levels as probabilities were pooled.

the previous study made scores of zero, but the 50% who made nonzero scores tended to make higher scores than in the present study.

The thematic analysis of posthypnotic compliance allows some comparison with Stoyva's (1961) data. Considering any score above negligible to indicate some effect, 2 of Stoyva's 16 Ss made negligible scores and 2 of the 13 Ss in the present study made negligible scores. If we combine the central and mixed categories in the present thematic scoring, we find that about two-thirds of all Stage 1 dream reports were markedly affected by the posthypnotic suggestions.

Thus the present and the two earlier studies, in spite of numerous differences in procedure, have found roughly the same number of Ss complying with the posthypnotic dream suggestions and roughly the same ranges of effect.

It would be reasonable to expect that Ss would gradually learn to do better on the posthypnotic dreaming task, as would be expected for any completely novel task. There is suggestive evidence, primarily for the better Ss, in the present study, that they did better on their second night in the laboratory. Also, rather than a learning effect this might be a disappearance of a "first night effect," an adaptation effect which has been reported in other dream laboratories (Agnew, Webb, & Williams, 1966; Domhof & Kamiya, 1964; Kales, Jacobson, Kales, Kun, & Weissbuch, 1967; Mendels & Hawkins, 1967; Rechtschaffen & Verdone, 1964), in spite of procedures in the present study which attempted to have Ss well adapted to the laboratory. Neither Stoyva's (1961, 1965) nor Tart's (1962, 1964) earlier work contained any relevant data for examining a learning effect. It should be noted, however, that a number of Ss in the present study have since been used as Ss in a number of other studies investigating various posthypnotic effects on nocturnal dreaming, and several of the Ss have spontaneously reported that they have learned to control the content of their dreams at home by giving themselves appropriate suggestions as they fall asleep. This has not yet been verified in the laboratory.

The present study provides new data on the relationship of posthypnotic dreaming to various aspects of hypnosis. The positive rela-
tionships to overall hypnotizability support the original hypothesis that posthypnotic dreaming is a relatively difficult hypnotic phenomenon. The correlations with various subscales on the SPSHS are of even more interest. The positive correlations with the Agnosia and Cognitive Distortion subscale, and the Positive Hallucination subscale, combined with the negative correlations with the Loss of Motor Control subscale and Amnesia and Posthypnotic Compulsion subscale, suggest that the primary hypnotic ability allowing posthypnotic dreaming is what might be considered a positive ability factor, whereas the inhibitory factor in hypnosis, the ability of the hypnotist to structure S's experience so he cannot do various things, militates against posthypnotic dreaming.

If these components of hypnotizability and hypnotic depth favor posthypnotic dreaming, we can make a rough estimate of the percentage of Ss that would be able to experience substantial compliance with posthypnotic suggestions to dream about specified topics. Given that the college-student Ss were selected to be in the upper 16% of the susceptibility range on Form C of the SHSS, and that approximately half of them showed rather substantial effects, 8% would be a rough figure. This may be somewhat less, as Ss were also selected to be frequent dream recallers, or it may be considerably higher as some of the least susceptible Ss were still showing dream effects.

It is appropriate to ask, however, whether posthypnotic suggestion is necessary to acquire control over the content of Stage 1-REM dreams, or whether it is merely helpful.

If we think of the various factors which may influence the content of any particular Stage 1-REM dream, we may conveniently divide these factors into the person's total life history, his immediate past (probably the last week or so preceding the dream), the events of the day, his thoughts and experiences close to going to bed, and, as a special case of the latter, whatever kind of experiences the person has in the hypnagogic state. Hall and van de Castle's data (1966) indicate that the content of Stage 1 dreaming is quite parallel, by and large, to everyday events, with much less bizarre distortion and physically impossible events being reported than one would be led to expect by most psychological theories of dreaming.

There is no good data, however, which gives some idea of the relation of specific events in a person's life history; immediate past, immediate events of the day, or prebedtime thoughts in terms of specific connections with events in a dream. The Freudian theory of dream formation claims that the events of the day, the "day residue," are the important immediate stimulus elements, but that they're only important insofar as they have associative connections with prepotent unconscious conflicts. While there is little doubt that free association to dreams can trace linkages back to events of the immediately preceeding day, via emotionally potent forces, this does not demonstrate that these were the actual causative linkages. Further, Freudian theory seems to come up with plausible connections in retrospect, but offers no way of predicting before the dream what events of the day will appear in the content of the dream.

Similarly, there is presently very little data on how events of the hypnagogic period affect the content of later Stage 1 dreaming, although some work by Witkin and collaborators (Bertini, Lewis, & Witkin, 1969; Witkin & Lewis, 1967) is beginning to produce relevant data.

Given this way of looking at events which might influence the content of Stage 1 dreaming, we can now ask the question, "How may deliberate control of the content of Stage 1-REM dreaming be brought about, either by a conscious decision on the part of the person to dream about a particular topic or by the intervention of an outside experimenter?" This question could be further subdivided into techniques of presleep control, techniques of hypnagogic control, and techniques of concurrent control, that is, where the person makes a decision during the dream itself to alter the content of the dream.

The posthypnotic suggestions used are clearly a form of presleep control, occurring in the rather special context of an altered state of consciousness, namely hypnosis. In the present study these posthypnotic suggestions were given quite close to the time of going to sleep. Nothing is known scientifically about the possibilities of hypnagogic control, although a number of occult writers have suggested this as a means of controlling dream life (Fox, 1962;
because of the ability of high susceptibles to slip into hypnotic states on their own. The question of whether such high susceptibles could get even larger posthypnotic dream effects if hypnosis was formally induced must be decided by further research.

Clearly, considerably more research is needed to understand the posthypnotic dream. Much research must be devoted to establishing the limits of the effect. How large an effect can be gotten with Ss? Can they be trained to produce even larger effects? What are the ways of maximizing individual responsiveness? How does the content of dream suggestions interact with individual dynamics, and so forth?

Because of potential practical applications of deliberate control over dream content, the feasibility of other techniques than classical hypnosis also needs to be determined.

The above questions can be raised in a wider context, that of deliberate control over dreaming. To almost all people, dreaming is a completely passive event; it happens to them each night, they may or may not remember it, and they have no control over the dream process and content. Could people in this culture be trained to have the sort of lucid dreaming has been produced in the laboratory. Further, Stewart (1953–1954, 1954, 1962, 1969) has reported on a primitive culture in Malaysia in which all members of the culture practice conscious dream control, both presleep and concurrent.

Thus it does not seem absolutely necessary to use a special technique like hypnosis in order to acquire control over the content of dreaming. Since our culture devalues dreams, it makes sense that with the present Ss, a very special technique, hypnosis, is necessary to order to begin to gain control over dreaming. The effect of posthypnotic suggestion may then be conceived of as an effective way of fixing attention with subsequent carry-over into the dream, as well as having special properties resulting from the hypnotic state.

Another aspect of the question of how necessary hypnosis is in inducing the posthypnotic dream effect is the consideration that highly hypnotizable Ss may possess an ability to (at least partially) enter hypnotic-like states spontaneously and/or use hypnotic-like techniques on themselves. It seems likely that some Ss will be able to exert significant influences over the content of their Stage 1-REM dreams without the formal induction of hypnosis. As discussed elsewhere (Hilgard & Tart, 1966; Tart & Hilgard, 1966), defining the presence or absence of hypnosis by whether or not a "hypnotist" has said the "magic words" (hypnotic induction procedure) is fallacious.
indication of disturbance within the psyche, and to then work on such disturbances in the ordinary waking state, a technique that may be quite inefficient by Senoi standards.

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