

AN EXPERIMENTAL STUDY OF "HYPNOTIC" (AUDITORY AND VISUAL) HALLUCINATIONS¹

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78 unselected female volunteers were individually pretested on response to direct suggestions designed to evoke auditory and visual hallucinations. In the same experimental session each S was retested on equivalent hallucination suggestions after the administration of 1 of the following 3 experimental treatments, with 26 Ss assigned at random to each treatment: standardized hypnotic induction procedure, brief task motivating instructions, control (no hypnotic induction or task motivating instructions). On the pretests (base level tests), 54% stated that they heard the suggested sounds and 33% reported that they saw the suggested object. Analyses of covariance indicated that: (a) the standardized hypnotic induction procedure and the brief task motivating instructions both facilitated response to the suggestions to hallucinate, (b) the group given the hypnotic induction and the group given task motivating instructions did not differ significantly from each other, and (c) both of these groups were significantly more responsive to the suggestions than the control group.

General treatises on hypnotism (Bernheim, 1957; Bramwell, 1956; Moll, 1958; Weitzenhoffer, 1953) assert or imply that visual and auditory hallucinations can be easily elicited by suggestions given to hypnotized subjects but are very difficult if not impossible to elicit by administering similar suggestions to nonhypnotized subjects. This assertion is based on unsystematic observations, not on rigorously conducted experimental studies. In searching the literature in this area (Barber, 1963b) we failed to find a single carefully controlled experiment which compared responses to hallucination suggestions in *unselected* subjects assigned at random to hypnotic and nonhypnotic treatments.² The present study was designed to make this comparison and to answer the following questions:

1. What proportion of unselected volunteers, *tested under normal waking conditions*,

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²Previous experiments in hypnosis which failed to randomize assignment of subjects to experimental treatments are open to the criticism that the results may have been due to pre-existing differences among the subjects assigned to the treatments rather than to differences produced by the treatments. A further discussion of the confusion resulting from the confounding of subject effects with treatment effects in hypnosis experiments is found in Sutcliffe (1960) and Barber (1962a).

respond positively to suggestions to hallucinate? (In accordance with the work of previous investigators in this area, reviewed elsewhere—Barber, 1963b—positive response to suggestions to hallucinate will be denoted by subject's testimony that suggested objects were seen and suggested sounds were heard.)

2. Is response to suggestions to hallucinate enhanced by the administration of a procedure of the type traditionally termed a hypnotic induction?

3. Is response to suggestions to hallucinate augmented by the administration of brief task motivating instructions, i.e., instructions stating that the subject can perform well and is expected to perform well on assigned tasks?

4. Which is more effective in facilitating response to suggestions to hallucinate, the administration of a hypnotic induction procedure giving rise to an apparent trance state, or the administration of brief task motivating instructions?

METHOD

Design

Seventy-eight unselected female volunteers participated in the experiment. Each was individually pretested and then retested in a single session on response to direct suggestions designed to elicit auditory and visual hallucinations. The pretests were given in the same way to all subjects, under ordinary experimental conditions. The retests were given after the administration of one of the follow-

ing three experimental treatments, with 26 subjects randomly assigned to each treatment: standardized hypnotic induction procedure, brief task motivating instructions, control (no hypnotic induction or task motivating instructions). The dependent variables consisted of subjects' testimony concerning the vividness and reality of the suggested hallucinations as quantified by standardized rating scales.

Subjects

The subjects consisted of 78 women secretarial students (ages 17-24) who had not previously participated in our experimental studies. These subjects were recruited from a larger population of approximately 105 students who had been asked,³ when assembled in classes, to volunteer for the experiment and had been told that: a psychological study was to be conducted, subjects would be paid \$1, and to conduct the experiment properly it was necessary that subjects not discuss it with each other. (The latter admonition was also repeated to each subject individually by the experimenter at the close of her own experimental session.)

Pretests

Each subject was tested individually by the same experimenter (DSC). Immediately after being seated in the experimental room, the subject was told that the experiment would begin at once and was given the following instructions in a firm and serious tone of voice:

I want you to close your eyes and to hear a phonograph record with words and music playing *White Christmas*. Keep listening to the phonograph record playing *White Christmas* until I tell you to stop.

After 30 seconds the subject was asked to open her eyes and to check the following dittoed rating scale (Rating Scale A):⁴

A. I heard the phonograph record of *White Christmas* clearly and believed that the record was actually playing.

B. I heard the phonograph record of *White Christmas* clearly but knew there was no record actually playing.

C. I had a vague impression of hearing the record playing *White Christmas*.

D. I did not hear the record.

Immediately after checking Rating Scale A the subject was instructed as follows, in a firm and earnest tone:

³The request for volunteers was made by Emily Ross, Dean of Women at Becker Junior College. A room at the college for conducting the experiment was also kindly provided by Dean Ross.

⁴The rating scales used in this study were patterned after the scale designed by Faw and Wilcox (1958) for measuring the vividness and reality of suggested hallucinations.

I want you to look at your lap and to see a cat sitting there. Keep looking at the cat until I tell you to stop.

After 30 seconds the subject was asked to check a second rating scale (Rating Scale B), as follows:

A. Saw cat clearly and believed it to be there.

B. Saw cat clearly but knew it was not there.

C. Saw a vague impression of the cat.

D. Did not see the cat.

Retests (Treatment Tests)

Immediately after completing the pretests, each subject was exposed to one of three experimental treatments (Hypnotic Induction Procedure, Task Motivating Instructions, or Control) and then retested on equivalent hallucination suggestions. The experimental treatments were as follows:

Hypnotic Induction Procedure. Each of the 26 subjects assigned to this treatment was asked if she would cooperate further in the experiment by permitting herself to be hypnotized. Since the subject had not been previously informed that the experiment would involve hypnosis, she was also told that there was nothing to fear and that she would not be asked to do anything that might be embarrassing. Some subjects asked questions about hypnosis or about what was to occur. These questions were answered briefly and all subjects agreed to continue in the experiment.

The subject was asked to fixate on a light blinking in synchrony with the sound of a metronome and was given a standard hypnotic induction procedure adapted from the induction procedures of Friedlander and Sarbin (1938), Marcuse (1959, pp. 52-53), and Weitzenhoffer and Hilgard (1959, pp. 13-18). This procedure, which subsumed a period of 15 minutes, included three interrelated types of suggestions: suggestions designed to produce favorable attitudes towards hypnosis and positive motivation to perform well on forthcoming tasks; suggestions of relaxation, drowsiness, and sleep; and suggestions that the subject was entering a unique state (a hypnotic state) in which she would have interesting and unusual experiences. At the completion of the Hypnotic Induction Procedure each subject manifested a number of ostensible characteristics—apparent disinclination to talk, apparent passivity, apparent lack of spontaneity and initiative—which, according to Pattie (1956, p. 21), Weitzenhoffer (1957, pp. 210-212), and other authorities, presumably signify the presence of a hypnotic trance state.⁵

Immediately after completing the hypnotic induction the subject was told that she would remain

⁵Whether these or any other observable characteristics, including hypersuggestibility, indicate that a subject is in an altered state of trance or hypnosis is open to serious question. The problem of denoting the presence of, or the depth of, a presumed state of hypnosis is discussed briefly in a later section of the present paper and in more detail in a forthcoming publication by the authors.

in deep hypnosis as she performed forthcoming tasks. She was then given the following instructions in a serious tone of voice, while her eyes remained closed:

I want you to hear a phonograph record with words and music playing *Jingle Bells*. Keep listening to the phonograph record playing *Jingle Bells* until I tell you to stop.

After 30 seconds the subject was told to open her eyes but to remain in deep hypnosis and was asked to check Rating Scale A (with the words *Jingle Bells* substituted for *White Christmas*). Immediately after checking the scale, the subject was instructed as follows, firmly and earnestly:

I want you to look at your lap and to see a dog sitting there. Keep looking at the dog until I tell you to stop.

After 30 seconds the subject was asked to check Rating Scale B (with the word "dog" substituted for the word "cat"). After checking the scale the subject was asked to close her eyes, was given suggestions that she would awaken from the hypnosis rested and relaxed, and was then instructed to awaken.

Task Motivating Instructions. The 26 subjects assigned to the task motivation treatment did not receive a procedure of the type traditionally known as a hypnotic induction and the word "hypnosis" was never mentioned to them. Instead they were given the following instructions designed to produce positive motivation to perform well on the hallucination tasks:

You did not do as well on these tests as you really could. Some people think it is difficult to see an animal sitting on their lap or to hear a phonograph record playing and therefore do not really try hard. However, everyone is able to do this if they really try. I myself can do it quite easily and all the previous subjects that participated in this experiment were able to do it when they realized that it was an easy thing to do and tried harder the second time. This is now a matter of your being able to do two things: first, to control your mind so that it will do what you want it to do; and, second, to take the attitude that these tests are easy to do and that you can do much better than you did before. This time I want you to really try to see and to hear the

things I ask you to. Don't assume that it can't be done. It's really quite easy. Just let yourself really see and really hear what I ask you to.

The subject was then retested, using the identical hallucination suggestions that had been given to the Hypnotic Induction group: she was asked to close her eyes and to hear the phonograph playing *Jingle Bells* and after 30 seconds was asked to open her eyes and check Rating Scale A; immediately afterwards she was asked to look at her lap and to see a dog sitting there and after 30 seconds was asked to check Rating Scale B.

Control. The 26 subjects allocated to the Control treatment were given neither a Hypnotic Induction nor Task Motivating Instructions. The remaining aspects of the procedure were exactly the same for this group as for the other two groups: the subject was asked to close her eyes, to hear the record playing *Jingle Bells*, and to open her eyes and check Rating Scale A; she was then asked to see a dog sitting on her lap and to check Rating Scale B.

Dependent Variables

The dependent variables consisted of subjects' testimony with respect to the vividness and reality of the suggestion hallucinations as indicated by response to Rating Scales A and B. These scales were scored in the same way. If the subject checked Item A (heard phonograph record clearly and believed that it was actually playing or saw animal clearly and believed it was present) she received a score of 4. Item B (heard record or saw animal clearly but knew they were not present) received a score of 3; Item C (vague impression of record or animal) received a score of 2; and Item D (did not hear record or see animal) received a score of 1.

RESULTS

Auditory Hallucination

The mean scores on the auditory hallucination tests are presented in Table 1. As this table indicates the three randomly selected groups did not differ significantly on the pretest, each group obtaining a mean score slightly above 2 ("had a vague impression of hearing the phonograph record"). Analysis of variance and covariance indicated that the

TABLE 1
MEAN SCORES ON AUDITORY HALLUCINATION TESTS

Experimental group	Hypnotic induction		Task motivation		Control	
	Pretest	Retest	Pretest	Retest	Pretest	Retest
Pretest mean	2.38 _a		2.08 _a		2.46 _a	
Treatment mean		3.04 _a		3.00 _a		2.35 _b
Adjusted treatment mean		3.00 _a		3.13 _a		2.26 _b

Note.—Means in the same row containing different letters in the subscript differ significantly from each other at the .05 level.

TABLE 2
PERCENTAGE OF SUBJECTS SCORING 4, 3, 2, AND 1 ON AUDITORY HALLUCINATION TESTS

Experimental group (1)	Hypnotic induction (2)	Task motivation (3)	Control (4)	Average (5)
Pretest score				
4	3.8	3.8	7.7	5.1
3	53.8	34.6	57.7	48.7
2	19.2	26.9	7.7	17.9
1	23.1	34.6	26.9	28.2
Retest (treatment) score				
4	42.3	26.9	15.4	
3	30.8	53.8	26.9	
2	15.4	11.5	34.6	
1	11.5	7.7	23.0	

groups differed significantly on the retest (treatment test) both with and without adjustment for differences in pretest scores. Multiple comparisons among the adjusted treatment means, made by the method presented by Winer (1962, Ch. 11), showed that the mean scores under the Hypnotic Induction and Task Motivation treatments (3.00 and 3.13, respectively) were significantly higher than the mean score under the Control treatment (2.26). Neither the adjusted nor the unadjusted means under the Hypnotic Induction and Task Motivation treatments differed significantly from each other. It should be noted that the Hypnotic Induction Procedure and the Task Motivating Instructions were both effective in raising the average scores from around 2 on the pretest ("vague impression of hearing the phonograph") to around 3 on the retest ("heard the phonograph clearly but knew there was no record actually playing").

Table 2 presents the percentage of subjects

in each group obtaining scores of 4, 3, 2, and 1 on the auditory hallucination pretest and treatment test. This table suggests a trend for the Task Motivating Instructions to be somewhat more effective than the Hypnotic Induction Procedure in raising low scores (scores below 3) to high scores (scores of 3 and above). It should also be noted (Table 2, Column 5) that on the pretest (base level test given under ordinary experimental conditions), more than half (53.8%) of the subjects stated that they heard the phonograph record clearly (obtaining scores of 3 or above) and 5% stated, in addition, that they believed that the record was actually playing (obtaining scores of 4).

Visual Hallucination

Findings similar to the above were also obtained on the visual hallucination tests. As Table 3 indicates, the three randomly selected groups did not differ significantly on the pretest. With respect to the retest under the

TABLE 3
MEAN SCORES ON VISUAL HALLUCINATION TESTS

Experimental group	Hypnotic induction		Task motivation		Control	
	Pretest	Retest	Pretest	Retest	Pretest	Retest
Pretest mean	2.15 _a		1.73 _a		2.04 _a	
Treatment mean		2.69 _a		2.65 _a		2.23 _a
Adjusted treatment mean		2.59 _a		2.79 _a		2.19 _b

Note.—Means in the same row containing different letters in the subscript differ significantly from each other at the .05 level.

TABLE 4
PERCENTAGE OF SUBJECTS SCORING 4, 3, 2, AND 1 ON VISUAL HALLUCINATION TESTS

Experimental group (1)	Hypnotic induction (2)	Task motivation (3)	Control (4)	Average (5)
Pretest score				
4	0.0	3.8	3.8	2.5
3	46.2	11.5	34.6	30.8
2	23.0	38.5	23.0	28.2
1	30.7	46.2	38.5	38.4
Retest (treatment) score				
4	26.9	15.4	0.0	
3	38.5	50.0	46.2	
2	11.5	19.2	30.7	
1	23.0	15.4	23.0	

experimental treatments, analysis of covariance and multiple comparisons among the adjusted means showed that the mean scores under the Hypnotic Induction and Task Motivation treatments (2.59 and 2.79, respectively) were significantly higher than the mean score under the Control treatment (2.19). Further, as Table 3 also indicates, the adjusted treatment means under Hypnotic Induction and Task Motivation did not differ significantly from each other.

Table 4, which presents the percentage of subjects in each group obtaining scores of 4, 3, 2, and 1 on the visual hallucination pretest and treatment test, suggests a trend for the Task Motivating Instructions to be somewhat more effective than the standardized Hypnotic Induction Procedure in raising low scores (scores below 3) to high scores (scores of 3 and above). Table 4 (Column 5) also indicates that on the pretest (base level test) 33% of the subjects stated that they saw the animal clearly (obtaining scores of 3 or above) and 2.5% also added that they believed that the animal was actually present (obtaining scores of 4).

DISCUSSION

Base Level Response to Hallucination Suggestions

The results indicate that, among volunteer female subjects, baseline response to hallucination suggestions may be higher than has

been assumed: on the pretest given under ordinary experimental conditions, one-third of the volunteer subjects said that they saw the suggested object and more than one-half (53.8%) reported that they heard the suggested sounds. These findings raise a serious question: To what extent are previous studies concerned with the hypnotic hallucination invalidated by failure to obtain base level data? As pointed out elsewhere (Barber, 1963b), previous investigations in this area almost always failed to obtain basal response measurements, apparently assuming that no subject in the normal waking state would report that he saw objects and heard sounds that were not present.

Effects of Hypnotic Induction Procedure and Task Motivating Instructions

The experiment yielded the following major finding: a 15-minute Hypnotic Induction Procedure patterned after the standardized induction procedures of Friedlander and Sarbin (1938), Marcuse (1959, pp. 52-53), and Weitzenhoffer and Hilgard (1959, pp. 13-18) was more effective than no instructions (Control treatment) but not more effective than brief Task Motivating Instructions in enhancing responsiveness to hallucination suggestions. These results are consistent with recent experimental studies, reviewed elsewhere (Barber, 1961a, 1961b, 1962b, 1962c,

1962d, 1963a), which found that a group subjected to a standardized procedure of the type traditionally labeled a Hypnotic Induction and a group given brief Task Motivating Instructions did not differ significantly from each other, but both groups were significantly more responsive than a group given neither a Hypnotic Induction nor Task Motivating Instructions, on the following dependent variables: objective and subjective responses to suggestions of limb and body rigidity, amnesia, color blindness, dreaming on a specified topic, analgesia to noxious stimulation, age regression, postexperimental or posthypnotic-like response, and other suggestions of this kind.

Effects of Selection and Training of Subjects

An apparent discrepancy between our findings and the findings obtained by a few previous investigators merits comment. In the present experiment only a minority (27% and 42%) of the subjects who had received the Hypnotic Induction and who seemed to be in trance obtained scores of 4 on the visual and auditory hallucination tests, stating that they saw the animal *and believed that it was present* and that they heard the music *and believed that the phonograph was actually playing*. In contradistinction, Estabrooks (1943) and other investigators imply that the majority of hypnotized persons believe that the hallucinatory object is a real object. It should be noted, however, that we used *unselected* subjects while previous investigators generally worked with *highly selected* "good" subjects. If we had allocated the "good" subjects, i.e., subjects who had obtained scores of 4 on the pretest (base level test), to the Hypnotic Induction treatment there is little doubt that we could report that all or nearly all of our hypnotized subjects believed that the hallucinatory object was a real object. Further, previous investigators almost always worked with subjects who were not only highly selected but also highly trained. It may be that training helps the subject to attain a deep trance and that deep trance is necessary to experience lifelike hallucinations. However, an alternative possibility is that the trained subject has learned what type of verbal testimony is

desired and expected from him. A neglected study by Sidis (1906) is pertinent here. This investigator noted that subjects gave more emphatic reports concerning the reality of the suggested hallucination as they participated in more and more hypnosis sessions even though they appeared to be as deeply hypnotized in the first session as in later sessions. He interpreted these findings as indicating that the subjects imagined or hallucinated in the same way in all sessions but had learned, after participating in a number of training sessions, that emphatic testimony concerning the reality of the hallucination was what was wanted from them. Along similar lines, Goldiamond and Malpass (1961), working with hypnotic subjects, and Murphy and Myers (1962) and Dobie (1959), working with nonhypnotic subjects, have presented evidence indicating that verbal reports with respect to hallucinations can be easily manipulated experimentally. Murphy and Myers, for instance, demonstrated that reports of visual imagery or hallucinations experienced in a pseudosensory deprivation situation (remaining in the dark for 10 minutes) can be increased or decreased by simple pre-experimental instructions to the effect that such hallucinations are desirable and normal or undesirable and abnormal. Dobie has shown that nonverbal reinforcement procedures are effective in inducing normal persons to state that they see objects that are not present. These studies offer presumptive evidence for the validity of the hypothesis, recently advanced by Fisher (1962), that subjects "learn the intended thoroughness of hallucinations just as they learn other behavioral consistencies—from reinforcements, approvals, and disapprovals in the context of the situation." Further studies are needed that are explicitly designed to test this hypothesis.

Apparent Limitations of the Investigation and Suggestions for Further Research

A possible criticism of the present investigation is that no attempt was made to measure depth of hypnosis in the group that received the standardized Hypnotic Induction Procedure. We cannot take this criticism seriously. No one has proposed an index or a

combination of indices by which an experimenter can state unequivocally that his subjects are in hypnosis let alone proposing an index or combination of indices that would enable an experimenter to make fine distinctions between light hypnosis, medium hypnosis, or deep hypnosis. Although response to standardized test suggestions of the type included in the scales devised by Friedlander and Sarbin (1938) and Weitzenhoffer and Hilgard (1959), e.g., arm rigidity, body immobility, amnesia, has often been used as an index of hypnotic depth, it has not been demonstrated that depth of hypnosis is related to response to test suggestions of this type when the two variables are measured independently of each other. Further, there is evidence to indicate that so-called hypnotized subjects (i.e., subjects who have received a procedure of the type traditionally labeled a hypnotic induction and who appear to be in trance) and nonhypnotized subjects (i.e., subjects who have not received a hypnotic induction and who do not appear to be in trance) do not differ in response to suggestions of the kind included in the scales of Friedlander and Sarbin and Weitzenhoffer and Hilgard, provided that the nonhypnotized subjects have received brief Task Motivating Instructions, i.e., instructions stating that they can perform well and are expected to perform well on the suggested tasks (Barber & Calverley, 1962, 1963a, 1963b; Barber & Hahn, 1962).

A second apparent limitation of the present investigation is that hallucinations were denoted in terms of the subject's testimony that suggested objects were seen and suggested sounds were heard and no attempt was made to determine the objective validity of the verbal reports. We have, however, dealt with this problem in a recent review (Barber, 1963b) which summarized a series of experiments indicating that suggested visual and auditory hallucinations are not the same as auditory and visual perceptions and which concluded that suggested hallucinations should be classified under the general psychological category of imagination rather than perception. From this viewpoint, the events of the present experiment can be conceptualized as follows: some of the sub-

jects responded in accordance with the implicit suggestion to categorize imagined objects and imagined sounds as seen objects and heard sounds but they could have shifted to the normally accepted frame of reference for categorizing imaginative events if they had been asked to do so. Further research is needed in which hypnotized and nonhypnotized subjects who have responded positively to suggestions to hallucinate are questioned after the experiment by a person ostensibly not associated with the experiment. We would hypothesize that careful inquiries would elicit testimony from both groups of subjects that they imagined but did not actually see and did not actually hear that which had been suggested.

Finally, it should be noted that in the present study the suggestions to hallucinate were given to all subjects under all experimental treatments in the same way, firmly and seriously. The implications of the experimenter's positive tone and serious expression were that the subject would unquestionably hear the music and would unquestionably see the animal. If the identical suggestions had been given in a more permissive tone—with the intonation that hallucinations were not seriously expected—different results might have been obtained. Further studies are needed which focus explicitly on the experimenter's manner of presenting suggestions as a major independent variable. Such studies may find that variations in the experimenter's tone, inflections, gestures, and facial expressions produce significant changes in response to suggestions.

CONCLUSION

This experiment indicates that if suggestions to hallucinate are given in a serious tone and in a firm manner to volunteer female subjects under ordinary experimental conditions, a surprisingly large number (approximately one-third to one-half) will testify that they saw objects and heard sounds that were not present. In harmony with previous reports it appears that such positive response to hallucination suggestions can be enhanced by administering a procedure of the type traditionally labeled as a hypnotic induction. However, it also appears that a comparable

facilitation of response to hallucination suggestions can be produced by administering brief task motivating instructions, i.e., instructions stating that the subject can perform better and is expected to perform better on the suggested tasks. These findings are consistent with a series of recent experiments which indicates that administration of a procedure of the type historically termed a hypnotic induction and administration of brief task motivating instructions produce a comparable enhancement of suggestibility. Rigorous research is indicated to determine which of the many specific independent variables subsumed under the broad categories of hypnotic induction procedure and task motivating instructions are effective and which irrelevant to producing this suggestibility enhancing effect.

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