THE NATURE OF HYPNOSIS: ARTIFACT AND ESSENCE[1]

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THE most meaningful present-day theories of hypnosis interpret hypnotic phenomena along three major lines: (*a*) desire on the part of the subject to play the role of a hypnotized subject (Sarbin, 1950; White, 1941), (*b*) increase in suggestibility (Hull, 1933), and (*c*) a further less well-defined category that is called by White "an altered state of consciousness" and by others, "cortical inhibition" (Pavlov, 1923), dissociation (Weitzenhoffer, 1953), etc. depending on their theoretical orientations.

The heuristic model of hypnosis that underlies this paper incorporates these three aspects. One of the hypotheses of the paper holds that much hypnotic behavior results from the subject's conception of the role of the hypnotic subject as determined by past experience and learning, and by explicit and implicit cues provided by the hypnotist and the situation. These varied role conceptions appear to be the source of most if not all of the inconstant patterns of behavior seen in the hypnotic state.

An increase in suggestibility may be viewed as an increase in motivation to conform to the wishes of the hypnotist. A second basic hypothesis to be tested thus proposes that, although increased motivation may be a constant accompaniment of the trance state, such increased motivation is by no means a phenomenon unique to hypnosis but can be seen to operate in other experimental and life situations with equal force.

By experimentally controlling these two elements, role-playing and increased motivation, it is possible to investigate their sufficiency for explaining all aspects of the trance state and the extent to which still other concepts, such as an altered state of consciousness, are required.

The third aspect of hypnosis, the altered state of consciousness, presents the greatest problem for investigation, yet it has been felt necessary to include the concept in all attempts to explain the phenomenon. This residual aspect, which remains after increased motivation and role-playing are accounted for, may be regarded as the "essence" of hypnosis, with reference to which increased motivation and role-playing appear as artifacts.

Three related experiments are presented. The first is devoted to the effects of "role-play artifact" on the manifestations of hypnosis commonly seen clinically. It demonstrates that much of the complex phenomenon which we call hypnosis may result from (*a*) the subject's preconceptions of what hypnosis is, (*b*) implicit cues by the hypnotist as to what he thinks it should be, and (*c*) the particular techniques of trance induction. The second experiment demonstrates an aspect of role-play artifact that is introduced by a concrete experimental situation. It investigates cues that an experimental design may give about the role the subject is expected to play and demonstrates that in some instances an experimental result may more reasonably be accounted for on this basis than by invoking "trance effects." The third experiment is concerned with the effect of "motivation artifact" upon performance. It examines the claims of increased physical capacity in hypnosis and tests the hypothesis that this may be accounted for by increased motivation.

Table 1 gives a schematic representation of the author's working model of the hypnotic state.

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TABLE 1
SCHEMATIC REPRESENTATION OF A WORKING MODEL OF HYPNOSIS

Situation of trance induction	"Role-Play Artifact" (cognitive component)	+	"Increased Motivation Artifact" (conative component)	+	Essence of Trance
Creation of situation to maximize: 1. Desirability of entering trance 2. Expectation that trance can be achieved 3. Respect and trust for operator 4. Restriction of extraneous stimuli 5. Focusing of attention All techniques have the further qualities of: 1. Concrete suggestions in vivid simple language 2. "Suggestions" utilizing the perception of subjective events as their basis 3. Suggestions of gradually increasing difficulty to insure successful responses 4. Praising (rewarding) explicitly or implicitly the subject's positive responses	1. Expectations of *Ss* a. preconceptions b. cues from trance induction 2. Cues from Experimenter a. explicit b. implicit 3. Cues from experimental situation		The sources of increased motivation are not defined They represent a major area of future inquiry Probably some aspects will prove to be a component of "essence"		Uncertain

PRECONCEPTIONS OF HYPNOSIS AND THEIR EFFECT ON TRANCE MANIFESTATIONS

The states induced by Mesmer (Binet & Féré, 1888; Boring, 1950), Coué (1922, p. 83), Wells (1923), Schilder (1956), and others are all hypnosis, yet their descriptions of how hypnosis characteristically manifests itself are very different. The common characteristics of these varied states that bring them all under the heading of "hypnosis" would appear to include: posthypnotic amnesia, apparent inability to use a given motor system when a functional paralysis is suggested, various sensory illusions including positive and negative hallucinations of all sensory modalities, apparent memory disturbances or improvements as well as reported increased control over autonomic nervous system functions. Whether all of these phenomena are necessarily part of hypnotic behavior will be discussed below. In any event, hypnosis is evidently characterized by the ability of the subject (*S*) in this special state to experience changes that are not normally found in response to similar cues in everyday life.

What, then, determines the particular trance manifestations that an *S* shows on entering hypnosis? In terms of the model presented here, the answer may lie in role-play artifact. From this viewpoint, *Ss* who enter trance are motivated to play the role of the hypnotized *S*, and the precise manifestations of this role depend upon their perception of what it entails. Behavior of the *S* in trance is then determined by the *S*'s preconceptions about how a hypnotic *S* acts, and the cues, both explicit and implicit, as to the desired behavior which the hypnotist communicates in the process of trance induction.

To test this hypothesis that conceptions about hypnosis held prior to entering the hypnotic state affect an *S*'s trance behavior, a pilot study and a main experiment were conducted in which volunteer *Ss* were given the erroneous prior impression that catalepsy of the dominant hand (with the other hand flaccid) is a typical feature of hypnosis. This behavioral item was chosen because it satisfied a number of criteria. It is sufficiently unusual to have been reported had it ever been observed as a spontaneous characteristic of hypnosis; it is easily recognizable so that judgments of its presence or absence are unequivocal; and it is sufficiently plausible as a charac-

teristic associated with hypnosis that it would be accepted as such by the *S* population.

Especial care was exercised to eliminate possible effects of the bias of the experimenter by making it impossible for him to influence the results. It is easy to suggest to an *S* by implicit cues that he manifest catalepsy as part of the hypnotic state. Perhaps catalepsy of one hand might also be suggested during induction of the trance. Selection of catalepsy of the *dominant* hand avoids this possibility, as the experimenter had no way of knowing whether the subject was right- or left-handed until he asked for this information after the data on catalepsy had been gathered.

Pilot Study

An introductory psychology class at the Massachusetts Institute of Technology was given a lecture on hypnosis. Prior to the lecture, and without the knowledge of the class, two students had been hypnotized and given the posthypnotic suggestion that upon entering the trance subsequently, they would manifest catalepsy of one hand, the dominant hand. One student was right-handed and one student was left-handed. The class was then given a 25-minute lecture on the nature of the hypnotic state, at which point volunteers were called for in order to demonstrate the phenomenon. Of the 11 students who volunteered, the two who had been previously hypnotized were selected in a fashion that appeared random. They were again placed in trance, in a manner that appeared to be the initial trance induction, and simple trance phenomena were demonstrated, including one-handed catalepsy. Attention was called to the fact that the right-handed student had catalepsy of the right hand, and the left-handed student had catalepsy of the left hand. Immediately following this procedure, three more students from the same group of volunteers, who had not been hypnotized previously, were placed in trance.

A class of psychology students at Harvard were subsequently given the same kind of a lecture and demonstration, following which four *S*s were hypnotized and tested for one-handed catalepsy.

All three of the M.I.T. experimental *S*s gave good trance results, and all showed catalepsy of the dominant hand. One *S* was left-handed. Of the four Harvard students who were hypnotized immediately after observing three demonstration *S*s with catalepsy of the dominant hand, three manifested catalepsy of the dominant hand and one, catalepsy of both hands. All *S*s were right-handed.

Main Study

In order to make it impossible for the experimenter to communicate his desire that the *S* demonstrate unilateral catalepsy, the main study was performed in a rigorous "blind" fashion. In this instance matched classes were used, each of which had received a lecture and demonstration of hypnosis. In one class the hypnotic demonstration included catalepsy of the dominant hand, while in the other this was omitted. The *S*s were then tested in small groups, with members of both groups mixed randomly. The experimenter thus had no way of knowing which subjects should manifest one-handed catalepsy.

Procedure

The procedure of the pilot experiment was repeated with members of the introductory psychology course at Boston University with the inclusion of the control group. Instead of asking for volunteers, three *S*s were employed who were introduced to the class as having taken part in prior research. The same three *S*s were used for both sections of the course, to which essentially identical lectures were given. The demonstrations differed only in that in one section the three *S*s manifested unilateral catalepsy, while in the other section this was not demonstrated. No students from either class were hypnotized at that time. Volunteers were solicited and subsequently tested in such a way that the experimenter had no way of telling which lecture they had attended until after the completion of the experiment.[2] All but two *S*s were tested by an experimenter who was not at the lectures.

Trance depth was rated by the experimenter and an observer. The degree of consensus was high and in no case was there more than a one point difference. In case of disagreement both ratings are recorded. The ratings are rough clinical estimates based on the phenomena

[2] One of these *S*s was tested the evening of the lecture. The remaining *S*s were tested approximately one month after the lecture.

TABLE 2
TRANCE BEHAVIOR IN THE EXPERIMENTAL AND CONTROL GROUPS

Subject	Catalepsy		Trance Depth	Dominant Hand
	R.	L.		
Experimental group				
1. M.S.	+	0	4	R.
2. M.K.	+	+	4	R.
3. R.L.	+	0	4	R.
4. C.L.	0	0	2	R.
5. S.T.	0	0	3	R.
6. A.L.	0	+	3	L.
7. O.B.	+	0	3	R.
8. S.R.	+	+	5	R.
9. B.T.	+	0	4	R.[a,b]
Control group				
1. D.L.	0	0	4	R.
2. W.O.	0	0	4	R.
3. M.R.	+	+	3	R.
4. L.P.	+	+	3	L.
5. B.Z.	0	0	3	R.
6. L.V.	0	0	4–5	R.
7. M.O.	+	+	3	R.
8. A.T.	0	0	3	L.[b]
9. W.M.	0	0	1–2	R.

[a] This *S* was tested the evening of the lecture when he appeared unannounced along with a group of *S*s who had previously volunteered. The experimenter did not know which class the *S* had attended until after the experiment was over.

[b] *S*s tested by author. I was not aware of which class these *S*s had attended, in fact, I did not know until subsequently that they had been at the lectures.

which could be elicited from the *S*s. A rating of 1 indicated no response; 2 implied eye-closure and only partial hand levitation without a positive response to "challenge" suggestions, i.e., you cannot open your eyes, or you cannot bend your elbow; 3 referred to positive responses to all challenge suggestions but inability to achieve hallucinations or posthypnotic phenomena; 4 was used to denote those *S*s who responded to suggested hallucinations, gave simple posthypnotic phenomena, but did not achieve a good post-hypnotic amnesia; 5 referred to "somnambulists" who could achieve all hypnotic phenomena easily, including complete amnesia.

Results

Of the nine *S*s in the experimental group, five showed catalepsy of the dominant hand. Two showed catalepsy of both hands, and two showed no catalepsy. None of the control group showed catalepsy of the dominant hand, but three out of the nine *S*s showed catalepsy of both hands. Table 2 gives a summary of the findings.

Discussion

The item of behavior that was used is known not to occur spontaneously; its occurrence is significant if it is found at all. The results of the pilot and main experiments may be regarded as confirming the hypothesis that trance behavior is affected by the individual's conceptions about hypnosis held prior to entering the hypnotic state.

It would not be expected that all *S*s would show this behavior. No truly naive *S* population is available, and many of the *S*s had observed hypnosis prior to the demonstration. Some *S*s should therefore have sufficient prior information to have formed very strong conceptions unlikely to be altered by the relatively mild attempt to manipulate these ideas experimentally.

That three of the nine *S*s in the control group spontaneously manifested catalepsy of both hands is readily understood in view of the repeated testing for catalepsy, which they apparently interpreted as a cue to manifest the behavior. None of the control *S*s, it should be emphasized, manifested unilateral catalepsy, indicating that no such desire was communicated by the hypnotist to the *S*.

This study has demonstrated for a single behavior item that trance behavior is affected by individual preconceptions about hypnosis. The results can be extrapolated to account for the apparently fixed qualities, not stemming from cues given by the hypnotist, that are reported in practically all present-day descriptions of hypnosis.

Thanks to the media of mass communication, it is relatively easy for a particular view of hypnosis to have gained wide currency and thus be found as a part of the general knowledge in which the *S*s share. Such novels as *Mario and the Magician* (Mann, 1931) and *Trilby* (DuMaurier, 1895) have had very wide audiences and are known indirectly to almost all members of our culture. Uncounted articles and features about hypnosis have been disseminated to all levels of society. The picture of hypnosis that emerges in all of these is that of a passive *S* in a sleeplike state who has amnesia for the events occurring in hypnosis, and responds only to the hypnotist's sugges-

tions. According to Dorcus, Brintmall, and Case (1941), 79% of the student sample that they studied accepted hypnosis as possible, 71% had discussed hypnosis with someone, 54% had read about it, and 29% had actually seen a hypnotic trance at one time during their lives.

In the context of group tests for "suggestibility," in order to screen *S*s, the investigators asked 57 students in elementary psychology courses: "Have you observed any other demonstrations of hypnosis; if so, where and when?" and "What have you read about hypnosis?" Only 12 *S*s denied both having read about hypnosis and having had any chance to see the phenomenon previously; 18 *S*s had seen hypnosis demonstrated in some form, and 23 had somehow read about it.

In the context of the questionnaires used in the above studies, "having read about hypnosis" meant specific reading in the scientific sense. In questioning well over 200 student *S*s about their knowledge of hypnosis, the author failed to find one who did not have a very clear-cut notion about the nature of hypnosis, and who could not define the trance in a fashion similar to that found in dictionaries. Furthermore, they had all read something about hypnosis and could recall having done so, once it was made clear that this included nonscientific sources. The normal *S* population thus knows the meaning of the word hypnosis prior to taking part in any study.

CUES IMPLICIT IN AN EXPERIMENTAL DESIGN

An *S* participating in an experiment is aware that his responses are being recorded for specific purposes—that there is a *raison d'être* for the experiment—and he frequently has some idea of what these purposes are. How this knowledge affects the *S*'s behavior depends upon the motivational structure that he brings to the experimental situation. The participation of the college student volunteer in psychological studies is usually due, not to the relatively low monetary remuneration but, rather, to his interest in taking part in scientific research, which in turn is likely to be based, at least in part, on a desire to further "progress in science" by his participation. Since the experimenter is perceived as knowing what he is doing, furthering "progress in science" may well be equated with "making the experiment work" or, in more sophisticated terms, having his individual performance support the hypothesis of the experiment. Thus, when the *S* is motivated to comply with the wishes of the experimenter, his responses are readily influenced by what he perceives to be the basic hypothesis of the experiment.

Typically, the experimenter's hypotheses are not stated explicitly to the *S* because of the very considerations just mentioned. But unstated hypotheses may be conveyed implicitly by the experimental procedure itself, through what will be called here the "demand characteristics of the experimental situation." It should be understood that a person may fail to perceive fairly clear demand characteristics either because of lack of past experience or because of an inability to generalize from it.

Demand characteristics thus conceived appear central to much psychological work. Experimental situations vary widely in the extent to which they convey the purpose and the hypothesis of the experimenter. If an *S* can describe a hypothesis being tested, of which he is supposedly unaware, the experimental arrangements have significant demand characteristics. The obvious way to test for their presence is to ask the *S* about his perception of the experiment and its purpose. Usually, however, *S*s are reticent about revealing their notions about the purpose of the experiment.

It is reasonable to assume that the student *S* population has some sophistication in regard to the philosophy of experimentation. They are aware that if an *S* is not told the purpose of an experiment he ought to remain naive in regard to it, lest his knowledge influence his performance. At the same time they understand the necessity for an experimental *S* to be "honest" in his response to the experimental situation and to questions about it. For these reasons, *S*s are motivated to avoid recognizing explicitly the purpose of an experiment even though it may be clearly communicated by its design. Thus, the response to the direct question "What do you think this is about?" tends to be "I don't know." The *S*'s behavior may nevertheless clearly betray an implicit aware-

ness of the relevant factors, and he may even verbalize them after the experiment in a "bull session" with his friends. We deal, therefore, with "knowledge" not readily available to consciousness which must be elicited in a clinical fashion. As in the case of other such material, the boundaries of consciousness may be expected to vary with the situation. When, however, a clinical approach is used in an inquiry and the *S* is pressed, one may be amazed—or horrified—by the *S*'s ability to formulate one's hypotheses in a lucid and at times highly sophisticated fashion. Unfortunately, the so-called inquiry is usually a most casual procedure.

While the demand characteristics of experimental situations probably have wider significance than is generally recognized, they are particularly significant for hypnotic experiments. Hypnotic *S*s tend to be particularly cooperative, almost eager participants. Furthermore, one of the assumptions of the present research for which there is extensive observational support is that the hypnotic state as such increases the motivation of the *S* to comply with the wishes ("suggestions")—both explicit and implicit—of the experimenter. The extent to which compliance can take place depends upon the demand characteristics in the experimental situation. The usual problem of demand characteristics (difficult enough to control in other fields of psychology because of the unconscious cooperation between *S* and experimenter) is thus compounded in hypnotic research.

In order to investigate the influence of the demand characteristics of an experimental procedure, a recent study (Ashley, Harper, & Runyon, 1951) was repeated with minor variations to be described. This experiment attempts to demonstrate a further dimension of the Bruner-Goodman (1947) effect, which has been the center of major controversy in recent years. Bruner and Goodman's basic tenet was that the perceiver's values alter his perception. There is no question that the perceiver's *previous experiences* may affect perception. A dispute, however, centers about whether *values* as such are significant variables affecting perception.

In order to show "clearly and unequivocally that the perceiver can contribute to the organization of his perception in a structured stimulus-situation," Ashley, Harper, and Runyon (1951) argue it would be necessary to have a special situation. They state: "The Bruner and Goodman type of experiment would do this *if* the rich group and the poor group were identical in every other respect—in terms of their experience with money, their life histories, their physiological conditions, in short, if the sole difference between the two groups was that only one group had the psychological organization . . . of rich people and the other group the psychological organization of poor people." They go on to say: "Actually for our problem, it is irrelevant whether the *S*s are economically as well as psychologically rich or poor, or whether they are only psychologically rich or poor. In either case, a difference in performance of the two groups would reflect a difference in the perception due to the psychological organization of the perceivers" (p. 565).

In order to obtain two groups identical in every respect but for their perception of their economic status, they used hypnosis. While the *S* was in trance, artificial life histories were induced—one rich and one poor—each followed by induced amnesia. In essence, then, they view the situation as if two identically matched groups were available—one rich, and one poor. It is assumed that because amnesia was induced for the preceding state, the *S* is again naive and that the only difference is in respect to his perceived economic status.

The final sentences of their rationale are particularly interesting. "Even though we do not know fully what happens when we hypnotize a person, if we do hypnotize him and tell him he is rich and he behaves in one way in the coin-matching situation, and then, a few moments later, we tell him he is now poor and he behaves in another way, *we can conclude that the observed difference is due to a change in his psychological organization*" (Ashley et al., 1951, p. 565).[3] The authors in fact conclude from their data that the psychological organization (including the wants, needs, interests, attitudes, and values) of the person contributes to the figural organizations of his perceptions.

It is unquestionably true that observed differences in coin-size judgments are due to

[3] Italics mine.

changes in psychological organization. The question with which we are concerned, however, is whether these changes in psychological organization relate to the actual experiencing of the feelings of being rich or poor, or whether they reflect the demand characteristics of the experimental procedure. The hypothesis to be tested is that the demand characteristics of the experiment are largely responsible for the results obtained by Ashley et al. (1951).

Disregarding the theoretical framework of the study, this is what actually took place: An individual was told—in hypnosis—that he was very poor, then—again with amnesia in hypnosis—that he was very rich and, subsequently, with another hypnotically induced amnesia, that he was himself. In each of these states he was required to make a series of coin-size judgments. The authors' interpretation rests largely on the assumption that hypnotic amnesia is truly the same as not knowing. Granted this, one would be justified in ignoring the fact that the procedure of coin-size estimation is repeated and that economic status is hypnotically induced. However, data are available that lead one to question this assumption.

One of the few specific experiments dealing with posthypnotic amnesia directly is a study by Strickler (1929), who compared the relearning of nonsense material in the posthypnotic state with induced amnesia with the learning time required for the material not previously learned. He concludes that "the posthypnotic amnesia ordinarily met with, which appears superficially to be a complete wiping-out of memory, is by no means complete."

Even more relevant are the data obtainable in hypnotic age-regression. Here we are dealing with an induced amnesia in hypnosis for what purports to be all material learned after a given age. All studies of hypnotic age-regression have shown that some material persists no matter how "real" the regression appears.

In the investigator's prior work (Orne, 1951), it was possible to show that an individual regressed to age six was able to comprehend English, though he himself pointed out in German that he could not understand it. Historically, the *S* was unable to understand English at age six. Another *S* could spell without error "I am conducting an experiment which will assess my psychological capacities." Another was able to give the square root of four, and so on. Furthermore, if we test for amnesia in a more subtle fashion, it is easy to demonstrate in the wake state or in trance that no true ablation of the material for which the *S* has amnesia exists, despite his subjective feeling of being unable to remember.

The fallacy of the assumption that knowledge for which the *S* has amnesia does not influence his behavior can be seen in any posthypnotic suggestion. The *S* firmly denies recall yet assiduously persists in the suggested behavior. The phenomenon is well known in response to an explicit cue; it would seem rather absurd to deny it in response to an implicit one.

A pilot study was therefore conducted that replicated all essential characteristics of the Ashley, Harper, and Runyon experiment, with the addition, however, of a careful inquiry after the completion of the experiment. The procedure was patterned after the inquiries commonly performed as part of the Rorschach test, which seek answers to a series of questions without providing the *S* with a cue as to the answers expected. 1. The subject's perception of the experimental task was elicited by a general question, "What do you think this experiment was about?" 2. The *S*'s perception of the purpose of the investigation was elicited by questions such as "What do you think this experiment is trying to prove or demonstrate?" 3. *S*'s perception of the experimenter's hypothesis was elicited by direct questioning, with such questions as "What do you think I hope to find?" 4. The *S* was also asked about his own hypothesis concerning the study—what he, on the basis of what he knew about the experiment, would predict the results to be. 5. The final question related to his beliefs about his own performance with the question, "What do you think your experimental behavior demonstrates?"

The following hypotheses were formulated:

1. The subject in an experiment is usually able to express some demand characteristics of the procedure, if careful inquiry is conducted and his initial resistance is penetrated in a clinical fashion.

2. The majority of subjects may perceive the same demand characteristics in the experi-

ment and these may be the same as the hypothesis being tested.

3. These demand characteristics rather than the experimental variables may be the major determinant of the subject's behavior.

a. If the majority of subjects perceive the same demand characteristics, then subjects who fail to perceive them should not show the behavior characteristic of the group.

b. If the demand characteristics are the determinant of subjects' behavior, it is possible for an experimental design that omits a crucial aspect of the original independent variable to elicit similar responses to the extent that the same demand characteristics are present.

Pilot Study

The pilot study was designed to test the first two hypotheses.

Procedure

The Ashley, Harper, and Runyon study was repeated in all essential details with four undergraduate *S*s, with the addition of appropriate inquiry. Equipment employed in the original Bruner-Goodman study (1947) was used for making the coin-size estimations. Unlike the procedure of Ashley, Harper, and Runyon, however, the coins were presented on the *S*'s left palm which he was permitted to hold beside the box. He was not permitted to remove the coin from his palm.

All *S*s used in this study had demonstrated their ability to manifest all of the usual deep trance phenomena including responsiveness to posthypnotic suggestions and the ability to experience what appeared to be total amnesia when this was suggested.

The procedure, briefly stated, was as follows: After the *S* was placed in trance, amnesia for his own life history was induced. He was then given a pseudo-life history which was essentially the same as that described by Ashley, Harper, and Runyon. The poor state was induced first, then the rich state, and finally the normal state. The *S* judged coin sizes in all three states. The same *S* was run with both imagined coins and with real coins presented in all three states. Also in all three states, he was given brass slugs which were called "lead," "silver," "gold," and "platinum." The brass was of a very whitish color so that it could conceivably have been the appropriate metal.

Results

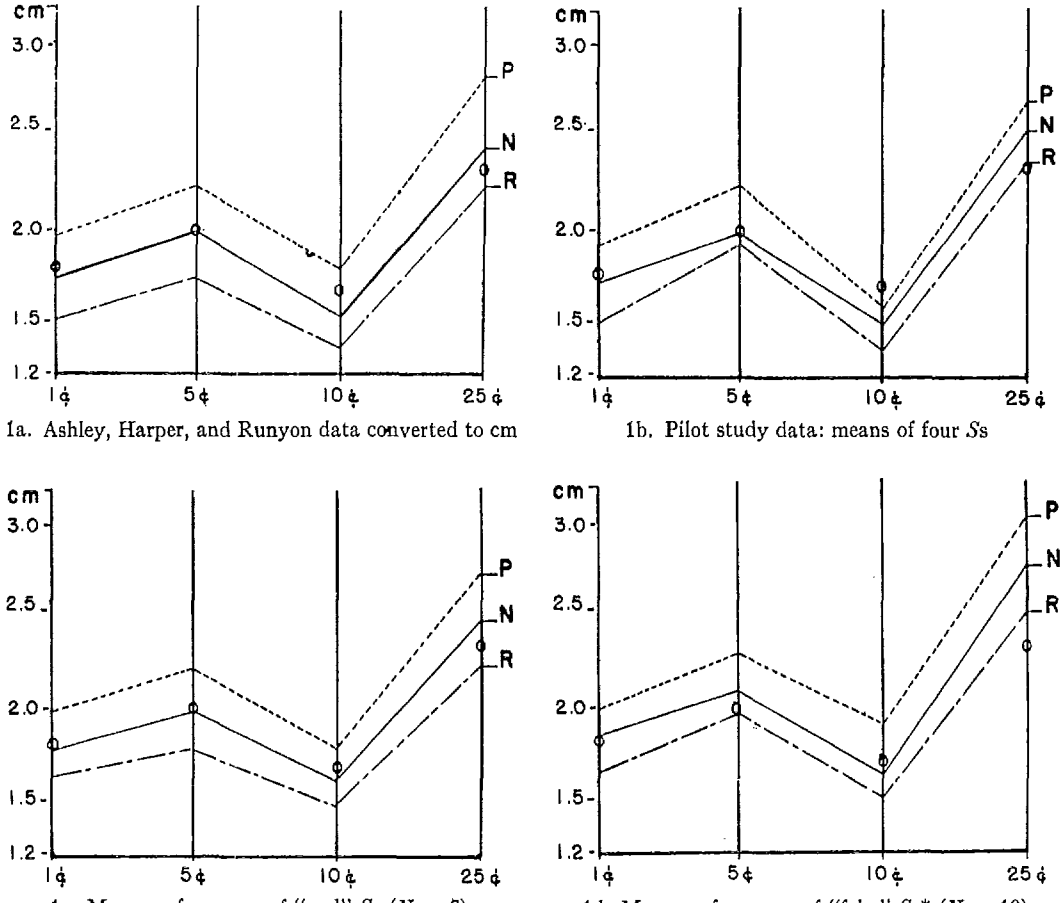
The results are summarized in Figure 1b, which presents the subjects' average coin-size estimates. The data are essentially identical to those obtained by Ashley, Harper, and Runyon (see Fig. 1a). The data on the size estimates of "slugs" successively called silver, gold, and platinum were also similar to those presented by Ashley, Harper, and Runyon in their series using a lead slug. All of the four subjects were able to describe correctly the purpose of the experiment and the hypotheses of the investigator who originally designed the experiment.

Discussion

The data from the pilot study imply that the present procedure effectively reproduces that of Ashley, Harper, and Runyon. Both in terms of the quantitative results and the observed behavior of our *S*, no significant differences emerge.

The only essential difference between these data and those obtained by Ashley, Harper, and Runyon relates to the inquiry procedure. The results confirm the first two hypotheses. 1. The *S* in an experiment is able to express some demand characteristics of the procedure, if careful inquiry is done and his initial resistance is penetrated in a clinical fashion. 2. The majority of *S*s may perceive the same demand characteristics of the experiment and these may be the same as the hypothesis being tested. However, the third hypothesis has yet to be dealt with.

It is interesting to note that two of the four *S*s who were specifically questioned about this point denied vehemently that they were influenced during the experiment by an awareness of the experimenter's hypothesis. But the *S*'s verbalization during inquiry cannot be accepted at face value. As long as the *S* recognizes and is able to verbalize the demand characteristics of the experiment, they may play a significant role in his experimental behavior, although to demonstrate that they do so requires supporting evidence. It is with this further evidence that the main study is concerned.



1a. Ashley, Harper, and Runyon data converted to cm

1b. Pilot study data: means of four *S*s

1c. Mean performance of "real" *S*s (N = 7)

1d. Mean performance of "fake" *S*s* (N = 10)

FIG. 1. COMPARISON OF ASHLEY, HARPER, AND RUNYON DATA WITH DATA FROM PRESENT REPLICATIONS (Legend: [R] = Rich; [P] = Poor; [N] = Normal; [O] = Actual coin size)

* One *S* (B. S.) was highly atypical and therefore excluded. See Fig. 2(b) for his performance.

Main Experiment

While the data found in the pilot study are consistent with the hypothesis that the demand characteristics of the experimental procedure may determine behavior, they are open to several serious objections.

The greatest single problem relates to the technique of inquiry and the interpretation of the data obtained in this fashion. It is important to have an objective method of rating how well the *S* perceives the demand characteristics of the experimental situation. The study was therefore designed so that the *S*'s inquiry would be rated by independent judges who did not have available to them the *S*'s data, but who would only have the opportunity of reading transcripts of the inquiry.

Another problem is a bias inherent in the inquiry procedure. Some *S*s who do not perceive the demand characteristics while engaged in the formal experimental procedure may perceive them during the inquiry. In such a case, and if the demand characteristics rather than the experimental variables determine the response, then the inquiry may indicate that the *S* should have responded a certain way when in fact he did not. However, the reverse should not occur.

The question still remains as to whether the *S*'s perception of the demand characteristics is responsible for his behavior, or whether it is due to the operation of the "intended" experimental variables. This question was dealt with by including a control group

that could not conceivably be construed as experiencing a "psychologically rich and poor state." If it could be demonstrated that a group of *S*s who do not experience the "rich and poor state" but are exposed to the demand characteristics of the procedure also show the data reported, it would be justifiable to attribute the results to the demand characteristics rather than to a presumed change in the psychological organization of the individual because of being "psychologically rich and poor." The control group thus permits inferences without reliance on the inquiry.

A group of *S*s who were not in hypnotic trance and did not manifest amnesia should provide such a control group. They would, of course, have to go through the same procedure as the "real trance" group. Such a group of *S*s would be asked to "play act" being in hypnosis and go through the whole procedure as if they were real *S*s. This group of *S*s would not truly consider themselves as psychologically rich or poor. In these *S*s no amnesia could be induced, and their behavior would clearly be that of a group of persons acting under three different sets of instructions—act as though you were poor, rich, and yourself.

This type of procedure is open to an important objection. Experimenter bias could play a major role. While the procedure and the wording of instructions would be the same, it would be possible unwittingly to include a variety of cues which could differentially shape the behavior of the two classes of *S*s. A blind technique is thus necessitated, in which the experimenter would not know which *S*s were "real" and which were "fake."

Such a stratagem presupposes that a "fake" *S* can simulate hypnosis sufficiently well to deceive the experimenter. However, there is a widely held opinion in the literature that it is impossible to simulate hypnosis successfully (Jenness, 1944; Stokvis, 1955). Cursory attempts by the author to have *S*s fake trance showed that the *S*'s efforts were half-hearted and obviously transparent.

In the usual faking situation, the experimenter knows that the *S* is faking, and the *S* is aware that the experimenter knows it; the usual purpose of this situation is to demonstrate the difficulties of fooling an experienced hypnotist. Clearly, the experimenter is not really expecting the *S* to be able to carry out his task effectively, and the *S* is aware of this. Thus, the *S*, who is anxious to please the experimenter, is in actuality motivated to give an unsuccessful performance. Furthermore, since the *S* is aware that the experimenter knows that he is acting, the *S* feels, with good cause, that it is impossible to deceive the hypnotist. There is a marked tendency to smile during induction procedure and in response to suggestions that might be construed as foolish, as well as to ask "How am I doing?" at intervals. Any suggestions that evoke even mild discomfort are followed only briefly and half-heartedly.

Most classical texts and modern authorities agree that hypnosis cannot be faked easily and "if a subject attempts to fake, tests for anaesthesia will permit ready recognition" (Estabrooks, 1948; LeCron & Bordeaux, 1947, p. 103; Mayer, 1951). However, the author has, upon two occasions, been taken in by *S*s who had apparently faked their way through the procedure and who subsequently disclosed the fact. In discussions with other hypnotists, he found that all who had had considerable experience could recall similar instances.[4] These experiences are usually explained by stating that such *S*s must really have been in the trance state or they would not have been able to act as well as they had, a view that is supported by the literature on hypnosis. The report of the *S* that he has not really been in hypnosis is thus lightly passed over, since "subjective reports are really not reliable." It is the author's opinion that it is dangerous to ignore the conviction of the *S*, expressed in good faith, that he did not experience the amnesia or anaesthesia or any other trance phenomena that he appeared to have experienced; and that it is indeed possible to construct a situation that would facilitate the successful "faking" of a hypnotic trance.

To do so it is necessary to motivate the *S* to

[4] In this respect, it is interesting to note that Pattie (1937) was sufficiently concerned with being deceived by a faking *S* that he asked each *S* to sign a statement "I, realizing that the experiment performed on me will probably be published in a scientific journal, solemnly declare that I was not faking or imitating the hypnotic trance but that I was genuinely hypnotized and do not remember the events of the experimental periods."

act the part of a hypnotic *S*—not to go into a trance—and for him to believe that it is possible to convince the hypnotist that he really is in trance. Accordingly, a situation was set up in which the *S* knew that the hypnotist would not know in advance whether or not he was really in trance. Further, it was so structured that the *S* would perceive the desire of the experimenters for him to do a successful job of faking. Finally, the situation was presented as a challenge that provided ample motivation for the *S* to tolerate unpleasant suggestions or tests.[5]

Training of Subjects

College students from Harvard and Brandeis were used as *S*s. All *S*s had been present during a lecture about hypnosis and a demonstration of the phenomenon given by the author in the context of an introductory psychology course. All *S*s were volunteers who agreed to take part in the study at the time of the lectures. No *S*s were paid. All had also been tested and rated by investigators other than the author for "suggestibility," in at least one screening session. All *S*s in the real trance group had further training with the author's associates. In order to satisfy criteria for depth of trance, they had to manifest the ability to respond to all the usual hypnotic suggestions with special emphasis on analgesia, visual hallucinations, negative auditory hallucinations, amnesia induced by suggestion, and simple posthypnotic suggestions.

The fake group of *S*s was drawn from the same population as the others but did not have special training in entering trance beyond the first screening session. They were all informed of their task in the manner described below.

The experimental procedure was administered to all the *S*s by the author, and he was given no information or cues by his associates as to which group any *S* might belong. Nor was he informed of the number of real and of fake *S*s. There were seven real *S*s and 11 fake *S*s.

Special Procedure for Faking Subjects

Prior to the experiment, the faking *S*s were told by an investigator other than the hypnotist:

> We're doing a study in which we would like you to take part. You recall some time ago you volunteered as a subject for some hypnotic experiments. We would like you not to go into a hypnotic trance; however, Dr. Orne, who will be working with you, will not know whether you are a real or a fake subject. He will go through trance induction with you, and then several tests and an experiment. We would like you to act as if you were entering a trance, but I don't want you to go into a trance. Your job is to fake the whole thing and to try to fool Dr. Orne. He knows that I may have some people trying to fake their way through the experiment but he has no idea who they are. I would like you, as a special favor, to try to do the best possible job of fooling him; to really convince him that you are in trance. This is quite difficult but a very important part of the experiment. I am trying to find out whether people are capable of doing this successfully. One of the tests which he will do with you will involve a harmless but somewhat painful electric shock. After the trance part, which you will have been faking, he will ask you some questions about it. Again, I don't want you to let on that you have been faking, and I want you to try to answer these questions as though you had been in hypnosis. Please keep on playing this part until I give you a signal. After the signal you can tell him what really happened. The signal will be that I will turn off the light on a box which will be on the table in front of you. I am sure that you will be able to do a good job of it.

The *S*s usually objected by saying that they did not know how a hypnotized *S* would act. They were told that although this feeling was understandable, others had been able to carry it off and that besides, they themselves had seen other *S*s go into a hypnotic trance during a previous demonstration.

The motivation for the *S* to act the role of the hypnotized individual is fairly clear. The author had been presented to the *S*s as an authority in the field of hypnosis and they had been taken into confidence by one of his associates in an attempt to fool him. Thus, on the one hand they were contributing to the advance of knowledge, on the other, they would have the pleasurable experience of "putting one over" on one of their teachers.

[5] After the completion of this study a previous reference to the use of a faking subject as a form of control was encountered. In an experiment on hypnotic pain suppression, Dynes (1932) asked a member of the psychology department to talk to *S*s privately and have them fake a trance the next time. The *S*s thought that he knew nothing of the plan and carried out the request to fake. However, Dynes himself did know and reports no difficulty in distinguishing this state from the real trance. It would have been interesting to know whether Dynes would have found it quite so easy to distinguish the behavior had he not known in advance.

Experimental Procedure

At the experimental session the *S* was exposed to trance induction. The Erickson hand levitation technique as described by Wolberg (1948) was used. After the *S* appeared to be in trance, a series of tests were done such as: hand clasp, analgesia, negative auditory hallucination, and positive visual hallucination.

When these tests had been completed, the *S* was told that his name would appear on his forehead and that he would feel it as though it were there in Braille. After this suggestion had been accepted, he was informed that if he would wipe this off he would forget everything about himself. Once he had accepted the suggestion of total amnesia, the rich state and the poor state was induced in a fashion identical to that used by Ashley et al. (1951). The *S* was then asked to make coin-size judgments of a penny, nickel, dime, and quarter, again using the original Bruner-Goodman box. He was required to make six coin-size judgments of each coin in each state. The final set of judgments was made in his normal state, but with the suggestion that he had no recollection of anything that had happened since he entered trance. The rich and poor states were randomized as well as the order of the coins. A balanced design could not be achieved in respect to coin order because of the number of *S*s used, but it was approximated as far as feasible. The hypnotist-experimenter did not know the key to the order and was merely told in each instance which state he was to run first and with which coin to start.

The procedure, used by Ashley, Harper, and Runyon and in the pilot study, of estimating the size of the lead slug which was called lead, silver, gold, and platinum, was omitted.

At the completion of the coin-size judgments, an inquiry was performed as previously described. This inquiry was the same for all *S*s. At the completion of the inquiry, both in the hypnotic and wake states, the light of the Bruner-Goodman apparatus was turned off, which was the signal for the fake group to tell what really happened. If the *S*s were real, this had no meaning to them, and the experiment was completed. Those of the fake group were asked a series of questions as to whether or not they had been in trance. They were also asked about their performance, why they had acted as they did on some points, and if and when they felt anxious. Finally, they were asked whether they thought that they had given themselves away; if so, when and why. All of these inquiries were completely tape recorded and transcribed so that, subsequently, judges could rate what each subject perceived as the hypothesis being tested.

Results

1. *Objective Findings–Group Results.* Figure 1 displays a comparison between the present data and those of Ashley, Harper, and Runyon (Fig. 1a); in Fig. 1c, the results of the hypnotic *S*s are averaged in the manner described by Ashley, Harper, and Runyon; in Fig. 1d, the results of the "fake" *S*s are averaged in the same manner. All three graphs present essentially the same configuration. In all cases the judgments in the poor state are the largest, judgments in the rich state smallest, while judgments in the "normal" state fall between.

2. *Results for Individual Subjects.* Figures 2a and 2b give the results for each "real" or "fake" *S*. *S*s varied widely in their response to the experimental task, not all of them yielding a configuration that corresponds to the group average. While Ashley, Harper, and Runyon unfortunately do not give their individual results, they report considerable variation.

3. *Comparison of Judges' Ratings with Objective Categorization.* Using analysis of variance for each individual *S*, it is possible to test statistically whether there are significant differences between *S*'s coin-size estimates in any combination of the three states and the direction of significant differences. Ignoring the "normal" judgments, the possibilities reduce to three categories: no significant differences between rich and poor, poor significantly larger than rich, and rich significantly larger than poor. Each *S*'s coin-size judgments were classified into one of the three categories on the basis of statistical analysis considering differences not significant at the .05 level as no difference.

The transcribed postexperimental inquiries were given to two independent judges to rate the *S*'s perception of the hypothesis being tested at the time of the experiment in terms of the same three categories. The judges had no contact with the *S*s or each other. Table 3 shows a comparison in terms of the

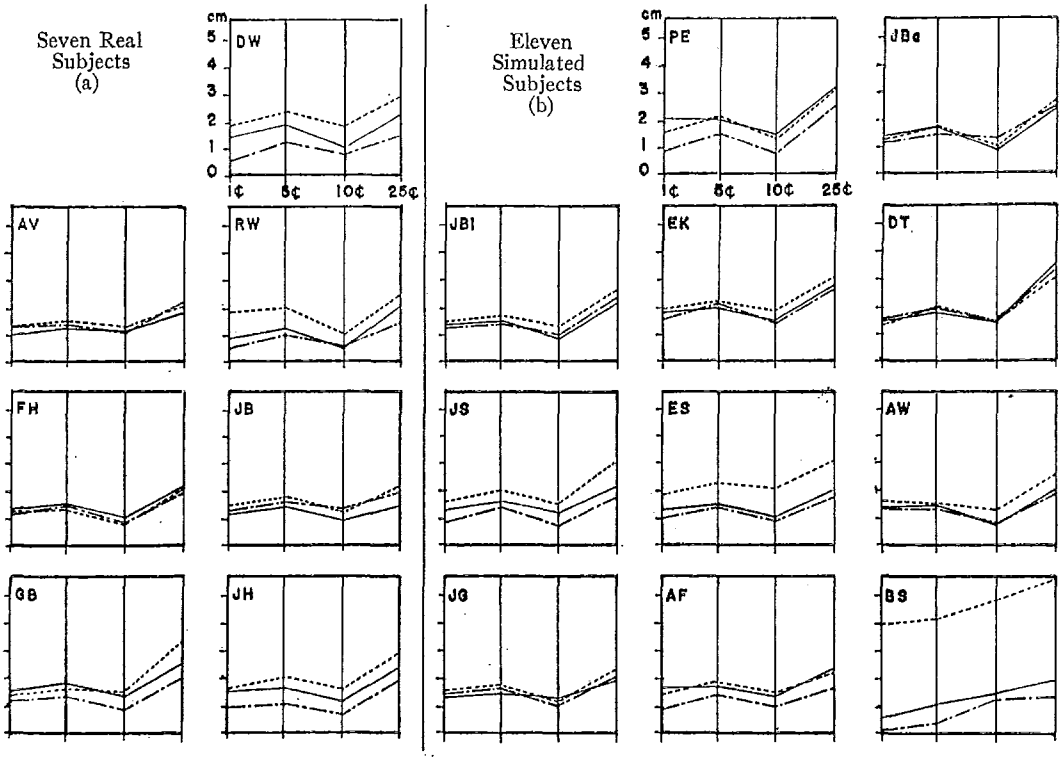


FIG. 2. GRAPHS OF INDIVIDUAL SUBJECTS
(Legend: [-----] = Poor; [——] = Normal; [—·—] = Rich)

TABLE 3
A COMPARISON OF JUDGED AND ACTUAL CATEGORIES OF RESPONSE

Subject	Major Categories		
	J1	J2	Actual
G. B.	II	II	II
F. H.	II	II	I
J. H.	II	II	II
A. U.	II[a]	I	I
R. W.	II	II	II
D. W.	II	II	II
J. Ba.	I	I	I
P. E.	II	II	II
J. Bl.	II	II	II
J. G.	I	I	I
A. W.	II	II	II
E. S.	II	II	II
J. S.	II	II	II
D. T.	I	II	I
A. F.	II	II	II
E. K.	II	II	II
B. S.	II	II	II

NOTE.—Key to symbols: I. No significant difference; II. Poor significantly larger than rich; III. Rich significantly larger than poor.

Two judges were used (J1 and J2). Note that no *S* actually belongs in Category III and that neither judge placed any *S* within it.

[a] Judge undecided about I or II here but chose II as better estimate.

three categories between the ratings of the two judges and the individual's responses. There is a high degree of correspondence between the judges' ratings and *S*'s performance.

Testing the null hypothesis of no systematic correspondence between judges' rating and *S*'s coin-size judgments leads to its rejection for each judge (.015, Fisher Exact Test); combining the significance levels of the two judges leads to an over-all significance of less than .01.

Discussion

The data obtained from the seven hypnotized *S*s are essentially identical to the findings of Ashley, Harper, and Runyon, and virtually indistinguishable from the performance of the 11 stimulating *S*s. These results confirm the hypothesis that it is possible for an experimental design that omits a crucial aspect (hypnotic amnesia) of the original dependent variable to elicit similar responses as long as the same demand characteristics are present.

The subjective experience of members of the simulating group was radically different from that of the *S*s in deep trance. The *S*s readily

described their conscious efforts to "second guess" what the experimenter would expect of them if they were actually in hypnosis. The data obtained from the simulating group are the result of a concerted effort on the part of the *S*s to respond in a way identical to hypnotized *S*s. The subjective experience of the hypnotized group was different. While clinical inquiry revealed the *S*s' perception of the author's expectations, they denied that these factors had any effect upon their performance. This denial on the part of the hypnotized *S* does not, of course, mean that their perception of the experimental purpose was unimportant. It does mean, however, that they themselves were not aware of its significance.

An investigation of the demand characteristics perceived by each *S* may account for individual results that did not conform to the group average, as an examination of the judges' ratings confirms. It was discovered that the inquiry procedure had not been refined sufficiently to permit prediction of the *S*s' performance in the "normal" state. However, performance in the "rich" and "poor" states could be predicted with a high degree of accuracy from the judges' ratings of the *S*'s perception of the experimental purpose. No *S* reversed the expected trend by making his coin-size judgments larger in the rich state than in the poor state. No *S* was rated by either judge as having perceived this to be the hypothesis of the experiment. Twelve subjects made the coin-size estimates significantly larger in the poor state than in the rich state. All 12 *S*s were rated by both judges as having perceived this to be the author's hypothesis. Five *S*s failed to significantly differentiate their coin-size judgments between the rich and poor state. Of these five subjects, four were rated by either one or both judges as having failed to perceive the demand characteristics of the experiment.

The inquiry data thus support Hypothesis 3*a*, that if the majority of *S*s perceive the same demand characteristics, then *S*s who fail to perceive these demand characteristics should not show the behavior characteristic of the group.

The present experiments do not bear on the validity of the Bruner-Goodman effect. The Ashley, Harper, and Runyon experiment was used, rather, as an example of a study that appears methodologically sound, but in which demand characteristics seem to be the major determinant of the *S*'s performance. The implications seem clear: demand characteristics may determine behavior in hypnotic experiments. Before an effect can legitimately be attributed to hypnosis, it is necessary to demonstrate that it is not primarily a function of demand characteristics. Such proof appears to require the use of blind techniques and adequate inquiry.

THE INFLUENCE OF MOTIVATION ON HYPNOTIC BEHAVIOR[6]

In studying the nature of the hypnotic trance, the question arises as to which phenomena are primary and consistent components of the trance state and which are secondary derivatives. Let us postulate that increased motivation is a constant accompaniment of the hypnotic state. The present phase of the research was designed to show that certain phenomena long viewed as part and parcel of the hypnotic state may more parsimoniously be viewed as derivatives of increased motivation, and can be reproduced *pari passu* by other motivational techniques that have no direct relationship to hypnosis.

For years it has been claimed that there is an increase in physical capacity during the trance state. In part this claim has been based on casual observation, the favorite example being that of the stage hypnotist who places a subject in deep trance across two chairs and permits one or more individuals to stand or sit upon him. This "experiment," with variations, is often cited as irrefutable evidence for increased physical capacity. Another group of frequently cited observations are those concerning the ability of the subject to maintain his hand in an outstretched position for extended periods of time without evidence of fatigue. On the basis of this type of data, estimates of greatly increased physical capacity have been made (McDougall, 1926; Moll, 1904).

An early study by Nicholson (1920, p. 89) maintained that "during the hypnotic sleep the capacity for work seemed practically end-

[6] This experiment was originally reported in German (Orne, 1954).

less." Unfortunately, no quantitative data were given, and the study was poorly controlled. In a meticulous investigation, Williams (1930) showed no difference between hypnotic and wake states in the ability to maintain the arm in an outstretched position. However, this study failed to employ suggestions to the effect that the arm would not get tired and could not drop. In another similar investigation, using an ergograph and employing appropriate hypnotic suggestions, Williams (1929) found a 12 to 16% increment in the trance. More recently, Roush (1951) showed an increment in performance in hypnosis significant at better than the .05% level using the arm dynomometer, the hand dynomometer, and hanging by the hands, as measures of fatigue.

All the experiments performed by psychologists in the laboratory have followed orthodox scientific methods insofar as a standard set of instructions was given to the *S* to hold a weight, pull an ergograph, or perform a similar task in both the nonhypnotic and hypnotic states. The better experiments used the usual ABBA arrangement to control fatigue or practice effects. Any increment in performance was defined as an increase in capacity due to trance. It is necessary here to question the logic on which the interpretation of these results is based. While these experiments undoubtedly show that instructions given in trance state result in increased performance over that achieved by the same instructions in the wake state, they do not necessarily show an increase in capacity. Alternatively, the *S* may be more willing to exert himself while in hypnosis. The governing factor could be the increase in the *S*'s motivation to comply with the experimenter's request rather than an increased capacity to comply. The instructions, while identical in wording, may be experienced as quite different by the *S* in hypnosis and the waking state. The request to hold a weight at arm's length, given in trance, may be a highly motivating cue or "suggestion," especially if the *S* is told that he is to feel very powerful and not fatigued. The identically worded request in the wake state is perceived as a request by the experimenter and may be followed if good rapport exists between experimenter and *S*. However, as the discomfort of the task increases, the *S* becomes increasingly disinclined to comply. Viewed in this context, the reported experimental results do not necessarily imply that physical capacity is in fact increased in trance but, rather, that the trance state increases performance.

Procedure

Nine *S*s in deep trance were asked to hold a kilogram weight at arm's length. This was done in such a way as to derive maximal benefit from the peculiar nature of the trance state. Thus the *S* was told to hallucinate a table, and only after the table was both seen and felt by the *S* was the suggestion given that the right arm would feel no fatigue and no pain.

All the standard tests of deep trance were met in each *S*. A kilogram weight was placed in the *S*'s right hand, and the *S* was instructed to place it on the imagined table, to continue holding it with his fingers, and under no circumstances to drop it or his arm. Continuous suggestions were given to the effect that he would be able to hold onto the weight, that his arm would not get tired, etc., and that he would continue to see the table. The end point was when the *S* was no longer able to hold up his arm and began to come out of trance. At that point he was reassured, told to drop the weight, and deep trance suggestions were again given. After some minutes, and having made certain deep trance was again established, the *S* was awakened with a carefully induced posthypnotic amnesia. The *S* was not told the length of his performance.[7] For the second part of the experiment, which was done within half an hour of the first, the *S*, not now under hypnosis, was instructed as follows:

> This is a most important part of our experiment. It is very important for us to know your endurance and

[7] In the preceding section it was pointed out that the posthypnotic amnesia induced in hypnosis is not tantamount to an ablation of memory. One may be justified in assuming that the *S*s do not know their hypnotic performance, not because of the amnesia but, rather, because they were never informed of the length of time they held the weight in hypnosis. A common belief that the *S* in hypnosis has a perfect sense of time would lead to the conclusion that this is not an adequate safeguard. Fortunately, a very thorough study of the time sense under hypnosis was conducted by Guenther Klaus in a doctoral dissertation (University of Freiburg, Germany, 1948) which demonstrates unequivocally that the time sense is not improved by hypnosis.

TABLE 4
COMPARISON OF SUBJECTS' PERFORMANCE IN HYPNOTIC AND WAKE STATE

Subject	Hypnosis		Waking	
	Minutes	Seconds	Minutes	Seconds
1	4	05	5	33
2[a]	4	40	6	25
3	4	38	8	06
4 (*a*)[b]	6	05	3	29
(*b*)	5	50	10	02
5	7	07	7	57
6	10	05	16	00
7	4	52	5	49
8	5	20	5	32
9[c]	4	57	2 (*a*)	10
			5 (*b*)	09

[a] This experiment was performed in 1950. In 1957, it came to my attention that this *S* feels that he simulated completely throughout this experiment. At the time, I was totally unaware of this possibility and the *S* was in trance by all the usual criteria.

[b] *S* dropped the weight after 3′ 29″ in the wake state. The next day, care was taken to motivate him adequately. While the hypnotic performance was only 15″ below the previous day, his wake performance now exceeded 10′.

[c] This *S* suddenly dropped the weight without warning in the wake state after 2′ 10″. She was encouraged and after a 20′ time lag again held the weight. This time her performance was 5′ 09″. This performance in itself is better than her hypnotic performance of 4′ 57″; however, it might seem that the waking performance was better than this, as the 2′ 10″ period was not given credit.

physical capacity. What I want you to do is a very difficult task. It does not look difficult but it is. I want you to hold this kilogram weight at arm's length. Your hand will get tired and it will take great effort to do this. There is a natural tendency to drop the weight if your hand gets tired. However, it is vital that we get your true capacity. Surprisingly enough, our female subjects have been able to hold the weight for T minutes. [The time T given would be his previous performance during hypnosis rounded off to the nearest half minute.] Our male subjests have been able to hold the weight at least T + ½ minutes. I realize that this is a difficult and painful task. Just to make it interesting we will try a game. At T minus 2 minutes we will start you off at 5 cents. At T minus one and a half, we will double that and make it 10 cents. At T minus one, 20 cents. At T minus one half, 40 cents. At T, 80 cents and at T plus one half, $1.60.

Then the *S* was told that while we could not afford to pay over $1.60, we were, of course, interested in how long he could actually hold the weight. One final point was explained to him:

While we often feel that we are so tired that we cannot go on, this is not really true. One can rarely be so tired as not to be able to continue for 30 seconds. Accordingly, I would like you to give me one-half minute's notice before you actually drop the weight.

Results

Table 4 gives the results for the nine *S*s tested. All but one *S* in the wake state immediately exceeded hypnotic performance. This *S* held the weight for 6 min. 5 sec. in trance, a very remarkable performance, but in a subsequent wake state dropped the weight after only 3½ min. The exception demonstrates very clearly that it is necessary to ego-involve the person in the task and to convince him of his ability to do it. He reported that the seven minutes that had been given as an illustration of "average performance" had seemed so long, and his hand became so tired after three minutes that he felt convinced that he would be unable to come even close to the average, so therefore "why bother to try?" The next day the *S* was more carefully motivated and encouraged. He was then able to hold the weight for over 10 minutes.

Discussion

This experiment does not purport to prove that there is no increase in physical capacity in the trance state. Because of the motivating nature of the trance state, and the operational difficulty in obtaining equal motivational states, it becomes a technical impossibility to prove conclusively whether increased physical capacity is produced or not. The data, however, do show that the usually observed increase in performance of trance *S*s may be accounted for by motivational difference.

From a theoretical viewpoint the reinterpretations to which this study had led seem most significant. As long as we believe physical capacity to be in fact increased by the simple expedient of the induced trance, it becomes necessary to look for the focus of the trance in something neurophysiological. If, on the other hand, we can understand the apparent increase in physical capacity observed during the trance state in terms of differences of motivation, we are then led to view hypnosis in psychological terms. It is clear that this study says nothing about why the trance tends to increase motivation nor does it even prove that this is so. It merely shows that adequate

motivation in the wake state leads to levels of performance equal or better than those found in the trance.

An objection that might be raised takes the form of the question as to what would happen if similar motivational techniques were used in the trance state to those in the wake state. But this question has little bearing on the essential point. If application of these techniques should produce a trance performance greater than the wake performance, it could be interpreted as the result of combined effects of ego-motivation and the postulated increased motivation associated with hypnosis. If, on the other hand, performance in trance were not greater it could be argued that the type of ego-motivation used is not germane to the trance state.

It may, finally, be argued that the *S* in the wake state is, in fact, still in hypnosis, since the same experimenter who induced hypnosis conducts the second phase. Perhaps *S*s performed better in the wake state because of the demand characteristics of the experiment, i.e., my expectation that they should do so! It is not easy wholly to refute this argument. That all previous studies are open to the same criticism does not answer the question. The clinical observation that the *S* does not look, act, or feel in any way the same in the hypnotic part and the waking part appears much more relevant. Nevertheless, I hope sometime to repeat the study with the aid of another hypnotist who believes in "the power of hypnosis" and who, therefore, expects *S* to do better in hypnosis than in the wake state. If it were possible for me to enable *S*s subsequently to exceed their hypnotic performance, it would go far toward removing this objection, of which I was aware during the collection of data. A different way to check the results would compare the performances of "fake" and "real" *S*s, using the strategy developed in the section entitled Cues Implicit in an Experimental Design.

REAL VS. "FAKE" HYPNOTIC SUBJECTS

The "real-fake" technique, a method of enabling *S*s to simulate hypnosis, was developed to demonstrate the effect of role-play artifact on trance behavior. Differences between the real and faking *S* that cannot be accounted for by the faking situation may be viewed as characteristic of hypnosis. Some behavior shown by both groups may, of course, also be a true characteristic of hypnosis since the fact that someone is able to simulate a given type of behavior does not indicate that it is not genuine in the nonsimulating group. For example, that it is fairly easy to simulate the compulsive quality of the trance does not imply that this quality is not germane to hypnosis. However, assertions that volitional capacities can be transcended in hypnosis would seem to require showing that faking *S*s cannot produce similar performances.

The present use of real and faking *S*s in a blind design appears to offer several advantages. It permits a rigorous control, in terms of behavior, of inquiry procedures designed to elicit demand characteristics of experiments. In the faking situation, the variable assumed to be the cause of the behavior can be omitted. If such behavior still occurs, it can then be accounted for adequately by the implicit demands of the situation. In this respect the technique may have useful application in other areas of psychology. With respect to hypnosis itself, the technique permits a rigorous control of experiments that claim to demonstrate transcendence of volitional capacities. It also helps to eliminate many biases almost universally present in hypnosis research and throws into relief certain differences between the "real" and "faking" groups which can then be attributed to the hypnotic state. These differences may be highly germane to the essence of hypnosis and seem to have been obscured by the overwhelmingly impressive nature of the phenomenon.

The Faking Subject

The situation of the simulating *S* may be viewed as one where he can (*a*) contribute to research by pleasing one experimenter and (*b*) satisfy different other needs by fooling another experimenter. The possibility of simultaneously satisfying usually incompatible needs leads to a state of peculiarly high motivation. Thus, he is highly motivated to play the role of a hypnotized *S* and continues to do so even in the face of great discomfort, without, however, the alteration of consciousness and the subjective experience found in hypnosis.

It had been anticipated that there would be differences in the clinical appearance of the

two groups of *S*s, both when going into trance and while in trance. Since the hand levitation technique (Wolberg, 1948) was used to induce trance, it was expected that the "faking" *S*s would lift their hands in a manner clearly indicating active volition rather than permitting the hand to rise slowly and gradually in response to a subjective feeling of lightness. Similar differences were anticipated in respect to eye-closure. When the inability to bend the extended right arm was suggested, differences were expected in the *S*'s attempts to do so. The *S*'s responses to negative auditory hallucinations and positive visual hallucinations, analgesia and anesthesia, pseudo identities in the trance, and amnesia for the trance were all expected to be means of differentiating the two groups. The discovery that most of the simulating *S*s did not differ behaviorally from those in deep trance came therefore with considerable surprise. True, it was possible to distinguish most of the "faking" group from the "real" group, but this discrimination was based on a clinical diagnosis with an inordinate amount of subjective uncertainty and about 20% error. With prior knowledge that an *S* is simulating hypnosis it is very easy for the observer to discern cues that reveal the "faking" nature of the "trance" behavior. Without such prior knowledge, these cues are obscure and judgments can be made only with a great deal of subjective uncertainty.[8] If it seems obvious to the experimenter that the *S* is faking, systematic error would again be introduced, and could affect the results. In such cases it seems desirable to discard the subject from the experiment, as was done in two instances in the present study.

Response to Pain in "Fake" and "Real" Subjects

Traditionally, hypnotists have viewed the induction of analgesia for highly painful stimuli as the best test for clearly distinguishing simulating *S*s from the *S*s in deep trance. The author expected, therefore, to find that reactions to pain would distinguish between the "real" and "fake" groups.

The technique for producing pain for testing hypnotic analgesia which the author had been using routinely involves forcible flexion of the two terminal phalanges of the little finger and pressure of the experimenter's thumbnail on the dorsal aspect of the middle of the second phalanx of the *S*'s little finger. These techniques failed to discriminate between the two groups. The "faking" group reported pain but indicated that they had had little or no difficulty in suppressing their reaction.

In order to provide a more painful, though still safe, stimulus a Harvard inductorium was employed. Standard Grass silver electrodes were applied to the sides of the index fingers and fixed with adhesive tape. It was found that the "faking" group flinched less and tolerated more pain than the "real" group. Actually, almost all of the *S*s tolerated the maximal stimulation that could be applied by the inductorium.

Another procedure, not particularly painful in itself, was designed to maximize anxiety about pain. Negative auditory hallucinations were induced and at the same time an analgesia of one hand. A match was then lighted close to the *S*'s ear and held under the third finger of this extended "pain insensitive" hand long enough to produce painful heat without causing a second degree burn. The experimenter tested the time interval on himself each time in order to determine what constituted a safe but painful stimulus. In no instance was an *S* ever subjected to a blistering burn. Again it was found that there were no noticeable differences between the simulating group and the deeply hypnotized *S*s. However, postexperimental inquiry revealed that the simulating group experienced a high level of anxiety and some pain during the procedure, while those in trance felt little or no discomfort.

To summarize the results of these informal experiments with pain, no clear-cut behavioral differences between "real" and "fake" *S*s have as yet been found, no matter what type of stimulus was employed. However, on postexperimental inquiries a very real difference was found in the *S*'s attitude toward this part

[8] The experimenter is currently attempting to study systematically the cues perceived as indicative of faking by an observer who knows that the *S* is simulating to see if consistent patterns appear. However, results thus far indicate that observers who had experience with observing faking *S*s, knowing that they were simulating, did not thereby become more able to discriminate in the absence of such knowledge.

of the experiment and in his report of subjective pain.

Differences Between "Real" and "Fake" Subjects

The faking *S*'s condition is characterized by the presence of faking behavior and the absence of hypnosis. If we wish to regard true hypnotic behavior as the difference between what can be observed in faking and real *S*s, it is necessary to take into account the characteristics of the faking *S*s introduced by the act of simulating.

One of the observed differences is related to an attempt by the simulating group to avoid commitments whenever possible. In some aspects, the situation of the simulating group is analogous to that of the malingerer, although the motivation to malinger is different and usually stronger. The person who is simulating a disease attempts to give the appropriate behavioral and symptomological manifestations without subjectively experiencing the symptoms that would be present with the actual disease. The real hypnotic group is more akin to the hysteric who reacts to subjectively real symptoms without organic pathology. Rorschach studies on malingerers in the military service (Rosenberg & Feldberg, 1944; Ross, 1944) reveal a typical syndrome. The most significant aspect is a marked constriction of the record, with occasional bizarre responses, a feature that is understandable as an attempt to avoid giving oneself away in the face of an unknown situation while attempting to appear cooperative. Applied to the present situation, these features suggest a tendency for the simulating group to avoid responding whenever possible and when forced to respond in an unstructured situation to give the safest possible answer. Just this occurred. In the replication of the Ashley, Harper, and Runyon study, it was observed that the "faking" *S*s would tend to be more hesitant in giving a false life history after being told that they were rich or poor. This reluctance cannot be considered a particularly meaningful finding for the theory of hypnosis, since it should rather be attributed to the psychological situation analogous to malingering, and not to the presence or absence of hypnosis.

Differences observed which may be attributed to the presence or absence of trance were with respect to: (*a*) congruence, the appropriateness of a response to the apparent level of trance, and (*b*) trance logic, the apparently simultaneous perception and response to both hallucinations and reality without any apparent attempts to satisfy a need for logical consistency.

The "fake" *S*s tended to exhibit behavior that was incongruous with what clinically appeared to be the depth of trance. For example, an *S* who responded very slowly to hand levitation was given the suggestion that he could hear only my voice. This negative auditory hallucination was tested by rubbing the thumb against the first two fingers of the hand close to the *S*'s ear and asking him "do you hear anything but my voice?" A response congruent with the *S*'s behavior of slow hand levitation and in a medium trance would be either no response or a *slight* nod or shaking of the head. Frequently, a repetition of the question would be required to elicit even a nod of the head. An *immediate* and emphatic *verbal* denial of any auditory perception other than my voice was considered a typical incongruent response—incongruent both in respect to speed and modality of response.

The most reliable criterion, as it turned out, may be termed trance logic.[9] It refers to the ability of the *S* to mix freely his perceptions derived from reality with those that stem from his imagination and are perceived as hallucinations. These perceptions are fused in a manner that ignores everyday logic. A good example of this process is the reaction of many *S*s in hypnosis who see a hallucination of a person sitting in a chair and describe it as "This is very peculiar, I can see Joe sitting in the chair and I can see the chair through him." This type of reaction, when made spontaneously, was absolutely diagnostic of the "real" *S*. Unfortunately, it did not occur spontaneously in every *S*; it was found, however, that "fake" *S*s *never* gave such a response.

In order to obtain the same type of data

[9] This seems intimately related to primary process thinking or autistic thinking. To avoid the developmental, pathological, and theoretical implications of these concepts a new phrase seems preferable to describe the clinically observable phenomenon.

that had proved to be so characteristic of hypnosis, a special situation was devised. Throughout the experiments, one of the co-experimenters was in the room with the *S* and the author, taking notes. At the beginning of the experiment he sat to the side of the *S*, well within his visual field. Once the *S*'s eyes were closed, the co-experimenter rose very silently and walked behind the *S* out of the *S*'s visual field. Subsequently, the *S* was instructed to open his eyes while still in deep trance and a hallucination of the associate sitting in the chair was induced. This hallucination was facilitated by the fact that during the initial part of the experiment, just prior to the *S*'s closing his eyes, the associate was actually sitting in the chair. After the hallucination appeared to be fully accepted by the *S*, and he appeared to be responding to the hallucination as though it were actually the associate, he was instructed to turn around and look at the associate now behind him with the question, "Who is that behind you?" Almost invariably the "real" *S* would look at the associate, then quickly turn back to look at the empty chair, and back at the associate. After looking back and forth between the hallucinated and the "real" associate, the *S*s indicated verbally that they were perceiving two images of the same person.[10] When asked about this, they tended to give bland responses such as "mirrors" or a "trick." Though they seemed somewhat confused, they did not become seriously disturbed.

The "fake" group, in most cases, either refused to see anyone behind them, or claimed that they could not recognize the person. Occasionally, they admitted recognizing the associate behind them and then claimed that the hallucination had vanished. (This reaction, while unusual among the real group, is occasionally found, especially if the *S* did not fully accept the initial hallucination.) Of approximately 30 "faking" *S*s, only two acted as if they saw two images of the same individual. The others, when asked during post-experimental inquiry about the reason for their response, gave a very significant answer. They stated that I had instructed them to hallucinate, the associate in the chair and therefore, when I asked who the individual behind them was, they had to deny seeing him, or if they saw him, recognizing him. After all, there was only one such individual and I had already told them that they were supposed to see him sitting in the chair. This logical conclusion determined the response given by simulating *S*s; it did not occur to the overwhelming majority of the "real" *S*s who saw two images without any difficulty. This finding appears to represent a valid and significant difference. The "real" *S* responds to a subjectively real image of the associate in the chair. When asked about an objectively real image of the same individual, he is able to perceive this as well. He can respond to perceptions that are subjectively real and determined by the suggested environment, as well as to his actual perceptions of the real world, without attempting to satisfy a possible need to make them logically compatible. The absence of expression of a need for logical consistency seems, at this point, to be one of the major characteristics of hypnosis.

Because it is my belief that the "essence" of hypnosis will be found in the subjective experiences of the *S*, I have become increasingly interested in a series of techniques attempting to obtain data about the actual feelings and experiences of the *S*. In the future, I intend to develop inquiry procedures that will include "casual conversation" with another *S* who, in reality, is an investigator. It is hoped to elicit cooperation from the *S*'s friends. Casual preliminary attempts using such procedures indicate that material obtained in this way may be quite illuminating and not accessible to direct inquiry by the experimenter.

A POINT OF VIEW TOWARD HYPNOSIS

While much of the research described here appears to be explaining away the hypnotic phenomenon, the intention is rather to differentiate its valid and significant aspects from what might be termed artifact. One of the problems inherent in any study of hypnosis is that of its definition. There is high consensus of opinion about what constitutes hypnosis in terms of a variety of scales. However, the

[10] This situation was originally discussed by Milton H. Erickson in a personal communication.

essential characteristics have remained obscure. A great many investigators have become impressed and fascinated by the apparent transcendence of normal physiological capacities in hypnosis. The present research program has made me increasingly skeptical of the experimental data that purport to support this view. However, clinical data obtained both by others and myself seem to show in a dramatic way that responses can be evoked in some *S*s which they themselves could not perform voluntarily. Such phenomena seem to be limited to *S*s who have a peculiar disposition in this direction. For example, authenticated cases of hypnotically induced blistering have been achieved only in individuals with previous dermatological histories.

One might hypothesize that the capacity to produce marked physiological alterations in hypnosis is confined to persons who have a readiness to somatize in the organ system being investigated, which will usually have been demonstrated by a history of similar pathology occurring spontaneously. Such findings do not preclude the possibility, of course, that a transcendence of normal volitional capacities in some areas may eventually be established in the laboratory as unequivocally due to hypnosis.

Aside from the controversial issue of such changes in physiological capacities, it appears that a universal effect of hypnosis on any *S* in deep trance can be delineated in terms of his subjective experience. Experience, after all, is not to be taken as an ephemeral or unimportant aspect of hypnosis but, rather, as extremely significant and, to the *S*, dramatic and striking.

Any *S* who has experienced deep trance will unhesitatingly describe this state as basically different from his normal one. He may be unable to explicate this difference, but he will invariably be quite definite and certain about its presence. Thus, one of the characteristics of hypnosis is that in deep trance the *S* experiences the state as discontinuous from his normal waking experience (though not always in the intermediate stages of trance). Hypnotic trance differs from pathological states, which may also be discontinuous, in that the *S* enters and leaves the state in accordance with previously established "rules of the game."

Another aspect of this altered subjective state is one which the *S* describes as an inability to resist a cue given by the hypnotist. (Interestingly enough, if the *S* *before entering the trance* decides not to follow a specific suggestion he is able to resist it.)[11] The uniformity with which this compulsive quality is reported tends to make us accept it as a characteristic of hypnosis. However, it will not emerge as a difference in behavior between real and faking *S*s.

Finally, an important attribute of hypnosis is a potentiality for the *S* to experience as subjectively real suggested alterations in his environment that do not conform with reality. In trance, the waking distinction between an imagined idea and what is perceived externally to the organism fades, and images may be perceived as originating from external reality. Thus, the waking individual, no matter how hard he tries to imagine that he saw someone sitting opposite to him, might at best be able to evoke some kind of imagery but would always be aware of the distinction between this and reality. The *S* in deep hypnosis may well be unaware of the distinction, though at some level he will always be able to discriminate.

In sum, the principal features of the hypnotic state are seen as changes in the subjective experience which are characterized by (*a*) discontinuity from normal waking experience, (*b*) a compulsion to follow the cues given by the hypnotist, (*c*) a potentiality for experiencing, as subjectively real, distortions of perception, memory, or feeling based on "suggestions" by the hypnotist rather than on objective reality, (*d*) the ability to tolerate logical inconsistencies that would be disturbing to the individual in the wake state.

SUMMARY

This paper has attempted to delineate some aspects of hypnotic phenomena which can be

[11] However, suggestions that are inconsistent with the basic "rules of the game" governing the implicit contract between hypnotist and *S*, as seen by the *S*, are, as a rule, not followed: e.g., antisocial and self-destructive acts, or any other suggestions running counter to basic ego needs or superego inhibitions.

rigorously tested and established. The hypothesis that the subject's "knowledge" regarding behavior in hypnosis influences his own hypnotic behavior was supported by an experiment. Students were exposed to a demonstration and lecture on hypnosis in which catalepsy of the dominant hand was mentioned as a common feature of trance behavior. Five out of nine volunteers exhibited this phenomenon under hypnosis. No students in a control group, who were given a similar lecture and demonstration but with no mention of catalepsy, showed the phenomenon.

An experiment performed by Ashley, Harper, and Runyon, which depends on hypnotic amnesia to explain the results, was repeated with the inclusion of a control group of subjects. These were subjects who simulated hypnosis but who were otherwise exposed to the same experimental situation as the hypnotic subjects. The behavior of the simulating group was indistinguishable from that of the "real" group, and both were indistinguishable from the results of the original study. Some doubt is thus cast on an explanation of the results in terms of hypnotic amnesia, and support is lent to the hypothesis that the demand characteristics of the experimental procedure may be a significant determinant of subject behavior.

In another experiment it was found that motivated subjects in the wake state held a weight at arm's length for a longer period of time than they did while in the hypnotic state. This result casts doubt on the notion that enhanced physical capacity is a primary characteristic of the trance state.

Differences between "real" and "fake" subjects were investigated. The major difference appears to be a tolerance by the "real" subject of logical inconsistencies.

It was concluded that in the absence of objective indices of hypnosis the existence of trance may be considered a clinical diagnosis. Until an invariant index of hypnosis can be established, such a diagnosis must be confirmed by the subject's report of alterations in his experience, since the real focus of hypnosis appears to lie in the subjective experience of trance.

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