MOTIVATION, PERFORMANCE, AND HYPNOSIS 1

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Abstract: London and Fuhrer (1961) and Rosenhan and London (1963a; 1963b) report that the waking base level performance of Ss who are relatively insusceptible to hypnosis is higher than the waking base level of highly susceptible Ss on tasks of muscular strength, endurance, coordination, and verbal learning. They also report that any increment in performance under hypnosis tends to be at least as great with insusceptible Ss as with highly susceptible Ss. These previous studies were carefully replicated, but the results were not confirmed. No differences in base level or hypnosis performance were found, except for poorer hypnosis performance of Ss of medium susceptibility to hypnosis, arising in part from the emphasis on relaxation in the induction procedure, and in part because of subtle demand characteristics present in the counterbalanced experimental design. These factors, and the failure by Ss to rate themselves as deeply hypnotized, suggest caution in interpreting the null findings as negating motivational explanations of hypnotic performance.

Motivational concepts are frequently discussed in attempts to understand hypnosis, both in the clinical and experimental literature. Formulations by Hull (1933), White (1941a; 1941b), Sarbin (1950), Orne (1954; 1959), and Sutcliffe (1960) have made explicit some aspects of a motivational account of hypnotic phenomena, while Hilgard (1964) has discussed the relevance of hypnosis to general motivational theory. Motivation also plays a central role in clinical accounts of hypnosis (Gill & Brenman, 1961; Schilder, 1956; Wolberg, 1948). Rapport between hypnotist and patient is thought to be essential to the successful induction of hypnosis, and responsible for the effects obtained during hypnosis. One of the consequences of rapport is that the patient is more likely to comply with the requests of the hypnotist. By reformulating the assumptions underlying clinical uses of hypnosis in terms of motivational concepts, it becomes possible to formulate testable hypotheses of these viewpoints.


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Central to some of the subsequent developments is White's (1941a) account of the special interpersonal situation which develops when hypnosis is induced. White emphasized the goal-directed striving of the S to act like a hypnotized person. The observed goal-directed striving explains why a S with favorable attitudes toward hypnosis is submissive to the hypnotist and behaves in accordance with the wishes of the hypnotist, thus helping to define the character of the ongoing hypnotic relationship.

It is possible to derive from White's formulation three different hypotheses about the way in which motivational factors may relate to hypnosis

1. The readiness with which S strives to act like a hypnotized person and submits to the suggestions of the hypnotist will enable the hypnotist to manipulate S's motivation during hypnosis. The special motivating suggestions are assumed to be more effective during hypnosis than identical suggestions in the waking condition because they are readily incorporated into the hypnotized S's generalized eagerness to please the hypnotist. Consequently, this hypothesis would lead to the prediction that the special motivating instructions during hypnosis would produce better performance on selected tasks than the same motivating suggestions while awake, and also better than when the same tasks are administered during hypnosis without the additional motivating suggestions.

Because this hypothesis is not tested in this study, relevant literature will not be reviewed; this has been done elsewhere (Orne, 1963).

2. The emphasis by White (1941a) on the special interpersonal relationship existing between S and hypnotist suggests that hypnosis per se should produce an increase in general motivation even if the hypnotist makes no special attempt to motivate the hypnotized S. The clinical view that hypnosis produces intensified transference and increased dependency also suggests this hypothesis.

The hypothesis may be tested by comparing performance under waking and hypnotized conditions, during which the selected tasks are administered without further special instructions to motivate the S to perform well. To test the hypothesis, a molar concept of generalized motivation will be assumed, i.e., that changes in the general level of motivation will result in directly proportional changes in performance on relevant tasks. In other words, the goal-directed striving to please the hypnotist, whether thought of as compliance, submission, or merely "trying especially hard," should improve performance on a variety of physical and mental tasks, such as dynamometer performance or learning nonsense syllables.

There is little evidence available to test this formulation. Although London and Fuhrer (1961), and Rosenhan and London (1963a) provide partial confirmation of the hypothesis, their results are difficult to interpret. Particularly disturbing is their finding that Ss of relatively low susceptibility to hypnosis improve performance as much as, or even more than, highly susceptible Ss.

3. From White's consideration of the importance of favorable preexisting attitudes towards hypnosis, it appears that motivational factors should partly determine whether a S can be successfully hypnotized. The S must wish to enter hypnosis before the condition can be successfully induced. Thus, Ss who are susceptible to hypnosis are more highly motivated to perform even before being hypnotized than Ss who are relatively insusceptible to hypnosis. Consequently, the waking performance of Ss who are highly susceptible to hypnosis should be better than that of relatively insusceptible Ss.

Results reported by London and Fuhrer (1961), Rosenhan and London (1963a; 1963b), Schulman and London (1963), and Shor (1964), as well as unpublished results of Slotnick and London, and London, Conant and Davison 3 directly contradict this hypothesis by demonstrating that the waking base level performance of relatively insusceptible Ss is consistently higher than base level performance of relatively susceptible Ss. Superior base level performance of insusceptible Ss also occurs when Ss do not know that
hypnosis will be involved in later experimental sessions. However, Zamansky, Scharf, and Brightbill (1964) demonstrate that base level word recognition thresholds are poorer if Ss know they will be subsequently hypnotized than if they are not aware of this.

A replication of previous research by London and Fuhrer (1961) and Rosenhan and London (1963a; 1963b) will be reported. These studies are important because they report results which are null in terms of the second formulation outlined above, and which are in the opposite direction to those predicted from the third formulation.

In the studies of London and Fuhrer (1961) and Rosenhan and London (1963a; 1963b) each S participated in an initial screening session, and was administered a standardized scale to determine susceptibility to hypnosis. The S was then told that he was a very good hypnotic S for the purposes of the experiment. Thus, a deliberate attempt was made to avoid creating any special differences in motivational levels between Ss except those accompanying differences in susceptibility and responsiveness to hypnosis.

However, no attempt was made to determine whether Ss actually believed they were deeply hypnotized. It is not known whether performance was in accord with Ss' perceptions of the experimental situation, nor is it known whether the surprising negative results are consistent with the expectations existing during the experiment. It is unclear whether Ss achieved a depth of hypnosis during the performance tasks similar to that achieved during the prior and subsequent administrations of the standardized measures of susceptibility to hypnosis. Finally, no attempt was made to determine whether the level of motivation was within the limits of the usually assumed monotonic relationship between motivation and performance. Such a relationship does not always hold. For example, it breaks down with extreme levels of motivation. One procedure to test that motivation is operating within the range of a monotonic relation to performance is to include Ss of medium susceptibility to hypnosis. Within a simple monotonic assumption, Ss selected from the middle of the susceptibility range should yield performances somewhere between those found with highly susceptible and relatively insusceptible Ss.

**Procedure**

**Subjects**

A tape-recorded version of the Harvard Group Scale of Hypnotic Susceptibility, Form A (HGSHS:A) of Shor and E. Orne (in press) was administered to 102 paid volunteer college students, in groups of 6 to 10 per session. Later, Ss were invited to participate in further "unrelated" research involving hypnosis. Three subgroups were selected, each containing 12 males and 8 females. The group which was most susceptible to hypnosis, the "high" group, contained Ss with HGSHS:A scores of 8 or more out of a maximum of 12 points; the "medium" group consisted of Ss with scores on HGSHS:A of 5, 6, or 7, and the "low" group consisted of Ss with scores of 4 or less.4

4 It is noted that London and Fuhrer (1961) used an individually administered screening procedure, Rosenhan and London (1963a; 1963b) used an unpublished group version similar to HGSHS:A. The standardized HGSHS:A, which is a modification of the Stanford Hypnotic Susceptibility Scale, Form A (SHSS:A) of Weitzenhoffer and Hilgard (1959) allowing group administration rather than individual administration (Shor & E. Orne, in press), was preferred in this study.
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Description of Tasks

Four performance tasks were used. Three of the tasks are described fully by London and Fuhrer (1961) and Rosenhan and London (1963a). The fourth task, learning nonsense syllables, is described by Rosenhan and London (1963b). Identical procedures and instructions were used in this study, and consequently only brief descriptions are presented.

Hand Dynamometer. Strength of grip of the dominant hand was measured on a hand-grip dynamometer. The score was the pressure in pounds averaged over two trials.

Weight Endurance. A 21/2 pound weight was taped to the back of S's nondominant hand. The arm was held outstretched and horizontal, so that the weight pressed against a board. The board was connected to a microswitch so that very gentle pressure activated a chronometer. The circuit closed and opened with an audible click. The S was asked to hold his arm outstretched as long as possible without losing contact with the board. The score was the time, in seconds, during which the unsupported arm was held outstretched.

Tremor. Stability of eye-hand coordination was measured by S's ability to hold a metal stylus in a hole without touching the edges of the hole. The diameters of the stylus and hole were 7/64 inches and 7/32 inches respectively. The stylus was attached to an electric circuit, and a counter was activated when contact was made with the edge of the hole. Two 30-second trials were separated by a 30-second rest interval. The score was the mean number of contacts per trial.

Rote Learning. Two lists of 10 consonant-vowel-consonant nonsense syllables of 53% association value were presented to S on a Gerbrands memory drum. For each S, the list used first was determined randomly. The list was presented three times, and each syllable was exposed for one second, with two seconds between exposures. The S was then asked to reproduce verbally as many of the syllables as possible. The score was the number of syllables correctly spelled.

Experimental Procedure

The tasks were presented in the same order to all Ss: dynamometer, endurance, tremor, learning. The waking base level and hypnosis testing were separated by an interval of about 20 minutes during which S was engaged in a series of unrelated cognitive tests. A counter-

5 A hand-grip dynamometer, measuring strength of grip in pounds, was used. In previous studies a Stoetling pistol-grip dynamometer, measuring in kilograms, was used.

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balanced design was used so that half of the Ss were randomly allocated to either hypnosis or waking testing during the first administration of the tasks.

The S was taught to enter hypnosis at the beginning of the session. Hypnosis was induced by a modification of the procedure described by Weitzenhoffer and Hilgard (1962), and S was taught to re-enter hypnosis at the count of 1 to 20. Further details of the hypnosis induction have been described by London and Fuhrer (1961). About one week after the performance tasks were completed, the Stanford Hypnotic Susceptibility Scale, Form C (SHSS:C) of Weitzenhoffer and Hilgard (1962) was administered. Whenever hypnotized, Ss were asked to estimate their subjective judgment of depth of hypnosis, using a scale numbered 1 to 10 on a large clock face. The position "1" was defined as normal and alert; "10," as
deeply hypnotized as any person could become. These ratings were indicated by moving a hand of the
clock, and were made continuously by S each time he was hypnotized. 6

The E remained unaware of the group membership of Ss until after the completion of the study.7 This is
an important departure from the procedure used by London and Fuhrer (1961), in which the same E
screened Ss using SHSS:A (Weitzenhoffer & Hilgard, 1959), and then administered the performance tasks
during the same session.

Results

Mean scores for each of the four tasks during both hypnosis and waking conditions, for each of the three
levels of susceptibility, are reported in Table 1. The results are further broken down to show results for the
two testing orders within each subgroup.

A triple classification, split-plot analysis of variance was conducted for each of the four tasks. The bases
of classification were: (a) level

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6 The procedure was freely adapted from previous unreported research in this laboratory conducted by
Field. Techniques and results for comparing several objective and subjective methods estimating depth of
hypnosis have been reviewed by O'Connell (1964).

7 Although each S was hypnotized by E during the session, there was no attempt to test depth of hypnosis
during this session: indeed the procedures used to induce hypnosis were specifically designed to avoid
testing responsiveness to hypnosis. The S was told to close his eyes and to adopt a passive, relaxed
posture. Apart from the performance tasks, the S was not asked to do anything else while hypnotized.
Consequently it was difficult to judge if Ss were in fact hypnotized. Generally, E was not aware of S's
susceptibility until he administered SHSS:C in a subsequent session. About half of the high and low group
Ss were completed before it was decided to add the medium subgroup.

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of susceptibility: high, medium and low; (b) order of testing: hypnosis followed by waking (HW), and waking followed by hypnosis (WH); (c) condition of testing: waking base level and hypnosis. Separate analyses were conducted on each task comparing only high and low susceptibility levels, as in the previous investigations, and also including the three susceptibility levels. These analyses of variance are summarized in Tables 2 and 3 respectively.

Performance Related to High and Low Susceptibility to Hypnosis

Base Level Performance. London and Fuhrer (1961) and Rosenhan and London (1963a; 1963b) reported that the waking base level performance of Ss who are insusceptible to hypnosis is significantly

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higher than the base level performance of Ss who are highly susceptible to hypnosis. This result is not confirmed. There are no significant differences between the base level performances of Ss of high and low levels of susceptibility to hypnosis for any of the four tasks. 8

Waking versus Hypnosis Performance. The earlier studies (London & Fuhrer, 1961; Rosenhan & London, 1963a; 1963b) reported that insusceptible Ss improved in performance under hypnosis as much as, or even more than, highly susceptible Ss. In this study, mean performance during hypnosis is insignificantly poorer than during waking.

8 It is noted in Tables 2 and 3 that the between Ss source of variance is extremely high. The range of scores for each task was very large, which limited the possibility of obtaining significant results. The large individual differences also occurred in the earlier studies. It is also worth noting that tests of significance comparing the variance of high, medium, and low subgroups in both waking and hypnosis conditions, and between conditions, as well as for the total group between waking and hypnosis conditions, were all insignificant except for the higher variance of the medium subgroup during both waking and hypnosis testing on the tremor test (p < .05 for four relevant F-ratios).

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base level performance for the dynamometer, endurance, and learning tasks. This occurs for both susceptible and insusceptible Ss.

Testing Order and Performance. For the endurance task there is a significant interaction effect (p < .05) between condition of testing and the order in which the conditions were tested. The base level endurance is significantly higher when the waking base level performance precedes the hypnosis performance rather than when it follows hypnosis performance (p < .05). Only when the waking performance comes first is there a significant difference between base level and hypnosis endurance (p < .01). The relative superiority of the base level performance of all Ss in the WH testing order is apparent in Table 1 for the endurance task. A similar trend in the dynamometer scores is not significant.

Performance and Medium Susceptibility to Hypnosis

The results summarized in Table 3 indicate that Ss of medium susceptibility to hypnosis performed differently from Ss of high and low susceptibility. The inclusion of the medium group produces a significantly lower mean dynamometer score during hypnosis compared to the waking base level mean. This is due to the low hypnosis score of the medium subgroup tested in the HW order (significant second and third order interactions involving order of testing, Table 3; p < .025 for both interactions). A similar result occurs with the endurance task, in which the medium group tested in the HW order also has a low hypnosis mean (p < .005). A similar trend in the learning task is not statistically significant.

Examination of the simple interaction effects (Table 3) indicates that these results, particularly for the dynamometer, cannot be accounted for in terms of practice or fatigue effects. The waking base level dynamometer score is higher when the hypnosis testing was administered first compared to the subgroups receiving their initial testing under waking conditions (p < .005). In fact, when Ss are tested in the HW order of administration, both scores are lower than the corresponding scores obtained in the counterbalanced WH order. These differences are most pronounced with the medium susceptibility group.

Perceptions of Depth of Hypnosis
Although the instructions stressed that each S was a good S for the purposes of the experiment, and although opportunities to test objectively the depth of hypnosis were carefully avoided, the self-estimates of the depth of hypnosis achieved by the high subgroup

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(3.9 ± 3.0) were significantly higher than those of the low group (2.7 ± 2.9; p < .025). The medium group, however, rated themselves more deeply hypnotized (4.3 ± 4.2) than the high group (p < .05). The Ss clearly did not consider themselves deeply hypnotized, but thought they were more deeply hypnotized during the performance tasks (total mean, 3.6 ± 3.5) than during the subsequent administration of SHSS:C (3.3 ± 2.9; t = 2.04, p < .05; F = 1.70, p < .05). These results are difficult to interpret because the correlations between the self-ratings of depth during the performance tasks and HGSHS:A and SHSS:C are only .25 (p = .05) and .38 (p < .01) respectively. The two hypnosis scales correlate .60 in this sample.

Discussion

Base Level Performance and Susceptibility to Hypnosis

The hypothesis that susceptible Ss are more highly motivated than insusceptible Ss, even before entering hypnosis, is not confirmed. On the other hand, previous empirical indications that they are less highly motivated were not confirmed either; waking base levels of susceptible and insusceptible Ss simply did not differ. Even this result may have been confounded by factors arising from the counterbalanced testing design. There was some evidence that Ss, especially those of medium susceptibility, produced lower scores when waking base level performance followed hypnosis than when it came first.

Performance and Subjective Experience of the Subject

During the postexperimental inquiries, the S typically reported that, although he believed hypnosis should improve performance on these tasks, his own performance had not apparently improved. Some Ss even felt that their performance may have been poorer under hypnosis. Superficially, it seems surprising that the results are not consistent with either S's or E's expectations about how hypnosis should influence performance (Orne, 1959). However, several factors suggest that the apparent paradox is not real. Many Ss commented that the special emphasis on drowsiness and deep relaxation stressed in the hypnosis induction procedure had a deleterious effect on performance. One S, for example, said: "In hypnosis I felt weakened. I want to please the hypnotist but the harder I try to comply, the more I wake up. When you work your muscles, you are working against your own cause." According to their own subjective ratings, Ss did not consider they were very deeply hypnotized during the performance tasks. Moreover, E was unaware of the subgroup membership

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of each S. Thus, a reasonable rationale for S in this study would be: "Hypnotized Ss should improve performance, but I don't believe I'm hypnotized. Besides, the hypnotist is stressing passivity and relaxation so much that I should not exert myself." The nature of the design might exclude the possibility of motivating S to perform well, even though his performance is in compliance with his perception of the total experimental situation. Apart from the blindness of E, these factors were presumably operating in previous studies as well as the present one.

Another source of special demand characteristics may have influenced performance, particularly that of the medium subgroup. For the dynamometer and endurance tasks there was a significant tendency for those Ss tested initially during hypnosis to perform less well in both base level and hypnosis conditions than Ss tested originally in the waking condition. It is possible that the expectation that hypnotic
performance should be greater than waking performance manifested itself, not by increasing the former, but by decreasing the latter. This finding suggests that care must be taken if counterbalanced designs are used in this type of investigation. It seems that there may be different cues available when the control testing is given initially, compared to when the control testing is added after the hypnosis, or experimental, performance.

The Effect of Hypnosis on Performance

The present investigation fails to confirm the results of previous work, even though we attempted to replicate the precise procedures of London and Fuhrer (1961) and of Rosenhan and London (1963a; 1963b). The mere induction of hypnosis was not sufficient to alter performance when Ss of either high or low susceptibility were used. Changes were observed only in the performance of Ss of medium susceptibility. Even these changes seemed to depend mainly on the demand characteristics of the counterbalanced design. Thus, hypnosis does not necessarily have a general facilitative effect on Ss' compliance with the hypnotist's requests.

If the present results prove to have general validity, it will be necessary to re-examine that aspect of a motivational theory of hypnosis which assumes that high motivation is an intrinsic aspect of the hypnotic state. Such a revision would necessarily affect clinical interpretations of hypnosis as well. Although the hypothesis is not tested in this study, it is possible that hypnosis will increase performance only when specific motivating suggestions are given during hypnosis.

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The failure to find evidence supporting two hypotheses about the relationship between motivation and hypnosis must be interpreted cautiously. With the instructions used, Ss did not believe themselves to be deeply hypnotized. In addition, research will be necessary to see whether the emphasis on deep relaxation in these instructions masked a genuine increase in motivation to perform well. The relatively poor performance during hypnosis may have been a response to Ss' perception of the many demand characteristics in this particular hypnotic situation. Until further research clarifies the role of such factors, results derived from the present type of design will need to be interpreted conservatively.

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