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The Effects of Hypnosis and Mastery Imagery on Task Performance

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THE EFFECTS OF HYPNOSIS AND MASTERY IMAGERY
ON TASK PERFORMANCE

by

Robert J. Russell

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
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Department of Counseling and Personnel

Western Michigan University
Kalamazoo, Michigan
August 1980
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I would like to express my deepest gratitude to my mother, Josephine R. Russell, who has been a prime influence in the completion of this academic endeavor. Her encouragement, praise, and love have proven to be the best of all methods in fostering a sense of mastery.

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Robert J. Russell
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CHAPTER I

INTRODUCTION

Purpose

The purpose of this study is to investigate the effects of hypnosis and mastery imagery on facilitating performance on a motor task. Mastery imagery is the covert process of imagining oneself performing effectively on a task and includes the two components of positive suggestion and mental practice. This study seeks to determine the efficacy of combining mastery imagery with hypnosis as an aid to enhance performance capabilities; and to identify the variables which are responsible for such an effect. The possibility exists that mastery imagery alone, regardless of hypnosis, may be sufficient to help facilitate task performance. Likewise, the hypnotic experience, regardless of mastery imagery, may be the contributing variable which serves as an aid to performance. How one's level of hypnotic susceptibility interacts with the use of mastery imagery is also of interest. To seek out the answers to these questions, a comprehensive investigation is needed which controls for the variables of hypnosis, mastery imagery and hypnotic susceptibility. This study is designed to accomplish this.

Mastery Imagery

Mastery imagery is comprised of two components: positive suggestion and mental practice. Positive suggestion can be used
to alter self image (Maltz, 1960). This is important because one's self image influences one's behavior in the sense that one acts in a congruent way with how one perceives oneself, one's limitation, and one's abilities (Rogers, 1951). For people who may underestimate their abilities and set their limits too low, the first purpose of mastery imagery is to help alter this self image into an identity which is more congruent with success. This enhancement of self image is accomplished through suggestions of self affirmation which serve as an ego-strengthening technique and allows the participant to imagine him or herself in a self-confident and competent manner. These suggestions are typically of a motivational and emotive quality and serve to "psych-up" the participant to perform to the best of his or her ability. In this process of mastery imagery, the participant can experiment with this new identity and learn from it.

The second component of mastery imagery pertains to mental practice which is a learning technique based on the same premise of actual practice--but rehearsed in the mind (Richardson, 1967a). It entails the covert process of imagining oneself improving at a challenging task. Like actual practice, mental practice usually includes a series of self-correcting responses which lead ultimately to the desired behavior which is being learned. In this self correcting process, the anticipated consequences of each response provides feedback to the participant who uses this information to more closely approximate the behavior needed to obtain the desired outcome. It is based on the premise that imagining a successful behavior is the first step toward its acquisition. Mental practice
may also include a process of conceptualization in which the participant can analyze the problems which are interfering with performance, and then experiment with new methods of increasing performance. In addition to acquiring new behaviors, mastery imagery may also be used to maintain or enhance existing behaviors.

For the purpose of this study, mastery imagery will be defined as follows:

Mastery imagery is the covert process of imagining oneself performing effectively at a task, a process which includes positive suggestion and mental practice used to enhance performance capabilities.

The two component parts of mastery imagery, mental practice, and positive suggestion, will now be reviewed; both in-and-out of the context of hypnosis.

Literature Review

Mental Practice

Richardson (1967a) refers to mental practice as "the symbolic rehearsal of a physical activity in the absence of any gross muscular movement" (p. 95). Although mental practice is the most common term used to describe this covert activity, it has been called by different names: symbolic rehearsal (Sackett, 1934), imaginary practice (Perry, 1939), implicit practice (Morrisett, 1956), conceptualization (Egstrom, 1964), covert rehearsal (Corbin, 1967) vicarious modeling (Bandura, 1969), and covert modeling (Kazdin, 1974).
Mental practice is very similar to mastery imagery in the sense that both involve the covert rehearsal of a desired behavior. If a difference exists between the two it would be over the degree to which each employs suggestions of self affirmation used to enhance self image and to motivate. Mastery imagery is explicit in the use of such positive suggestions, whereas mental practice is not. It is interesting to note that although Corbin (1972) states that the specific intent of mental practice is that of learning, Richardson (1967b) points out that there may well be motivational elements which are implicit in mental practice. If this is true, then there may be even a closer similarity between mental practice and mastery imagery.

Several studies have used mental practice as an aid in developing perceptual motor skills as well as physical endurance. These studies have compared mental practice groups with actual physical practice groups and with no practice control groups. A comprehensive review of the literature by Richardson (1967a, pp. 98,99) summarizes this mental practice research (see Table 1.1).

Corbin (1972) in his review of the research in mental practice has found more studies supporting than rejecting the use of this technique as an aid in the development of skilled motor behavior. His conclusions are guarded, however, and he states:

There seems to be little doubt that mental practice can positively effect skilled motor performance, especially when practice conditions are "optimal."
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### Table 1.1 (Continued)

<table>
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<td>NP</td>
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<tr>
<td></td>
<td>Jr.</td>
<td></td>
<td>n.u.</td>
<td>23.00**</td>
</tr>
<tr>
<td></td>
<td>Varsity</td>
<td></td>
<td>n.u.</td>
<td>26.00**</td>
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<td></td>
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<td>12.98**</td>
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</table>

**p .01.
*p .05.
n.a.—not available
n.s.—not significant
n.u.—not used in final study
NP=No Practice; MP=Mental Practice; PP=Physical Practice
It is equally clear, however, that mental practice is not always an aid to performance and that factors such as practice type, the skill task, and the nature of the performance ultimately reflect the extent of behavior change resulting from mental practice (p. 115).

Indeed, there are several variables, which can either facilitate or inhibit the use of mental practice. For instance, the length of time used for mental practice should be long enough to have an impact and yet not so long that it would lose the individual's attention. It seems that a time period of three to five minutes is ideal for mental practice (Twining, 1949; Shick, 1969). The person's familiarity with the task prior to the use of mental practice is important in that it is difficult to imagine oneself performing a task with which one has had little or no experience (Clark, 1960; Corbin, 1967). Accordingly, the more complex the task is, the greater the need for previous experience (Phipps, 1968).

Some theorists (Start & Richardson, 1964; Waterland, 1956) contend that for mental practice to be effective it must not only include a visual component, but also a kinesthetic component as well. This neuromuscular theory espouses the belief that during mental practice, actual electrical potentials pass through the nerves which innervate at the muscle groups which are responsible for the imagined task. In the process of covert rehearsal, perceptual motor learning takes place as the participant pairs visual data with neuromuscular sensations.

Along this same principle, one could also hypothesize the need for an auditory component in mental practice, where the task is
associated with auditory stimuli. Of these sense modalities (visual, kinesthetic, and auditory), certain tasks may require a different emphasis on one or more of these. It is also likely that participants may differ in their own reliance on these modalities (Bandler & Grinder, 1975). Mental practice which utilizes the right mixture of these modalities to fit the task as well as the subject may be the most effective.

Perhaps the most significant variable which would determine the effectiveness of mental practice is the subject's ability to have vivid and controlled imagery (Gordon, 1949; Start & Richardson, 1964). It is reasonable to expect that the more vivid or real an image is, the more similar it would be to actual practice. Likewise, the amount of control a subject has over the image will determine the subject's ability to keep the image "on course." Obviously, if a mastery image were to fade away into a totally irrelevant image or were to become an image of failure, it would have a neutral or detrimental effect.

If this conclusion is true then one might expect that there would be better utilization of mental practice when used in conjunction with hypnosis. This is because hypnosis has the capability of making imagery more vivid and real when compared to imagery in the waking state (Vinacke, 1952). The subject's increased concentration in hypnosis helps facilitate this rich detail in the image and may also permit a greater degree of control over the image.

With this in mind, Poe (1963) hypothesized a reality continuum with actual practice being at the top of this continuum, followed
by hypnotic practice, then by imagined practice, and then at the bottom of the continuum by no practice. In one of his studies, Poe (1966) screened subjects for hypnotizability from which 30 "good" hypnotic subjects were equally distributed into three groups: (1) hypnotic imagined practice, (2) waking imagined practice, and (3) waking no practice. Thirty "poor" hypnotic subjects were equally distributed into three groups: (1) waking imagined practice, (2) waking no practice, and (3) waking actual practice. "Good" hypnotic subjects were not included in the waking actual practice group, nor were "poor" hypnotic subjects included in the hypnotic imagined practice group. All "good" hypnotic subjects were trained in the use of hypnotic imagery (imagery which was unrelated to the performance criterion) prior to the treatment intervention. The performance criterion included a motor task, the Pursuit Rotor, and a cognitive task, the digit-symbol. All subjects were pretested, presented with the independent variable and posttested. Analysis of the results indicated that significant improvements occurred for all conditions, and that the waking actual practice group scored significantly better than the other five groups. Only nonsignificant differences were found among the other five conditions.

A study by Garver (1973) was also concerned with the effects of hypnotic (mental) practice versus regular mental practice on the acquisition of a motor skill as measured by the Pursuit Rotor Task. His independent variable consisted of nonhypnotic direct positive suggestion in the form of mental practice, and hypnotic suggestion of the same type and duration. In this study, each
of the 12 hypnotically trained subjects received a total of 48 trials, each lasting 30 seconds, on the Pursuit Rotor over a four day period employing "uniformally" both regular mental practice and hypnotic (mental) practice. Results demonstrated the following: (1) a significantly greater improvement in subjects who first trained in mental practice followed by hypnotic practice as compared to subjects who first trained in hypnotic practice followed by mental practice, (2) the final average hypnotic practice scores were significantly greater than the final average mental practice scores. The author concluded that hypnotic practice was superior to mental practice in facilitating performance and learning on the Pursuit Rotor Task. This study can be questioned, however, due to the small sample size used and the possibility of carry-over effects for the subjects undergoing both types of practice conditions.

**Hypnosis Versus Waking Suggestion**

In the previous section research dealt with the use of imagery as a learning technique to improve task performance. In comparison, this section will focus on the use of suggestion as a motivational device to enhance performance. This will compare the efficacy of suggestion in hypnosis and in the waking state.

Rieger (1884) discovered that hypnosis and suggestions for arm catalepsy greatly facilitated a woman's performance on an arm endurance task. Several additional studies (Wells, 1947; Hammer, 1954; Gladfelter & Craselneck, 1960; Collins, 1961; McCord & Sherrill, 1961) have also found suggestions given under hypnotic
trance to be effective in aiding task performance. Yet critics (Parker & Barber, 1964; Barber 1965; Gilbert & Barber, 1972; Morgan, 1972) point out that these studies failed to use a control group of subjects who were awake and received the same suggestions as did the hypnotized subjects. Morgan (1972) espouses this position and states: "one of the most serious methodological problems that has characterized hypnosis research involving muscular performance has been the confounding of suggestion and state" (p. 195). And other studies (Sears, 1955; Hottinger, 1958; Salzberg, 1960) which did control for hypnotic versus waking suggestion errored by not controlling for subject hypnotic susceptibility. These studies failed to require waking subjects to meet the same high hypnotic susceptibility requirements which were made of the hypnotic subjects.

Barber and Calverly (1964) contend that hypnotic or posthypnotic suggestion is no better than waking suggestion on improving muscular performance. Several studies (Williams, 1930; London & Fuhrer, 1961; Parker & Barber, 1964; Barber & Calverly, 1964; Barber, 1965; Albert & Williams, 1975) compared suggestion given in both hypnotic and waking conditions and found no significant difference between these two conditions. Two studies (Manzer, 1934; Crane, 1940) investigated the use of suggestions designed to increase and suggestions designed to decrease strength in waking subjects. Although no hypnotic suggestion group was used, both studies did find that positive and negative suggestion could significantly increase and decrease the strength of waking subjects. These studies attest to the effectiveness of waking suggestion in affecting muscular performance.
There are several well controlled studies, however, which do attest to the efficacy of hypnotic suggestion over waking suggestion in enhancing muscular performance. One of the earlier studies by Nicholson (1920) demonstrated that suggestion administered in hypnosis was more effective than the same suggestion administered in the waking state in increasing muscular capability. A closely replicated study by Williams (1930) supported this same conclusion.

Studies by Mead and Roush (1949) and by Roush (1951) used identical suggestions on subjects in both hypnotic and waking conditions to facilitate muscular performance in three different strength and endurance tasks. The results from these studies showed that hypnotic suggestion was significantly more effective than waking suggestion but only on certain tasks. Both studies illustrate the fact that the utility of hypnotic suggestion may be a function of the type of task used. Related to this is a study by Johnson and Kramer (1961) who found that hypnotic suggestion was significantly more effective than waking suggestion on an endurance task. Strength and power tasks, however, were not affected by this hypnotic suggestion.

In a study by Slotnick and London (1965) both high and low susceptible subjects were assigned to various hypnotic and waking conditions. Various instructions of an exhortative or an analgesic nature were used to enhance strength and endurance. Results showed that instructions helped to improve performance in the hypnotic state but not in the waking state. It was also demonstrated that exhortative instructions were more effective than analgesic instructions in accomplishing this. A second study (Slotnick, Liebert,
& Hilgard, 1965) found that "involving" instructions combined with 
exhortative instructions helped promote significant increments with 
subjects in both hypnotic and waking conditions. Performance of the 
hypnotic group, however, was significantly greater than that of the 
waking group. These two studies not only support the notion that 
hypnotic suggestion is superior to waking suggestion, but they also 
emphasize the differential efficacy of various kinds of suggestions 
and instructions.

**Hypnosis Alone**

Rosenhan and London (1963) employed both high and low susceptible 
subjects, and found that muscular endurance was reduced in hypnotized 
subjects. They attributed this to the belief that hypnosis had 
caused a lethargic state in the subjects. A second study (Graham, 
Olsen, Parish, & Leibowitz, 1968) tested subject reaction times and 
found psychomotor retardation and impaired reaction time in subjects 
who were in the hypnotic state. Another study (Barber & Calverly, 
1964) found that hypnosis alone depressed muscular endurance, while 
hypnotic suggestion and waking suggestion helped to increase endurance.

There is evidence, however, which contradicts these findings. 
For instance, two studies (Levitt & Brady, 1964; London & Fuhrer, 1961) 
did not find any impairment in muscular endurance in hypnotic subjects. 
Another study (Ham & Edmonston, 1971) did not find any difference in 
reaction time in subjects who were in a relaxed hypnotic state and 
in subjects who were in a waking state. Other researchers (Eysenck,
1941; Sakata & Anderson, 1970) have found that hypnosis alone can actually enhance a subject's physical performance.

If hypnosis alone can help to increase performance, this may be due to one of several explanations. Hypnosis may relax the subject and serve to reduce any performance anxiety which would inhibit the subject's performance capabilities (Naruse, 1965). A second explanation might be that the hypnotic experience works as a placebo on susceptible subjects who believe in its "powers" to affect change (Morgan, 1972). A third explanation might be that the hypnotic relationship between the subject and the hypnotist nurtures a high degree of cooperation and motivation on the subject's part (Orne, Sheehan & Evans, 1968; White, 1941). It could also be possible that highly susceptible subjects are already more motivated to perform prior to hypnosis as compared to low susceptible subjects. Evans and Orne (1965) found no difference, however, between susceptible and unsusceptible subjects on base level performance. These researchers also found that the mere induction of hypnosis was not sufficient to alter performance in either low or high susceptible subjects.

Problem

The research is clear that under optimal conditions mental practice can facilitate the acquisition of a motor skill. The research is equally clear that suggestions of a motivational nature can also enhance performance capabilities. What remains uncertain is whether the use of hypnosis when used in conjunction with mental practice or with suggestion can be a superior method when compared
to mental practice or suggestion used in the waking state. The research is also mixed on what effect hypnotic experience has on performance, regardless of mental practice or suggestion.

Perhaps an important variable which contributes to this issue is the type of hypnosis employed. For instance, Ham and Edmonston (1971) found that alerting hypnotic inductions were more effective than relaxing hypnotic inductions in lowering reaction time. One might also expect subjects to be more lethargic while in the relaxed hypnotic state, while posthypnotic subjects may benefit from hypnosis while avoiding the possible lethargic effects.

Many of the studies which have investigated these various issues have not been adequately controlled for and the ones which have been controlled for still conflict with each other. These conflicting results may be attributed to the fact that such procedural variables as criterion tasks, hypnotic induction procedures, type of suggestion or mental practice used and subject characteristics have varied widely from study to study. For this reason it is difficult to assess from this research how hypnosis may interact with mental practice or suggestion to enhance task performance. How hypnosis will interact with mastery imagery is, therefore, just as uncertain.

Another problem arises in studies which use subjects in waking imagery conditions who are high on hypnotic susceptibility. The possibility exists that these subjects could spontaneously enter a hypnotic trance without the aid of any formal induction procedure. This could be accomplished by merely asking them to close their eyes and visualize an image. Poe (1963) mentioned the possibility
of such an occurrence of spontaneous hypnosis and Gardner (1976) states that "hypnosis need not be tied to any formal induction at all . . . (and that) the criterion for determining hypnosis vs. nonhypnosis should be based on some aspects of the experience or behavior of the 'patient' and not on that of the 'therapist'" (p. 211). An illustration of this is the fact that Milton Erickson reportedly uses formalized inductions in less than 10% of his hypnotic work (Beahrs, 1971). If spontaneous hypnosis does occur in highly susceptible subjects, then this would tend to equalize waking imagery and hypnotic imagery groups which are comprised of these susceptible individuals. Of course, it is important to control for susceptibility when comparing hypnotic and waking subjects, and yet one still wonders if spontaneous hypnosis does occur and if this might be a confounding variable in many of the studies which were cited in this literature review. One way to investigate this would be to compare low and high susceptible subjects in the waking imagery condition.

To summarize, whether it is mastery imagery alone, hypnosis alone or a combination of the two which is responsible for the facilitation of task performance is still uncertain. Also unknown is whether spontaneous hypnosis may occur in waking imagery subjects who are highly susceptible. A comprehensive investigation is needed, therefore, which controls for the variables of hypnosis and mastery imagery and for low and high susceptibility for subjects in waking imagery.
Hypothesis

Based on an experimental design which would include the following groups: (1) hypnosis and mastery imagery, (2) hypnosis, (3) mastery imagery (H)\(^1\), (4) no-treatment control, and (4) mastery imagery (L)\(^2\); the following hypotheses are stated.

Hypothesis A

Hypnosis and mastery imagery subjects will demonstrate a significantly greater gain score on a motor task when compared to the no-treatment control subjects.

Hypothesis B

Mastery imagery (H) subjects will demonstrate a significantly greater gain score on a motor task when compared to the no-treatment control subjects.

Hypothesis C

Hypnosis and mastery imagery subjects will demonstrate a significantly greater gain score on a motor task when compared to the mastery imagery (H) subjects.

Hypothesis D

Hypnosis and mastery imagery subjects will demonstrate a significantly greater gain score on a motor task when compared to the hypnosis subjects.

\(^1\)Mastery imagery (H) is for subjects who are high on susceptibility.

\(^2\)Mastery imagery (L) is for subjects who are low on susceptibility.
Hypothesis E

Hypnosis and mastery imagery subjects will demonstrate a significantly greater pain score on a motor task when compared to the mastery imagery (L) subjects.

Significance of Experiment

Currently the use of techniques similar to mastery imagery are becoming increasingly popular in clinical practice (Meichenbaum, 1974). It has received new impetus from researchers who are finding many diversified applications for its uses. For instance, it may be used to acquire complex interpersonal skills such as assertiveness (Kazdin, 1974), to overcome phobias (Bandura, 1977; Grayson & Borkovec, 1978; Norton, MacLean, & Wachna, 1978) to extinguish habit behaviors such as smoking (Nesse & Nelson, 1977) or to enhance athletic performance (Mahoney & Avener, 1977; Shelton & Mahoney, 1978). Gardner (1976) emphasized the use of mastery imagery in the context of hypnosis for the purpose of psychotherapy to be used to enhance esteem and confidence in three broad areas: self, nonpersonal environment and interpersonal relationships. He also pointed out the application of this technique to humanistic psychology for the purpose of self-actualization.

The goal at the present, however, is not to find new applications for the use of mastery imagery, but to explore the important variables which are responsible for this phenomenon. For instance, if hypnosis were found to be an important variable in the facilitation of mastery imagery, then this discovery would have important implications for
those clinicians who use mastery imagery in the waking condition. If, on the other hand, hypnosis were found to have no appreciable effect when combined with mastery imagery, then this would serve as a message that a more simplified waking imagery is just as effective as hypnotic imagery. Whether hypnosis when used alone has a facilitory, a neutral, or an inhibitory effect on task performance would also have implications for those who wish to use mastery imagery in conjunction with hypnosis.

Regardless of the role which hypnosis plays in this process, a second goal of this study is to discover if master imagery, as used in this experiment, can facilitate the acquisition of a motor skill. Whether it can or cannot will provide additional information on the use of such covert practice techniques.

Finally, additional information may be obtained on whether or not spontaneous hypnosis occurs in highly susceptible subjects who use imagery in the waking state. Spontaneous hypnosis could be occurring in these subjects, especially if the following were found: (a) no difference in highly susceptible subjects in the waking mastery imagery condition and the hypnosis and mastery imagery condition, and (b) a significant difference between highly susceptible and low susceptible subjects benefiting more from mastery imagery than low susceptible subjects. This information may also highlight other subject traits which may contribute to the use of imagery in improving task performance. These findings would give a new perspective on much of the previous research which has found no difference in hypnotic and waking subject conditions.
CHAPTER II

METHOD

Pilot Study

A pilot study was initially conducted to test the feasibility of the experimental procedures and to gain some preliminary findings on the effects of hypnosis and mastery imagery on task performance. The subjects (N=18) were counselors at a university student counseling service who were asked to participate in the study. Procedures for this pilot study which closely followed the procedures used for the experiment are outlined in this chapter. Ten subjects who were susceptible to hypnosis were assigned to the following groups: hypnosis and mastery imagery (n=4), hypnosis (n=3), and mastery imagery (H) (n=3). Three less susceptible subjects were assigned to a second mastery imagery (L) group. Five subjects who were not tested for hypnotic susceptibility were assigned to the no-treatment control group. Out of necessity, this pilot study made two main deviations from the procedures outlined in this chapter: (1) Subjects were not randomly assigned into groups and (2) the level of susceptibility for subjects was not strictly controlled. Although no significant findings were found, the results were encouraging enough to continue with the experiment (see Appendix H).
**Subjects**

Student volunteers from a medium size, midwest university were the subjects for this experiment. All volunteered with the knowledge that they would be participating in an "experiment in hypnosis" and would receive credit for this participation in their introductory psychology course. All of the initial students (n=99) were screened for hypnotic susceptibility on the Harvard Group Scale of Hypnotic Susceptibility (Shor and Orne, 1959). From this initial screening, 59 students were ranked high on susceptibility, 25 were ranked medium on susceptibility and 15 were ranked low on susceptibility. Levels of susceptibility were predetermined on the following criteria according to the student’s scores on the Harvard Group Scale of Hypnotic Susceptibility: high susceptible (12-8), medium susceptible (7-5), low susceptible (4-1). Of the initial 99 students, 40 of the high susceptible and 10 of the low susceptible returned to participate in the experiment. All of the medium susceptible students (n=25) were thanked for their participation in this screening session and were dismissed from further participation in the study. Several of the high susceptible students (n=13) and a few of the low susceptible students (n=3) were also dismissed from further participation in the study due to the fact that their treatment conditions had been filled. Five of the students who were asked to return for the study did not, while three who did return could not participate. One of these students had physical injuries and two had emotional problems which prevented them from participating in the experiment. Therefore, of
the initial 99 volunteers, 50 of these students became the subjects for this experiment; 23 were women and 27 were men.

**Design**

**Dependent Variable.** Performance on the Pursuit Rotor Task\(^1\) was used as the dependent variable. The Pursuit Rotor is a rapid, gross motor task which requires the subject to keep a stylus wand on a small target which is located on the outer edge of a turntable which rotates around (see Figure 2.1).

---

\(^1\)Model 2203A, Lafayette Instrument Co., Lafayette, Indiana.
Time-on-target (TOT), as recorded by an electronic digital millisecond timer, served as the performance score. This fully automated turntable rotated at 60 revolutions per minute and rotated for three 15 second trials with each trial being separated by a 25 second pause. On a regular basis, the Pursuit Rotor apparatus was checked for its reliability. The total TOT score for these three trials was the subject's performance score. The dependent variable consisted of the gain score between pre and posttest performance scores.

All subjects had the task administered to them on an individual basis and in the privacy of the experimenter's office. Each subject was seated at a table which supported the Pursuit Rotor Task, while the experimenter sat directly behind the subject and out of the subject's line of vision. Both the subject and the experimenter were able to see the subject's performance score on the electrical digital timer which was to the subject's left. The room was well lighted. During the pretest session all subjects were requested to listen to a tape-recorded set of instructions on the operation of the Pursuit Rotor Task (see Appendix A).

Independent Variable. The independent variable consisted of the presence or absence of hypnosis and the presence or absence of mastery imagery. Three experimental manipulations, a no-treatment control group and a special comparison group comprised the five treatment conditions. Highly susceptible subjects were randomly assigned to one of four conditions: (1) hypnosis and mastery imagery,
(2) hypnosis, (3) mastery imagery (H), and (4) a no-treatment control group. Low susceptible subjects were assigned to a second mastery imagery (L) condition which served as a special comparison group (see Figure 2.2). A detailed account of these experimental conditions are given in the procedures.

![Figure 2.2. Experimental Conditions](image)

**Procedure**

**First Session.** Students were asked to read and sign the "Informed Consent Agreement" in order to participate in the experiment (see Appendix B), and were given the "Hypnosis: Questions and Answers" handout which was used to dispel any misconceptions which they may have had regarding hypnosis (see Appendix C).

Students were then pretested individually on the Pursuit Rotor Task by the experimenter (see Appendix A). These students were then
screened hypnotically in groups of 10 to 15 individuals using the Harvard Group Scale of Hypnotic Susceptibility (Shor and Orne, 1959). Using each subject's susceptibility score, screening was then done to separate the high susceptible students from the low susceptible students.

High susceptible students who scored eight or higher on the susceptibility test were randomly assigned to one of four conditions: (1) hypnosis and mastery imagery, (2) hypnosis, (3) mastery imagery (H), and (4) no-treatment control. Low susceptible students who scored four or lower on the susceptibility test were directly assigned into the fifth group, the mastery imagery (L) condition. Students who scored between four and eight on the hypnotic susceptibility test were thanked for their helpful cooperation and were then dismissed from any further participation in the experiment. As with every person who left the experiment, they received a "Debriefing Handout" which instructed them to contact this experimenter-counselor if any problems or concerns arose regarding their experience in the experiment (see Appendix D).

Second Session. During the second session which occurred at approximately the same time of day, six to eight days after the first session, all subjects were seen on an individual basis in the experimenter's office. Subjects who were assigned to the hypnosis and mastery imagery condition were hypnotized by a standardize hypnotic induction procedure (see Appendix E). Following the induction and while in the hypnotic state, they were presented with a tape-recorded mastery imagery narrative (see Appendix F). Instructions at the
end of this narrative served to dehypnotize the subject. Following this, they were instructed to wait five minutes in a waiting room after which time they returned to the experimenter's office to be posttested on the Pursuit Rotor Task.

Hypnosis subjects were hypnotized by the same standardized hypnotic induction procedure used with the hypnosis and mastery imagery subjects, but were not presented with the mastery imagery narrative. Rather, they were allowed to remain in the hypnotic state for the same duration of time which was used for the mastery imagery narrative (approximately six minutes). In this manner, both hypnosis and hypnosis and mastery imagery subjects were in the hypnotic state for approximately the same period of time--about 20 minutes. The hypnosis subjects were dehypnotized and instructed to wait five minutes in a waiting room after which time they were posttested on the Pursuit Rotor Task.

Subjects who were assigned to the mastery imagery (H) and the mastery imagery (L) conditions were treated in identical fashion. They were merely instructed to close their eyes and listen to a tape recorded message, which was the same tape recorded mastery imagery narrative used in the hypnosis and mastery imagery condition. Following this they were instructed to wait five minutes in a waiting room after which time they returned to be posttested on the Pursuit Rotor Task.

The no-treatment control subjects were merely posttested on the Pursuit Rotor Task and did not receive any of the interventions (hypnosis and/or mastery imagery) which were employed with the other subjects.
Before leaving, each subject (with the exception of the no-treatment control subjects) was asked to complete a brief questionnaire which was used to gain some additional information on their experience in the experiment. A slightly different variation of this questionnaire was given to each group (see Appendix G). Following this, each subject received the "Debriefing Handout" (see Appendix D), were thanked for their helpful cooperation with the experiment, and were then dismissed.

A schematic illustration outlining the procedural activities during these two sessions is now presented (see Figure 2.3). It should be noted that these procedures did not allow for a "blind" study. That is the experimenter knew what group the subject had been assigned to when he presented the subject with the independent variable.
Figure 2.3. Procedural Flow Chart
Experimental Results

Subject characteristics for each group (see Table 3.1) reveal that two of the groups were unbalanced on the number of male and female subjects who were randomly assigned to them. The hypnosis and mastery imagery group has nine male and only one female subject(s). Hypnosis subjects are the most susceptible out of all groups with an average hypnotic susceptibility score of 9.5 and, as intended, mastery imagery (L) subjects were the least susceptible with an average hypnotic susceptibility score of 3.3.

Table 3.1

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Male</th>
<th>Female</th>
<th>H.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>hypnosis &amp; mastery imagery</td>
<td>10</td>
<td>3</td>
<td>7</td>
<td>8.9</td>
</tr>
<tr>
<td>hypnosis</td>
<td>10</td>
<td>5</td>
<td>5</td>
<td>9.5</td>
</tr>
<tr>
<td>mastery imagery (H)</td>
<td>10</td>
<td>4</td>
<td>6</td>
<td>9.1</td>
</tr>
<tr>
<td>no-treatment control</td>
<td>10</td>
<td>9</td>
<td>1</td>
<td>9.1</td>
</tr>
<tr>
<td>mastery imagery</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>Totals</td>
<td>50</td>
<td>27</td>
<td>23</td>
<td></td>
</tr>
</tbody>
</table>

*H.S.: mean score on Harvard Group Scale of Hypnotic Susceptibility
Descriptive data on the mean pretest, posttest, and gain score (see Table 3.2) reveals the following: On the average, mastery imagery (H) subjects have the largest pretest score, while the hypnosis and mastery imagery subjects have the lowest pretest score. However, hypnosis and mastery imagery subjects have the highest posttest scores, followed by mastery imagery (H) subjects. The mastery imagery (L) subjects have the lowest posttest performance scores.

The dependent variable, the gain score on the Pursuit Rotor Task, is the largest for hypnosis and mastery imagery subjects, followed by mastery imagery (H) subjects, hypnosis subjects, mastery imagery (L) subjects, and no-treatment control subjects, who as a group have the lowest gain scores of all of the subjects. Between group differences on gain scores is calculated (see Table 3.3).

Standard deviations (see Table 3.2) for the pretest and posttest, and gain scores show that, for each group, intragroup variability is higher for the posttest than it is for the pretest scores. Standard deviations for the dependent variable, the gain score, reflects that the highest intragroup variability occurs for the mastery imagery (H) subjects, followed by hypnosis subjects, and hypnosis and mastery imagery subjects. No-treatment control and mastery imagery (L) subjects demonstrate lower intragroup variability. A survey of the raw data (see Appendix I) reveals that the mastery imagery (H) condition includes the subject with the lowest gain score (.969) and the subject with the highest gain score (18.517) out of the entire subject pool. Great differences in performance among subjects is also noted in other groups.
Table 3.2
Means (in sec.) and Standard Deviations (S.D.): Pretest, Posttest and Gain Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>Pretest Mean</th>
<th>Pretest S.D.</th>
<th>Posttest Mean</th>
<th>Posttest S.D.</th>
<th>Gain Score Mean</th>
<th>Gain Score S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>hypnosis &amp; mastery imagery</td>
<td>6.8454</td>
<td>3.1212</td>
<td>17.2296</td>
<td>5.2262</td>
<td>10.3842</td>
<td>4.3023</td>
</tr>
<tr>
<td>mastery imagery (H)</td>
<td>7.7178</td>
<td>4.6002</td>
<td>15.3862</td>
<td>7.3421</td>
<td>7.6684</td>
<td>5.1912</td>
</tr>
<tr>
<td>mastery imagery (L)</td>
<td>7.2631</td>
<td>3.9877</td>
<td>14.1343</td>
<td>5.1490</td>
<td>6.8712</td>
<td>2.7396</td>
</tr>
<tr>
<td>Average</td>
<td>7.3039</td>
<td>3.6841</td>
<td>15.1494</td>
<td>5.6927</td>
<td>7.8455</td>
<td>4.1934</td>
</tr>
</tbody>
</table>

Table 3.3
Between Group Differences on Gain Scores (in sec)

<table>
<thead>
<tr>
<th></th>
<th>Hypnosis Mean</th>
<th>Hypnosis S.D.</th>
<th>Mastery Imagery (H) Mean</th>
<th>Mastery Imagery (H) S.D.</th>
<th>No-treatment Control Mean</th>
<th>No-treatment Control S.D.</th>
<th>Mastery Imagery (L) Mean</th>
<th>Mastery Imagery (L) S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypnosis &amp; Mastery Imagery</td>
<td>2.78</td>
<td>2.71</td>
<td>3.68</td>
<td>3.51</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypnosis</td>
<td>-</td>
<td>.08</td>
<td>.90</td>
<td>.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mastery Imagery (H)</td>
<td>-</td>
<td>-</td>
<td>.97</td>
<td>.80</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No-treatment Control</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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An analysis of variance was run to determine what influence, if any, did the variables of sex, hypnotic susceptibility, pretest and posttest administrations have on the dependent variable, the gain score. This analysis of variance shows that the variables of hypnotic susceptibility, pre- and posttest scores have no influence on the dependent variable. As expected, the test demonstrates that the sex of the subject differs accordingly to what group he/she belongs to \( (F=3.152, p=0.03) \) (see Appendix J). Regression analysis, however, shows that there is no sex by group interaction for the dependent measure \( (F=0.352, p=0.79) \) (see Appendix K).

Noting that the results are free from the influence of the variables of sex, hypnotic susceptibility, pre- and posttest scores; an analysis of variance was conducted among the five groups in the study. This analysis of variance finds no significant differences among these five groups \( (F=1.292, p=0.29) \) (see Table 3.4).

Table 3.4

<table>
<thead>
<tr>
<th>Source</th>
<th>Degrees of Freedom</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F Value</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>4</td>
<td>87.879081</td>
<td>21.9697703</td>
<td>1.27769</td>
<td>0.2922</td>
</tr>
<tr>
<td>Residual</td>
<td>45</td>
<td>773.773381</td>
<td>17.1949640</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>49</td>
<td>861.652462</td>
<td>17.5847441</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Analysis of covariance also finds no significant differences among the five groups. It did, however, find a significant relationship between pre and posttest scores. The size of the posttest score is significantly related to the size of the pretest score ($F=27.572, p=.0001$) (see Appendix L). That is, the larger the posttest score—the larger the pretest score.

Analysis on the questionnaire which was distributed reveals no significant differences in group comparisons (see Appendix M). Because a different questionnaire was used for each group (with the exception of the no-treatment control group which did not receive a questionnaire), only certain questions can be compared between each group.
CHAPTER IV

CONCLUSIONS

Because comparisons are not significantly different, the null hypotheses can not be rejected. That is, there is no significant difference between the hypnosis and mastery imagery group and any of the other groups in gain scores on the Pursuit Rotor Task, nor is there any difference between the mastery imagery (H) group and the no-treatment control group in gain scores on the Pursuit Rotor Task. Results are in the predicted direction, however, with the hypnosis and mastery imagery group showing the largest absolute values on the gain scores, followed next by the mastery imagery (H) condition (see Table 3.2, p. 31). The largest difference among comparisons on the dependent variable (see Table 3.3, p. 31) is between the hypnosis and mastery imagery group and the no-treatment control group with a difference in gain scores of 3.68 seconds. The second largest difference is between the hypnosis and mastery imagery group and the mastery imagery (L) group with a difference in gain scores of 3.51 seconds. The next two largest differences in gain scores occurs between the hypnosis and mastery imagery group and the hypnosis group and the mastery imagery (H) group with differences of 2.78 and 2.71 seconds, respectively. All other comparisons among groups reveal differences of less than one second. Although it is expected that the largest differences in gain scores would occur between the hypnosis and mastery imagery group and the remaining groups--especially the
no-treatment control group—in final analysis, none of these differences are significant.

As the results illustrate, differences between groups are due to individual subject differences and not to treatment differences. On the average, those who have higher pretest scores obtain higher posttest scores. Although this varies from subject to subject, it can be said that those who are adept on the Pursuit Rotor Task during the first session, improve the most on this motor task during the second session. The one group where this does not seem to hold true is for the hypnosis and mastery imagery group which holds the lowest pretest score and the highest posttest score among the five groups.

The lack of significant findings can be attributed to two possible explanations: (1) the high degree of subject variability and (2) a treatment intervention which may not have been powerful enough to affect change across subjects.

In a review of the standard deviations for pretest, posttest, and gain scores (see Table 3.2, p. 31), it is shown that intragroup variability increases across all groups on the posttest measure. This is especially true for the mastery imagery (H), hypnosis and hypnosis and mastery imagery conditions. Less of an increase occurs for the mastery imagery (L) and no-treatment control conditions in variability from pre to posttest measures. This increase in variability on the posttest results in raising the variability on the gain scores which, in turn, contributes to the lack of significant findings. In a review of the raw data (see Appendix I) it is seen that many subjects improve substantially after receiving the
independent variables of hypnosis and/or mastery imagery, while some subjects receive little or no benefit from this treatment intervention.

It could well be that some unknown subject variables which are not controlled for could have a confounding effect on the results. It is these variables which could contribute to the high degree of variability among subjects. Factors such as imaging ability, motor ability, "game" ability and selective attention may be related to the benefit which a subject receives from mental practice (Richardson, 1967a). Yet these variables, with perhaps the exception of imaging ability, may be a benefit to learning a motor skill regardless of mental practice or mastery imagery. A more important variable might be the subject's initial performance on the criterion task. As the results illustrate, one's posttest score is significantly related to one's pretest score on the Pursuit Rotor Task. It is still unknown, however, as to what subject variables, if any, may have interacted with mastery imagery or hypnosis.

A second plausible explanation for the lack of significant findings may be that the treatment intervention is not powerful enough to affect change across more subjects. It seems probable that, for some, the treatment intervention of hypnosis and mastery imagery is sufficient to help produce gains in performance above that which would be expected due to practice effect. Still this treatment intervention is not strong enough to affect change consistently across enough subjects to make the results significant.
It is possible that the mastery imagery may not be powerful enough as an independent variable to affect change. Results from the questionnaire (see Appendix M) show that the three groups which receive mastery imagery perceive this imagery as real (see Appendix M.3). These same groups believe that their private imagery is close to being the same as the mastery imagery narrative (see Appendix M.4). Finally, these groups believe that mastery imagery is an aid to performance (see Appendix M.5). Yet because this independent variable of mastery imagery is only presented once, this may be too brief a time to have a large enough impact. It is reasonable to expect that the more one practices a task, whether this be actual or covert practice, the more one would improve at the task. Although the time of six minutes for the mastery imagery should not be lengthened (Twining, 1949), perhaps additional sessions could be used for mastery imagery which would add additional power to this intervention.

Whether or not the independent variable of hypnosis is powerful enough is uncertain. From the questionnaire one observes that the subjects in the two groups which receive hypnosis perceive their depth of trance as being medium to very deep (see Appendix M.1), and it appears that subjects in both groups believe that hypnosis is an aid to performance (see Appendix M.2). Still perhaps additional hypnotic training would strengthen the effects of hypnosis. Or it may be possible to increase the power of hypnosis by using an "alerting" hypnotic induction rather than a "relaxed" hypnotic induction (Ham & Edmonston, 1971). At least it is clear that hypnosis alone does not
inhibit functioning on a motor task. This is true when the task follows dehypnosis by five minutes or more. This is apparent because the hypnosis group does not perform any worse on the Pursuit Rotor Task when compared to the no-treatment control group.

Another finding suggests that there is a possibility that spontaneous hypnosis occurs in subjects who are in the waking state and who use imagery. According to the questionnaire (see Appendix M.6) several of the high and low susceptible subjects in the two mastery imagery conditions believe that they may have entered a trance. This is somewhat surprising because it is expected that low susceptible subjects would not spontaneously enter a trance. Yet because this information is of a self-report nature, it still remains uncertain as to whether both high and low susceptible subjects enter a trance during the use of imagery.

Future research in the area of hypnosis and mastery imagery should incorporate the following features: First, more than one treatment session should be used to make the independent variables of hypnosis and mastery imagery more powerful. Second, a technique to make the hypnotic intervention more powerful would be to use an alerting rather than a relaxing hypnotic induction procedure. Third, future research should examine various subject variables which interact with hypnosis and mastery imagery to facilitate or inhibit task performance. One possibility would be to design a study which would control for the subject's pretest performance on the criterion task. Other subject variables could also be controlled for. This would provide for better understanding of what kind of individual would benefit most from hypnosis and mastery imagery.
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APPENDIX A

Administration of the Pursuit Rotor Task (PRT)

Physical Arrangement

The subject was seated at a table which supports the PRT apparatus. The experimenter was seated directly behind the subject and out of the subject's line of vision. Both the subject and the experimenter were able to see the subject's performance score on the electrical digital timer which was to the subject's left. The room was well lighted and other than the experimenter there was no one else present in the room to observe the subject's performance.

Instructions

The instructions were played to each of the subjects by a tape recorder after the subject had taken his/her seat in front of the pursuit rotor.

Now you will be asked to perform the Pursuit Rotor Task. You will see in front of you a turntable with a silver dot along its outer edge and a stylus wand which is to the left of the turntable. The object of this task is to keep the tip of the stylus wand on the silver dot or target as the turntable rotates. It will rotate clockwise quite rapidly; so when it does, you must quickly follow it being sure to keep in contact with it. The longer you are able to keep the tip of the stylus wand on the silver dot or target, the higher the score you will receive. If you lose contact with the target, quickly try to catch up to it again. Every second counts. The electronic counter which you see to your left will record your time-on-target score in milliseconds.

You will have three time trials. Each trial will last for 15 seconds. Between each trial there will be a 25 second pause. The important point for you to remember is that the turntable will start and stop each trial automatically, so you will not be warned. In a moment, I will activate the turntable. Do not pursue the target at this time, but merely observe the rotating turntable. When it stops automatically, get prepared to begin right away by placing the tip of the wand on the target. Shortly the turntable will begin automatically for your first timed trial. Between
each trial, look at your score and get prepared for your next trial by placing the wand on the target.

Do you have any questions before we begin?

(The experimenter answered only questions which pertained to the information presented in the instructions and did not suggest or recommend helpful techniques or give any coaching.)
APPENDIX B

INFORMED CONSENT AGREEMENT

The purpose of this experiment is to investigate the effects of imagery and hypnosis on task performance. As subjects participating in this experiment, you will have the opportunity to be hypnotized, to experience imagery and to perform the Pursuit Rotor Task, which is a perceptual motor task.

While in hypnosis or after hypnosis, you will not be deceived nor will you be asked to do anything which will be against your will. It is very rare for anyone to endure any physical or mental discomfort while participating in a hypnotic experiment of this nature. Rather, it is probable that you will receive some benefits for your participation in the experiment, including being able to experience the pleasure and deep relaxation typical of a hypnotic trance.

For some of you, the time required for the experiment will merely include this first session which will last about two hours. Many of you, however, will be asked to return for a second session a week later which will last about one hour. A major effort will be made to arrange times for you to come in for this second session which will be convenient for you. After a time has been agreed upon, however, you will be expected to keep the appointment and to be prompt. For your help in the experiment, you will receive appropriate credit in your psychology class. Failure to keep an appointment will result in a reduction of your extra credit point total by the number of points you would have earned had you kept the appointment.

The only data which will be kept on you is your scores on the Pursuit Rotor Task and your answers to a brief questionnaire. At the end of the experiment, all of this information will be totally dissociated from your name, thus keeping everything confidential.

It will be required of you that you do not discuss your experiences in this experiment with any other students during this quarter. By discussing your experiences with another student, you may unknowingly bias his/her reaction to this experiment if they were to participate with it at a later time. Your cooperation with this would be greatly appreciated.

I, ______________________, have read and understood this Informed Consent Agreement and do hereby agree to participate with this experiment, realizing that I have the option to discontinue my participation at any time which I so desire.

________________________
Signature

________________________
Date

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APPENDIX C

HYPNOSIS: QUESTIONS AND ANSWERS

1. Will I be able to go into the hypnotic state?

As a matter of fact every normal person has many times been in a state which is essentially the same as the hypnotic condition. You have at times been completely absorbed in something you were doing; e.g., reading a highly interesting novel. When you are in this state people may speak to you and you do not hear. Your attention is piled up on what you are doing. In hypnosis you give your attention to what your psychologist is saying to you and other things do not bother you. You will certainly be able to go into the hypnotic state if you cooperate and concentrate on what is being said to you.

2. Will I lose consciousness?

No! You will no more lose consciousness in the hypnotic state than you did when you were paying complete attention to your reading. The word sleep is frequently used with reference to hypnosis but it is not the nighttime sleep. To someone else you will appear to be asleep because your eyes are closed and you are relaxed, but you will know that you are not asleep like at night.

3. Will I have difficulty awakening?

No! You are at all times able to awaken yourself should you wish to do so. However, it is to your advantage to remain in the hypnotic state until your psychologist asks you to awaken.

4. Is a weak will essential for hypnosis?

On the contrary, a strong willed person is more likely to be successful in hypnosis. Strictly speaking you put yourself into the hypnotic state. Your psychologist can only be a teacher or instructor. It takes self-control to go into the hypnotic state and with repeated hypnosis you will learn better self-control. This will be useful to you in many other ways.

5. On repeated occasions will I find going into hypnosis easier?

Yes, because you will learn better how to go into the hypnotic state just as you learn other skills by practice.

6. Can I be hypnotized against my will?

No! No matter how well you have learned to go into the hypnotic state you can always refuse to do so if you desire. You have learned to write but you do not have to write unless you wish to. Hypnosis is the same.
7. If I am in the hypnotic state and someone suggests I do an immoral act will I comply?

No! It is unlikely that a person can be caused to violate a concept of morality to which he is strongly attached. However, your psychologist is a professional who is governed by a very strict code of ethics and he/she would not think of asking you to do anything immoral.

8. If I do not believe that there is any such thing as hypnosis will that make any difference.

You do not have to believe in hypnosis in order to go into the state. You must, however, be willing to go along with what your psychologist tells you.

9. Can any psychologist do hypnosis?

To help you go into the hypnotic state your psychologist has to have a certain amount of skill which he/she attains by a study of the matter. Ask your psychologist if he/she has had training in hypnosis. He/she will give you an honest answer.

10. Is hypnosis new?

Hypnosis is probably as old as the human race. Some of its applications are fairly new.

11. Will hypnosis harm me?

Hypnosis can do you no more harm that nighttime sleep. However, if you are hypnotized by an untrained person he/she might give you suggestions which may cause you discomfort. Be hypnotized only by those who are skilled and who use hypnosis for medical, dental, or psychological purposes.

12. Are there different depths of hypnosis?

Yes! Some people go quickly into a much deeper hypnosis than others. However, a normal person can go deeper with practice.

13. Is it possible to hypnotize oneself?

Yes! Most people with a little practice and help can learn to do auto-hypnosis. This is a very valuable skill to have because by means of it one can control oneself much better than one might otherwise be able to do.

14. Will I remember what happened in the hypnotic state?

If you go into very deep hypnosis, what went on while you were hypnotized may seem like a nighttime dream. Upon awakening, portions of the dream will be remembered, while other portions of the dream will be forgotten.
APPENDIX D

DEBRIEFING HANDOUT

Thank you for your help in participating in this research. As you know, you will receive appropriate credit in your psychology class for your time spent.

If you have any questions or concerns which arise after you leave today, feel free to contact me. It is very rare for people to experience unwanted side effects after hypnosis. However, if for any reason you would like to talk with myself or another counselor regarding personal concerns you may have, please contact me at the Student Counseling Service (294-5056) or at my home (233-4891).

Thank you:

Robert J. Russell, M.A.
Counselor
Student Counseling Service
APPENDIX E
Hypnotic Induction Procedure

This evening you will have the opportunity to reexperience hypnosis for the second time. Following this you will take a short break and then come back and perform the pursuit rotor task. Afterwards you'll fill out a short questionnaire and then you'll be finished.

Do you have any questions before we begin?

So this evening would you like to go into a light trance or into a deep trance?

Good, you'd like to go into a (light, deep) trance. But before you do, I want you to face the wall and make sure that both of your feet are flat on the floor and that your hands are resting comfortably in your lap.

I'd like you to find a spot opposite yourself on the wall and focus all of your attention on that spot. And you will recall how a week ago when you were focusing your attention, some very peculiar things began to happen. Things did not seem quite the same. For instance, you can imagine that one of your feet is becoming heavy, very heavy. I wonder if it will be your left foot which will become heavier first, or perhaps it will be your right. Sooner or later, it will feel so heavy--it will feel like lead, being weighted down, down into the floor.

And once when you become aware of that heaviness, that same sensation will spread to other parts of the body. I wonder if it
will spread to your legs first or to your arms first? I'm sure that this heaviness will eventually spread to your eyes, because sooner or later your eyes will begin to blink, blink and water. And there is nothing mysterious about this, because when they blink and water, it is merely a sign that you are becoming very drowsy and that your eyes are tired. There, your eyes are blinking more and more! And now that spot that you are looking at will sooner or later move in-and-out of focus, as it becomes more and more difficult to keep your eyes open.

Now, all the while that we've been focusing on your eyes, you probably haven't even noticed how numb your legs have become, how heavy and limp your legs have become. And something else is very interesting. You know what it is like to fall asleep, but what happens if you fall asleep and awake, but only half of you is awake and the other half is asleep? You know what it is like to awake and find that your arm is still asleep. Some people describe it as a tingling sensation, while others describe it as a numbing sensation, almost a hollow sensation. I wonder how it will be for you?

And you realize how nice hypnosis can be. You don't have to do anything at all; you don't have to be aware of how deeply relaxed you are or how your arms feel apart from your body; you don't even have to keep your eyes open as they blink and water and wish to close.

And let me show you something which you will find very curious. I'm going to pick up your right arm and it will somehow mysteriously hang there in mid-air, as though an imaginary string were holding it
there. (The hypnotic-operator lifts the person's arm out to a horizontal position. If the arms drops or lowers, the hypnotic-operator exclaims: "Your arm is so relaxed, it is so limp that you can't even hold it in one position. This is a good sign that you are in a trance. But notice how easy it is to keep your left arm in one position when you really want to." Following the inevitable cooperation of the subject to hold out an arm, the induction continues.) Your arm will hang in mid-air as though it were floating on its own, floating. But sooner or later your arm will begin to feel heavy, and it will lower, slowly on its own. And when your arm begins to lower, you will go deeper into trance.

The lower your arms goes, the deeper you will go until your hand touches either your lap or the chair and when it does you'll go immediately into a much deeper state of hypnosis. (If the subject's eyes are still open at this point, the hypnotic-operator comments: "And if your eyes are not already closed by the time your hand touches, they will close at that time and you will go deeper and deeper into trance.")

Now let me help you to go even deeper still into trance. I'm going to count from ten down to one. The closer I get to one, the deeper you will go, until I reach ONE and when I do, you'll go much deeper into a hypnotic state. Ten . . . nine . . . eight . . . You are sinking deeper and deeper . . . seven . . . six . . . four . . . three . . . Much deeper now . . . two . . . ONE.

(At this point, the mastery imagery narrative is played for the hypnosis and mastery imagery subjects. This tape includes
directions to dehypnotize the subject. The hypnosis subjects do not listen to the narrative, but merely remain in the hypnotic state for approximately six minutes, at which time the hypnotic-operator dehypnotizes them by saying: "Listen closely to what I am going to say. I am going to count from one to five, and when I reach five you will open your eyes and be totally awake and refreshed. Ready . . . one . . . two . . . three . . . four . . . five. You may open your eyes and be totally awake and refreshed!" Following dehypnosis for both hypnosis and mastery imagery and hypnosis subjects, the hypnotic-operator gave the following directions: "Now I'd like you to stand up and walk down to the lobby. You may want to stretch or get a drink of water, and I'll be down in a few minutes to bring you back."
APPENDIX F
Mastery Imagery Narrative

You will remember performing the Pursuit Rotor Task during your first appointment here. In a moment I am going to ask you to visualize in your mind's eye performing this same task again. But first, the important achievement for you is to recognize that you have certain capabilities within yourself which have yet to be realized. Performing the Pursuit Rotor Task efficiently is one of these.

Now begin by visualizing in your mind's eye what the Pursuit Rotor looks like from your position in front of it at the table, with its black turntable and silver dot. Focus your total attention on this image until you can see everything about it very clearly—as though you were really there. Now recall how the stylus wand feels in your hand as you prepare for the turntable to begin. As you hold it, you say to yourself "how easy it is for me to concentrate." As you place the wand on the target, notice how it feels to have every muscle in your arm and hand poised, ready to begin. Now the turntable starts to rotate and you are quide to follow the target. As you observe this rotating target, you find that your hand follows it easily and you find that you are performing this task much more efficiently and correctly than before. Notice how it feels to keep the stylus on the target. Listen to the sound of the motor and the stylus tip connecting with the silver target. Take all the time you need to visualize this, because one minute
of imagery is equivalent to several minutes or even an hour of actual practice. Around and around, around and around, you follow the target. If the stylus leaves the target temporarily, this only motivates you more and you tell yourself to "quickly catch-up"--which you do very easily. As this image becomes clearer for you, you see that you are beginning to master the task and this is very pleasing for you to discover.

Now the rotor stops and you find a sense of achievement with yourself. Before it starts up again, you feel the anticipation surge through every muscle in your hand and arm. You feel confident, but not over confident. You do feel determined to do the very best that you can. When it starts up again, you tell yourself to "quickly follow" which you do easily. Around and around, around and around, your hand and arm feel coordinated as you follow the target. You say to yourself "how easy it seems." Any slip off of the target merely amuses you and creates the challenge and the determination in you to "quickly catch-up." Around and around, around and around, you follow the target easily. Now the rotor stops again. You say to yourself that you have done a "good job." You are enjoying this task now and feel eager to begin again for the final trial. Your body feels ready and you are ready. As the turntable starts, you are quick to follow it. Around and around, around and around; we have all had the experience of doing something and knowing that we were getting better at it, that we were mastering it. When this happens, you feel confident and self-assured of your ability to perform the task very well. Around and around, around and around;
you follow the target easily. Now it stops and you are pleased
at your ability to perform the pursuit rotor task efficiently, much
more efficiently than before. You understand how increased con-
centration and increased motivation have helped you to do much
better on the task than before.

Now when you are ready, I want you to leave this satisfying
image and listen to what I have to say. After I tell you to open
your eyes, you will be asked to wait a few minutes before you
actually take the Pursuit Rotor Task for real. This image will
stay very clear in your mind during this time. It will help you
to look forward to doing this task with anticipation. And when it
is time to actually do the task, you will be very alert and motivated
to do the best that you can do.

Now I am going to count from one to five and when I reach five,
you will open your eyes and be fully alert and totally refreshed.
This is very important, when you open your eyes you will be fully
alert and totally refreshed and you'll be able to concentrate very
well when it is actually time to perform the task. Now I'll count
from one to five and at five you will open your eyes: one . . .
two . . . three . . . four . . . five. Open your eyes.
APPENDIX G

QUESTIONNAIRE A

Name: ____________________________
Date: ____________________________

Directions: Read each question and circle the appropriate number.

1. You were hypnotized during each session. During this last session, how would you rate the "depth" of your trance?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>very light</td>
<td>very deep</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

2. During this last session, how "real" was the tape-recorded, mastery imagery narrative of performing the Pursuit Rotor Task?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
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<tr>
<td>not real</td>
<td>very real</td>
<td></td>
<td></td>
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</table>

3. Was your own private imagery the same as the tape recorded imagery or was it different?

<table>
<thead>
<tr>
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<th>3</th>
<th>4</th>
<th>5</th>
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<tr>
<td>different</td>
<td>same</td>
<td></td>
<td></td>
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4. Do you believe that the hypnosis helped or hindered your ability to perform the Pursuit Rotor Task?

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<thead>
<tr>
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<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>hindered</td>
<td>helped</td>
<td></td>
<td></td>
<td></td>
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</table>

5. Do you believe that the mastery imagery helped or hindered your ability to perform the Pursuit Rotor Task?

<table>
<thead>
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<tr>
<td>hindered</td>
<td>helped</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. If you have any comments regarding this research experiment, please make these comments on the back of this questionnaire.
QUESTIONNAIRE B

Name: _____________________
Date: _____________________

Directions: Read each question and circle the appropriate number.

1. You were hypnotized during each session. During this last session, how would you rate the "depth" of your trance?

   1  2  3  4  5
very very light very deep

2. Do you believe that the hypnosis helped or hindered your ability to perform the Pursuit Rotor Task?

   1  2  3  4  5
hindered helped

3. If you have any comments regarding this research experiment, please write these comments below.
QUESTIONNAIRE C

Name: ______________________
Date: ______________________

Directions: Read each question and circle the appropriate number.

1. During this last session, how "real" was the tape-recorded, mastery imagery narrative of performing the Pursuit Rotor Task?

   1  2  3  4  5
   not real very
   real

2. Was your own private imagery the same as the tape recorded imagery or was it different?

   1  2  3  4  5
   different same

3. Do you believe that the mastery imagery helped or hindered your ability to perform the Pursuit Rotor Task?

   1  2  3  4  5
   hindered helped

4. Sometimes it is possible for some people to spontaneously enter a trance state while concentrating on imagery. Do you think that you entered a trance state while listening to the tape recorded imagery narrative?

   1  2  3  4  5
   not in a very much
   trance in a trance

5. If you have any comments regarding this research experiment, please make these comments below.
# APPENDIX H

## Pilot Study Results

Table H.1

Mean Pretest, Posttest and Gain Score (in sec)

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<thead>
<tr>
<th>Group</th>
<th>Pretest</th>
<th>Posttest</th>
<th>Gain Score</th>
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</thead>
<tbody>
<tr>
<td>hypnosis &amp; mastery imagery</td>
<td>10.825</td>
<td>17.272</td>
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<td>hypnosis</td>
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<td>mastery imagery (H)</td>
<td>3.155</td>
<td>11.040</td>
<td>7.885</td>
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<td>no-treatment control</td>
<td>13.049</td>
<td>18.416</td>
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<td>mastery imagery (L)</td>
<td>15.500</td>
<td>22.284</td>
<td>6.785</td>
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## Table H. 2

Pilot Study Raw Data

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<th>Subject Number</th>
<th>Group¹</th>
<th>Hypnotic Susceptibility</th>
<th>Sex</th>
<th>Pretest Trials 1</th>
<th>Pretest Trials 2</th>
<th>Pretest Trials 3</th>
<th>Posttest Trials 1</th>
<th>Posttest Trials 2</th>
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<th>Posttest Score</th>
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<td>5.542</td>
<td>11.112</td>
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¹Groups: 1 = Hypnosis and mastery imagery; 2 = hypnosis; 3 = mastery imagery (H); 4 = no-treatment control; 5 = mastery imagery (L).
## APPENDIX I

**Experimental Raw Data**

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<thead>
<tr>
<th>Subject Number</th>
<th>Group</th>
<th>Hypnotic Susceptibility</th>
<th>Sex</th>
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<th>Pretest Trials 2</th>
<th>Pretest Trials 3</th>
<th>Posttest Trials 1</th>
<th>Posttest Trials 2</th>
<th>Posttest Trials 3</th>
<th>Gain Score</th>
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### APPENDIX J

**Analysis of Variance: Sex**

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<tr>
<th>Source</th>
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<th>Sum of Squares</th>
<th>Mean Squares</th>
<th>F-Value</th>
<th>Probability</th>
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### APPENDIX K

Regression Analysis: Sex by Group

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<th>Probability</th>
</tr>
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## APPENDIX L

**Analysis of Covariance: Posttest as Dependent Measure, Pretest as Covariate**

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APPENDIX M

QUESTIONNAIRE RESULTS

Table M.1
Perceived Depth of Trance

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<th>Group</th>
<th>Very light</th>
<th>2</th>
<th>3</th>
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<th>Very Deep</th>
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Table M.2
Hypnosis as Aid to Performance

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<th>4</th>
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<th>5</th>
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<td>4</td>
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Table M.3
"Realness" of Mastery Imagery

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<th>3</th>
<th>4</th>
<th>same</th>
<th>5</th>
<th>Mean</th>
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<td>5</td>
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Table M.4
Private Imagery Same as Imagery Narrative

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Table M.5
Mastery Imagery as Aid to Performance

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Table M.6
Spontaneously Entering a Trance

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BIBLIOGRAPHY

