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Resistance to Weakening Influences as a Function of the Similarity Between Aquisition and Weakening Phases

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To the Graduate Council:

I am submitting herewith a dissertation written by Harry F. Desroches entitled "Resistance to Weakening Influences as a Function of the Similarity Between Aquisition and Weakening Phases." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Carl N. Sipprella, Major Professor

We have read this dissertation and recommend its acceptance:

William O. Jenkins, Kenneth R. Newton, Virgil E. Long, Lawrence M. DeRidder

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(Original signatures are on file with official student records.)

June 21, 1961

To the Graduate Council:

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RESISTANCE TO WEAKENING INFLUENCES AS A FUNCTION OF THE SIMILARITY BETWEEN ACQUISITION AND WEAKENING PHASES

A Dissertation

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

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by

Harry F. Desroches

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CHAPTER I

INTRODUCTION

I. PROBLEM AREA

In general there are three reasons for the study: (1) to test a specific hypothesis as deduced from a particular theoretical position, the generalization hypothesis, that resistance to weakening influences is a function of the similarity between acquisition and weakening phases, (2) to compare and to contrast the influences of various experimental operations in weakening a learned response, (3) to compare two groups of people who are believed to respond differently to traditional methods of strengthening and weakening behaviors.

There is general agreement that much, if not most, of human behavior is learned. As the infant matures he meets new problems at each stage of development and ways of handling these problems are learned. On reaching adulthood the human has faced many problems and has many learned solutions in his repertoire of responses. If the solutions are adequate and the world static, then the human would be perfectly adapted at all times. However, there are two important restrictions: adequate solutions and a never changing world. An adequate solution would seem to involve at least some satisfaction for the learner and minimum censure from people whom the learner feels are important in his surroundings. Nevertheless, inadequate solutions may

be learned producing censure from other people and/or discomfort and maladaptation for the learner. In addition, the world is not static but ever changing. New problems emerge demanding new solutions or old problems may change and require different solutions. If the old solution does not interfere with the learning of a new solution, then the learner will make the change quickly and with only minimum discomfort. However, if the old solution interferes with the learning of a new solution, the learner may be incapable of solving the problem or do so with difficulty. Thus he may experience much discomfort, depending upon the importance of the problem and necessity for a solution. When this situation occurs, the learner may require help in solving his problem. Such help would seem to involve identification of the learning difficulty followed by selection of the most effective technique to undo the old learning and hasten new learning or solutions. This paper will attempt to shed some light on the effectiveness of various methods of weakening learned behavior.

II. STATEMENT OF THE PROBLEM AND DEFINITION OF TERMS

The generalization hypothesis as summarized by Jenkins makes certain predictions about weakening behavior: " . . . When the cues are changed from those originally conditioned, the behavior tends to decrease in strength" (Jenkins, 1956, p. 2). Changes in cues elicit

different behaviors. According to this hypothesis the more similar the conditions between acquisition and weakening phases, the more resistive the behavior will be to attempts to weaken it.

Recently Bindra (1959) has stated this same position but used slightly different terminology. With a certain range of variation in stimuli, the learned response will continue to occur. Any alteration outside of this range produces a decrement in the learned response. The change in cues produces interfering responses as a result of novel stimuli. Thus, according to Bindra the degree of response decrement is not only a function of the similarity between acquisition and weakening phases, but also the familarity of the stimuli for the subject. Both the generalization hypothesis and Bindra's theories owe much to Guthrie's (1952) theory of learning.

The investigation to be reported in this paper involved the acquisition of a response followed by several different operations or combinations of operations traditionally used to weaken acquired responses. This, in turn, was followed by the reacquisition or relearning of the originally learned response. Thus, three phases were involved: acquisition, weakening, and relearning.

The basic operations used to weaken the acquired response were extinction, counter conditioning, response prevention, punishment, and various combinations of these operations. Reinforcement, operationally defined, is a stimulus which follows a response and

which increases the probability of the response occurring. For example, feeding (reinforcement) a hungry rat at one end of a straight alley will increase the probability of the rat running from the other end. The operational definition of extinction is the removal of the reinforcement which instated the response. Counter conditioning involves both the operations of extinction and reinforcement; it is the removal of reinforcement from the originally learned response with the simultaneous reinforcement of an incompatible response. Punishment is a stimulus following a learned response which reduces the probability of that response occurring. Response prevention is merely preventing the learned response from occurring during the weakening phase.

The position taken in this paper is that the differential effects of these various weakening operations are due to the differential cues which they provide the subject between the acquisition and weakening phases. The more differential cues provided by a specific weakening operation between acquisition and weakening phases, the greater will be the response decrement; or the greater the similarity between the two phases, the less will be the response decrement. In like manner the speed of relearning will depend upon the similarity between the relearning and weakening phases. The greater the similarity, the faster the relearning.

There are people who are unable to function outside of an institution. When institutionalization is not primarily because of organic defect, crippling disease or mental deficiency, then it can be inferred that the traditional reinforcements or punishments existing in the culture have for some reason failed to work with the individual. A Veteran's Administration domiciliary population is composed of persons who are unable to function independently outside of an institution. Although the major criterion for admission is the possession of a disability severe enough to prevent working and functioning in the community, this disability may be psychological in nature. In a multidisciplinary study by Fogel et al. (1956), it was demonstrated that domiciled veterans are not as seriously disabled physically as veterans of similar age living outside of an institution. Thus, it was suggested that domiciled veterans' major problems involve difficulties in living. It was expected that these domiciled veterans would manifest learning difficulties when compared to veterans hospitalized for specific medical problems and who spend the majority of their time outside of an institution.

The purposes of this study can now be more sharply defined. The following hypotheses will be tested: (1) the greater the similarity between acquisition and weakening phases, the more resistive the learned response will be to weakening influences, (2) the speed of relearning the originally acquired response is dependent upon the

similarity between the weakening and relearning phases: the greater the similarity between these two phases, the faster will be the relearning of the originally acquired response, and (3) people having difficulties in living (domiciled veterans) will show greater learning deficits than people having fewer difficulties in life (hospitalized veterans).

CHAPTER II

RELATED LITERATURE

In this chapter studies related to the present investigation will be reviewed. Empirical findings in extinction, counter conditioning, response prevention, punishment, retroactive and proactive transfer and inhibition designs, and studies using more than one method of weakening will be cited and in each case it will be shown how these findings are consistent with the theoretical position of this paper.

I. EXTINCTION

As stated previously, extinction is the removal of the stimulus which previously reinforced a response. When the reinforcement is removed, the response strength will remain high for a short period and then show a steady but irregular decline (Deese, 1958). The decline of response strength can be slowed up by manipulating certain parameters during the acquisition and weakening phases. Some of these variables which increase resistance to extinction will next be examined.

Reviewers of the literature (Brogden, 1951; Bugelski, 1956; Deese, 1952; Deese, 1958; Lawson, 1960; Osgood, 1953; and Razran, 1956) have concluded that resistance to extinction is inversely related to the number of reinforcements during acquisition up to a

limit, but beyond that limit there is no appreciable increase in resistance to extinction. However, there is some evidence that with a large number of reinforcements resistance to extinction decreases (Bindra and Seely, 1959; Capaldi, 1957; Capaldi, 1958; Lewis and Duncan, 1956; Lewis and Duncan, 1958; and North and Stimmel, 1960). The results of these experiments are interpreted as supporting the generalization hypothesis. As Mednick and Freedman (1960) have shown in a review of stimulus generalization, generalization increases as number of reinforcements increase, but with a large number of reinforcements, generalization breaks down or a discrimination begins to be formed. Thus, it seems consistent with Mednick and Freedman to say that with a large number of reinforcements it is easier to discriminate between acquisition and weakening phases.

Other experimental parameters, for example, effort, schedules of reinforcements, distribution of extinction trials, and drive, are consistent with the generalization hypothesis. Although earlier reviewers of the literature (Deese, 1952; Dollard and Miller, 1950; and Osgood, 1953) concluded that the rate of extinction varied directly as a function of greater work done in extinction, more recent reviewers questioned this relationship (Bugelski, 1956; Deese, 1958; Lawson, 1960; Maatsch, Adelman, and Denny, 1954; and Mowrer, 1960). The greatest resistance to extinction is displayed when the efforts required for the responses in the acquisition and weakening phases

are similar and the greater the differences in efforts required for the two phases, the greater the decrement (Lawson and Brownstein, 1957; Maatsch, Adelman, and Denny, 1954; and Stanley and Aamodt, 1954). Extinction is also dependent upon the schedule of reinforcements during acquisition. Perhaps one of the most accepted principles in psychology agreed upon by all reviewers is that, other things being equal, partial reinforcement during acquisition produces greater resistance to extinction than continuous reinforcement (Bugelski, 1956; Deese, 1952; Deese, 1958; Jenkins and Stanley, 1950; Lawson, 1960; Lewis, 1960; Mowrer, 1960; Osgood, 1953; and Woodworth and Schlosberg, 1954). Jenkins and Stanley (1950) and Jenkins (1956) interpreted the partial reinforcement effect as consistent with the generalization hypothesis, that is, partial reinforcement during acquisition is more similar to extinction than continuous reinforcement and thus more resistive to extinction. There are many studies which showed increased extinction when spacing of trials was changed from acquisition to extinction with rats (Sheffield, 1950; Stanley, 1952; Rothkopf, 1955; Teichner, 1952; and Wilson, Weiss, and Amsel, 1955) and with human eyelid conditioning (Grant, Schipper, and Ross, 1952; and Reynolds, 1945). The conclusions of Teichner (1952) and Deese (1958) appear in accord. They concluded that the greatest resistance in extinction is found when the intertrial intervals are the same during both acquisition and extinction and least when the intervals

are changed. Although many studies show the distribution of extinction trials influences extinction, the effects are relatively small. In the same way studies using a change in drive level from acquisition to extinction have showed large decrements in extinction (Cautela, 1956; Haralson, 1958; and Heathers and Arakelian, 1941).

In summary, some of the major empirical findings of extinction have been reviewed. These studies appear consistent with the generalization hypothesis which is also similar to Skinner's (1950) position on extinction. Lawson (1960) felt that the generalization hypothesis is so well documented that it should be referred to as the law of extinction.

II. COUNTER CONDITIONING

Counter conditioning, as previously defined, involves withholding the previously reinforcing stimulus from a response (extinction) plus the simultaneous reinforcement of an incompatible response. Few studies have been done on counter conditioning per se. Because counter conditioning is, in essence, the acquisition of a new response, it may be speculated that it has received little attention due to the belief that it follows the same laws of learning as response acquisition. The laws of response acquisition will not be reviewed here.

Some theorists (Jenkins, 1956; Guthrie, 1952; Lawson, 1960; and Mowrer, 1960) feel that extinction itself is unrewarded counter conditioning. They feel that if a response has been reinforced in the presence of specific cues, and if the reinforcement is removed, the response declines in strength and the organism learns different responses to those same cues. Although that "something else" response is usually ignored, it may interfere with the originally reinforced response and help to produce its decrement. Reinforcement of the new response to the old cues may then further the decline of the old response. Some of the studies of counter conditioning will be included later in this chapter when comparison of different methods of weakening behavior is discussed.

III. PUNISHMENT

As stated above, punishment is a stimulus following a learned response which reduces the probability of that response occurring. It is a negative incentive such as electric shock, disapproval, and the word "wrong," all of which have been used in studies of punishment. Although many studies have been concerned with the role of punishment in acquisition, we will consider here only those studies in which punishment has been used to weaken an existing response.

Punishment of a learned response has been found to reduce the strength of that response (Deese, 1952; Deese, 1958; Dinsmoor, 1954; Dinsmoor, 1955; Lawson, 1960; and Mowrer, 1960). Other conclusions from studies in which the lever pressing response of rats in the Skinner box was punished are as follows: (1) a really severe punishment may eliminate a response completely (Deese, 1952; Deese, 1958), (2) partial punishment, similar to partial reinforcement, is more effective than continuous punishment in maintaining the decrease in frequency of the originally acquired response after the punishing stimulus is no longer administered (Deese, 1958; Estes, 1944), (3) delayed punishment is not as effective as immediate punishment (Lawson, 1960). Stephens (1941) and Stephens and Baer (1944) found that punishment was more effective on strong habits than on weak habits in verbal associations.

The above empirical findings are consistent with the generalization hypothesis, and the following conclusions may be deduced from this theoretical position. Punishment appears to be a radical cue change in the sense that the response is punished rather than reinforced. Punishment provides many differential cues and is a type of negative feedback (Mowrer, 1960). A strong punishment would seem to make the punishing phase more distinct from the acquisition phase and thus produce a faster and better discrimination. Partial punishment, similar to partial reinforcement discussed previously,

increases generalization. Partial punishment, in contrast to continuous punishment, makes the period of punishment similar to the period of removal of punishment and increases the probability that the behavior during the punished period will continue to occur. Delaying punishment allows many behaviors to intervene between the response to be punished and the application of the punishment and hence allows punishment to be associated with responses other than the one which the experimenter wants to punish. In this case punishment provides few, if any, differential cues between the acquisition and punishing phases and thus little decrement would be expected. Similar to the extinction studies, the application of punishment to a strong habit would be more easily discriminated than punishing a weak habit.

IV. RESPONSE PREVENTION

Response prevention is defined as the creating of a situation in which it is impossible for the learned response to occur. The most relevant findings appear to be in the area of avoidance conditioning. In avoidance conditioning a warning signal is followed by a fixed interval of time and then an electric shock. The animal learns to run to the safe area on presentation of the warning stimulus thus avoiding the shock. During extinction the shock is given no longer. Response prevention in this design consists in preventing escape from the shock

area while extinction training is carried on. Page (1955), and Page and Hall (1953), and Carlson and Black (1959) found that later extinction was facilitated by preventing the escape response from occurring early in extinction. Black (1958) in a different approach immobilized the animals after conditioning by using the drug curare. In two replications he found that dogs immobilized early in extinction required fewer trials to reach an extinction criterion than those not so immobilized. Because of the nature of the avoidance situation, it is difficult for the animal to discriminate where acquisition ends and extinction begins; that is to know that the shock no longer occurs, because the learned response prevents the occurrence of shock. Response prevention keeps the animal in the situation, prevents the avoidance response, and thus would appear to increase discrimination between the shock and no shock phases.

V. PROACTIVE AND RETROACTIVE DESIGNS

The acquisition, weakening, and relearning design of the experiments reported here are similar to the experiments on proactive and retroactive inhibition. In this section some of the many studies on transfer of training will be reviewed.

Transfer in its simplest definition means that training on one task facilitates performance on another task, while the negative aspects of transfer are referred to as proactive or retroactive

inhibition. If the experimental task causes a decrement in the old task, retroactive inhibition is said to have occurred; if the experimental task interferes with the learning of a new task, proactive inhibition is said to have occurred. The distinction between transfer and inhibition will not be maintained here; positive transfer will be used synonymously with proactive or retroactive facilitation while negative transfer will be used synonymously with proactive and retroactive inhibition.

The degree of original learning has a significant influence on the amount of transfer. In the retroactive design the degree of original learning as measured by varying the number of trials, setting a performance criterion, or analyzing individual item strengths, influences the amount of retroactive inhibition (Slamecka and Ceraso, 1960). These studies have shown that the greater the degree of original learning, the less the amount of retroactive inhibition and the greater the amount of interpolated learning needed to produce maximal retroactive inhibition on recall scores. Studies measuring the degree of interpolated learning by varying the number of trials, by setting a performance criterion, or by varying the number of interpolated lists have shown that recall scores, after interpolation, were a negatively accelerated increasing function of increasing interpolated activity (Slamecka and Ceraso, 1960). The greatest interference occurred when the interpolated practice slightly exceeded the original

learning. However, with high degrees of interpolated activity, the amount of retroactive interference was reduced. Similar findings were reported by McAllister and Lewis (1951) and Lewis and Miles (1956) on the Modified Mashburn Apparatus.

In proactive studies, proactive inhibition increases as a function of original learning (first task) and appears to level off at a high degree of prior learning (Slamecka and Ceraso, 1960). However, proactive inhibition is more sensitive to procedural differences and some variations in design do not produce this effect. There is some evidence that proactive inhibition decreases with high levels of original learning.

Slamecka and Ceraso (1960) have reviewed studies of similarity and retroactive inhibition. There are no studies on the proactive design and similarity. The authors found that in the A-B, C-B paradigm (stimuli between the two tasks different, but responses similar) all the studies found retroactive facilitation with verbal tasks which increased as stimulus similarity increased. Similar findings were observed in the proactive transfer design for a variety of different tasks (Adams, 1954; Briggs, Fitts, and Bahrick, 1958; Briggs and Waters, 1958; Mandler, 1954; and Mandler and Heinemann, 1958).

In the A-B, A-C paradigm (the stimuli between the two tasks similar, but the responses different) is typically believed to produce

retroactive inhibition. As response similarity is decreased from identity to antagonism, retroactive facilitation changes towards retroactive inhibition. However, Slamecka and Ceraso (1960) in their review of verbal studies criticized most of the positive findings and concluded that this principle had not been clearly established. With the same paradigm in the proactive transfer design, some studies found negative transfer, Mandler (1954) for a lever pressing response to specific letters, Spiker and Holton (1958) for a motor paired-associate task, and Besch and Reynolds (1958) for paired adjective lists. Other studies found no consistent effects, Mandler and Heinemann (1956) and Porter and Duncan (1953) for paired associates, and still other studies found positive transfer, Duncan (1953) and Underwood (1951) with paired associates, but both found positive transfer increasing as response similarity increased. The inconsistent findings of Mandler and Heinemann (1956) and Porter and Duncan (1953) have been criticized by Besch and Reynolds (1958) for not controlling "warm up" effects and failure to have the subjects sufficiently practiced. Deese (1958) explained why this paradigm sometimes leads to positive transfer and sometimes to negative transfer. If the first task contains components of the second task, then positive transfer occurs; if it does not or if the first task interferes with the second task, then negative transfer occurs.

Thus, other things being equal, this paradigm produces negative transfer. Slamecka and Ceraso (1960) have given evidence which shows that these relationships between transfer and the various paradigms hold for serial list learning and perhaps even for prose.

In their review Slamecka and Ceraso (1960) pointed out the transitory nature of the interference in proactive and retroactive designs. The effects of the inhibition often disappear by even the second relearning trial.

Forgettings or loss in retention have often been attributed to proactive or retroactive inhibition. Underwood (1957) states that nobody rejects the view that interference plays some role in forgetting. He felt that research has narrowed the causes of forgetting to three sources: (1) interference from learning previous lists, (2) interference from habits being currently learned, and (3) interference from habits subsequently learned. The amount of interference is primarily a function of associative strength and similarity and the interaction between them. Underwood made a good presentation of his belief that forgetting is more a result of proactive than retroactive inhibition.

Transfer, in terms of the generalization hypothesis, would be due to the similarity of the tasks involved. If the tasks are compatible or similar there is positive transfer; if the tasks produce interference between each other (cue change), there is negative transfer. If the paradigm (A-B, C-B) results in positive transfer,

the greater the similarity between the two tasks, the greater the positive transfer. If the paradigm (A-B, C-D) produces negative transfer or retroactive and proactive inhibition, the greater the similarity between the two tasks, the greater the amount of negative transfer. Anything which increases the discrimination between the two tasks will reduce the amount of transfer. The findings of the three paradigms reported above are generally consistent with this theoretical position and also in many respects similar to Gibson's (1940) views on proactive and retroactive inhibition and to Gagne, Baker, and Foster's (1950) position on transfer of training.

In like manner the degree of original learning or interpolated learning fits this theoretical position of the generalization hypothesis. Mednick and Freedman (1960) in a review of stimulus generalization have shown that generalization increases as number of reinforcements increases. However, with a large number of reinforcements, generalization breaks down and a discrimination begins to be formed. Thus, in the proactive and retroactive designs as original learning is increased, inhibition increases up to a point, but, with a greater amount of original learning, inhibition decreases. In the retroactive design with sufficiently great amounts of interpolated activity, the interpolated activity becomes more easily discriminated from the original learning thus decreasing inhibition. However, the

predictions deduced from the generalization hypothesis in transfer are closest to the Skaggs-Robinson Hypothesis (Robinson, 1927). The hypothesis states that "as similarity between interpolation and original memorization is reduced from near identity, retention falls away to a minimum and then rises again, but with decreasing similarity it never reaches the level obtained with maximum similarity" (Robinson, 1927, p. 298).

VI. COMPARISON OF DIFFERENT METHODS OF WEAKENING BEHAVIOR

The effects of punishment on weakening a learned response have been constrasted with the effects of extinction. Skinner (1938) punished rats in the Skinner box by slapping them on the paw with the lever after a lever pressing response had been well established. Rats punished at the outset made fewer lever responses early in extinction than the control animals under regular extinction. However, by the end of the extinction period the punished animals caught up with the control animals in total number of responses emitted. Skinner interpreted these results as showing that punishment has only a temporary inhibiting effect. Estes (1944) substituting electric shock for the slap in the same apparatus confirmed Skinner's results. However, Estes (1944) found that both continued punishment or punishment for

only a portion of the responses kept responding at a low level. However, an intense traumatic punishment may eliminate the response and it will show little recovery (Deese, 1952). Punishment appears to be a greater cue change than extinction and we would thus predict a greater decrement in responding. The findings of only a temporary decrement with a few mild punishments at the beginning of the extinction period may also be attributable to cue change, because the animals can easily discriminate between the end of the punished period and the beginning of the extinction training.

Avoidance conditioning, mentioned previously under response prevention, produces a response which is extremely resistant to extinction. Solomon and Wynne (1954) reviewing some of the work done in their laboratory felt that the response was so resistant to extinction that it could not be completely extinguished. They reported one experiment with dogs in which a few shocks yielded over 650 avoidance responses with few signs of weakening. Solomon, Kamin, and Wynne (1953) trained dogs in the Mowrer-Miller Shuttlebox using the avoidance conditioning design. After the avoidance response had been well established, they were exposed to four different weakening procedures: (1) regular extinction, (2) response prevention in which a glass barrier prevented the animals from making the response during extinction, (3) punishment for making the avoidance response during extinction, and (4) a combination of response prevention and

punishment of the avoidance response during extinction. The results were as follows: (1) ordinary extinction was "ineffective," (2) response prevention and mild punishment were equal and mildly effective, (3) the combined response prevention and punishment technique was most effective in weakening the avoidance response. According to the theoretical position of this paper, the combined procedure was a more radical cue change and hence provided more differential cues between the conditioning and weakening phases than were provided by punishment or response prevention alone, while either punishment or response prevention alone provided more of a change than did regular extinction.

Page and Hall (1953), mentioned previously under response prevention, trained rats to escape from the first of two identical chambers to the second to avoid shock. One group was given extinction training immediately while the other group was prevented from making the avoidance response early in extinction training. They found that response prevention on the first few extinction trials led to faster extinction than ordinary extinction. In a later study using the same apparatus, Page (1955) confirmed their results and also found that response prevention plus the reinforcement of a competing running response (counter conditioning) yielded the fastest weakening. Thus, these studies found that response prevention plus counter conditioning yielded faster weakening of an avoidance response than response prevention. Response prevention, in turn, produced a greater decrement than ordinary extinction.

Timmons (1959) conditioned college students to say words beginning with certain letters. After the response had been well established, he divided the subjects into four groups, each group receiving a different method of weakening behavior. The weakening procedures were as follows: (1) counter conditioning in which a word beginning with a different letter was reinforced by saying "right," (2) punishment in which the word "wrong" was said following each occurrence of the originally conditioned response, (3) ordinary extinction, and (4) combined punishment and reinforcement. The following order of decreasing effectiveness in weakening the conditioned response was found: punishment plus counter conditioning, counter conditioning, punishment, and ordinary extinction. The addition of punishment added little to the effectiveness of counter conditioning. Timmons interpreted his results and the results of other studies as supporting the generalization hypothesis.

In this section we have reviewed studies which have compared more than one procedure in weakening a learned response. The findings appear consistent with the generalization hypothesis. The effectiveness of a specific procedure in weakening a learned response depends upon the degree of cue change which it provided between the acquisition and weakening phases. The greater the cue change, the greater the decrement in response strength.

CHAPTER III

EXPERIMENTAL PROCEDURE

I. EXPERIMENT I

Subjects were randomly selected male veterans from the domiciliary population at Mountain Home, Tennessee. They were given the following instructions:

> See this box in front of you. It has five doors. Push them open to see how they work. Now I am going to put a cigarette behind one of the doors. When I say ready, I want you to find it. Each time you will have only one chance to guess the correct door. If you push open the right door, you keep the cigarette. The better you play the game, the more cigarettes you will win.

With the punished groups, to be defined below, another sentence was added, "If you push open the wrong door, sometimes I will take back one cigarette."

The Hunter-Pascal Concept Formation Test, described elsewhere (Pascal and Jenkins, 1959), was the apparatus used. It has five doors which are opened from the subject's side. The subjects were reinforced by finding a cigarette behind the correct door. Punishment for choosing a wrong door consisted of taking back a cigarette. Response prevention was brought about by placing a block of wood in front of the conditioned door on the subject's side so that the door could not be opened.

Door 2 of the H-P apparatus was reinforced 75 per cent of the time under a random ratio schedule (see Table I) with the criterion of learning being eight consecutive responses. It was decided that subjects who did not meet the criterion within one-hundred responses would be discarded. Out of sixty subjects only forty met the criterion of learning.

The forty subjects meeting the criterion were randomly assigned to the eight groups depicted in Table I. The weakening phase was fixed at fifty responses for each subject. All schedules of reinforcement and punishment were random ratio schedules. The weakening phase immediately followed the learning phase. Group I received extinction. Group II was exposed to extinction plus counter conditioning (75 per cent of Door 4). In Group III the subjects were punished 75 per cent of the time for repeating the originally learned response (pushing Door 2). The subjects in Group IV were punished 75 per cent of the time for pushing Door 2 while simultaneously being reinforced 75 per cent of the time for an incompatible response to Door 4 (counter conditioning). The subjects in Group V were prevented from repeating the originally learned response. Group VI subjects were prevented from repeating the originally learned response while simultaneously being reinforced 75 per cent of the time for pushing Door 4 (counter conditioning). In Group VII the subjects were punished 75 per cent of the time despite the correctness or

TABLE I

THE BASIC DESIGN COMPARING THE DIFFERENTIAL EFFECTS OF EXTINCTION, COUNTER CONDITIONING, PUNISHMENT, RESPONSE PREVENTION, AND A COMBINATION OF THESE OPERATIONS IN WEAKENING BEHAVIOR

	Learning Phase	Weakening Phase	Relearning Phase
Group I	75% Reinforcement Door 2	Extinction (Removal of Reinforcement)	75% Reinforcement Door 2
Group II	75% Reinforcement Door 2	Extinction Plus Counter Conditioning (75% Reinforcement Door 4)	75% Reinforcement Door 2
Group III	75% Reinforcement Door 2	75% Punishment of Door 2	75% Reinforcement Door 2
Group IV	75% Reinforcement Door 2	75% Punishment of Door 2 Plus Counter Conditioning (75% Reinforcement of Door 4)	75% Reinforcement Door 2
Group V	75% Reinforcement Door 2	Response Prevention (Blocking Door 2)	75% Reinforcement Door 2
Group VI	75% Reinforcement Door 2	Response Prevention (Blocking Door 2) Plus Counter Conditioning (75% Reinforcement Door 4)	75% Reinforcement Door 2
Group VII	75% Reinforcement Door 2	Unsystematic Punishment (75% Punishment For Any Response Made by the Subject)	75% Reinforcement Door 2
Group VIII	75% Reinforcement	Unsystematic Reinforcement and Punishment (Punished 50% and Reinforced 50% APR For 75% of Any Responses Made by the Subject)	75% Reinforcement Door 2

incorrectness of the response. The subjects in Group VIII were unsystematically reinforced 50 per cent of the time and punished 50 per cent of the time for 75 per cent of their responses despite the correctness or incorrectness of the response.

Group VII, the unsystematic punished group, was treated slightly different from the other groups. Since the subjects in Group VII did not accumulate enough cigarettes during the learning phase to offset the cigarettes taken away during the weakening phases, the subjects were given an open pack of cigarettes during the weakening phases with no verbal comment by the experimenter. If the subjects asked any questions about the pack of cigarettes, the experimenter only said to keep pushing the doors.

In the relearning phase, which immediately followed the weakening phase, all subjects relearned the originally learned response (pushing Door 2) to the same criterion (eight consecutive correct responses) under a 75 per cent random ratio reinforcement schedule.

Our first hypothesis was that the greater the similarity between acquisition and weakening phases, the more resistive the response would be to weakening. In the weakening phase the subject must learn not to respond to Door 2 but to do something else. It was hypothesized that the more cues given to the subject about what

TABLE II

THE KIND OF CUES, THE WEIGHTED VALUE OF THE CUES, AND THE PREDICTED ORDER OF WEAKENING INFLUENCE FOR THE SIX GROUPS DURING THE WEAKENING PHASE

	Group	Kind of Information	Weighted Value	Predicted Order
I	Extinction	Door 2 May No Longer Be Correct (Indefinite)	1	4
II	Counter Conditioning	Door 4 Correct (Definite); Door 2 May Be Incorrect (Indefinite)	3	2
III	Punishment	Door 2 Incorrect (Definite)	2	3
IV	Punishment Plus Counter Conditioning	Door 2 Incorrect (Definite); Door 4 Correct (Definite)	4	1
VII	Unsystematic Punishment	Sometimes Door 2 Incorrect But It Seems As Correct as the Others (No Information)	0	5
VIII	Unsystematic Reinforcement and Punishment	Sometimes Door 2 Incorrect But So Are The Others (No Information); Sometimes Door 2 Correct (Minus Indefinite)	-1	6

was to be learned about the changed need for responding, the faster the competing response would be learned. Thus in this experiment the more differential cues that a particular operation gave to the subject concerning the giving up of pushing Door 2, the more effective this operation should be in weakening the response of pushing Door 2.

A crude method of quantifying stimulus change for the weakening phase was devised (Table II). If the weakening operation provided definite cues for the subject, they were given a weight of two. If the weakening operation provided indefinite cues, they were given a weight of one. Since Groups V and VI were prevented from making any Door 2 responses during the weakening phase, they do not appear in Table 2 defining the kind of cues given to the subjects in each group, its weighted value, and the predicted order of habit interference. In extinction (Group I) the removal of reinforcement communicated to the subject that Door 2 might no longer be correct because reinforcements were no longer given. However, since reinforcements were not given on every trial during acquisition and since the extinction operation did not give any definite cues not to push Door 2, extinction was given the weight of one. Reinforcement of Door 4 communicated to the subject that Door 4 must be pushed during the weakening phase (definite cue). Thus, counter conditioning (Group II) which involved extinction (indefinite cue) and the reinforcement of Door 4 (definite cue) was given a weight of three. Punishment (Group III) was given

a weight of two because punishment of Door 2 during the weakening phase communicated to the subject that Door 2 must no longer be pushed (definite cue). Group IV, punishment (definite cue) plus counter conditioning (definite cue), was given a weight of four. The use of unsystematic punishment (Group VII) did not provide any differential cues to the subject that Door 2 might be incorrect but it seemed as correct as the other doors. Since the use of unsystematic reinforcement occasionally reinforced Door 2 producing negative information about giving up the pushing of Door 2, the operation using unsystematic punishment (no cues) and unsystematic reinforcement (minus indefinite) was given a weight of minus one (Group VIII). It was predicted that Group IV would have the fewer Door 2 responses followed by Group II, Group III, Group I, Group VII, and Group VIII in that rank order of effectiveness. Thus, punishment plus counter conditioning would be the most effective method of weakening the learned habit and unsystematic reinforcement and punishment would be the least effective.

The second hypothesis was that the greater the similarity between the weakening and relearning phases, the faster would be the relearning. In relearning all the groups were treated alike. The changes from weakening to relearning were more complex than the changes from acquisition to the weakening phase. During the relearning phase only one experimental treatment (counter conditioning) was

applied and the end result of any single treatment might be expected to produce a reduction in individual differences. In addition, the subjects had been taught two habits in the same stimulus situation by the time of the relearning phase. They learned to push Door 2 and they learned to do something else. There is some evidence that when two habits are learned in response to the same stimulus and the second habit ceases to be reinforced, the subjects will return to the first habit.

In the same way as for the weakening phase, a crude method for estimating the extent of stimulus change can be devised for the relearning phase as the subjects must relearn pushing Door 2. Table III gives the kind of cues, the weighted values of the cues, and the predicted order of the speed of relearning the original response. The amount of differentiation provided by reinforcement of Door 2 depended upon what the subject had learned during the weakening phase. The reinforcement of Door 2 during the relearning phase for the extinction group (Group I) communicated to the subjects that Door 2 was again correct (definite cue) and this condition was given a weight of two. For the counter conditioning group (Group II) reinforcement of Door 2 during the relearning phase communicated to the subjects that Door 2 was correct (definite cue) and the removal of reinforcement from Door 4 (extinction) communicated to the subjects that Door 4 may no

TABLE III

THE KIND OF CUES, THE WEIGHTED VALUE OF THE CUES, AND THE PREDICTED RANK ORDER OF THE SPEED OF RELEARNING THE ORIGINAL RESPONSE

Groups	Kind of Information	Weighted Value	Predicted Order of Means
VIII Unsystematic Punishment and Reinforcement	Reinforcement of Door 2 Provides Maximum Information	Maximum	1
VI Response Prevention Plus Counter Conditioning	Door 2 Correct (Plus Definite) Door 2 Response Can Be Made (Plus Indefinite) Door 4 May No Longer Be Correct (Plus Indefinite)	4	2
V Response Prevention	Door 2 Correct (Plus Definite) Door 2 Response Can Be Made (Plus Indefinite)	3	3.5
II Counter Conditioning	Door 2 Correct (Plus Definite) Door 4 May Be Wrong (Plus Indefinite)	3	3.5
I Extinction	Door 2 Correct (Plus Definite)	2	5
VII Unsystematic Punishment	Door 2 Sometimes Wrong (Minus Indefinite) Door 2 Sometimes Right (Plus Indefinite)	0	6
IV Punishment Plus Counter Conditioning	Door 2 Wrong (Minus Definite) Door 4 May Not Be Correct (Plus Indefinite)	-1	7
III Punishment	Door 2 Wrong (Minus Definite)	-2	8

longer be correct (indefinite cue) which gave a weight of three for this condition. For the response prevention group (Group V) reinforcement of Door 2 communicated to the subjects that Door 2 was correct (definite cue) and the removal of the block from Door 2 provided the information that Door 2 could be used (indefinite cue) which gave a weight of three for this group. The reinforcement of Door 2 during the relearning phase for the group exposed to response prevention plus counter conditioning (Group VI) provided the subjects with the weighted value of response prevention (plus three) plus the indefinite cue provided by extinction of Door 4 which gave a weight of four for this condition. For three of the punished groups (Groups II, IV, and VII) the previous learning gave negative cues. That is, since the subjects in these groups were punished for pushing Door 2 during the weakening phase, it would take some time for them to overcome that previous learning and to push Door 2 in the relearning phase before that response could be reinforced. Thus the reinforcement of Door 2 during the relearning phase provided no positive cues for these three punished groups early in relearning. Yet the previous punishment during the weakening phase provided a definite negative cue that Door 2 was incorrect (minus two), no differential cues for Group VII since Door 2 was sometimes right and sometimes wrong, and for Group IV the definite negative cue that Door 2 was

wrong (minus two) plus the indefinite positive cue from extinction of Door 4 (plus one). The other punished group, Group VIII, was the only group reinforced for pushing Door 2 during the weakening phase and thus it experienced the least cue change from weakening to relearning.

II. EXPERIMENT II

In Chapter I it was predicted that people having difficulties in living (domiciled veterans) would show greater learning deficits than people having fewer difficulties in life (hospitalized veterans).

Each domiciliary subject in the first experiment who met the criterion of learning was matched with a male veteran from the Hospital at Veterans Administration Mountain Home on age, education, and socio-economic status. The hospital subjects were taken from the general medical wards and were ambulatory. Since Groups V and VI, the response prevention groups, did not yield appreciable differences during the relearning phase of Experiment I, they were not replicated in Experiment II. Out of forty-two subjects, thirty met the criterion of learning. It was predicted that the various sub-groups of patients would have the same rank order of performance during the weakening and relearning phases as the various sub-groups of members. However, a difference in learning favoring patients was predicted which would indicate learning deficits in the domiciliary population.

On the basis of observation of subjects during Experiment I, a five point qualitative scale was constructed for the learning phase. Immediately following the experiment, the subjects were asked if they knew which door was correct during the experiment. From the subjects' verbalizations and performance the scale proved to be of the Guttman type. That is, a subject obtaining a given score must have fulfilled the criteria for all of the points indicating poorer performances. The five points were as follows: (1) learning and reaching the criterion (eight consecutive Door 2 responses), (2) learning (four consecutive responses) but not reaching the criterion, (3) a lower level of learning (five correct responses out of the last ten), (4) no learning but knowledge that Door 2 was reinforced, and (5) no learning and lack of knowledge that Door 2 was reinforced. It was predicted that this scale would significantly separate hospital subjects from domiciliary subjects revealing learning deficits in the domiciliary subjects.

CHAPTER IV

RESULTS

I. ACQUISITION PHASE

In Table IV the number of responses required for the individual subjects in each group to reach the criterion are recorded for the first experiment. The analysis of variance for the eight different means yielded an F of 1.38 which was insignificant and indicates that the groups were not significantly different in the learning phase. Similar results were obtained in the second experiment. Table V gives the number of responses for the individual subjects to reach the criterion of learning for the hospital sample. Analysis of variance for the six different means yielded an F of .26 and indicates that the groups were not significantly different. A glance at either Table V or Table VI reveals the tremendous variability not only within groups but between groups. However, if the two tables are combined the means for the six groups are more equated (Table VI).

The third hypothesis predicted that domiciliary subjects would learn slower than the hospital subjects. However, there were no significant differences between the groups in the domiciliary sample and the groups in the hospital sample. It was further predicted that a qualitative scale of learning would separate the two samples. Table VII shows that the scale separated the two samples yielding an X^2 of 10.34 and a probability of less than .04. Thus, the third hypothesis received some support.

TABLE IV

NUMBER OF RESPONSES TO REACH THE CRITERION FOR THE INDIVIDUAL SUBJECTS IN THE EIGHT DIFFERENT GROUPS FOR THE DOMICILIARY SAMPLE

	Groups							
Ss	I	II	III	IV	V	VI	VII	VIII
1	12	45	21	42	19	68	17	44
2	69	50	15	13	41	25	67	54
3	10	50	20	14	53	73	66	36
4	10	16	59	22	67	63	66	20
5	81	16	30	23	6	82	36	16
Mean	36.4	35.4	29	22.8	37.2	62.2	50.4	34
Median	12	45	21	22	41	68	66	36
S.D.	31.59	15.91	15.76	10.42	22.17	19.63	20.42	14.31

$F_{7, 32} = 1.58$

$p > .05$

TABLE V

NUMBER OF RESPONSES TO REACH THE CRITERION FOR THE INDIVIDUAL SUBJECTS IN THE SIX DIFFERENT GROUPS FOR THE HOSPITAL SAMPLE

	Groups					
Ss	I	II	III	IV	VII	VIII
1	6	17	31	44	31	10
2	29	17	35	31	16	49
3	13	55	53	89	59	59
4	80	96	89	64	23	94
5	30	53	37	3	11	67
Mean	31.6	47.6	49	46.2	28	55.8
Median	29	53	37	44	23	59
S.D.	25.89	29.32	21.35	29.16	16.9	27.34

$F_{5, 24} = .26$

$p > .05$

TABLE VI

NUMBER OF RESPONSES TO REACH THE CRITERION OF LEARNING FOR THE INDIVIDUAL SUBJECTS IN THE SIX DIFFERENT GROUPS FOR THE COMBINED SAMPLES

	Groups					
Ss	I	II	III	IV	VII	VIII
1	12	45	21	42	17	44
2	69	50	15	13	67	54
3	10	50	20	14	66	36
4	10	16	59	22	66	20
5	81	16	30	23	36	16
6	6	17	31	44	31	10
7	29	17	35	31	16	49
8	13	55	53	89	59	59
9	80	96	89	64	23	94
10	30	53	37	3	11	67
Mean	34	41.5	39	34.5	39.2	44.9
Median	21	47.5	33	27	33.5	46.5
S.D.	29.07	24.36	21.27	24.82	21.84	24.39

$F_{5, 54} = .26$

$p > .05$

TABLE VII

THE DISTRIBUTION OF THE HOSPITAL AND DOMICILIARY SAMPLES ON THE QUALITATIVE SCALE OF LEARNING

Score	Hospital Subjects	Domiciliary Subjects
1. Learning, Reaching Criterion	30	40
2. Learning, Not Reaching Criterion	2	3
3. Low Level of Learning	6	1
4. No Learning, Knowledge Door 2 Reinforced	4	12
5. No Learning, No Knowledge Door 2 Reinforced	0	4
N	42	60
	$X^2 = 10.34$	
	df = 4	
	$p < .04$	

II. WEAKENING PHASE

Table VIII gives the total number of Door 2 responses during the weakening phase for the domiciliary sample. A single classification analysis of variance yielded an F of 10.73 which was significant at less than the .001 level. Since there was not homogeneity of variances, a Kruskal-Wallis "Rank Chi Square Test" was used yielding a significant probability at less than .01. The results of the hospital sample are given in Table IX. A single classification analysis of variance yielded an F of 7.7 which was significant at less than the .001 level. There were no significant differences between the groups in the domiciliary sample and the groups in the hospital sample. The combined results of the two samples during the weakening phase are found in Table X. The analysis of variance for the combined samples yielded an F of 18.42 which was significant at less than the .001 level. For both the domiciliary sample and the hospital sample and also for the combined samples the Tukey Gap Test for comparing individual means separated Group VIII from the other five groups at less than the .001 level of significance, but no other significant gaps emerged. The test for stragglers also failed to separate the remaining five groups. The five groups did not form a single group and the means showed excessive variability.

TABLE VIII

THE TOTAL NUMBER OF FORMERLY CORRECT (DOOR 2) RESPONSES FOR EACH SUBJECT IN THE SIX DIFFERENT GROUPS DURING THE WEAKENING PHASE FOR THE DOMICILIARY SAMPLE

	Groups					
Ss	I	II	III	IV	VII	VIII
1	18	8	11	6	24	33
2	16	6	21	16	17	27
3	20	14	20	4	16	23
4	14	17	3	3	26	48
5	16	2	2	4	16	48
Mean	16.8	9.4	11.4	6.6	19.8	35.8
Median	16	8	11	4	17	33
S.D.	2.04	5.42	8.06	4.8	4.3	10.46

$F_{5, 24} = 10.73$, $p < .01$

X^2 H = 18.21, df = $p < .01$

TABLE IX

THE TOTAL NUMBER OF FORMERLY CORRECT (DOOR 2) RESPONSES FOR EACH SUBJECT IN THE SIX DIFFERENT GROUPS DURING THE WEAKENING PHASE FOR THE HOSPITAL SAMPLE

	Groups					
Ss	I	II	III	IV	VII	VIII
1	32	2	24	13	15	49
2	19	11	20	17	17	32
3	25	13	33	5	24	36
4	16	10	3	8	15	31
5	15	5	8	5	13	24
Mean	21.4	8.2	17.6	9.6	16.3	34.4
Median	19	10	20	8	15	32
S.D.	6.33	4.07	10.86	4.72	3.81	8.26

$F_{5, 24} = 7.7$

$p < .001$

TABLE X

THE TOTAL NUMBER OF FORMERLY CORRECT (DOOR 2) RESPONSES FOR EACH SUBJECT IN THE SIX DIFFERENT GROUPS DURING THE WEAKENING PHASE FOR THE COMBINED SAMPLES

	Groups					
Ss	I	II	III	IV	VII	VIII
1	18	8	11	6	24	33
2	16	6	21	16	17	27
3	20	14	20	4	16	23
4	14	17	3	3	26	48
5	16	2	2	4	16	48
6	32	2	24	13	15	49
7	19	11	20	17	17	32
8	25	13	33	5	24	36
9	16	10	3	8	15	31
10	15	5	8	5	13	24
Mean	19.1	8.8	14.5	8.1	18.3	35.1
Median	17	9	15.5	5.5	16.5	32.5
S.D.	4.22	4.84	10.10	4.99	4.35	9.45

$F_{5, 54} = 18.42$

$p < .001$

When the number of Door 2 responses during the weakening phase were broken down into blocks of ten trials, both the domiciliary sample (Table XI) and the hospital sample (Table XII) showed that these different operations produced significant differences within the first ten trials. The analysis of variances were highly significant for each block of ten trials in both samples.

Groups VII and VIII are rather special cases of weakening methods while Groups I, II, III, and IV are ones more traditionally used. The analysis of variance for the latter four groups yielded an F 3,16 of 2.89 for Experiment I which was significant at the .07 level, an F 3,16 of 3.27 for Experiment II which was significant at less than the .05 level, and an F 3,36 of 5.47 for the combined samples which was significant at less than the .01 level. A Tukey Gap Test separated the four groups into two groups with Groups II and IV forming one group and Groups I and III the other. Thus, punishment plus counter conditioning or counter conditioning alone were more effective methods of weakening behavior than either extinction or punishment alone.

The first hypothesis, that the greater the similarity between acquisition and weakening phases the more resistive the learned responses would be to weakening influences, was confirmed by both experiments and the results of the combined samples. Table XIII

gives the Spearman rank correlations between the predicted and empirical means for Experiment I, Experiment II, and the combined data during the weakening phase. The following rank order of means was predicted in terms of their effectiveness in weakening a learned response: Group IV (punishment plus counter conditioning), Group II (counter conditioning), Group III (punishment), Group I (extinction), Group VII (unsystematic punishment), and Group VIII (unsystematic punishment and reinforcement). The correlations between the predicted and the empirical means were 1.00 for Experiment I (probability less than .01), .77 for Experiment II (probability less than .05), and .94 for the combined data (probability less than .01). In contrast to the magnitude of these correlations, the Spearman rank correlations between the means in the acquisition phase and the means in the weakening phase were all insignificant being .54 for Experiment I, .06 for Experiment II, and .26 for the combined data. Thus, the various experimental operations produced significantly different effects. The effectiveness of a particular weakening operation appeared to be due to the differential cues and the weighted value of these cues between the acquisition and weakening phases.

TABLE XI

THE MEAN NUMBER OF DOOR 2 RESPONSES BROKEN DOWN INTO BLOCKS OF TEN TRIALS DURING THE WEAKENING PHASE FOR THE DOMICILIARY SAMPLE

		Trials				
	Groups	1-10	11-20	21-30	31-40	41-50
I	Extinction	4.4	3.4	2.8	2.8	3.4
II	Counter Conditioning	4.6	1.2	1.4	1.4	1.0
III	Punishment	4.0	2.6	2.0	1.8	1.0
IV	Punishment Plus Counter Conditioning	4.2	.8	.6	.6	.4
VII	Unsystematic Punishment	5.4	4.2	3.6	3.0	3.4
VIII	Unsystematic Punishment and Reinforcement	7.8	7.0	7.4	7.2	6.4
F 5,24	Analysis of Variance	4.94	9.21	9.0	7.51	7.19
p	Less Than	.01	.001	.001	.001	.001

TABLE XII

THE MEAN NUMBER OF DOOR 2 RESPONSES BROKEN DOWN INTO BLOCKS OF TEN TRIALS DURING THE WEAKENING PHASE FOR THE HOSPITAL SAMPLE

		Trials				
	Groups	1-10	11-20	21-30	31-40	41-50
I	Extinction	5.4	4.4	4.2	3.8	3.6
II	Counter Conditioning	3.4	1.4	1.8	.8	.8
III	Punishment	4.4	3.2	3.2	2.8	4
IV	Punishment Plus Counter Conditioning	4.0	2	1.2	1.4	1
VII	Unsystematic Punishment	4.2	3	3.4	3	3.2
VIII	Unsystematic Punishment and Reinforcement	8.2	6.6	6.6	5.6	7.4
F 5,24	Analysis of Variance	7.58	5.47	5.26	4.39	7.88
p	Less Than	.001	.01	.01	.01	.001

TABLE XIII

THE SPEARMAN RANK CORRELATIONS BETWEEN THE PREDICTED AND EMPIRICAL MEANS FOR EXPERIMENT I, EXPERIMENT II, AND THE COMBINED DATA FOR THE WEAKENING PHASE

		Exp. I (1)		Exp. II (2)		Combined (3)	
Groups	Predicted Order	Mean	Rank	Mean	Rank	Mean	Rank
IV	1	6.6	1	9.6	2	8.1	1
II	2	9.4	2	8.2	1	8.8	2
III	3	11.4	3	17.6	4	14.5	3
I	4	16.4	4	21.4	5	19.1	5
VII	5	19.8	5	16.8	3	18.3	4
VIII	6	35.8	6	34.4	6	35.1	6
		rho = 1.00		rho = .77		rho = .94	
		p< .01		p< .05 (one tail)		p< .01	

(1) $F_{5, 24} = 10.73$, $p < .001$

(2) $F_{5, 24} = 7.7$, $p < .001$

(3) $F_{5, 54} = 18.42$, $p < .001$

III. RELEARNING PHASE

During the relearning phase there were no significant differences between the groups in the number of responses to reach the criterion of relearning for either the domiciliary sample (Table XIV) or the hospital sample (Table XV). The subjects were stopped after one-hundred trials with three subjects failing to relearn to the criterion in the domiciliary sample. There were no significant differences between the groups in the domiciliary sample and the groups in the hospital sample. Attention is directed to the extreme variability within groups and between groups.

The weakening of the habit was also evaluated by calculation of a saving score. Table XVI gives the saving scores for the eight groups in the domiciliary sample and Table XVII for the six groups in the hospital sample. There were no significant differences in either sample.

As stated previously, the effects of interference in a retroactive inhibition design disappear early during relearning. For that reason and because of the extreme variability among groups and individuals during relearning, and because some subjects relearned immediately, the first eight trials constituted the largest unit upon which all subjects could be compared. The number of Door 2 responses in the first eight trials are given in Table XVIII for the domiciliary sample and Table XIX for the hospital sample. While the F for the

TABLE XIV

THE NUMBER OF RESPONSES TO REACH THE CRITERION FOR INDIVIDUAL SUBJECTS IN THE EIGHT DIFFERENT GROUPS DURING THE RELEARNING PHASE FOR THE DOMICILIARY SAMPLE

	Groups							
Ss	I	II	III	IV	V	VI	VII	VIII
1	0	12	29	11	6	1	36	19
2	28	35	1	11	19	6	1	25
3	2	34	2	6	44	46	100	40
4	100	34	68	42	27	4	9	0
5	15	0	100	7	14	9	17	0
Mean	29	23	40	15.4	22	13.2	32.6	16.8
Median	15	34	29	11	19	6	17	19
S.D.	36.9	14.38	38.6	13.45	12.94	16.60	35.65	15.32

$F_{7, 32} = .52$

$p > .05$

TABLE XV

THE NUMBER OF RESPONSES TO REACH THE CRITERION FOR INDIVIDUAL SUBJECTS IN THE SIX DIFFERENT GROUPS DURING THE RELEARNING PHASE FOR THE HOSPITAL SAMPLE

	Groups					
Ss	I	II	III	IV	VII	VIII
1	0	3	52	16	1	0
2	22	14	11	83	4	21
3	18	27	31	4	36	11
4	3	1	44	14	11	49
5	4	6	20	4	18	17
Mean	9.4	10.2	31.6	24.2	14	19.6
Median	4	6	31	14	11	17
S.D.	9.16	9.49	15.03	29.82	12.47	16.32

$\chi^2_H = 5.67$

$df = 5$

$p > .05$

TABLE XVI

THE SAVING SCORES FOR INDIVIDUAL SUBJECTS IN THE EIGHT DIFFERENT GROUPS FOR THE DOMICILIARY SAMPLE

	Groups							
Ss	I	II	III	IV	V	VI	VII	VIII
1	+100	+73	-38	+74	+68	+99	-112	+57
2	+59	+50	+93	+15	+54	+76	+98.5	+54
3	+80	+32	+90	+57	+17	+37	-51.5	-11
4	-900	-113	-15	-91	+60	+94	+86	+100
5	+81	+100	-233	+70	-133	+89	+53	+100
Median	+80	+50	-15	+70	+54	+89	+53	+57

$X^2_H = 5.29$

df = 7

p = .70

TABLE XVII

THE SAVING SCORES FOR INDIVIDUAL SUBJECTS IN THE SIX DIFFERENT GROUPS FOR THE HOSPITAL SAMPLE

	Groups					
Ss	I	II	III	IV	VII	VIII
1	+100	+82	-68	+64	+97	+90
2	+24	+18	+69	-168	+75	+95
3	-38	+51	+42	+96	+39	+97
4	+88	+99	+51	+78	+52	+98
5	+87	+89	+46	-33	-64	+96
Median	+87	+82	+46	+64	+52	+96

$\chi^2_H = 9.06$

df = 5

$p > .05$

TABLE XVIII

THE NUMBER OF DOOR 2 RESPONSES IN THE FIRST EIGHT TRIALS OF THE RELEARNING PHASE FOR INDIVIDUAL SUBJECTS IN THE EIGHT DIFFERENT GROUPS FOR THE DOMICILIARY SAMPLE

	Groups							
Ss	I	II	III	IV	V	VI	VII	VIII
1	8	5	0	5	7	5	0	7
2	6	5	7	5	5	7	7	8
3	6	5	6	2	6	5	0	5
4	2	2	0	0	7	4	5	8
5	6	5	0	1	4	7	4	6
Mean	5.6	4.4	2.6	2.6	5.8	5.6	3.2	6.8
Median	6	5	0	2	6	5	4	7
S.D.	1.96	1.2	3.2	2.06	1.17	1.2	2.78	1.17

$F_{7, 32} = 2.67$

$p < .05$

TABLE XIX

THE NUMBER OF DOOR 2 RESPONSES IN THE FIRST EIGHT TRIALS OF THE RELEARNING PHASE FOR INDIVIDUAL SUBJECTS IN THE SIX DIFFERENT GROUPS FOR THE HOSPITAL SAMPLE

	Groups					
Ss	I	II	III	IV	VII	VIII
1	8	5	5	3	7	8
2	3	5	3	6	5	4
3	6	4	6	4	5	6
4	7	7	0	4	5	4
5	6	4	5	4	6	4
Mean	6	5	3.8	4.2	5.6	5.2
Median	6	5	5	4	5	4
S.D.	1.68	1.09	2.14	.98	.80	1.60

$F_{5, 24} = 1.31$

$p > .05$

domiciliary sample was significant at the .05 level, this significance was not found in the hospital sample suggesting this was probably a chance finding. When the two samples were combined on the six groups which could be compared, the F 5,54 of 3.47 was not significant.

The third hypothesis stated that the speed of relearning the originally acquired response would be positively related to the similarity between the weakening and relearning phases. The following rank order of means were predicted with respect to speed of relearning: Group VIII (unsystematic reinforcement and punishment), Group VI (response prevention plus counter conditioning), Group V (response prevention), Group II (counter conditioning), Group I (extinction), Group VII (unsystematic punishment), Group IV (punishment plus counter conditioning), and Group III (punishment). Table XX gives the Spearman rank correlation between the predicted and empirical means for Experiment I. The correlation of .89 was significant at less than the .01 level. Table XXI gives the Spearman rank correlations between the predicted and empirical means for the six groups which could be compared in both samples. These correlations were .77 (probability less than .05) for Experiment I, .93 (probability less than .01) for Experiment II, and .94 (probability less than .01) for the data of the combined samples. Thus, the third hypothesis was supported.

In contrast to the correlations given above, the Spearman rank correlations between the weakening phase and the relearning phase was .67 for Experiment I, .37 for Experiment II, and .71 for the combined data. Although none of these correlations was significant, there was a trend for the groups which gave more responses during the weakening phase to relearn faster.

The correlations between the original learning and relearning were .46 for the eight groups in the domiciliary sample, -.17 for the six groups in the hospital sample, and .37 for the six groups in the combined data. None of these correlations was significant.

TABLE XX

THE RANK ORDER OF PREDICTED AND EMPIRICAL MEANS IN TERMS OF SPEED OF RELEARNING FOR THE INDIVIDUAL GROUPS IN THE DOMICILIARY SAMPLE

Groups	Predicted Order	Empirical Order
VIII	1.0	1.0
VI	2.0	3.5
V	3.5	2.0
II	3.5	5.0
I	5.0	3.5
VII	6.0	6.0
IV	7.0	7.5
III	8.0	7.5
		rho = .89
		$p < .01$
		(one tail)

TABLE XXI

THE SPEARMAN RANK CORRELATIONS BETWEEN THE PREDICTED AND EMPIRICAL MEANS FOR EXPERIMENT I, EXPERIMENT II, AND THE COMBINED DATA DURING THE RELEARNING PHASE

		Exp. I		Exp. II		Combined	
Groups	Predicted Order	Mean	Rank	Mean	Rank	Mean	Rank
VIII	1	6.8	1	5.2	3	6.0	1
II	2	4.4	3	5.0	4	4.7	3
I	3	5.6	2	6.0	1	5.8	2
VII	4	3.2	4	5.6	2	4.4	4
IV	5	2.6	5.5	4.2	5	3.4	5
III	6	2.6	5.5	3.8	6	3.2	6
		rho = .77		rho = .93		rho = .94	
		p = .05		p = .01		p = .01	
		(one tail)		(one tail)		(one tail)	

CHAPTER V

DISCUSSION

The results of this study support the hypothesis that resistance to weakening behavior is a function of the similarity between the acquisition of that behavior and the weakening influences. The effectiveness of any particular operation to weaken behavior appears dependent upon the number and weighted value of differential cues which is provided the learner indicating that the old behavior must be given up. Such conclusions have practical implications for psychotherapy, child training, education, and other areas in which the weakening of a behavior pattern is desired. The best single operation for reducing undesirable behavior was found to be counter conditioning. Counter conditioning produces weakening of the originally undesirable behavior while reinforcement of another response communicates information to the subject about the new response required (Group II). If punishment is added to the counter conditioning procedure, more differential cues are given to the subject and slightly faster weakening may result (Group IV). The method used in Group IV is essentially similar to the operation found so effective in discrimination learning. Punishment can be an effective method of weakening behavior (Group III) and the more differential cues provided by the punishment, the greater the decrement. When punishment gives no information for differential

behavior (Group VII) or false information (Group VII) it appears ineffectual. Punishment does not appear to be as effective as counter conditioning because it does not provide as many differential cues. Ignoring the behavior (Group I) does not appear to be an effective way of weakening behavior because it provides few differential cues. Response prevention (Groups V and VI) is the most effective method of preventing an undesired response, but in practice it may be impossible to apply.

Some comments may be made about Group VIII, the unsystematic application of punishment and reinforcement. During the weakening phase this group was significantly (probability less than .001) separated from every other group. Most of the subjects in Group VIII never lost the habit and kept pushing Door 2 whether they were being reinforced or punished. Such unusual behavior could be interpreted as working for punishment and appears similar to the Freudian concept of masochism. The reinforcement in masochistic behavior is usually obscure, but some reinforcement is always postulated. Group VIII supports some of the concepts being used in personality theory and child training. Consistency is believed to be more important than the nature of the approach in rearing children. Inconsistency in affection (love and punishment, Group VIII) is stressed as being more damaging to the child's personality than either consistent punishment

(Group III) or consistent love (Group II), or inconsistent punishment (Group VII). Thus, the results of this experiment provide indirect support for such a position. Unsystematic punishment and reinforcement is harmful because it provides no differential cues for weakening old behavior or learning new behavior, and may even produce experimental masochism.

Although this study indicates counter conditioning to be more effective than punishment in weakening a learned response, what happens when the reinforcement in counter conditioning and punishment in the punished group ceases? Although this experiment does not provide a definitive answer, there are suggestions in the relearning data. In both experiments and in the combined data, the groups in which punishment conveyed definite cues in the weakening phase about the wrongness of Door 2 (Groups III and IV) were consistently slower in relearning than the other groups. That is, punishment may exceed the influences of counter conditioning if the incompatible response is no longer reinforced.

Another interesting finding was that the speed of relearning was not significantly related to the degree of interference by a specific experimental operation during the weakening phase, and not related to the similarity between the acquisition and weakening phases, but was positively related to the similarity between weakening and relearning phases. This finding has implications for experiments in

retroactive inhibition. As Slamecka and Ceraso (1960) pointed out, there has been some controversy about which produces greater inhibition, the proactive or retroactive design with the early experiments favoring retroaction. These authors also commented on Underwood's work which suggested that most of the inhibition, even in the retroactive design, was due to proaction. The results of this study support Underwood. That is, the interference in retroactive inhibition is due more to the interference (similarity) of the interpolated learning on relearning (proaction) rather than the interference of the interpolated activity with original learning (retroaction). In the traditional retroactive design such a relationship would be masked because only one type of interpolated activity is used and because the original and relearning tasks are similar.

This experiment was not sensitive enough to separate the influences of different operations for weakening behavior as significantly separated as other experiments. Although no significant quantitative differences were found between the domiciliary and hospital samples, one difference, although not significant, emerged which is not readily apparent by looking at the tables. Punishment did not have as much influence on the hospital subjects as on the domiciliary subjects. The perfect correlation in the domiciliary sample between the predicted and empirical results during

the weakening phase dropped in the hospital sample because of the relatively poorer performance in those groups in which punishment conveyed definite cues (Groups IV and III). Subjects in Group III of the hospital sample kept performing the originally learned response in spite of being punished, perhaps due to the fact that cigarettes were not as important to hospital subjects as domiciliary subjects because they had more money to purchase them.

CHAPTER VI

SUMMARY

The purpose of the investigation was to test three hypotheses, two of them suggested by the generalization hypothesis. The first hypothesis stated that resistance to weakening influences was a function of the similarity between acquisition and weakening influences. The more similar the two phases, the less decrement would be predicted. The second hypothesis predicted that the speed of relearning was dependent upon the similarity between the weakening and relearning phases. The more similar the two phases, the faster would be the relearning. The third hypothesis predicted that people having difficulties in living (domiciled veterans) would show greater learning deficits than people having fewer difficulties in life (hospitalized veterans). It was expected that the various operations to weaken behavior would have the same rank order of effectiveness in both samples, but that there would be differences between the samples revealing learning deficits in domiciliary subjects.

In the first experiment subjects were randomly selected male veterans from a Domiciliary. These subjects were taught to push a door in the Hunter-Pascal Concept Formation Test. The forty subjects who met the criterion of learning were exposed to eight different methods of weakening behavior. These were as follows: (1) extinction, (2) counter conditioning, (3) punishment, (4) punishment plus counter conditioning, (5) response prevention, (6) response prevention plus counter conditioning, (7) unsystematic punishment, and (8) unsystematic punishment and reinforcement. After the weakening phase all subjects relearned the original response to the same criterion.

The second experiment was a replication of the first except for the two response prevention groups which were not used. Each subject from the first experiment was matched with a hospital subject on age, education, and socio-economic status.

The first hypothesis was supported by both experiments and the combined data yielding respectively the following significant rank correlations of 1.00, .77, and .94 with the predicted rank order for the weakening phase. The different experimental operations produced highly significant differences during the weakening phase. Counter conditioning plus punishment and counter conditioning were the most effective methods of weakening behavior while unsystematic punishment and reinforcement was the least effective.

During the relearning phase there were no significant differences between the groups in terms of the number of responses to reach the criterion, saving scores, or the first eight responses during the relearning phase. However, the predicted rank order of relearning with the empirical rank order yielded significant correlations being .89 for eight groups in Experiment I, .93 for the second experiment, and .94 for the combined data with the six groups which could be compared. Thus, the second hypothesis received significant support from the data.

The domiciliary subjects did not differ in magnitude of performances from the hospital subjects for any phase of the study. However, a qualitative scale of learning significantly separated the two samples and provided indirect but secondary support for the third hypothesis.

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APPENDIX

TABLE XXII

THE NUMBER OF DOOR 2 RESPONSES TO REACH THE CRITERION OF LEARNING BROKEN DOWN INTO BLOCKS OF TEN TRIALS FOR GROUPS I, II, III, AND IV OF THE DOMICILIARY SAMPLE

		Trials										
Groups	Ss	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	Total
I	1	6	1*	0	0	0	0	0	0	0	0	12
	2	3	4	3	4	5	5	4	0	0	0	69
	3	5	0*	0	0	0	0	0	0	0	0	10
	4	3	0*	0	0	0	0	0	0	0	0	10
	5	2	3	5	5	7	7	8	9	0*	0	81
II	1	3	2	7	7	3*	0	0	0	0	0	45
	2	3	5	5	5	6	0*	0	0	0	0	50
	3	4	4	3	5	8	0*	0	0	0	0	50
	4	4	4*	0	0	0	0	0	0	0	0	16
	5	4	1	0	0	0	0	0	0	0	0	16
III	1	3	7	0*	0	0	0	0	0	0	0	21
	2	3	3	0*	0	0	0	0	0	0	0	15
	3	2	6	0*	0	0	0	0	0	0	0	20
	4	5	6	7	8	7	6*	0	0	0	0	59
	5	4	5	6	0*	0	0	0	0	0	0	30
IV	1	4	5	9	9	1*	0	0	0	0	0	42
	2	5	0*	0	0	0	0	0	0	0	0	13
	3	2	3*	0	0	0	0	0	0	0	0	14
	4	5	7	1*	0	0	0	0	0	0	0	22
	5	5	6	2*	0	0	0	0	0	0	0	23

* Reached Criterion

TABLE XXIII

THE NUMBER OF DOOR 2 RESPONSES TO REACH THE CRITERION OF LEARNING BROKEN DOWN INTO BLOCKS OF TEN TRIALS FOR GROUPS V, VI, VII, AND VIII OF THE DOMICILIARY SAMPLE

		Trials										
Groups	Ss	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	Total Trials
V	1	7	7*	0	0	0	0	0	0	0	0	19
	2	3	6	8	8	0*	0	0	0	0	0	41
	3	5	5	7	7	7	1*	0	0	0	0	53
	4	1	4	3	3	5	3	5*	0	0	0	67
	5	3*	0	0	0	0	0	0	0	0	0	6
VI	1	3	3	2	1	5	5	5*	0	0	0	68
	2	5	5	4*	0	0	0	0	0	0	0	25
	3	3	3	3	4	3	7	8	2*	0	0	73
	4	4	6	7	8	8	8	2*	0	0	0	63
	5	2	2	5	8	6	9	7	8	0*	0	82
VII	1	2	6*	0	0	0	0	0	0	0	0	17
	2	3	4	6	5	6	8	5*	0	0	0	67
	3	1	4	7	4	5	7	5*	0	0	0	66
	4	2	4	4	5	8	8	4*	0	0	0	66
	5	5	4	7	4*	0	0	0	0	0	0	36
VIII	1	2	5	6	8	3*	0	0	0	0	0	44
	2	2	3	6	6	8	3*	0	0	0	0	54
	3	3	3	4	3*	0	0	0	0	0	0	36
	4	5	3*	0	0	0	0	0	0	0	0	16
	5	4	4*	0	0	0	0	0	0	0	0	20

* Reached Criterion

TABLE XXIV

THE NUMBER OF DOOR 2 RESPONSES TO REACH THE CRITERION OF LEARNING BROKEN DOWN INTO BLOCKS OF TEN TRIALS FOR GROUPS I, II, AND III OF THE HOSPITAL SAMPLE

		Trials										
Groups	Ss	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	Total Trials
	1	0*	0	0	0	0	0	0	0	0	0	6
	2	3	6	6*	0	0	0	0	0	0	0	29
I	3	6	2	0	0	0	0	0	0	0	0	13
	4	3	3	4	5	2	4	7	7	0*	0	80
	5	2	5	6	0*	0	0	0	0	0	0	30
	1	3	6*	0	0	0	0	0	0	0	0	17
	2	2	3*	0	0	0	0	0	0	0	0	17
II	3	2	4	0	2	5	3*	0	0	0	0	55
	4	1	4	4	4	5	6	6	7	7	4*	96
	5	4	4	7	7	9	3*	0	0	0	0	53
	1	4	4	8	1*	0	0	0	0	0	0	31
	2	2	4	4	3*	0	0	0	0	0	0	35
III	3	3	4	5	7	7	2*	0	0	0	0	53
	4	3	3	3	3	3	3	2	4	6*	0	89
	5	1	3	7	7*	0	0	0	0	0	0	37

* Reached Criterion

TABLE XXV

THE NUMBER OF DOOR 2 RESPONSES TO REACH THE CRITERION OF LEARNING BROKEN DOWN INTO BLOCKS OF TEN TRIALS FOR GROUPS IV, VII, AND VIII OF THE HOSPITAL SAMPLE

Groups	Ss	Trials 1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	Total Trials
IV	1	1	3	4	6	3*	0	0	0	0	0	44
	2	5	7	8	0*	0	0	0	0	0	0	31
	3	3	7	8	8	9	8	8	9	3*	0	89
	4	2	3	6	7	6	7	3*	0	0	0	64
	5	1*	0	0	0	0	0	0	0	0	0	3
VII	1	2	3	8	0*	0	0	0	0	0	0	31
	2	2	3*	0	0	0	0	0	0	0	0	16
	3	2	3	4	5	6	6*	0	0	0	0	59
	4	3	5	2*	0	0	0	0	0	0	0	23
	5	5	0*	0	0	0	0	0	0	0	0	11
VIII	1	6	0*	0	0	0	0	0	0	0	0	10
	2	3	5	8	6	5*	0	0	0	0	0	49
	3	2	5	6	8	8	7*	0	0	0	0	59
	4	1	0	1	0	2	6	5	8	9	3*	94
	5	1	2	4	3	3	7	5*	0	0	0	67

* Reached Criterion

TABLE XXVI

THE NUMBER OF DOOR 2 RESPONSES DURING THE WEAKENING PHASE BROKEN DOWN INTO BLOCKS OF FIVE TRIALS FOR GROUPS I, II, AND III OF THE DOMICILIARY SAMPLE

		Trials									
Groups	Ss	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
I	1	3	2	1	2	1	2	3	1	2	1
	2	2	1	2	2	1	2	0	2	2	2
	3	3	2	2	2	2	1	2	2	2	2
	4	3	1	2	2	1	1	1	1	1	1
	5	3	2	1	1	1	2	2	1	1	2
II	1	3	1	1	0	1	0	1	0	1	0
	2	3	1	1	0	0	1	0	0	0	0
	3	4	2	1	1	1	0	1	2	1	1
	4	3	3	1	1	3	1	2	1	1	1
	5	3	0	0	0	0	0	0	0	0	0
III	1	4	2	2	2	1	0	0	0	0	0
	2	3	2	2	3	4	0	3	2	1	1
	3	3	2	2	1	2	3	3	1	1	2
	4	2	0	0	1	0	0	0	0	0	0
	5	2	0	0	0	0	0	0	0	0	0

TABLE XXVII

THE NUMBER OF DOOR 2 RESPONSES DURING THE WEAKENING PHASE BROKEN DOWN INTO BLOCKS OF FIVE TRIALS FOR GROUPS IV, VII, AND VIII OF THE DOMICILIARY SAMPLE

		Trials									
Groups	Ss	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
IV	1	4	2	0	0	0	0	0	0	0	0
	2	3	2	2	1	2	1	2	1	1	1
	3	3	1	0	0	0	0	0	0	0	0
	4	2	0	1	0	0	0	0	0	0	0
	5	3	1	0	0	0	0	0	0	0	0
VII	1	2	1	3	3	3	2	1	2	3	4
	2	4	3	1	2	1	2	0	1	2	1
	3	2	3	1	2	2	1	3	1	1	0
	4	4	3	3	3	2	3	3	1	2	2
	5	3	2	1	2	1	1	2	1	1	2
VIII	1	4	2	3	2	4	4	4	4	2	4
	2	5	3	4	3	3	2	3	1	2	1
	3	5	3	3	1	3	1	2	2	2	1
	4	5	3	5	5	5	5	5	5	5	5
	5	5	4	5	4	5	5	5	5	5	5

TABLE XXVIII

THE NUMBER OF DOOR 2 RESPONSES DURING THE WEAKENING PHASE BROKEN DOWN INTO BLOCKS OF FIVE TRIALS FOR GROUPS I, II, AND III OF THE HOSPITAL SAMPLE

		Trials									
Groups	Ss	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
I	1	4	4	2	3	3	3	4	3	2	4
	2	2	3	2	2	0	3	2	2	1	2
	3	3	3	2	3	3	4	1	2	2	2
	4	3	2	1	3	0	2	2	1	2	0
	5	2	1	2	2	1	2	1	1	2	1
II	1	2	0	0	0	0	0	0	0	0	0
	2	2	1	1	1	1	1	1	1	1	1
	3	3	1	1	1	1	2	0	2	0	2
	4	4	1	1	2	1	1	0	0	0	0
	5	2	0	0	0	0	0	2	0	0	0
III	1	3	2	2	2	2	2	2	2	3	4
	2	3	2	1	2	3	2	1	1	1	4
	3	3	3	4	3	3	3	3	4	3	4
	4	1	1	0	1	0	0	0	0	0	0
	5	3	1	0	1	1	0	1	0	0	1

TABLE XXIX

THE NUMBER OF DOOR 2 RESPONSES DURING THE WEAKENING PHASE BROKEN DOWN INTO BLOCKS OF FIVE TRIALS FOR GROUPS IV, VII, AND VIII OF THE HOSPITAL SAMPLE

		Trials									
Groups	Ss	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50
IV	1	3	1	1	1	1	1	2	1	1	1
	2	3	3	2	2	1	1	1	1	2	1
	3	2	1	1	0	0	0	0	1	0	0
	4	2	1	1	1	1	1	0	1	0	0
	5	3	2	0	0	0	0	0	0	0	0
VII	1	3	2	1	1	1	2	1	2	1	1
	2	2	1	2	1	1	2	1	2	2	3
	3	2	2	3	2	4	2	2	2	2	3
	4	3	2	2	0	2	1	2	1	1	1
	5	2	2	1	2	0	2	2	0	2	0
VIII	1	5	5	5	5	5	5	5	4	5	5
	2	3	3	4	2	4	3	3	2	5	3
	3	4	5	4	4	3	3	4	3	4	2
	4	4	4	4	2	3	3	2	2	4	3
	5	4	4	2	1	3	1	1	2	3	3

TABLE XXX

THE NUMBER OF DOOR 2 RESPONSES TO REACH THE CRITERION OF RELEARNING BROKEN DOWN INTO BLOCKS OF EIGHT TRIALS FOR GROUPS I, II, III, AND IV OF THE DOMICILIARY SAMPLE

		Trials													
Groups	Ss	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72	73-80	81-88	89-96	97-100	Total Trials
I	1	0*	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	6	5	6	3*	0	0	0	0	0	0	0	0	0	28
	3	0*	0	0	0	0	0	0	0	0	0	0	0	0	2
	4	2	2	2	2	1	3	1	2	1	2	2	2	1	100
	5	6	5*	0	0	0	0	0	0	0	0	0	0	0	15
II	1	5	0*	0	0	0	0	0	0	0	0	0	0	0	12
	2	5	5	7	7	2*	0	0	0	0	0	0	0	0	34
	3	5	6	5	6	1*	0	0	0	0	0	0	0	0	34
	4	2	3	3	6	1*	0	0	0	0	0	0	0	0	35
	5	0*	0	0	0	0	0	0	0	0	0	0	0	0	0
III	1	0	3	6	4*	0	0	0	0	0	0	0	0	0	29
	2	0*	0	0	0	0	0	0	0	0	0	0	0	0	1
	3	0*	0	0	0	0	0	0	0	0	0	0	0	0	2
	4	0	4	5	7	5	5	6	6	3*	0	0	0	0	68
	5	0	0	0	0	0	0	0	0	0	0	0	0	0	100
IV	1	5	0*	0	0	0	0	0	0	0	0	0	0	0	11
	2	5	0*	0	0	0	0	0	0	0	0	0	0	0	11
	3	0*	0	0	0	0	0	0	0	0	0	0	0	0	6
	4	0	0	0	0	0	0*	0	0	0	0	0	0	0	42
	5	0*	0	0	0	0	0	0	0	0	0	0	0	0	7

* Reached Criterion

TABLE XXXI

THE NUMBER OF DOOR 2 RESPONSES TO REACH THE CRITERION OF RELEARNING BROKEN DOWN INTO BLOCKS OF EIGHT TRIALS FOR GROUPS V, VI, VII, AND VIII OF THE DOMICILIARY SAMPLE

		Trials													
Groups	Ss	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72	73-80	81-88	89-96	97-100	Total Trials
V	1	5*	0	0	0	0	0	0	0	0	0	0	0	0	6
	2	5	5	2*	0	0	0	0	0	0	0	0	0	0	19
	3	5	6	6	6	7	2*	0	0	0	0	0	0	0	44
	4	7	6	5	3*	0	0	0	0	0	0	0	0	0	27
	5	4	4*	0	0	0	0	0	0	0	0	0	0	0	14
VI	1	0*	0	0	0	0	0	0	0	0	0	0	0	0	1
	2	0*	0	0	0	0	0	0	0	0	0	0	0	0	6
	3	5	4	5	6	4	4*	0	0	0	0	0	0	0	46
	4	0*	0	0	0	0	0	0	0	0	0	0	0	0	4
	5	7	0*	0	0	0	0	0	0	0	0	0	0	0	9
VII	1	0	4	6	7	3*	0	0	0	0	0	0	0	0	36
	2	0*	0	0	0	0	0	0	0	0	0	0	0	0	1
	3	0	0	0	0	0	0	0	0	0	0	0	0	0	100
	4	5	0*	0	0	0	0	0	0	0	0	0	0	0	9
	5	4	7	0*	0	0	0	0	0	0	0	0	0	0	17
VIII	1	6	5	2*	0	0	0	0	0	0	0	0	0	0	19
	2	7	6	7	0*	0	0	0	0	0	0	0	0	0	25
	3	5	5	6	6	6*	0	0	0	0	0	0	0	0	40
	4	0*	0	0	0	0	0	0	0	0	0	0	0	0	0
	5	0*	0	0	0	0	0	0	0	0	0	0	0	0	0

* Reached Criterion

TABLE XXXII

THE NUMBER OF DOOR 2 RESPONSES TO REACH THE CRITERION OF RELEARNING BROKEN DOWN INTO BLOCKS OF EIGHT TRIALS FOR GROUPS I, II, AND III OF THE HOSPITAL SAMPLE

Groups	Ss	Trials 1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72	73-80	81-88	89-96	97-100	Total Trials
I	1	0*	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	3	5	4*	0	0	0	0	0	0	0	0	0	0	22
	3	6	6	1*	0	0	0	0	0	0	0	0	0	0	18
	4	0*	0	0	0	0	0	0	0	0	0	0	0	0	3
	5	2*	0	0	0	0	0	0	0	0	0	0	0	0	4
II	1	0*	0	0	0	0	0	0	0	0	0	0	0	0	3
	2	5	3*	0	0	0	0	0	0	0	0	0	0	0	14
	3	4	5	6	1*	0	0	0	0	0	0	0	0	0	27
	4	0*	0	0	0	0	0	0	0	0	0	0	0	0	1
	5	2*	0	0	0	0	0	0	0	0	0	0	0	0	6
III	1	5	7	6	6	7	6	3*	0	0	0	0	0	0	52
	2	3	2	0	0	0	0	0	0	0	0	0	0	0	11
	3	6	7	6	4*	0	0	0	0	0	0	0	0	0	31
	4	0	4	7	5	6	3*	0	0	0	0	0	0	0	44
	5	5	5	2*	0	0	0	0	0	0	0	0	0	0	20

TABLE XXXIII

THE NUMBER OF DOOR 2 RESPONSES TO REACH THE CRITERION OF RELEARNING BROKEN DOWN INTO BLOCKS OF EIGHT TRIALS FOR GROUPS IV, VII, AND VIII OF THE HOSPITAL SAMPLE

		Trials													
Groups	Ss	1-8	9-16	17-24	25-32	33-40	41-48	49-56	57-64	65-72	73-80	81-88	89-96	97-100	Total Trials
IV	1	3	5	0*	0	0	0	0	0	0	0	0	0	0	16
	2	6	6	6	6	6	6	5	5	5	6	3*	0	0	83
	3	0*	0	0	0	0	0	0	0	0	0	0	0	0	4
	4	4	4*	0	0	0	0	0	0	0	0	0	0	0	14
	5	0*	0	0	0	0	0	0	0	0	0	0	0	0	4
VII	1	0*	0	0	0	0	0	0	0	0	0	0	0	0	1
	2	1*	0	0	0	0	0	0	0	0	0	0	0	0	4
	3	5	5	5	6	2*	0	0	0	0	0	0	0	0	36
	4	5	2*	0	0	0	0	0	0	0	0	0	0	0	11
	5	6	6	1*	0	0	0	0	0	0	0	0	0	0	18
VIII	1	0*	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	4	6	4*	0	0	0	0	0	0	0	0	0	0	21
	3	6	2*	0	0	0	0	0	0	0	0	0	0	0	11
	4	4	6	5	5	6	7	0*	0	0	0	0	0	0	49
	5	4	2	0*	0	0	0	0	0	0	0	0	0	0	17

* Reached Criterion