THE INFLUENCE OF FORCED-CHOICE AND FREE-CHOICE TRAINING ON THE USE OF THE DOUBTFUL JUDGMENT IN RESPONSE TO CONFLICT

By

JAMES O. DAVIS

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

1965

Submitted to the faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the degree of
MASTER OF SCIENCE
May, 1968

THE INFLUENCE OF FORCED-CHOICE AND FREE-CHOICE TRAINING ON THE USE OF THE DOUBTFUL JUDGMENT IN RESPONSE TO CONFLICT

Thesis Approved:

Kenneth D. Senkbeil
Thesis Adviser

R Weber

Robert J Stevens

N Durham
Dean of the Graduate College

ACKNOWLEDGMENTS

I wish to acknowledge all those in the Psychology Department who offered guidance and advice. In every case I encountered sincere enthusiasm and encouragement. I wish to express my gratitude to Dr. Kenneth Sandvold for sharing with me his interest for this subject. To Dr. Robert Stanners and Dr. Robert Weber, I would like to express my appreciation for their interest, advice and guidance.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

THE PROBLEM

Conflict is both a basic and classical psychological concept. It is basic in the sense that it is introduced with the beginning studies of psychology (Kendler, 1963), and it is considered fundamental for an understanding of ordered behavior (Schaffer and Shoben, 1956) and psychopathology (Maher, 1966). Conflict is also classical in that it is an extension of the work of Freud (1938) and Pavlov (1928).

In general, it can also be said that the study of conflict involves two different, though not necessarily opposing, modes of inquiry. One mode is primarily concerned with variables which lead to conflict. Despite whatever success is achieved with that type of investigation, a complete understanding must include the second mode which questions the effects of conflict. The task is, therefore, two-fold; determine what causes conflict, and then determine the course of conflict.

Review of the Literature

The first phase of the investigation of conflict involved a somewhat serendipitous beginning in Pavlov's (1928)

laboratory, when one of his students, Shenger-Krestovnikova, attempted to determine the degree to which a dog could discriminate between a circle and an ellipse. The dog was conditioned to salivate to the circular stimulus but not to the elliptical stimulus. Next, the elliptical stimulus was changed again and again, each time the ratio of the two axes was decreased so that the stimulus approached the shape of a circle. Finally, when the axes of the ellipse reached a ratio of 9:8, the dog could not discriminate and began to struggle and howl. Pavlov's attempt to account for this phenomena in physiological terms of cerebral processes was not successful simply because cortical involvement could not be demonstrated or measured. The study did show that difficult discrimination led to behavior which was called <u>experimental neurosis</u> (Cook, 1939), and also resulted in an apparent breakdown of discriminations which had been made before without difficulty.

The fact that not all dogs subjected to difficult discrimination tasks suffered the fate of experimental neurosis led to the assumption that a constitutional factor was also involved. Dworkin (1939) stated that there were two necessary conditions for experimental neurosis: (1) undue strain on the nervous system which could be experimentally induced by a difficult discrimination task, and (2) constitutional susceptibility. A third, but not necessary condition, was the observation that castrated males were more likely to exhibit experimental neurosis than intact males.

Dworkin explained that castration caused a permanent weakening of cortical-cell functions. Again an untestable physiological theory was offered. But to demonstrate constitutional susceptibility in general, Dworkin compared dogs to cats in an auditory discrimination task. The dogs were strapped to a table in the same manner used in Pavlov's laboratory, and the cats were placed in cages. The fact that not all the dogs exhibited experimental neurosis supported the assumption of a constitutional factor. The observation that fewer cats than dogs became disturbed was interpreted by Dworkin as evidence for the same factor. One criticism would be that the dogs were more restrained than the cats.

The possibility of isolating the variables of this complex behavior led other investigators to replicate the experiments and vary factors which might influence neurosis. Anderson and Liddell (1935) demonstrated that when sheep were subjected to the same restrained treatment Pavlov described, the sheep reacted in the same fashion. However, when sheep were placed in a pen during difficult discrimination, none of the sheep displayed any signs of experimental neurosis. To Anderson and Liddell, the significant difference between the pen situation and the classic Pavlovian situation was the fact that in the pen, the sheep had an opportunity to move, while in the classic experiment the animals were strapped down. The experimenters interpreted these results to mean tension could be lowered by muscular

movement. When spontaneous activity was allowed there could be no increase in nervous tension, but restraint in a situation increased nervous tension and experimental neurosis was the result. Of course, there was no way of measuring or demonstrating nervous tension. While the concept was questionable, the difference between restraint and no restraint had been demonstrated.

After considering Anderson's and Liddell's results, Cook (1939) conducted a study to demonstrate the effect of restraint on experimental neurosis. In contrast with those studies mentioned above, Cook chose an instrumental conditioning paradigm and used white rats. Water-deprived rats were shocked while drinking but unrestrained, or shocked while drinking and restrained. Again, only the restrained animals exhibited the classical symptoms of experimental neurosis.

At this point it may be said that certain important variables have been isolated. There is evidence supporting a constitutional factor of susceptibility. Also, behavior abnormalities are observed following difficult discrimination tasks in a variety of organisms, i.e. cats, dogs, rats and sheep, and restraint increases the probability of a response pattern called experimental neurosis.

Brown (1942 a) analyzed the difficult discrimination task into various stimulus properties and response patterns. Experimental neurosis was put in the place of an historical development, and <u>conflict</u> became synonomous with difficult

discrimination. Brown's purpose was to analyze conflict in terms of generalization. He remarked: "An attempt has been made to apply the principle of conditioned-response-generalization to the interpretation of conflict behavior" (Brown, 1942 a, p. 272). Conflict was defined as two oppositely directed response tendencies simultaneously incited. The properties of the stimuli which caused conflict were to be understood in terms of stimulus generalization. Based upon a study (Brown, 1942 b) of the generalization of approach responses, Brown assumed avoidance responses would likewise generalize in the same manner as approach responses. Figure 1 expresses this scheme graphically. CS_1 evokes R_1 while CS_2 evokes R_2, and CS_1 and CS_2 are in the same continuous physical dimension, e.g. light intensity. As the response strength gradients decrease, they cross at a point corresponding to CSg. This point where the two response tendencies are equal is the point of conflict. Thus, Brown explained conflict as a pattern of stimulation which evokes two or more incompatible responses.

With this analysis, Brown was able to deduce certain tests in order to demonstrate the theory's predictive power. At this point attention was focused not only on which variables caused conflict, but also which behaviors other than the classic example of experimental neurosis could be explained by the conflict model. Brown's model predicted that if a stimulus complex possessed equal qualities of two stimuli, both of which were associated with approach res-

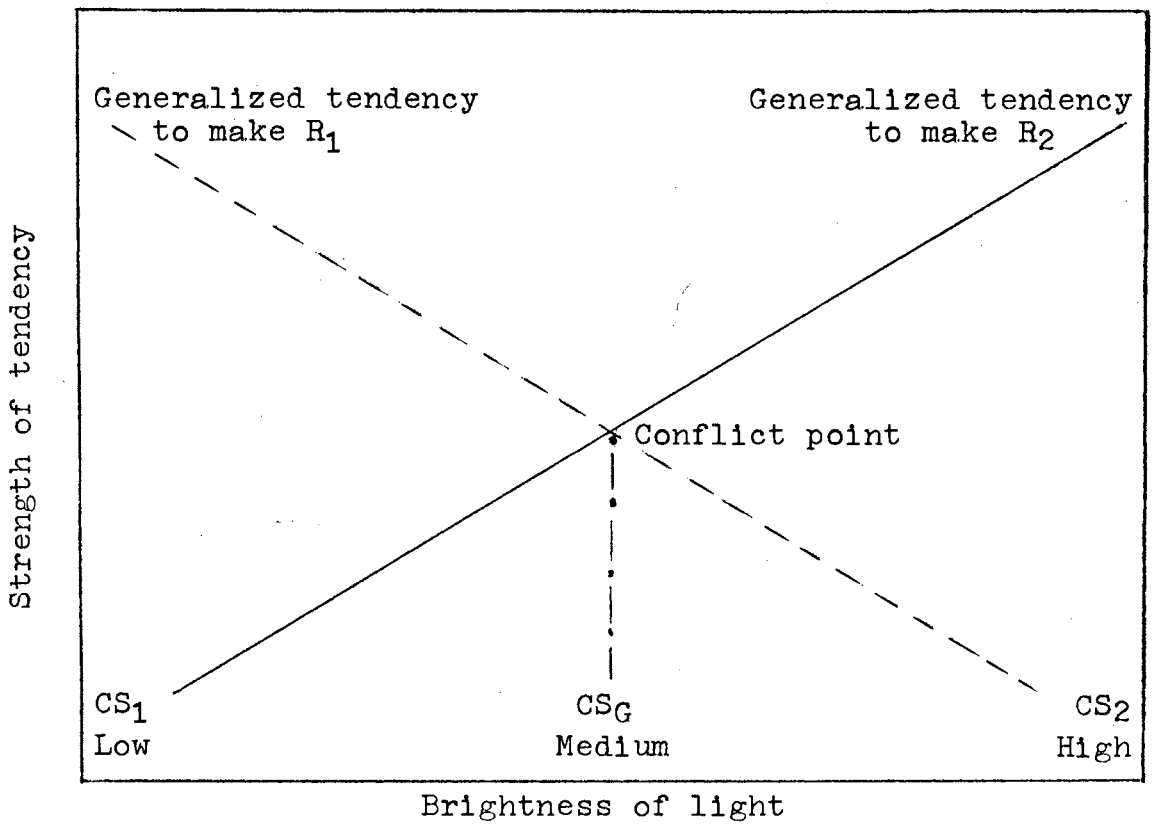

Figure 1. Generalized tendencies to make competing responses elicit conflict when the two gradients meet. (Maher, 1966, p. 138).

ponses of equal habit strength, then the resulting behavior would be indiscriminate approach, or approach-approach. Also, if a stimulus complex included equal properties of two stimuli and one of these conditioned stimuli was associated with approach, and the other with avoidance, this type of conflict, called approach-avoidance, would lead to blocking, or refusal of the organism to approach or avoid. A third type of response, called withdrawal, would follow an avoidance-avoidance conflict when the two responses are both avoidance responses. Subjecting rats to the situation described above supported all of Brown's hypotheses (Brown, 1942 a). Also observed, but not predicted, was a disruption of the original discrimination habits following conflict, i.e., the preceding tests had a detrimental effect upon the animal's responses to the original easy discrimination.

A decrease in discrimination capacity following conflict has been found in other studies (Worrell, 1963; and Kalish, 1954). A possible explanation will be discussed later in terms of the assumptions made by Brown.

Summary and Conclusions

The investigation of conflict has revealed the relative effects of several factors such as restraint, difficult discrimination, and constitutional susceptibility. A definition of conflict behavior was developed (Brown, 1942 a) which has proved useful. As mentioned before, the total investigation of conflict must include knowledge about the

responses to conflict.

Initially, conflict behavior was inclusively called experimental neurosis, and included any response pattern which the observer considered "abnormal". The importance of restraint indicated that the response pattern resembled "...a refinement and elaboration or even chronic distortion of the crude fight or flight pattern" (Liddell, 1956, p. 15). This phenomenological description was later clarified by a demonstration of the relative differences achieved when the competing responses in conflict were approach and avoidance tendencies (Brown, 1942 a).

While some of the relatively permanent effects (c.f., Brown, 1942 a, and Miller, 1948, 1958) have been described, e.g., the disruption of the original discrimination habits following conflict, the mechanisms causing these effects are also of interest, and this interest provides the basis of this study.

Brown (1942 a) assumed the strength of a conditioned response increases with the number of trials and that the conditioned response was subject to stimulus generalization. With these assumptions, a model was made from which certain hypotheses were deduced and supported by empirical findings. With these same assumptions, it is possible to extend Brown's model so that it could account for the disruption of the original discrimination habits (conditioned responses) following conflict. This extension is graphically presented in Figure 2, S_1 evokes R_1 while S_2 evokes R_2, as established

by suitable prior conditioning. Both of the conditioned responses are incompatible and generate gradients of response generalization. The point at which these intersect is the point of conflict, i.e., in correspondence with Sg which has the tendency to elicit both R_1 and R_2 equally. The strength of any response (Rg) evoked by Sg is increased since strength of tendency increases with the number of trials. This Rg also generalizes as represented by the dotted gradients, so that any stimulus on the continuum between Sx and Sy will elicit Rg.

The above model is designed to account for the reported disruption of the original discrimination habits following conflict. The purpose of this study is to test the following hypothesis. If the subjects are forced to make a difficult discrimination during a training stage, the Rg could not be an avoidance response since the subjects have had no training with this response. If subjects with forced-choice training were compared with control subjects without this training in a testing situation where no choice is required, the control subjects (free-choice) should avoid choosing more often than the trained subjects (forced-choice). A psychophysical experiment could be used to test this. Conflict could be evoked by requiring a judgment about the lengths of two lines (S_1 and S_2) which are nearly equal (Sg). Forced-choice subjects would be required to attempt to choose the longer of two lines so that the conflict specific response (Rg) would be R_1 or R_2. Free-choice

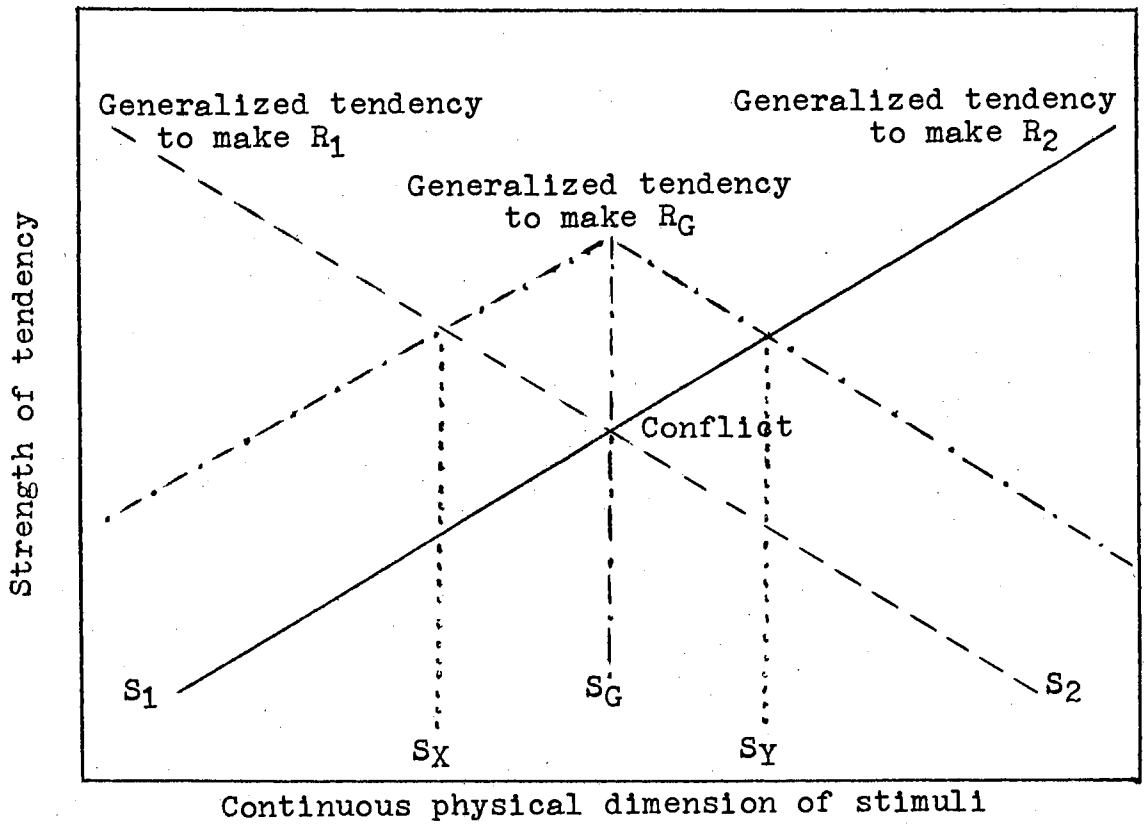

Figure 2. As a specific response (R_g) is associated with S_g, the tendency to make R_g is increased and generalizes (dotted gradient) so that stimuli between S_x and S_y tend to elicit R_g.

subjects would get the same training but they would be allowed to use a "doubtful" response. Then the forced-choice subjects would be compared with free-choice subjects on a second task similar to the first except that all the subjects would be allowed to avoid making R_1 and R_2 simply by saying "doubtful". The tendency to make responses R_1 or R_2 to Sg should be greater in the forced-choice subjects than in naive subjects or free-choice subjects who had been allowed to report "doubtful" in previous training.

CHAPTER II

METHOD

Subjects

All subjects were students in fifth and sixth grade classes at Lincoln Grade School in Stillwater, Oklahoma. Each subject was examined for corrected acuity with a Snellen Chart and received a Snellen rating. The subjects were then paired on the basis of Snellen rating, sex, age and homeroom class membership. Members of a pair were tested at the same time of day. In all there were six pairs of boys and eleven pairs of girls. The seventeen pairs were derived from fifty-six children who secured parental permission to participate. Eleven pairs had 20/20 Snellen ratings, three pairs had 20/25 ratings, one pair had 20/15, one pair had 20/30, and one pair had 20/40 Snellen ratings. One subject from each pair was assigned at random to the forced-choice group for training without the doubtful judgments.

Apparatus

The apparatus was specifically designed and built for this study and is referred to as the "tunnel". The tunnel was essentially a long box measuring 36 X 5.5 X 5.5 inches on the inside. The end towards the subject (S) was open and

allowed S to see the opposite end which was a hinged door operated by the experimenter (E). On the door was a stimulus card holder so that when the door was closed, the card was in direct line of S's vision. The inside of the tunnel was painted mat black and the stimulus was not visible until an enclosed light source above the tunnel was turned on and illuminated the stimulus card.

In series with the light source were: (1) an on-off switch operated by E, (2) an electric clock for measuring the cumulative reaction times for any series of trials, and (3) three SPDT toggle switches operated by S. The entire circuit was completed (On) when E's switch was on and all three of S's switches were in the back position (toward the S). When any one of the S's SPDT switches were pushed forward to the second position, the above circuit was open (Off) and a second circuit was completed which turned on a light in front of E. For each of the S's switches there was a second circuit and pilot light so that E could record which switch was manipulated.

All of E's recording apparatus, clock and lights, switch, and tunnel door were screened from S. The tunnel passed through and was supported by the screen at the end of the tunnel near E. At the open end of the tunnel was an adjustable support raising or lowering the tunnel to achieve whatever angle was comfortable for S. The switches operated by S were directly below the open end of the tunnel and could be seen and manipulated without any head movement.

Finally, a telegraph key served as the start point equidistant from the three SPDT switches, and also served as a ready signal when depressed, sounding an 800 cycles per second tone produced by an audio generator.

The stimulus cards were made of white note cards measuring 5 X 8 inches. Two vertical lines were drawn on each card with a black ink Micropoint ball-point pen, one line being a standard of eighty millimeters. The second line varied in length plus or minus zero, one, two, three, or four millimeters. The standard stimulus was paired twice with each possible variable stimulus and appeared once on the right and once on the left of the variable stimulus, resulting in eighteen stimulus cards. The portion of a card which appeared to the subject measured 5 X 5 inches. The stimulus lines were drawn parallel to and one inch from the right and left edges of the five-inch square visible to the subject, with the center of each line two and one-half inches from the top and bottom edges. Two alternate orders for presentation of the cards were determined by reference to a table of random digits.

Procedure

On each experimental trial, the S was asked to indicate which of the two lines was longer. Two types of choice procedures determined the structure of the experimental conditions. The free-choice procedure allowed S to choose one of these response alternatives: left, right, or don't know.

Under the forced-choice procedure, S could only choose left or right. Forced-choice subjects were given 54 trials of forced-choice training followed by 54 trials of free-choice testing. The free-choice subjects were given 108 free-choice trials.

Each subject was conducted to the room containing the apparatus and asked to be seated. The experimenter then turned the tunnel light on and gave the subject these verbal instructions: "When the light in this tunnel is on, you can see the end of the tunnel. Do you want me to raise or lower the tunnel for you?" Any necessary adjustment was made and the experimenter read the main instructions:

> I will put some cards at the end of the tunnel and there will be two lines on each card. I want you to tell me which line is longer. If it is the line on your right, then you push forward the switch on the right. What do you think I want you to do if it is the switch on the left?

Every child tested correctly assumed that he would push forward the switch on the left. At this point only the free-choice subjects were told: "If you do not know which line is longer, push forward the switch in the middle." All subjects were told: "When you are ready for the next card, signal me by pushing this button," referring to the telegraph key. "Push it and see what happens." After the subject did this, the experimenter told them: "That is the ready signal that tells me to turn on the light. Are there any questions?" There were none and the training and testing began.

Each subject made 54 judgments before being interrupted

and told: "Let's stop for a minute." At this point all the forced-choice subjects were told: "From now on if you do not know which line is longer, push forward the switch in the middle." All subjects once again proceeded to make 54 judgments.

CHAPTER III

RESULTS

The forced-choice group gave a mean of 13.2 doubtful judgments over the last 54 trials, while the free-choice group gave a mean of 11.2 doubtful judgments. The mean difference between members of a pair was 1.3 and was not found to be significant at the .10 level by means of the *t* test of differences between paired observations (See Table I). The hypothesis that subjects exposed to difficult forced-choice discrimination tasks would give significantly fewer doubtful judgments than subjects with free-choice training was not supported. The number of doubtful judgments during the testing stage of both groups revealed considerable within-group variation. An *F* test of the equality of the two variances (Freund, Livermore and Miller, 1960) revealed no significant difference ($F = 1.535$; d.f. = 16, 16; $p > .10$). Figure 3 presents the percentage of doubtful judgments for each stimulus variable and group. The observation should be made that the free-choice group made a mean of 10.5 doubtful judgments over the first 54 trials which fulfilled the requirement that some doubtful response training did occur.

It was also hypothesized that subjects trained under

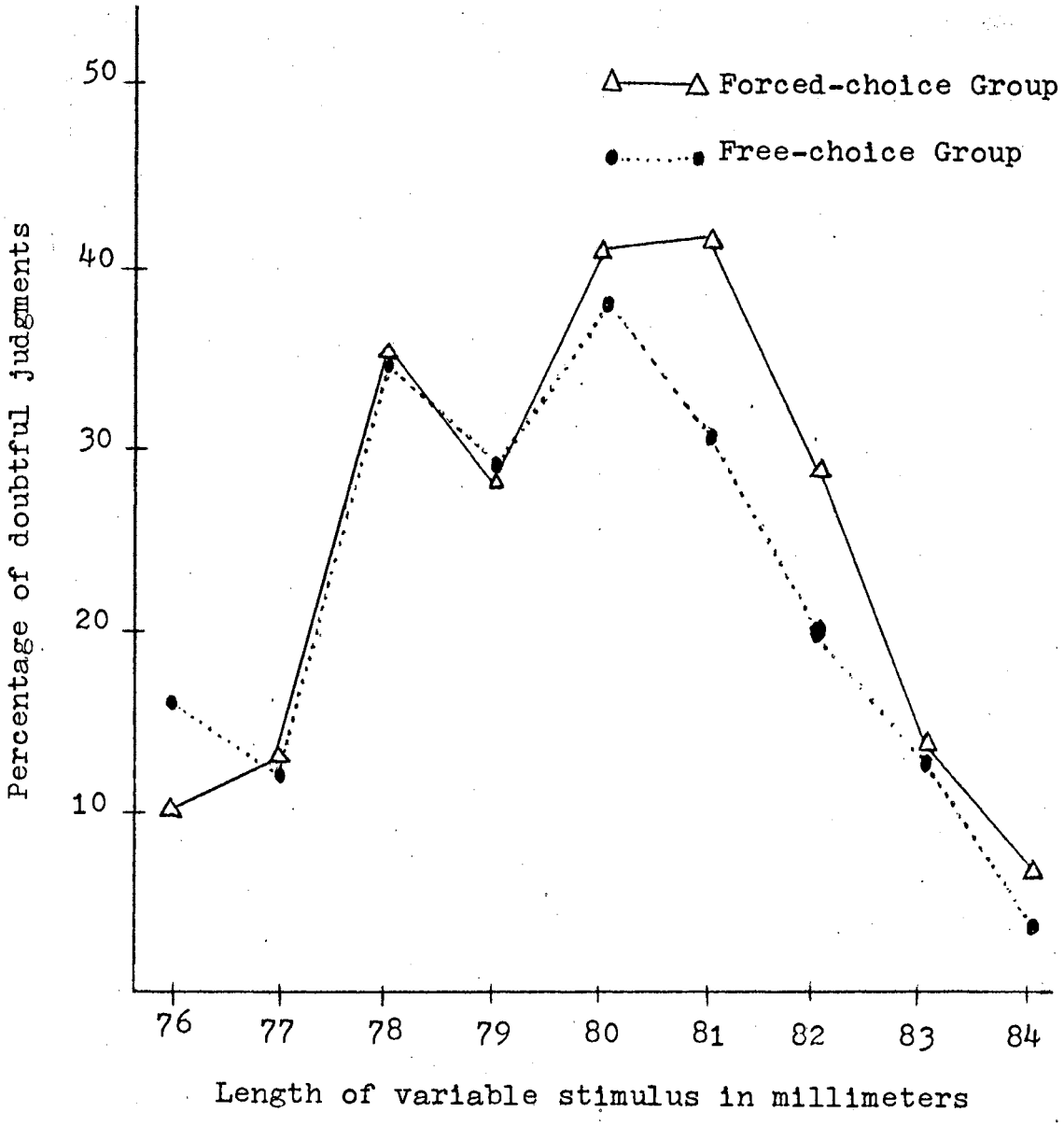

Figure 3. Percentage of doubtful judgments for each stimulus variable during trials 55 through 108.

the forced-choice condition would tend to use the doubtful judgment less often than naive subjects. The forced-choice group gave a mean of 4.47 doubtful judgments in the first 18 trials of free-choice following 54 forced-choice trials, i.e., trials 55 through 72. The free-choice group gave a mean of 3.94 doubtful judgments for trials 1 through 18. The mean difference between members of a pair was 0.53 (S.D. = 1.11). This difference was not found to be significant (t = .478; d.f. = 16; $p > .10$). The hypothesis that subjects trained in a forced-choice discrimination task would make fewer doubtful judgments than naive subjects was not supported.

TABLE I

MEANS AND STANDARD DEVIATIONS OF DOUBTFUL JUDGMENTS IN THE FORCED-CHOICE AND FREE-CHOICE GROUPS

	FORCED-CHOICE	FREE-CHOICE
Mean	13.2	11.9
S.D.	11.4	9.2

The mean total time to judge the last 54 presentations was 239.73 seconds for the forced-choice group following the forced-choice training, and 231.75 seconds for the free-

choice group. The mean difference between numbers of a pair was 7.17 seconds (S.D. = 26.27). This difference was not found to be significant (t = 1.017; d.f. = 16; $p > .10$).

The possible influence of visual acuity upon the number of doubtful judgments reported was estimated by correlating the number of mistakes made in forced-choice testing with the number of doubtful responses in free-choice testing by forced-choice subjects. The product-moment correlation was .14 and not significant at the .05 level for fifteen degrees of freedom.

CHAPTER IV

DISCUSSION

The results of this experiment do not support the hypothesis that a specific response to conflict is conditionable and maintained in subsequent conflict. Any attempt to explain these results is speculative but subject to testing.

It is possible that not enough training had been given on the doubtful judgment and that 10.5 doubtful responses did not increase that tendency enough to result in significant differences. A training procedure which would increase the number of doubtful responses would use only the 76, 84, and 80 millimeter stimuli, thus allowing more training with the stimulus specifically associated with conflict (Sg). This method might put the response strength of doubtful to the 80 millimeter stimulus at a higher value for the free-choice group. If testing with all the stimulus values followed this training, the amount of generalization could be estimated for groups with and without free-choice training.

Another possible explanation would assume that training had little or no effect. Guilford (1954) speculated:

> An objective test of personality might be built on the total proportion of doubtful judgments. Its meaning would have to be established through

intercorrelation studies [p. 139].

One such relationship was later demonstrated by Riedel (1965). In Riedel's study, twelve "anxious" subjects were compared to twelve "non-anxious" subjects on a difficult discrimination task. Anxiety was defined by means of a score on Welsh's (1956) A scale. Out of 195 judgments, the "anxious" group gave a mean of 63.6 doubtful responses, while the "non-anxious" group gave a mean of 27.7; this difference was significant at the .001 level. It is possible that anxiety contributed more to variation among pairs than training.

CHAPTER V

SUMMARY

This study represents an attempt to explain the evidence that following conflict situations, which are defined as difficult discriminations, former discriminations become more difficult. It was hypothesized that a conflict specific response is learned during conflict and that the tendency to make this response generalizes to stimuli that formerly evoked different responses.

To test this hypothesis, 34 fifth and sixth grade subjects were paired for age, sex, visual acuity and homeroom class membership. All subjects were given the same difficult discrimination tasks. At random, one member from each pair was forced to choose the longer of two lines for 54 trials, while the other member was allowed to report "doubtful". It was predicted that the subjects forced to choose would report doubtful less often in subsequent testing than subjects without training or subjects who were allowed to report doubtful in training.

The hypothesis was not supported by the results. It was shown that visual acuity, defined as the number of mistakes made by the subjects in the forced-choice training, did not correlate significantly with the number of doubtful

judgments reported by those subjects in free-choice testing. These results were discussed in relation to testing and training procedures.

BIBLIOGRAPHY

Anderson, O. D. & Liddell, H. S. Observations on experimental neurosis in sheep. Arch. neurol. Psychiat., 1935, 34, 330-354.

Brown, J. S. Factors determining conflict reactions in difficult discrimination. J. exp. Psychol., 1942 a, 31, 272-292.

Brown, J. S. The generalization of approach responses as a function of stimulus intensity and strength of motivation. J. comp. Psychol., 1942 b, 33, 209-226.

Cook, S. W. The production of experimental neurosis in the white rat. Psychosom. Med., 1939, 1, 293,308.

Dworkin, S. Conditioning neuroses in dog and cat. Psychosom. Med., 1939, 1, 388-396.

Freud, S. Basic writings of Sigmund Freud. New York: Random House, 1938.

Freund, J. E., Libermore, P. E. & Miller, I. Manual of experimental statistics. Englewood Cliffs, N. J.: Prentice-Hall, 1960.

Guilford, J. P. Psychometric methods. (2nd ed.) New York: McGraw-Hill, 1954.

Kalish, H. I. Strength of fear as a function of the number of acquisition and extinction trials. J. exp. Psychol. 1954, 47, 1-9.

Kendler, H. H. Basic psychology. (3rd ed.) New York: Appleton-Century-Crofts, 1963.

Liddell, H. S. Emotional hazards in animals and man. Springfield, Ill.: Charles C. Thomas, 1956.

Maher, B. A. Principles of psychopathology. New York: McGraw-Hill, 1966.

Miller, N. E. Theory and experiment relating psychoanalytic displacement to stimulus-response generalization. J. abnorm. soc. Psychol., 1948, 43, 155-178.

Miller, N. E. Liberalization of basic s-r concepts: extensions to conflict behavior, motivation and social learning. In S. Koch (Ed.), Psychology: a study of a science. Vol. 2, New York: McGraw-Hill, 1958.

Pavlov, I. P. Lectures on conditioned reflexes. New York: International Publishers, 1928.

Riedel, W. W. Anxiety level and the "doubtful" judgments in a psychophysical experiment. J. abnorm. Psychol., 1965, 70, 462-464.

Shaffer, L. F. & Shoben, E. J. The psychology of adjustment. (2nd ed.) Boston: Riverside, 1956.

Welsh, G. S. Factor dimensions a and r. In G. S. Welsh and W. G. Dahlstrom (Eds.), Basic readings in the MMPI. Minneapolis: U. Minnesota Press, 1966, pp. 264-281.

Worrell, L. Intraindividual instability and conflict. J. abnorm. soc. Psychol., 1963, 66, 480-488.

VITA

James Orville Davis

Candidate for the Degree of

Master of Science

Thesis: THE INFLUENCE OF FORCED-CHOICE AND FREE-CHOICE TRAINING ON THE USE OF DOUBTFUL JUDGMENT IN RESPONSE TO CONFLICT

Major Field: Psychology

Biographical:

Personal Data: Born in Novelty, Missouri, April 6, 1943.

Education: Attended grade school in Tulsa, Oklahoma, and graduated from Will Rogers High School in Tulsa, in May, 1961. Entered Oklahoma State University in September, 1962, and graduated in May, 1965. Completed requirements for a Master of Science degree at Oklahoma State University in May, 1968.

Professional Experience: Practicum experience at Payne County Guidance Center at Stillwater, Oklahoma, January, 1967 to May, 1968. Practicum experience at Oklahoma State University Student Counseling Center, September, 1967 to January, 1968. Teaching introductory psychology classes at Oklahoma State University from September, 1967 to May, 1968.