THE EFFECTS OF POST-DECISION REINFORCEMENT ON TIME SPENT VIEWING CHOSEN AND NONCHOSEN ALTERNATIVES

By

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Bachelor of Arts

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Madison, New Jersey

1964

Submitted to the faculty of the Graduate School of
the Oklahoma State University
in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE
May, 1966

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Thesis Approved:

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ACKNOWLEDGMENTS

I would like to acknowledge the assistance of Drs. L. T. Brown, W. Rambo, and L. Worell, whose advice and criticism have been most helpful. In addition, a special thanks goes to my wife, Barbara, for her assistance in the typing of drafts and revisions.

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REVIEW OF THE LITERATURE AND STATEMENT OF THE PROBLEM

Introduction

Since 1956 a body of research has been building up which attempts to assess the effects of decision-making on post-decision responses and processes. All the studies concerned with this problem have involved (a) giving the subject a task to perform, (b) having him choose between two or more of the items taken from the task, and (c) asking him to perform the task a second time. By comparing performance on the second task with performance on the first task the experimenter is able to measure the effects of having made a decision. All of these studies have been generated by and related to dissonance theory, a theory concerned with the effects of motivation tension between two or more discrepant cognitive elements (Festinger, 1957).

This study involves the same elements of the previous studies with two exceptions: (a) the task given the subject to perform was different, and (b) the influence of reinforcement on post-decision effects was investigated.

Review of the Literature

The studies which are pertinent to this paper fall into two categories, attractiveness-of-alternatives and psychological-selectivity.

The studies of the attractiveness-of-alternatives category have attempted to answer the question: Is there a change in the attractiveness of the chosen or nonchosen alternatives after a choice among them has been made? The answer to this question has been almost without exception in the affirmative. The change which takes place is an increase in the attractiveness of the chosen alternative and/or a decrease in the attractiveness of the rejected alternative (Allen, 1964; Brehm, 1956; Brehm and Cohen, 1959; Brock, 1963; Cohen, 1962; Jecker, 1964; Rahman, 1963; Walster and Festinger, 1964).

In the study by Brehm (1956), for example, the subjects rated eight objects both before and after being presented with a choice between two of them. It was found that the subjects increased their liking for the chosen alternative after the decision.

Jecker (1964) asked 88 subjects to rank 15 phonograph records according to which they would most like to have. After choosing between two records of nearly equal rank, they reranked the 15 records. One-half of the subjects were allowed to keep both records (no dissonance condition) and the other half were allowed to keep only the chosen record (dissonance condition). The subjects received the records before reranking them.

The chosen alternative increased significantly ($P < .05$) in attractiveness in the dissonance condition but not in the no dissonance condition. Thus it was found that the change in attractiveness of alternatives only occurs when the subject is forced to reject one of the alternatives and does not occur when the subject receives both alternatives.

The studies in the psychological-selectivity category have attempted to answer the question: Can the act of decision-making affect psychological selectivity? Mills, Aronson and Robinson (1959), Rosen (1961), and Ehrlich, Guttman, Schonbach and Mills (1957) have shown that subjects tend to seek out information which favors the chosen alternative following a decision.

Interest in other studies has focused on the hypothesis that subjects also tend to avoid information that favors the rejected alternative following a decision. However, the evidence relating to this hypothesis has been contradictory. A study by Lane (1961) mildly supported it; studies by Mills, Aronson and Robinson (1959) and Rosen (1961) failed to support it; while Feather (1962; 1963) found that subjects "are more interested in information contrary to their held opinions than information supporting that opinion."

Mills, Aronson and Robinson (1959) investigated the hypothesis that "following a decision, persons tend to seek out information that favors the chosen alternative and to avoid information that favors the rejected alternative." College students were given a choice between an essay or objective type of examination. After they made the decision they were presented with a list of articles about the two alternative types of examinations and were asked to indicate which articles they preferred to read. In the positive information condition the articles presented arguments in favor of the kind of examination the article was about. In the negative information condition key words were changed so that the same article presented arguments against the kind of examination the article was about. Selectivity, i.e., selection of articles related to their decision, occurred in the positive information

condition only ($P < .001$). There was no selectivity in the negative information condition.

In the experiment by Lane (1961) a television station was presenting a program about lung cancer and smoking. Using questionnaires it was found that "smokers who did not intend to quit were less likely to view than smokers who were not sure."

It is important to note that the above researchers did not investigate the influence of post-decision reinforcement which, if it were present, was not controlled for. This might account for the equivocal evidence relating to the hypothesis that subjects tend to avoid information that favors the rejected alternative. This problem will be returned to later.

Statement of the Problem

This study will focus on two aspects of the study of post-decision effects, the nature of the dependent variable and the influence of reinforcement.

In most of these studies the task provided the subject has involved the use of a rating scale. The reliability of the rating scales used comes into question when one considers the frequency with which subjects, when asked to choose between alternatives, choose the alternative initially rated lower (e.g., Walster, 1964). Moreover, Freeman (1962) reports reliability coefficients of .50 to .60 for general rating scales. In addition, the subject's ratings must meet the experimenter's requirements, for if the experimenter is predicting a decrease in rating he must discard those subjects whose initial ratings are too low to allow for any decrease to be measured. Similarly, if the experimenter is

predicting an increase in rating he must discard subjects whose initial ratings are too high to allow for any increase to be measured (cf. Chapanis and Chapanis, 1964). For these and other reasons about one-third of the investigators in this area have rejected over 10 percent of their subjects.

It would seem that a method of measuring post-decision effects which does not suffer from the liabilities of a rating scale would constitute an important improvement. One of the purposes of this experiment was to investigate the possibility of measuring post-decision effects using "viewing time," i.e., the length of time spent looking at visual patterns as the dependent variable. The feasibility of comparing this method with the use of rating scales is enhanced when one considers the consistency of results in the attractiveness-of-alternatives category mentioned above. Thus, if the results obtained were congruent with those obtained in studies employing rating scales, it may become possible to replace rating scales in future investigations of post-decision effects.

Another purpose of this experiment was to explore the influence of positive and negative reinforcement on post-decision effects. Greenbaum, Cohn and Krauss, (1965) found both an increase in attractiveness of the chosen alternative and a decrease in attractiveness of the non-chosen alternative when the subjects received negative information about a task they had chosen (negative reinforcement). In a related study Gerard, Blevans and Malcolm, (1964) found that only under conditions of positive reinforcement did the chosen alternative increase in rank; under conditions of negative reinforcement the chosen alternative decreased in rank.

The importance of reinforcement to post-decision behavior was investigated by (a) recording the time each of 30 subjects spent viewing each of a series of stimulus patterns, (b) presenting the two patterns which were closest in viewing time to the subject for a decision, (c) providing positive, negative, or no information relative to the "correctness" of the decision, and (d) recording the time each subject spent viewing the patterns a second time. To obtain a score for each subject, the viewing time of the first presentation of each pattern was subtracted from the viewing time of the second presentation. Thus, the procedure of this experiment was designed to parallel that of previous studies using rating scales.

Predictions Based on Three Relevant Theories

The effects of positive reinforcement, negative reinforcement, and absence of reinforcement on changes in viewing time of the chosen and nonchosen alternatives may be predicted on the basis of at least three different theories: reinforcement, dissonance, and conflict.

The predictions of reinforcement theory are straightforward. Under the no-reinforcement condition neither the viewing time of the chosen or nonchosen alternatives should change. Under the positive reinforcement condition the chosen alternative should elicit longer viewing, while time spent viewing the nonchosen alternative should show no change. Under the negative reinforcement condition time spent viewing the chosen alternative should decrease while the nonchosen alternative should show no change.

The predictions of dissonance theory (Festinger, 1957) are more complex. Dissonance refers to a motivational tension between two or

more discrepant cognitive elements. The source of dissonance stemming from a decision is held to be the motivational tension arising as a result of rejecting something which is attractive (Festinger, 1957, p. 32). Thus, a change in the relative value of the alternatives may be considered to be an attempt by the subject to minimize the attractiveness of the nonchosen alternative and/or the unattractiveness of the chosen alternative. Hence, the subject may be seen as asserting or justifying his decision (Festinger, 1957; Gerard, Blevans and Malcolm, 1964). As mentioned above, previous studies have employed the use of a rating scale to measure the attractiveness of the alternatives used in the study. In this study, with viewing time rather than ratings as the dependent variable, it is therefore necessary to assume that viewing time is positively related to judged attraction before predictions based on dissonance theory may be made.

As explained above, under the no-reinforcement condition the chosen alternative should increase in viewing time while the nonchosen alternative should decrease in viewing time as a result of this motivational tension. Under the positive reinforcement condition there may also be an increase in the viewing time of the chosen alternative and a decrease in the viewing time of the nonchosen alternative. However, since positive reinforcement may serve the function of reducing dissonance, the changes in viewing time might not be so large as those in the no-reinforcement condition. Negative reinforcement on the other hand, might serve to <u>increase</u> the subject's dissonance following his decision. At this point dissonance theory would seem to lend itself to either of two predictions: (a) as above, the subject might reduce his dissonance by viewing the chosen alternative longer and viewing the nonchosen

alternative less, or (b) the subject might reduce his dissonance by avoiding both the chosen and nonchosen alternatives. With regard to the former, the possible increase in dissonance due to negative reinforcement might serve to produce greater changes than those occurring under conditions of no-reinforcement; with regard to the latter, it might be assumed that negative reinforcement would produce motivational tension so great that the subject would avoid both alternatives. The results reported by Greenbaum, Cohn and Krauss (1965) support the first prediction while the results reported by Gerard, Blevans and Malcolm (1964) support, in part, the second.

One theoretical approach to conflict theory is the competing-response (Worell, 1962). The competing response view assumes "that responding to different levels of conflict leads to the learning of differing conflict-specific responses. For example, a person who is protractedly exposed to relatively strong conflict might be expected to learn such responses as withholding a decision or considering each alternative more carefully, etc. Then, in new but similar situations, the individual might be expected to invoke those behaviors which he has previously learned. Thus, with the competing-response view, the effects of conflict are expected to have a limited generality--limited by the similarity between earlier and later conflict situations" (Worell, 1962).

With regard to this experiment, predictions may be made on the basis of the competing response approach if it is assumed that the decision situation is similar to the post-decision task situation. It might be predicted that an increase in viewing for both the chosen and nonchosen alternatives should occur under both the no-reinforcement

and the negative reinforcement conditions. Under the former the results of the decision are unknown, while under the latter the result is unsatisfactory; therefore, in both conditions the conflict involved in the decision is not reduced and, hence, responses made to the decision situation, e.g., viewing, should generalize to the post-decision task. Since positive reinforcement should reduce the conflict involved in the decision situation, there should be no change in the viewing time of either the chosen or nonchosen alternative.

Table I summarizes the predictions based on three theoretical approaches, a plus indicating an increase, a minus indicating a decrease, and a zero indicating no change in the dependent variable.

TABLE I

SUMMARY OF PREDICTIONS BASED ON THREE THEORETICAL APPROACHES

Theories	Reinforcement					
	No		Positive		Negative	
	Chosen	Nonchosen	Chosen	Nonchosen	Chosen	Nonchosen
Reinforcement	0	0	+	0	-	0
Dissonance	+	-	+	-	+/-	-/-
Competing-response	+	+	0	0	+	+

CHAPTER II

METHOD

Subjects

The subjects were 30 volunteer undergraduates, 20 men and 10 women, from introductory psychology classes at Oklahoma State University.

Apparatus

To the right of the entrance to the experimental room was a chair with a telegraph key attached to one arm. The chair was placed 4 ft. 2 in. in front of a black screen measuring 7 ft. 3 in. in length and 5 ft. in height. A 10 in.^{2} window, covered with a sheet of tightly stretched tracing paper, was located 9 in. from the top of the screen and directly in front of the chair. A black cardboard box measuring 2 ft. 2 in. long, 1 ft. 6 in. wide, and 1 ft. 6 in. high was placed in front of the screen 2 ft. 8 in. from the chair.

Upon entering the room the subject saw only the chair, the front of the screen and the box. In back of the screen was an Esterline Angus Event Recorder and an Airquipt Superba 77a slide projector.

To prepare the stimulus patterns several non-representational shapes, each constructed according to Method I of Attneave and Arnoult (1956), were painted on each of 13 10 in. x 10 in. squares of white cardboard. The patterns were photographed and made into 2 in. x 2 in. slides, the shapes appearing in black against a transparent background.

Experimental Design and Procedure

When the subject arrived he was shown to the experimental room, seated in the chair, and presented with the following written instructions which he was asked to read along with the experimenter:

> A series of patterns will be presented in this window. The length of each presentation will be up to you. Look at each pattern for as long as you like, and, when you don't wish to see it any longer, press this button and the next pattern will be presented. When you press the button, push it briefly but firmly and then withdraw your hand completely and place it in your lap. If you don't keep your hand at some distance from the button, you may accidentally trigger the apparatus before you wish to. You will not be tested on what you see or on any other aspect of the situation and there will be no shock or pain involved.
>
> Remember, look at each pattern only as long as you wish and then press the button and a new pattern will appear. I will tell you when to begin, and I also will tell you when the end of the series has been reached. Are there any questions?

All subjects viewed five practice slides and then, without a break in timing, eight test slides. The eight test slides were presented in ten random orders, each order being used for three subjects. The length of presentation of each slide was recorded by the event recorder.

Following projection of the last slide the subject was asked to wait one moment and the experimenter chose two patterns, the two closest in recorded viewing time, for presentation to the subject. The

presentation consisted of placing the two cardboard originals of these patterns on the box in front of the screen.

To provide a situation in which the decision was "perceived to reflect or measure aspects of the individual's self which the subject has a vested interest in maintaining" (Deutsch, Krauss and Rosenau, 1962) all subjects were given the following instructions indicating a relation between preferences for visual stimuli and masculinity-femininity:

> Here are two patterns we are most interested in. Our present findings show that most men prefer one pattern and most women the other. I want you to tell me which one you prefer, the one on your right or the one on your left. You will not be allowed to change your decision once it is made, so examine each pattern carefully before telling me your choice. Are there any questions?

An electric clock was used to record the time required by each subject to make a decision and this decision-time was then used to assign each subject to one of three groups. In this way the average decision-time of all three groups was held approximately constant. Two of the groups contained seven women and three men while the third contained six women and four men.

Subjects in Group I were not given any information regarding their decision, i.e., they were given no reinforcement; subjects in Group II were given positive reinforcement by telling them that their choice coincided with the choice of most members of their own sex; and subjects in Group III were given negative reinforcement (punishment) by

telling them that their choice coincided with the choice of most members of the opposite sex.

The following instructions were then read to all subjects:

> Now I will show you the same patterns again. As before, look at each pattern only as long as you wish and then press the button, and a new pattern will appear. I will tell you when to begin, and I, also, will tell you when the end of the series has been reached. Are there any questions?
>
> Do not push the button until I tell you to begin.

All subjects then viewed the same eight test slides in the same order as before and the viewing times were again recorded.

In order to have some measure of the effectiveness of the reinforcement conditions each subject was next asked to rate the group of six patterns which had not been presented for a decision on (a) the degree of masculinity-femininity in their appearance, and (b) how well they liked them. This was done by means of two seven-point rating scales (see Appendix A). The rating scales were used as an index to assess the extent to which the reinforcement might be important to the subject. It was assumed that if the reinforcement conditions were indeed effective, a male (female) subject who rated the patterns as masculine (feminine) should also indicate a liking for them, and, conversely, a male (female) subject who rated the patterns as feminine (masculine), should also indicate a dislike for them. Hence, it was assumed that a positive correlation between rated appropriateness to one's own sex and rated "likingness" should result.

CHAPTER III

RESULTS

For each subject the viewing time of the first presentation of each slide was subtracted from the viewing time of the second presentation. There were three such difference scores: one for the chosen alternative, one for the nonchosen alternative, and one consisting of the median of the difference scores for the remaining six patterns (see Appendix B). Table II shows the means of these three sets of scores for each of the three reinforcement groups.

TABLE II

MEAN DIFFERENCE SCORES IN SECONDS FOR THREE REINFORCEMENT GROUPS

Choice Condition	Reinforcement Conditions		
	No	Positive	Negative
Chosen	+2.50	-2.20	- .25
Nonchosen	-5.23	-2.45	- .38
Control	-2.90	-2.24	-2.13

The data were analyzed by means of an analysis of variance with the scores arranged in a 3 x 3 factoral design with repeated measures on the second (i.e., the Choice) factor. The three levels of the first factor were the three reinforcement conditions (positive, negative, and

no); the three levels of the second factor were the three choice conditions (chosen, nonchosen, and non-involvement in choice). A summary of this analysis is presented in Table III.

The significant Choice effect indicates that changes in viewing time depended on whether the pattern was chosen, rejected or neither (i.e., not involved in the decision). The meaning of this effect can be best understood by analysis of the Reinforcement by Choice interaction.

Relative to the change in median viewing time of the six patterns not included in the choice, i.e., the control patterns, the viewing time of the nonchosen alternative decreased in the No-Reinforcement and Positive Reinforcement Groups and increased in the Negative Reinforcement Group. Paired comparison one-tailed t tests showed that for the No-Reinforcement Group the chosen score was significantly greater than the nonchosen score ($P < .05$), the chosen score was significantly greater then the median control score ($P < .05$), and the nonchosen score was significantly less than the median control score ($P < .05$). These differences were not statistically significant in the Positive Reinforcement Group. Similarly, in the Negative Reinforcement Group the differences failed to reach statistical significance, although the difference between the nonchosen and median control scores reached the .10 level.

Since it was assumed in the above analysis that differences in viewing time between the first and second presentations of the six control slides were unaffected by the reinforcement conditions, a second analysis of variance was performed. This analysis, summarized in Table IV, showed that differences among the median control scores of

TABLE III

SUMMARY OF ANALYSIS OF VARIANCE

Source	df	MS	F
Between subjects	29		
R (reinforcement)	2	14.9880	.427
Subjects within groups	27	35.0519	
Within subjects	60		
C (choice)	2	66.5016	3.74*
RC	4	50.8693	2.86*
C x subjects within groups	54	17.7614	
Total	89		

*Significant at the .05 level.

TABLE IV

SUMMARY OF ANALYSIS OF VARIANCE

Source	df	MS	F
Mean	1		
Between subjects	2	1.7536	.1597
Within subjects	27	10.9806	
Total	30		

the three reinforcement groups did not approach statistical significance.

It will be recalled that each subject was asked to rate the group of six patterns which were not presented for a decision on (a) the degree of masculinity-femininity in their appearance, and (b) how well they were liked. The product-moment correlation between rated appropriateness to one's own sex and rated "likingness" was +.52, $P < .01$.

To determine the degree of relationship between viewing time and rated "attractiveness," the correlation between the median viewing times and ratings of "likingness" of the six control patterns was also computed. A significant positive correlation was found, eta = .58, $P < .02$.

CHAPTER IV

DISCUSSION

Using "viewing time" as the dependent variable in place of ratings the results of this experiment have shown that in the absence of post-decision reinforcement the chosen alternative is viewed longer while the nonchosen alternative is viewed less. Since this finding is congruent with that obtained in studies employing rating scales (Allen, 1964; Brehm, 1956; Brehm and Cohen, 1959; Brock, 1963; Cohen, 1962; Jecker, 1964; Rahman, 1963; Walster and Festinger, 1964) it appears that post-decision changes in the attractiveness of stimuli may be reflected in viewing times as well as ratings. It might appear rather remarkable that a phenomena discovered using rating scales should also be found using viewing time as the response measure, particularly in light of evidence suggesting a negative relation between preferences for visual stimuli and time spent inspecting them (Berlyne and Lawrence, 1964; Brown and Farha, 1966). Nevertheless, the significant positive correlation found between the median viewing times and ratings of "likingness" of the six control patterns suggests that a common process may underlie both, at least in experimental situations like that reported here.

With regard to psychological-selectivity, i.e., the tendency to seek information which favors the chosen alternative following a decision and/or to avoid information that favors the rejected alternative, the

necessity for considering the type of post-decision reinforcement--or lack of it--is clear. Under conditions of positive reinforcement no significant change in viewing time was found for either alternative. Likewise, no significant changes were found under conditions of negative reinforcement, although there was some tendency for both alternatives to elicit longer viewing. Thus, the equivocal nature of previous results (Lane, 1961; Mills, Aronson and Robinson, 1959; Rosen, 1961; Feather, 1962; 1963) may stem from a failure to consider the importance of reinforcement.

The findings of this experiment provide differential support for reinforcement, dissonance and conflict theories. The predictions of reinforcement theories are clearly not supported. This is evident in the significant changes in the no-reinforcement condition, the lack of change in the positive reinforcement condition, and the suggested change of "attention" in a direction opposite to what would be predicted for the negative reinforcement condition.

Predictions based on dissonance theory for conditions of no-reinforcement are supported: The chosen alternative increased significantly in viewing time and the nonchosen alternative decreased significantly. In addition, the lack of change in the positive reinforcement condition is congruent with dissonance theory. With regard to the negative reinforcement condition, however, neither of the alternative predictions were supported. If there were any tendency for changes in viewing time to occur, the data suggest that it was in a direction opposite to that predicted by dissonance theory.

For the no-reinforcement condition predictions stemming from the competing-response approach find partial support. As predicted, time

spent viewing the chosen alternative did increase; however, contrary to prediction, time spent viewing the nonchosen alternative did not. The results for the positive reinforcement condition were also as predicted. And, although only approaching statistical significance, the data for the negative reinforcement condition were consistent with predictions based on the competing-response approach.

Table V summarizes the extent to which the data of this experiment are consistent with the three theoretical approaches.

TABLE V

SUMMARY OF CONSISTENCY BETWEEN PREDICTIONS AND RESULTS

	Reinforcement					
	No		Positive		Negative	
	Chosen	Nonchosen	Chosen	Nonchosen	Chosen	Nonchosen
Reinforcement	-	-	-	-	-	-
Dissonance	+	+	+	+	+/-	-
Competing-response	+	-	+	+	+	+

It can be seen that the data are accounted for more adequately by dissonance and conflict theories than by reinforcement theory.

If dissonance theory is to achieve predictive utility it will probably be necessary for its advocates to clarify predictions relating to the post-decision effects of positive and especially, negative reinforcement. It appears that an extension of the theory may be needed to account for results of studies concerned with the effects of reinforcement on post-decision selectivity.

That the reinforcement conditions were indeed important to the subjects is indicated by the significant positive correlation between ratings of "likingness" and ratings of appropriateness to one's own sex. Moreover, that the effects of reinforcement were confined to the two patterns involved in the decision is shown by the lack of differences among the three reinforcement groups in time spent viewing the control patterns.

There are at least two aspects of this study which should be considered in future experimental work of this nature: (1) the reliability of viewing time should be investigated and (2) some means should be devised to assess the level or degree of conflict for each group after reinforcement is administered, in order to achieve more accurate predictions.

The first may be accomplished by the addition of a control group. The second is not as easily achieved, but one possibility is to ask the subjects to make an additional decision, similar to their first one, between the two alternatives after the administration of reinforcement. The length of time required to make this decision may then be used as an indication of the level or degree of conflict for each group.

CHAPTER V

SUMMARY

The importance of reinforcement to post-decision behavior was investigated by (a) recording the time each of 30 subjects spent viewing each of a series of stimulus patterns; (b) presenting the two patterns which were closest in viewing time to the subject for a decision; (c) providing positive, negative, or no information relative to the "correctness" of the decision; and (d) recording the time each subject spent viewing the patterns a second time. To obtain a score for each subject, the viewing time of the first presentation of each pattern was subtracted from the viewing time of the second presentation.

Predictions were made on the basis of three different theories: reinforcement, dissonance, and conflict. The results indicated that post-decision changes in the attractiveness of stimuli may be reflected in viewing times and differential support was provided for the three theories. Changes in time spent viewing the pattern depended on whether it was chosen, rejected, or neither, i.e., not involved in the decision. These changes occurred, however, only when no information was provided as to the "correctness" of the decision. Thus, it was suggested that the influence of reinforcement on post-decision behavior may be important.

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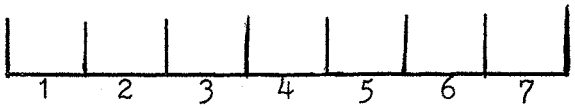
APPENDIX A

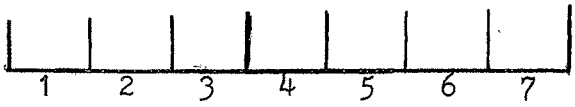
SCALES USED TO OBTAIN RATINGS OF "LIKINGNESS" AND MASCULINITY-FEMININITY

You have seen 6 different patterns (not including the 2 that you chose between). On the 7 point scale below rate these 6 patterns (as a whole, that is, 1 rating for all 6) on the degree of masculinity-femininity in their appearance.



Extremely feminine Extremely masculine

Now rate the same 6 patterns on how well you liked them.



Dislike them very much Like them very much

APPENDIX B

DIFFERENCE SCORES FOR THE CHOSEN ALTERNATIVE, THE NONCHOSEN ALTERNATIVE, AND THE MEDIAN OF THE SIX CONTROL PATTERNS, UNDER CONDITIONS OF POSITIVE, NEGATIVE, AND NO-REINFORCEMENT

No-Reinforcement

	Chosen	Nonchosen	Control
	+ .50	- 5.75	- 3.00
	-13.25	-10.25	- 1.75
	- .25	- 3.00	-10.50
	- .75	- 1.00	- 4.625
	+13.00	- 3.25	- .375
	+ 4.75	- 3.50	+ .875
	+ .50	- 2.25	- .25
	+23.25	-15.75	- 3.25
	- 2.50	- 2.50	- 4.25
	- .25	- 5.00	- 1.875
Total	+25.00	-52.25	-29.00

Positive Reinforcement

	Chosen	Nonchosen	Control
	- .50	+ .25	+ .50
	- 5.50	- 5.50	- .75
	- 6.75	- 8.50	- 1.125
	- 2.25	- 1.50	- 5.125
	- 1.25	- 1.25	- 2.50
	- 2.25	+ .25	- 1.375
	- 5.75	- 9.25	- 1.625
	+ 1.50	+ 2.00	- 1.00
	+ 1.00	- .50	- 5.25
	- .25	- .50	- 4.125
Total	-22.00	-24.50	-22.375

APPENDIX B (Cont.)

Negative Reinforcement

	Chosen	Nonchosen	Control
	- 5.00	- 7.00	+ .625
	- 3.25	- 7.25	- .375
	+ 1.50	+ .25	- 1.00
	+ 4.50	- 1.50	+ 2.875
	0.00	+11.75	-10.00
	- 2.25	- 1.25	- .25
	+ 1.00	- 1.00	- 6.875
	- 1.50	- 2.50	- 6.00
	- .50	- 1.25	- 3.375
	+ 3.00	+ 6.00	+ 3.125
Total	- 2.50	- 3.75	-21.25

VITA

Clifford O'Donnell

Candidate for the Degree of

Master of Science

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