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GRADUATE COLLEGE

SOME REINFORCING PROPERTIES OF NEGATIVE INTERPERSONAL EVALUATIONS

A DISSERTATION

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DOCTOR OF PHILOSOPHY

BY

KERRY W. WYANT

Norman, Oklahoma

1975

SOME REINFORCING PROPERTIES OF NEGATIVE

INTERPERSONAL EVALUATIONS

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TABLE OF CONTENTS

Some Reinforcing Properties of Negative Interpersonal Evaluations

Kerry W. Wyant

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(Abstract)

Evidence suggestive of some reinforcing properties of negative interpersonal evaluations was obtained. Slide projector presentations of interpersonal evaluations were escapable for 20 trials and escapable and avoidable for an additional 20 trials. Use of this procedure enabled an attempt at assessing some of the alleged reinforcing properties of negative evaluations. The presentation of the evaluations was either signalled or unsignalled. Following an escape response on the first 20 trials, the termination of the evaluations was either immediate or delayed, and the termination of the signal was either immediate or delayed. Following either an escape or an avoidance response on the second 20 trials, Ss, for whom the termination of the signal was delayed on the first 20 trials, continued to receive the delay; otherwise reinforcement was immediate. When slides were escapable, unsignalled evaluations produced better performance than unsignalled neutral scenes. Evaluations plus signal failed to produce superior performance. When slides were escapable and avoidable, acceptable differences among groups

were not obtained. However, indicating results were in the predicted direction, the combined effects of delayed termination of the evaluations (but not of the signal) on the first 20 trials and of immediate termination of evaluations and signal on all trials produced better performance than the combined effects of delayed termination of the signal (but not of the evaluations) on all trials, of immediately terminated unsignalled evaluations, and of delayed termination of evaluations and signal on the first 20 trials.

Some Reinforcing Properties of Negative

Interpersonal Evaluations

Kerry W. Wyant

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Positive interpersonal evaluations (e.g., assigning high intelligence to a person) have been shown to exhibit some of the properties of positive reinforcers (Lamberth & Craig, 1970; Lamberth, Gay, & Dyck, 1972). Negative evaluations, however, have not been shown to function like negative reinforcers. The purpose of the present study was to investigate several of the putative reinforcing properties of negative evaluations. A discrete trials escape conditioning procedure was used. In addition to the reinforced trial, delay of reinforcement and conditioned excitation procedures were used.

Decremental performance effects have been the almost universal finding for delay of reinforcement (e.g., Fowler & Trapold, 1962; Weiss, 1968; Weiss, Lombardo, Warren, & Kelley, 1971) though in several studies incremental performance effects have been found following a delay of reinforcement (e.g., Holder, Marx, Holder, & Collier, 1957; McHose & Tauber, 1972). Aversive stimuli produced in conditioned excitation procedures have been shown to facilitate performance (e.g., D'Amato, Fazzaro, & Etkin, 1968; Rescorla, 1968;

Weisman & Litner, 1969; Morris, 1974).

In the present study, the dependent variable was the speed (1/latency) with which the instrumental response of pressing a button was executed. The instrumental response terminated slide projector presentations of negative evaluations. Subjects received either immediate or delayed reinforcement and either signalled or unsignalled evaluation presentations. In a second phase of the study, a discrete trials delayed avoidance procedure was used during which the escape contingency was present, and UCS offset was immediate for all groups. The procedure was used not only to further assess the reinforcing properties of the evaluations but also the carryover effects of delayed reinforcement. It was assumed that performance, which is under the control of the CS, is an increasing function of the duration of prior exposure to aversive stimulation. In the first phase of the experiment, a delay of reinforcement results in a longer exposure (just following the termination of the CS and in the presence of apparatus cues and instrumental response contingent proprioceptive feedback) to aversive stimulation, and thus, to greater punishment, than when reinforcement is immediate. Consequently, the magnitude of aversiveness conditioned to the CS should be greater for delayed than for imimediate reinforcement. In the second phase, following a shift from delayed to immediate reinforcement, it was expected that performance would be an increasing function of the delay interval received in Phase I. The first phase of the study was assumed analogous to discrete trials escape conditioning, the second, to standard delayed avoidance conditioning. It was hypothesized for the escape procedure that response speed is an increasing function of the number of reinforced trials, and increasing function of the CS, and a decreasing function of the delay of reinforcement. It was hypothesized for the avoidance procedure that response speed is an increasing function of the CS and an increasing function of the delay of reinforcement received during the escape phase.

Method

Subjects. The 83 Ss employed in the experiment were introductory psychology students at the University of Oklahoma.

Apparatus and materials. A S was seated in a comfortable chair 8 ft. from a screen with his back to a one-way mirror that adjoined the control room. On each of 20 trials, a 35 millimeter color transparancy containing an evaluative statement was projected by means of a Kodak Carousel 860 projector through the one-way mirror. With the exception of a small area through which the evaluation statements were projected, the mirror was opague. A 1000 Hz tone functioned as the CS. The sound level in the room, as measured by a Realistic sound level meter, Model 33-1028, was approximately 50 db; with the onset of the tone, the sound level in the room was 60 db. The subject room was dimly lit by a shaded 60 watt bulb. Immediately in front of the chair was a table supporting a control box. During the first phase, two illuminated buttons recessed on the angled surface of the box were employed by S. During the second phase, only one button was used. Haydon stop clocks, model KIS140, were used.

A 15 item Survey of Attitudes and the Interpersonal Judgment Scale (IJS) were also employed (Byrne, 1971). Responses to the items of the attitude scale were made on a 6-point scale, and the topics were of varying degrees of interest including fraternities and sororities, smoking, premarital sex relationships, religion, creative work, and divorce. Subjects were administered the attitude scale early in the semester during a class period. The responses were ostensibly used as a basis for evaluating the Ss. The IJS consist of six 7-point scales concerning intelligence, knowledge of current events, morality, adjustment, liking of a person, and desirability as a work partner. Evaluative statements were taken from the IJS.

Some evaluative statements were projected more than once during the first phase. Subjects were evaluated as being: below average in intelligence (shown on three trials), very much below average in intelligence (one), slightly below average in knowledge of current events (two), below average in knowledge of current events (one), immoral to a slight degree (two), immoral (one), maladjusted to a slight degree (two), maladjusted (one), a person who would probably be disliked very much (three), a person who would probably be disliked (one), a person with whom the evaluator would very much dislike working (three). Statements were presented in a random order.

Procedure. Subjects were treated individually and arrived for the experimental session at 30 min intervals. At the outset of Phase I, deceptive written instructions indicated the effects of interpersonal evaluations on attitudes were being investigated. Subjects were informed they had been evaluated, on the basis of their attitude surveys, in the areas of intelligence, knowledge of current events, morality, adjustment, liking of a person, and desirability as a work partner. Each S had been ostensibly evaluated by an anonymous student who the S did not know.

At the outset of Phase II, the avoidance contingency was made explicit by informing the S it was not necessary to see all or any of the statements again if it was felt the first exposure was enough to acquaint S with the statements. Subjects were debriefed upon completion.

During Phase I, tonal onset occurred one second prior to the automated onset of the evaluative statement. Concurrent with the onset of the statement, a clock started. Depression of an illuminated white button terminated the clock, which controlled for reading time, and started a second clock. Depression of an illuminated red button terminated the tone and the second clock, which provided a measure of latency.

During Phase II, only the red button was used. Tonal onset occurred one second prior to the illumination of the red button. Concurrently with the activation of the button, a clock started. Depression of the red button within six seconds following activation of the button prevented the onset of the evaluative statement, terminated the tone, and stopped the clock. Onset of the evaluative statement occurred six seconds following illumination of the button. Depression of the button, after the onset of the statement, terminated the presentation of the statement, the tone, and stopped the clock. An avoidance response was defined as the depression of the button prior to the onset of the statement. If Ss failed to avoid on each of the 20 trials, they received the same evaluative statements in the same order as during the escape trials. During both phases, the intertrial interval was 10 sec, and a masking task was not employed.

Design. The escape and avoidance procedures were each subsumed within a groups by trials repeated measures design with 20 trials. Subjects were randomly assigned to groups.

Seven groups received the escape procedure. The negative tone (NT) group received evaluations and the tone. A negative (N) group received only the evaluations. Use of the N group enabled the assessment of the combined effects of evaluations and tone. A negative tone prolonged (NTP) group received evaluations and tone, but the offset of the tone was prolonged five seconds following the instrumental response (Kamin's procedure, 1954). This group also received the prolonged tone during the second phase. Use of the NTP group enabled an assessment of the CS termination contingency in the NT group. A negative tone slide delayed (NTD) group received evaluations and tone but the offset of the slide was delayed five seconds following the instrumental response. A negative tone prolonged and slide delayed (NTPD) group received evaluations and tone, but the offset of both the evaluations and tone was delayed five seconds following the instrumental response. A no evaluation or tone only (ST) group received only the tone. This group did not receive the avoidance procedure nor the evaluations during the escape procedure. Instead of an evaluative statement on each of the escape trials, Ss were exposed to relatively neutral slides of various buildings and landscapes. Otherwise, Ss in the ST group were treated the same as those in the NT group. The ST group enabled an assessment of the energizing properties of the tone independently of the evaluative statements. Finally, a no evaluation and no tone (S) group received only the neutral slides of buildings and scenery. The S group served as a control for the N group. The S group did not receive the avoidance phase.

Results and Discussion

Trials were treated in blocks of two. Response speed (1/latency) for each phase were subjected to an analysis of variance.[1] Results for the escape phase are presented in Figure 1. For the escape phase, differences across trials were significant (F = 6.976, df = 9/684, $p < .0001$). Differences among groups approached significance (p = .0748). Further analysis indicated a group effect across the first eight trials (F = 2.461, df = 6/76, p = .0311). Individual comparisons indicated a reliable difference between groups N and S (Tukey's test, $p < .05$). Other group comparisons were not significant.

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Insert Figure 1 about here

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Presented in Figure 2 is a graph of the results for the avoidance phase. The effect due to trials was significant (F = 10.449, df = 9/513, $p < .001$). Groups did not differ significantly (p = .1929). Group performance, however, was in the expected direction. Consequently, the two high performing groups (NTD and NT) were combined as were the three low performing groups (NTP, N, and NTPD), and the analysis was repeated. In this further analysis, with groups NTD and NT combined and groups NTP, N, and NTPD combined, a group effect was obtained (F = 5.106, df = 1/60, p = .0259). Groups did not differ significantly in the number of avoidance responses.

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Insert Figure 2 about here

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Results from Phase I were largely negative. The outcome was primarily due to the poor performance of group NT. Speeds were generally slowest for the control groups S and ST, intermediate for the delay groups NTD, NTP, and NTPD, and greatest for N. The relative performance of these six groups was consistent with expectations. The performance of group NT, however, was characterized by a steep increasing slope reaching a maximum, above that of group N, on trial six. Thereafter, speeds declined to approximate those of the delay groups. The significant finding of the first phase was the superior performance of group N relative to that of group S. The finding tenuously indicates that negative interpersonal evaluations do function as negative reinforcers.

Prior to combining groups, results from the avoidance phase were insignificant. The failure to obtain significance, however, could not be attributed to the performance of a particular group. Rather, the performance of the five groups was consistent with expectations. Response speeds of Ss receiving the tone and immediate reinforcement, group NT, were faster than those of Ss who received negative evaluations only, group N, indicating that the tone tended to facilitate performance. Moreover, the response speeds found in group

NT were faster than those for Ss receiving a tone prolonged five seconds beyond the instrumental response, indicating the performance in group NT was facilitated by immediate tonal offset. The speeds of Ss who received a five second delay in the offset of the slides during Phase I were generally greater than those of group NT, indicating that the aversiveness of the tone was greater for group NTD than for the other groups. Presumably, the tenuous superior performance may be attributed to the conditioning of a greater amount of punishment to the CS, as well as other cues, as a result of the delay interval that occurred in Phase I. The finding tends to indicate that performance, under the control of a CS, is an increasing function of the duration of prior exposure to aversive stimulation. Finally, Ss who received delayed tonal and delayed slide offset in the first phase performed the poorest in the second phase. The finding indicates that the CS termination contingency in the first phase was a relevant factor for the subsequent performance of group NTD in the second phase.

That the performance of the groups was in the anticipated direction was supported by the analysis performed on the combined groups. With groups NTD and NT aggregated, a between group effect was obtained. Subjects who received either delayed termination of the evaluations (but not of the CS) during the first phase, group NTD, or immediate termination of the evaluations and CS on all trials, group

NT, performed better than Ss who received either delayed termination of the CS (but not of the evaluations) on all trials, group NTP, or immediate termination of unsignalled evaluations on all trials, group N, or delayed termination of evaluations and CS during the first phase, group NTPD. The interpretation of this finding, however, tends to be equivocal. The tone and tonal offset, not conditioned aversive stimulation and its offset, may have produced the effect. On the other hand, the performance of group NTD suggests that aversive properties were conditioned to the tone.

The performance of group NT was poor during the escape phase but in the expected direction during the avoidance phase. Seemingly analogous results have been reported in several studies. In these studies facilitatative effects, due to the CS employed, were found during extinction when shock was not being delivered (McAllister & McAllister, 1962; Franchina, 1966) but not during acquisition when shock was being delivered (Franchina, 1966; Bolles & Grossen, 1969). Phase II was similar to an extinction phase to the extent Ss avoided (the mean number of avoidance response in group NT was 7.38). In addition, the credibility and hence the impact of the evaluations may have decreased during Phase II. The fewer number of exposures to the slides and the possible decrease in credibility may have provided conditions necessary for a facilitative effect.

References

Bolles, R. C., & Grossen, N. E. Effects of an informational stimulus on the acquisition of avoidance behavior in rats. Journal of Comparative and Physiological Psychology, 1968, 68, 90-99.

Byrne, D. The attraction paradigm. New York: Academic Press, 1971.

D'Amato, M. R., Fazzaro, J., & Etkin, M. Anticipatory responding and avoidance discrimination as factors in avoidance conditioning. Journal of Experimental Psychology, 1968, 77, 41-47.

Fowler, H., & Trapold, M. A. Escape performance as a function of delay reinforcement. Journal of Experimental Psychology, 1962, 63, 464-467.

Franchina, J. J. Effects of shock schedules on the acquisition and extinction of escape behavior. Psychonomic Science, 1966, 4, 277-278.

Holder, W. B., Marx, M. H., Holder, E. E., & Collier, G. Response strength as a function of delay in a runway. Journal of Experimental Psychology, 1957, 53, 316-323.

Kamin, L. J. Traumatic avoidance learning: the effects of CS-UCS interval with a trace conditioning procedure. Journal of Comparative and Physiological Psychology, 1954, 47, 65-72.

Lamberth, J., & Craig, L. Differential magnitude of reward and magnitude shifts using attitudinal stimuli. Journal of Experimental Research in Personality, 1970, 4, 281-285.

Lamberth, J., Gay, R. A., & Dyck, D. G. Differential reward magnitude and human conditioning with social reinforcers. Psychonomic Science, 1972, 28, 231-233.

McAllister, W. R., & McAllister, D. E. Role of the CS and of apparatus cues in the measurement of acquired fear. Psychological Reports, 1962, 11, 749-756.

McHose, J. H., & Tauber, L. Changes in delay of reinforcement in simple instrumental conditioning. Psychonomic Science, 1972, 27, 291-292.

Morris, R. G. M. Pavlovian conditioned inhibition of fear during shuttlebox avoidance behavior. Learning and Motivation, 1974, 5, 424-447.

Rescorla, R. A. Pavlovian conditioned fear in Sidman avoidance learning. Journal of Comparative and Physiological Psychology, 1968, 65, 55-60.

Weisman, R. G., & Litner, J. S. The course of Pavlovian excitation and inhibition of fear in rats. Journal of Comparative and Physiological Psychology, 1969, 69, 667-672.

Weiss, R. F. An extension of Hullian learning theory to persuasive communication. In A. G. Greenwald, T. C. Brock, & T. M. Ostrom (Eds.), Psychological foundations of attitudes. New York: Academic Press, 1968, Pp. 109-145.

Weiss, R. F., Lombardo, J. P., Warren, D. R., & Kelley, K. A. The reinforcing effects of speaking in reply. Journal of Personality and Social Psychology, 1971, 20, 186-199.

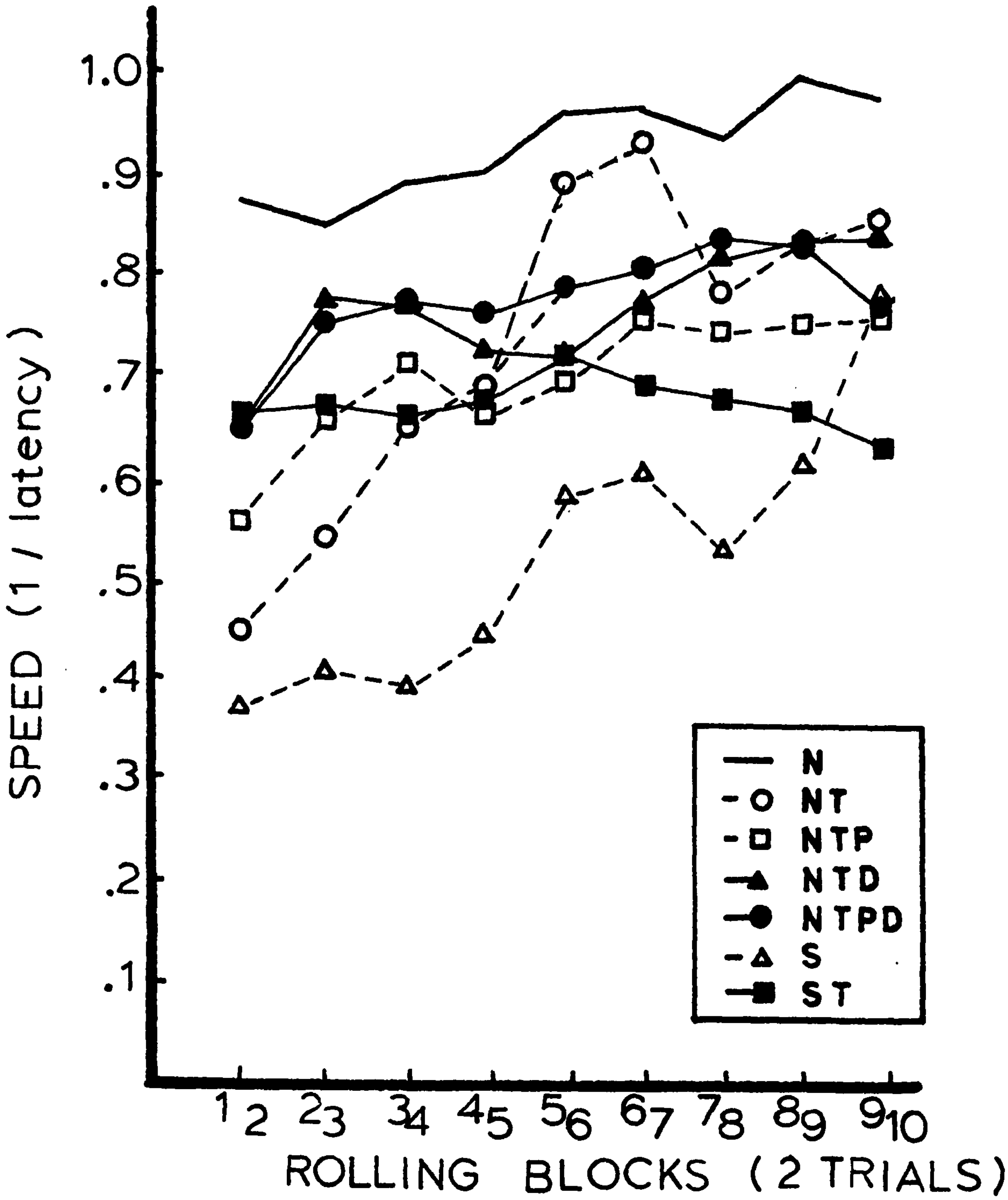
Footnote

1. Two hundred and eighty-nine Ss were used in some nine pilot studies. Among the variables manipulated were the intensity (e.g., strong or mild), source (e.g., psychologist or student), and type (e.g., positive or negative) of evaluations, length of the intertrial interval and interpolated activity between trials (e.g., masking tasks such as proof reading), number of trials and number of conditioning phases (e.g., a "classical" phase in which slides were inescapable and unavoidable was employed at one point) and, of course, discriminative stimulus conditions (e.g., presence or absence of tone) and delay of reinforcement (e.g., 3 or 5 sec delay). Results from these studies were generally promising. Thus, for example, while decremental performance effects due to a delay of reinforcement were not always obtained during the escape phase, performance following the delay (i.e., during the avoidance phase) was typically better than the performance of Ss who received immediate reinforcement during the escape phase.

Figure Captions

Fig. 1 Mean escape response speeds for slide content (neutral or evaluative material), CS (presence or absence), and delay (in slide offset or CS offset or both).

Fig. 2 Mean avoidance response speeds for CS (presence or absence), delay (in slide offset or CS offset or both) received during escape training, and delay (in CS offset) received during avoidance training.



SPEED (1 / latency)
1.0
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.5
.4
.3
.2
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NT
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ST
1 2
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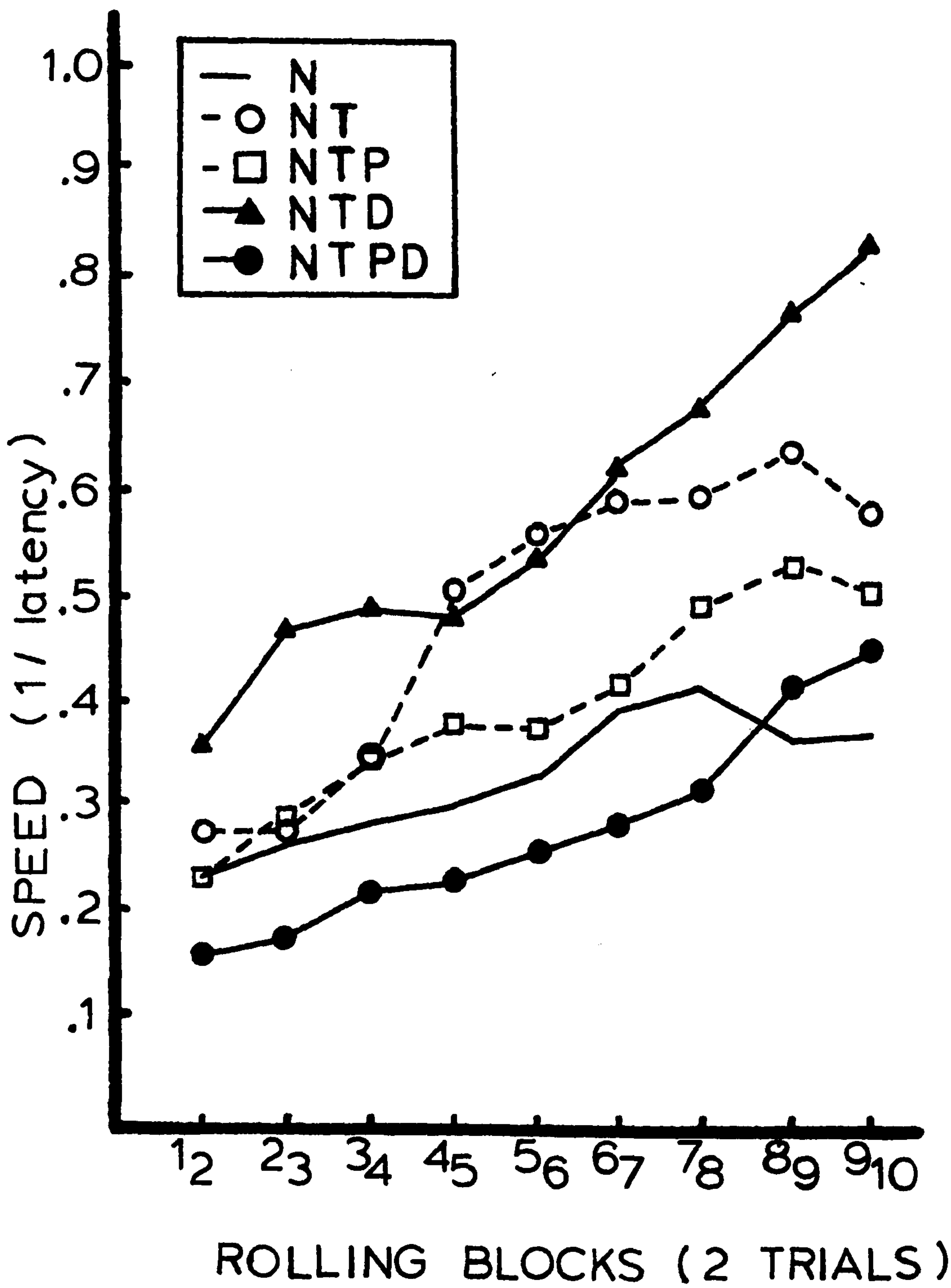
ROLLING BLOCKS (2 TRIALS)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SPEED (1/ latency)
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2 3
3 4
4 5
5 6
6 7
7 8
8 9
9 10
ROLLING BLOCKS (2 TRIALS)

APPENDIX A

PROSPECTUS

Reinforcing Properties of Evaluations and Some Variables which Affect Response Acquisition in Escape and Avoidance Learning: A Review of the Literature

The functional properties of the CS as they pertain to standard delayed avoidance conditioning are reviewed first. Because it seems the quality of properties characterizing the CS change after some 40 to 60 trials or more, depending on the situation, the review is largely restricted to findings steming from short term training. Aversive stimulation (drive) intensity, contrast, and delay of reinforcement procedures as they pertain to escape conditioning are reviewed second. A review of several studies in which delay of reinforcement has been found to have two functions is then presented followed by a consideration of the effects of the duration of aversive stimulation in an aversive setting. Fifth, conditioning studies employing attraction stimuli (e.g., interpersonal evaluations) are then reviewed. Finally, an experiment using delay of reinforcement, a warning signal or CS, and negative interpersonal evaluations, is suggested.

CS and CS Termination Early in Avoidance Training

Evidence in this section is pertinent to the effects of the CS termination contingency early in training. Evidence is restricted to the early training trials since the properties characterizing CS termination appear to change later in training (i.e., after some 40 to 60 trials). Evidence relevant to establishing the aversiveness of the CS is considered first. Second, evidence pertinent to the discriminative functions of the CS is examined. Does the CS function to signal punishment and motivate performance? Third, studies addressing the motivating properties of the CS and the reinforcing properties of CS termination are reviewed. The discriminative, motivating, and reinforcing properties are assumed to be due to the aversiveness of the CS.

Aversive Properties of the CS

Aversiveness has traditionally been considered the salient characteristic of the CS. Consistent support for the notion has come from the early acquisition trials of experiments and has been of three kinds. Overt characteristics of unpleasant emotion have been observed, a conditioned emotional response (CER) has been produced, and Ss have preferred unsignalled to signalled avoidance.

Early in training, Ss typically show signs of intense emotion (e.g., vocalizations, vomiting, running, urinating, defecating, crouching, tenseness) in response to a CS even though the CS is not followed by an aversive stimulus (e.g., Miller, 1948; Kamin, 1954; Rescorla & LoLordo, 1965). Kamin, Brimer and Black (1963) trained Ss to bar press for an appetitive reinforcer and in a separate situation, to acquire an avoidance response (R_a). During various stages of training, Kamin et al. imposed the CS for the R_a on the appetitive task. Early in training, a suppression of the appetitive behavior was found. A suppression of behavior is generally interpreted as an index of a CER.

Unsignalled avoidance was preferred by Ss in three experiments. Following the initial phase, Ss bar pressed to avoid shock in a Sidman procedure in an experiment reported by Badia, Culbertson, and Lewis (1971). Contingent on the R_a was the instigation of a one minute period during which lever pressing resulted in a immediate feedback stimulus (15 sec of a white light) and shock was preceded by 5 sec presentation of a CS (tone). Later Ss entered into an extinction procedure in which the feedback stimulus was omitted and Ss could by pressing an alternate bar change over to an unsignalled (CS omitted) avoidance schedule. Subjects spent most of the time in the unsignalled condition. In a later study by Badia and Culbertson (1972) an escape procedure was used in the first experiment and unescapable and unavoidable shock was used in the second experiment. Subjects again spent most of their time in the unsignalled (no CS) condition. Results from these studies indicate the CS is aversive early in training (i.e., when shock is being delivered).

Discriminative Properties of the CS

The facilitative or discriminative properties of the onset and presence of the CS have been assessed in a number of different situations.

In an abortive but ingenious attempt, Brown, Kalish, and Farber (1951) indexed the facilitative effect of the CS by means of a startle response as measured in a stabilimeter. Experimental Ss received Pavlovian conditioning; for control Ss, the CS and UCS were never presented simultaneously. On each of four days conditioning occurred on 7 trials and testing on 3 (trials 4, 7, & 10). Three seconds following the introduction of the CS on each of the 12 test trials, the presentation of a loud sharp noise produced a greater startle response for experimental Ss than for controls. While Brown et al. (1951) proposed that conditioned fear elicited by the buzzer-light combination had a general energizing function, the authors also proposed an alternative interpretation. Subjects reacted to the CS with a specific postural adjustment (crouching) that facilitated the startle response to a sudden loud noise. It has since been shown that the startle response is not augmented when back shock (rather than foot shock as in the Brown et al. study) is administered during the fear conditioning phase (Kurtz & Siegel, 1966).

More recent attempts at indexing the discriminative properties of the CS appear successful. Substantial evidence supporting a discriminative function has come from studies employing a transfer of control paradigm. The transfer of control paradigm uses both Pavlovian defense conditioning and instrumental conditioning, frequently avoidance conditioning. During Pavlovian conditioning two kinds of CSs may be produced. A negatively valenced CS (CS+) is produced by preceding shock with the CS. A positively valenced CS (CS-) may be conditioned in several ways (e.g., Rescorla & LoLordo, 1965). (a) The CS+ is followed by shock on some trials while the CS+ is followed by the CS- on other trials (shock omitted) (conditioned inhibitor). (b) The CS+ is followed by shock on some trials while the CS- is followed by a stimulus free period on other trials (shock and CS+ omitted) (discriminative). (c) Following a stimulus free period (CS+ omitted), shock is presented while on the other trials, the CS- is presented followed by a stimulus free period (shock omitted) (contrast). Either preceding or following Pavlovian conditioning an instrumental response is conditioned. Once instrumental and Pavlovian conditioning have occurred, the CS(s) are superimposed on the instrumental task independently of the S's behavior in a transfer of control test. Thus, a CS+ produced by pairing a neutral stimulus with an aversive stimulus (e.g., shock, loud blast from a horn) when imposed on avoidance responding facilitates avoidance responding (Rescorla & LoLordo, 1965; LoLordo, 1966; Rescorla, 1967, 1968; Weisman & Litner, 1969, Experiment I). Note that in the Rescorla (1968, Experiment II) study aversive properties were conditioned to the CS during a Sidman avoidance procedure. A panel pressing R_a has also been elicited by a CS+ in the absence of the CS to which R_a was originally conditioned (Soloman & Turner, 1962).

Several experiments by Weisman and Litner (1969) illustrate the conditioning of a CS+ in a Pavlovian procedure. In an operant chamber fitted with a wheel turn manipulandum, animals were trained in a Sidman avoidance procedure (shock-shock interval 5 sec, response-shock interval 20 sec) (Weisman & Litner, 1969, Experiment I). Training occurred for 70 min sessions on each of 4 days (days 5, 7, 9, & 11) Pavlovian conditioning occurred for one hour. The CS+ was a tone (2,8000 Hz, 85 db); the CS- was a light. The discrimination group received the CS+ for 5 sec followed by shock and the CS- was randomly presented for 5 sec such that the CS+ and CS- were separated by an average intertrial interval (ITI) of 1.5 min. In the conditioned inhibition group, the CS- was always immediately preceded by the CS+. In the CS+ contrast group the CS- was omitted; in the CS- contrast group, the CS+ was omitted. During the tests sessions (on days 6, 8, 10, & 12), the CSs were imposed on the Sidman procedure. The discrimination and inhibition groups received presentations of the CS+ and CS-. The CS+ contrast group received the CS+; the CS- contrast group received the CS-. The rate of responding during 5 sec periods prior to, during, and following presentations of the stimuli were recorded. In the conditioned inhibition, discrimination, and CS+ contrast groups, responding reliably increased during and following CS+ presentations. On the first day of testing, the conditioned inhibition, discrimination, and CS- contrast group, showed no decreases in responding attendent to CS- presentations. However, following continued Pavlovian conditioning, reliable decreases in responding occurred.

In the second experiment reported by Weisman and Litner (1969), the durability of the discriminative functions of CS+ and CS- after Pavlovian conditioning had been discontinued were investigated. Experiment II differed from Experiment I in two respects. Testing occurred after fear conditioning had been discontinued and a minimum of 15 test sessions were given. Results replicated and extended the principle findings of Experiment I. The effect of the CS- was longer lasting than that of the CS+. By the sixth test session little differences between pre-CS+ and CS+ response rates were observed. In contrast the CS- continued to suppress response rates throughout the eleventh test session.

Morris,(1974), following a procedure similar to that employed by Rescorla (1968, Experiment II), also produced a CS+ by pairing a tone (1000 Hz, 85 db) with shock during avoidance training. In Experiment I, Ss were trained on a

Sidman avoidance schedule in a wheel turn apparatus. A quarter turn of the wheel produced a 20 sec shock free period; further responding during the shock free interval initiated new intervals free of shock. Following a second phase in which animals were pretested for the unconditioned effects of the tone and lights, animals received standard avoidance training in a shuttlebox. Shock was preceded by a 10 sec presentation of the tonal CS; contingent on R_a was a 10 sec presentation of the lights. Four groups were trained for as many trials as were necessary to complete a criterion of 1, 3, 9, and 27 successive R_as respectively. Yoked controls received exactly the same number, sequence, and duration of the CSs and shocks as their master animals, but had no control over the presentation of these stimuli. Following shuttlebox training, Ss were returned to the wheel turn apparatus for a further Sidman avoidance session. On the following day the tone and lights were imposed on the Sidman schedule for 5 sec presentations at intervals of 35, 115, or 145 sec. Response frequency was recorded for three successive prestimulus 5 sec periods, a 5 sec stimulus period, and for three successive poststimulus 5 sec periods. Response frequencies increased during and after the presentation of the tonal CS+. Experimental groups did not differ nor did the yoked controls differ from the experimental groups. Only the response frequency of the fourth group (Ss in this group were required to make 27 successive R_as during shuttlebox training) decreased significantly following the introduction of the lights (CS-). Performance, however, was a function of the number of successive avoidance responses required during shuttlebox training (group 27 < group 9 < group 3 < group 1), though groups 27 and 9 did not differ significantly nor did groups 3 and 1. Yoked controls did not differ from experimental *S*s. The absence of any differences between experimental and yoked *S*s indicated conditioning was Pavlovian.

In the second experiment reported by Morris (1974), the initial Sidman avoidance training was omitted and *S*s received 60 standard avoidance trials in the shuttlebox. One yoked control group received exactly the same sequence and duration of the CSs and shocks as their respective masters; a second was treated the same as the first except the feedback stimulus was presented randomly; for half of the third group, treatment was again the same as in the first group but no shocks were delivered while for the other half, the number and duration of shocks was the same as their masters but the CSs were omitted. Reported here are the results from the first session. The imposition of the tonal CS+ resulted in significant rate increases for the experimental and the first two yoked groups (*S*s received the same pattern of shocks and CS+ presentations), and these groups performed at a significantly higher rate than the last control group (*S*s received either shock or CSs). The imposition of the

CS- (lights) resulted in significant rate reductions for the experimental Ss and the first yoked group (Ss received same pattern of stimuli), and the response rates of these groups were significantly smaller than the second two yoked groups. These data confirm and extend the findings of the preceding experiment. The performance of the yoked controls precluded an explanation of the results in terms of habitation or sensitization.

The second experiment reported by Rescorla (1968) and the present two experiments (Morris, 1974, Experiments I & II) provide the strongest evidence for the putative negative discriminative properties of the CS in standard avoidance conditioning. The conditioning of the CSs occurred in avoidance procedures; and when a CS+ was imposed on the same avoidance procedure (as in the Rescorla experiment) or transferred to a different avoidance procedure (as in the Morris experiments), rate increases in R_a were observed. The CS signals punishments and facilitates performance.

In the following three experiments avoidance paradigms were used exclusively. They are reported here because of the performance of the Ss early in training. Early in acquisition, Ss receiving a standard delayed procedure performed better than Ss who received a safety signal plus a trace or prolonged CS. However, during asympotic performance, the performance of the Ss was similar.

By making a distinctive cue (e.g., 3 white lights) contingent on R_a, D'Amato, Fazzaro, and Etkin (1968) associated the cue with the absence of shock and produced a safety signal (i.e., a CS- contingent on R_a). Subjects were also exposed to a prolonged CS (e.g., white noise); both the CS and safety signal terminated 8 sec following R_a. Another group received a standard delayed procedure. In the second experiment reported by D'Amato et al. (1968) one group was exposed to a safety signal and received a trace conditioning procedure; another group received a standard procedure. On day two of both experiments (i.e., early in training), the safety signal groups produced fewer avoidance responses than the standard groups. Individual comparisons between the safety signal and standard groups in each of the experiments were reported to be near significant ($p \approx .06$). In the third experiment reported by Bolles and Grossen (1969), one group of Ss was exposed to a safety signal and received a prolonged CS termination procedure; another group received a standard procedure. During the first 20 trials, the standard or immediate CS termination group apparently performed at a higher level than the safety signal group receiving the prolonged CS termination procedure. The results steming from the early stages of these experiments suggest that immediate CS termination has facilitative effect and possibly a reinforcing effect early in training.

Discriminative Properties of Nonserial Compound, Serial, and Compound Serial CSs

Studies focusing on nonserial compound, serial, and compound serial CSs provide further tests of the discriminative properties of the CS. Differential effects due to the various possible conditions provided by the single element CS, nonserial compound CS, serial CS, and the compound serial CS would provide further evidence.

In an experiment reported by Miller (1969b), for 40 trials on each of 8 days, Ss received standard delayed avoidance training in a flat black shuttlebox. As is conventional in shuttlebox situations, trials were initiated from the side to which S traversed. On each trial, Ss were presented with one of two CSs (buzzer or light). Subjects were given 20 trials to each stimulus, and the order of the presentations was random. Thirty-five tests in which the CSs were presented simultaneously in a nonserial compound were given over seven sessions. For three of four Ss, response latencies for the compound were significantly shorter than for either CS separately. Thus, two CSs conditioned separately in an avoidance situation and then combined and simultaneously presented in the avoidance situation, facilitated avoidance responding more than either of the CSs alone.

Overmier and Bull (1970, Experiments III & V) have demonstrated a similar effect. Conditioning of a CS+ occurred in a classical procedure; the CS+ was then imposed on R_a

in a signalled avoidance procedure in which a shuttlebox was used. Response frequency was greater for the compound CSs than for the CS to which R_a had been conditioned. Consistent with these findings were the effects of compound CSs+ in an appetitive situation. Miller (1969a) found that a nonserial compound of two CSs+, each element having been conditioned separately, suppressed the rate of a lever pressing response below that due to either stimulus separately. Moreover, a compound of two highly suppressive stimuli produced more suppression than a compound of two less suppressive stimuli.

A discriminative function is also indicated by the effects due to serial and compound serial CSs. A summary of a series of experiments by Levis and associates follows. In the first experiment reported by Levis and Stampfl (1972), Ss in the nonserial condition were exposed to either a 16 sec presentation of a one element CS (e.g., tone, 1275 Hz, 74 db) or to a 16 sec presentation of a nonserial two element compound CS (two different CSs presented simultaneously, tone and flashing lights). In the serial conditions, Ss were exposed to a two element serial CS (8 sec presentation of one CS followed by an 8 sec presentation of a different CS) or to a two element compound serial CS (a 16 sec presentation of a CS the last 8 sec of which was overlapped by the presentation of a different CS). Elements in the serial CSs were counterbalanced. Standard delayed avoidance conditioning occurred for 150 trials in a clear plexiglass shuttlebox (barrier, 10.2 cm). Onset of an element in the second position of a serial CS was prevented by R_a if R_a occurred prior to the onset of the element. Control Ss received the compound serial CS either in a trace procedure or in a no shock condition. Results indicated more avoidance responding in the combined serial CS groups than in the combined non-serial groups; no differences were found between the two non-serial conditions groups, and while a difference appeared between the two serial conditions, it was not reliable. Subjects receiving the nonserial CSs responded primarily in the first half of the CS-UCS interval, while Ss receiving the serial CSs responded primarily in the second half of the 16 sec CS-UCS interval. Control Ss generally failed to learn the R_a. Results from Experiments II and III replicated various aspects of Experiment I and extended the findings.

In Experiment I of a study reported by Levis (1970), Ss received either a one element CS (e.g., tone, 1200 Hz, 65 db), a three element nonserial compound CS (tone, flashing lights, buzzer), a two element serial CS, or a three element serial CS. Each S received 100 standard delayed acquisition trials, with an average ITI of 60 sec, in a clear plexiglass shuttlebox. In the two nonserial groups, responding occurred primarily with the onset of the CS-UCS interval, while in the serial groups, responding occurred primarily with the onset of the last stimulus element in the series. Groups did not differ in the number of R_as. In Experiment II, Ss were ran for 100 standard trials in a shuttlebox and received either a single element CS (e.g., tone, 4000 Hz), a three element nonserial compound CS (tone, flashing lights, white noise), a two element compound serial CS, or a three element compound serial CS. A control group received shock on the average of 30 sec following termination of three element compound serial CS; CS offset was not contingent on R_a. In the nonserial conditions, R_a again occurred primarily during the first half of the CS-UCS interval; in the compound serial CS conditions, responding primarily coincided with the onset of the last stimulus element in the series. Further, avoidance responding was significantly greater for the two compound serial CS groups than for the single element CS condition. Responding was also significantly greater for the three element compound serial CS group than for the three element nonserial compound group. Control group Ss made few responses to the CS.

Levis, Bouska, Eron, and McIlhon (1970) used a black Mowrer-Miller one-way box and ran Ss until a 10 consecutive R_a acquisition criterion was achieved in a standard procedure. Two-hundred conventional extinction trials (i.e., shock omitted, CS termination contingent on R_a) were then administered. In the nonserial condition, Ss received either a one (e.g., tone, 1000 Hz, 67 db), two, or three element (tone, flashing lights, buzzer) CS compound. In the serial condition, Ss received either a two or three element serial CS. In the compound serial condition, Ss received either a two or three element compound serial CS. Apparently, due to the different situation (one-way rather than shuttlebox situation), delayed responding did not occur in the serial and compound serial CS conditions. Nor were there any differences due to conditions (nonserial compound, serial, compound serial) or due to the number of stimulus elements constituting the various CSs (two, three). However, during extinction, responding in the combined serial and compound serial conditions was more resistent to extinction than in the combined nonserial groups. Subjects in the non-shock control group made few R_as to the R_a contingent compound serial CS.

The following findings support a discriminative cue interpretation of the CS. When elements were conditioned on alternate trials, the addition of an element to a single element to produce a two element compound has facilitated avoidance responding (Miller, 1969b; Overmier & Bull, 1970, Experiments III & V). Combined serial and compound serial groups have produced greater responding than combined non-serial groups (Levis & Stampfl, 1972) and greater resistance to extinction than combined nonserial groups (Levis, et al., 1970). Two and three element compound serial CS groups have produced greater responding than a one element CS group (Levis, 1970, Experiment II). Finally, in the shuttlebox but not in the one-way situation, delayed responding has reliably occurred in serial and compound serial conditions but not in nonserial groups (shuttlebox: Levis, 1970, Experiment I & II; Levis & Stampfl, 1972; one-way situation: Levis et al., 1970).

Negative findings are worth noting. The addition of one or two elements to a single element to produce a nonserial compound CS, where the elements have been conditioned simultaneously, has not facilitated R_a above that supported by the single element (Levis, 1970, Experiment I & II; Levis & Stampfl, 1972). The addition of one or two elements to a single element to produce a serial CS has not facilitated R_a (Levis, 1970, Experiment I). The temporal rearrangement of an element in a two or three element serial CS to produce a compound serial CS has not facilitated avoidance responding beyond that occurring with the two or three element CS (Levis et al., 1970; Levis & Stampfl, 1972).

Reinforcing Properties of CS Termination

As a result of the aversive properties of the CS, the CS is motivating and CS termination is negatively reinforcing. Studies indicative of this function must show how the acquisition of new responses has been under the control of the CS. Studies demonstrating the reinforcing properties of CS termination have been referred to as escape from fear or acquired drive studies. Typically, Ss receive unavoidable shock that is paired with a CS (i.e., Pavlovian, or classical, conditioning). Shock is then discontinued, the CS is presented, and

Ss are allowed to escape to an adjoining compartment. Thus, unlike the standard avoidance procedure, Ss encounter neither the escape (from shock) or the avoidance contingency but are afforded the CS termination contingency. In addition, the classical conditioning of aversive properties to the CS and the learning of the instrumental response do not occur simultaneously but at different stanges in the acquired drive paradigm.

In the first of the acquired drive studies, Miller (1948) concluded that the CS motivated and CS termination reinforced the acquisition of escape responses. On each of 10 trials, Ss were individually placed in a white compartment (the CS) whereupon shock was delivered and the door to the adjoining black compartment was lowered allowing S to escape. On all subsequent trials shock was omitted. For 5 trials, Ss consistently escape to the black compartment; for 10 trials Ss learned to turn a wheel (a fraction of a turn) in order to lower the door and escape; on 10 additional trials, Ss rapidly extinguished the wheel turn response and acquired a bar press response in order to lower the door and escape to the black compartment. In two experiments using similar apparatus and procedures, a new response of bar pressing was acquired in the presence of a white compartment previoesly associated with shock (Burros, 1949; Miller & Lawrence, 1950; cited in Miller, 1951, Pp. 450, 447, 448).

The interpretation of Miller's results, however, has been challenged. Allison, Larson, and Jensen (1967), for example, have demonstrated an unlearned preference for black in their Long-Evans rats. Subjects received either fear conditioning or they did not and were initially placed either in a white or black start compartment. Twenty-four hours later, initial preference for, and time spent in, a black or white compartment was recorded. Nonshocked Ss preferred the black goal compartment. The preference for black over white was increased when Ss had previously been shocked in white. It was depressed, but not reversed, when Ss had previously been shocked in black. The amount of time spent in the two compartments was consistent with the initial choice preference.

Four additional groups received similar conditioning followed by additional fear conditioning in a shuttlebox patterned after Miller's. Twenty-four hours later, Ss were trained to escape from the compartment in which fear conditioning occurred. The escape response was touching a paddle wheel located just above the guillotine door. While the nonshocked Ss going from white to black performed better than the nonshocked Ss going from black to white, neither group could be said to have acquired the response. Shocked Ss escaping from white to black responded with progressively shorter latencies across 8 of 10 trials. However, shocked Ss escaping from black to white failed to acquire the paddle wheel response. The authors concluded that while conditioning may have occurred in the Miller experiment, it was confounded by an innate color preference for black. Moreover, the initial performance of the shocked Ss was inferior to the performance of the nonshocked Ss suggesting that in the Miller study increments in performance may have been due, in addition to color preference, to an initial suppressed performance. With reference to color preference, Miller (1958) reported that his male albino rats did not show a color preference prior to conditioning.

While Miller's study may have methodological problems, a number of acquired drive studies have been indicative of the reinforcing properties of CS termination; a review of studies employing the acquired drive paradigm can be found in McAllister and McAllister (1971). The methodological problems requiring control are the color of the compartments forming the two sides of the apparatus, the side of apparatus on which Ss receives shock, and the use of control groups. Of the acquired drive studies reported below all employed compartments of uniform color, and in two studies, Ss received shock on both sides of the apparatus. All of the studies employed at least one control group.

On each fear acquisition trial in the first phase of the Kalish (1954) study, Ss were exposed to a 5 sec presentation of a compound CS (buzzer, 75 db, and increase in illumination from 9 to 15 ft-c) and 4 sec after its onset, to

1 sec of shock (60 to 70 V.). The number of acquisition trials was either 1, 3, 9, or 27, and conditioning occurred in a gray box with an assimilated guillotine door at one end to increase the similarity of the box to the apparatus employed during the hurdle jumping. In an attempt to control for the conditioning of aversive properties to apparatus cues, time spent in the fear conditioning apparatus was equalized for all Ss. On the day following acquisition, Ss received either 0, 3, 9, or 27 extinction trials during which the CS was presented but the UCS was not. Immediately following extinction, hurdle jumping trials were instigated. The box employed was painted gray and divided into two compartments by a guillotine type door that rested on a two inch hurdle. On each of the 12 trials the UCS was never presented, and the CS was terminated when Ss escaped to the other compartment. An additional 12 trials occurred on the following day. Ten control Ss received 27 backward conditioning trials (1 sec of shock followed 15 sec later by a 5 sec presentation of the CS), zero extinction trials, and all hurdle jumping trials. The latencies of the hurdle jumping responses were recorded and transformed to logarithms. Significant trials (hurdle jumping) by number of fear acquisition trials and trials (hurdle jumping) by number of extinction trials interactions were obtained. The latency of the hurdle jumping response was a decreasing function of the number of acquisition trials and an

increasing function of the number of extinction trials. Latencies did not decrease for the control Ss as evidenced by individual comparisons (t tests) between the control group and experimental groups.

Using a compound CS (buzzer and lights) and flat black compartments separated by a guillotine type door and hurdle, Goldstein (1960) classically conditioned aversive properties (fear) to the CS and then required Ss to hurdle jump in order to terminate the CS. Response speeds were found to be an increasing function of UCS intensity; curiously, UCS intensity interacted with the number of CS-UCS pairing only during the latter stages of the test period. Presumably, the interaction should have occurred earlier because the greater the intensity of the UCS, fewer CS-UCS pairing should be required to produce asymptotic performance.

The Brown and Jacobs (1949) study is different from most other acquired drive studies in that Ss received shock on both sides of the apparatus. Compartments forming the apparatus were identical. On each of 22 training trials in the second experiment reported by Brown and Jacobs (1949), experimental Ss were presented with 9 sec of pulsating light and tone the last 6 sec of which were paired with shock. The apparatus was a black oblong box with two compartments being formed by a guillotine door and a two inch hurdle; training trials were alternated between the compartments and there was no opportunity to escape. For 40 subsequent test trials, the light and tone were presented without shock and the guillotine door to the adjoining compartment was raised; new trials were initiated from the compartment into which the S escaped. Control animals received the same procedure with shock omitted. Normalized latencies for the escape responses for the experimental Ss dropped markedly for the first 20 trials (thereafter they tended to increase somewhat) and were significantly shorter than those for the control Ss. Results from the second experiment replicated the less dramatic, but significant, results of the first experiment reported by Brown and Jacobs (1949).

The following two studies differ from those above in that a standard avoidance procedure was used prior to the testing phase. They are similar to the above studies in that a CS was employed to motivate, and CS termination was employed to reinforce, the acquisition of a novel response. A study by Robinson (1961) is similar to the Brown and Jacobs (1949) study in that both compartments were identical and Ss received shock in both compartments. Robinson's (1961) study was addressed to the question whether a response may persist without apparent motivation; relevent here are the results of the first two stages. After adaptation to the two identical compartments separated by a door, Ss learned to escape from shock (.5 ma) by running into the opposite compartment. A compound CS (light and buzzer and sound from door opening) preceded shock by 5 sec and was terminated by the escape response. New trials were initiated from the compartment to which Ss escaped. Following escape training which occurred for six trials, Ss received a standard avoidance procedure for an average of 140 trials. One of the compartments was then fitted with a lever, and the door to the adjoining compartment was blocked by a barrier. Subjects were then tested for the acquisition of the lever press escape response in the absence of the UCS. Five min sessions occurred on each of seven consecutive days. Several control groups were employed. One control group was never exposed to the UCS but otherwise received the same procedure as the experimental Ss; a second group was naive; a third received the same procedure as the experimental with the exception that the CS consisted of the door opening alone, without the buzzer or lights. The dependent variable was the precentage of time S kept the CS off by depressing the lever.

Subjects exposed to both the CS and UCS acquired the running avoidance response; Ss exposed to the CS compound without the UCS did not learn the running avoidance response. Acquisition of lever pressing in response to the CS occurred only when Ss had had prior exposure to CS-UCS pairings. Subjects in the experimental group depressed the bar up to 95% of the time. In contrast, controls depressed the lever only up to 30% of the time. The results of the first two stages of this study were successfully replicated by Trapold, Blehert and Sturm (1965) though small amounts of shaping on Ss having low operant bar press rates were employed.

Negative findings found in acquired drive paradigms have been reported. Grossberg (1962) attempted to replicate the Brown and Jacobs (1949) procedure but failed to find learning or any differences between experimental and control Ss. There were, however, several notable problems with this study. One of which may have contributed to the poor performance of Ss was the duration of the CS and UCS. On each of the classical conditioning trials in the Brown and Jacobs study the CS was presented for 9 sec with the UCS being presented the last 6 sec. Grossberg presented the CS for 6 sec with the UCS being presented the last 3 sec.

Negative findings have also been reported by Bolles and Tuttle (1967). For half the Ss the escape response was running to the adjoining compartment while for the other half the escape response was rearing up on the hind legs. Ten escape trials were administered; the CS was a 80 db white noise. Control Ss were exposed to shock but not the CS. During testing Ss who ran in Phase I were not required to rear up on their hind legs to terminate the CS, and Ss who reared up on their hing legs in Phase I were now required to run. For half the Ss the CS was prolonged 10 sec after the instrumental response (Kamin's procedure, 1956). As expected, the experimental animals acquired the new response, and Ss receiving the prolonged CS did not. On the other hand, Ss who were exposed to immediate CS termination but who only received the UCS during training also acquired the new response. However, the trend characterizing the performance of controls in the case of the rearing response was markedly variable and dropped sharply after the tenth trial. The trend characterizing the experimental Ss was stable and increasing. In the case of the running response, experimental and control Ss performed similarly.

Several aspects of the present study should be noted. One is that the CS was possibly aversive (i.e., 80 db white noise); one might expect animals to escape from a relatively loud white noise. Perhaps an additional control group given exposure to the tonal CS but not the UCS would have been informative. Further, control Ss were shocked, and aversive properties were probably conditioned to apparatus cues; one might expect animals to acquire a running response to escape these cues. One also wonders what would have happened had Ss been shocked on both sides of the apparatus as in the Brown and Jacobs (1949) and Robinson (1961) studies.

The following two studies did not employ the acquired drive paradigm but the results of one of the studies (Dinsmoor, 1962) are suggestive of the reinforcing properties of CS termination. Both employed a bar press as the instrumental response. In one study (Baron, 1959) the bar press produced the presumably aversive CS while in the other (Dinsmoor, 1962) the bar press afforded the opportunity to escape and avoid. Dinsmoor (1962) presented three Ss with variable intervals during which shock (2 ma) was not administered (i.e., variable shock-shock interval), with variable intervals during which Ss were not afforded with the opportunity to avoid or escape (i.e., variable interval reinforcement schedule), and with response contingent variable intervals or safe periods during which shock series was not in effect (i.e., variable response-shock interval). Five mean shock-shock intervals (7.5, 15, 30, 60, 1200 sec) were employed. The mean interval during which an R_a did not terminate shock was 30 sec. The first escape response following this interval terminated shock. The mean of the instrumental response contingent safe periods was 90 sec. On some of the 10 hour long sessions, a CS (e.g., tone, 500 cps, 80 db) indicated the shock series was in effect and a safety signal (e.g., illumination of a neon bulb) indicated no shocks were to be delivered. When the CS was being presented along with the avoidance contingency, the R_a terminated both the shock series and the CS and initiated the safety signal. Results indicated a higher rates of responding when the CS and safety signal were being presented than when they were not. The rate of responding was highest when shocks were closely spaced regardless of the presence or absence of the arbitrary stimuli (CS and safety signal), but the decline in responding with longer shock-shock intervals was markedly more gradual in the presence of the stimuli than in their absence. Rates tended to drop with safe periods less than 60 sec regardless of the presence or absence of the stimuli. While the effects of the safety signal were confounded with those of the CS, the results of this experiment are suggestive of the reinforcing properties of the CS.

In the experiment reported by Baron (1959) 20 classical conditioning trials occurred in a small compartment. Subjects were exposed to either the CS (a faint tone) and shock or shock alone or the CS alone or neither to the shock or CS. The CS occurred for 5 sec; shock occurred during the last second of the CS presentation. Immediately following training, testing occurred for 20 min in a separate and larger testing apparatus that was fitted with a large bar. For all Ss shock was omitted. For half of each of the four groups a depression of the bar resulted in the onset of the CS. Three measures were employed: frequency of the response, total amount of time bar was depressed, and the duration of each bar depression. For the first two measures, the main effects of each of the three variables (shock, no shock; CS, no CS; CS contingent on response, CS not contingent on response) were significant. However, the three-way interaction was not significant, and according to the author a significant interaction was required to demonstrate the aversiveness of the CS. Subjects who received CS-UCS pairing during training and the CS during testing should have depressed the bar less frequently and for a shorter overall period of time than any of the other Ss. Thus, the mean bar press frequency for experimental Ss was 12.00 while the mean bar press frequency for the 30 control Ss was 28.03. Furthermore, there was even a greater descrepancy in variability. The standard deviation for the experimental Ss was 4.65; the mean standard deviation for the control Ss was 15.85.

Several aspects of the Baron (1959) study that may account for the lack of significance deserves attention. First, the intensity of the CS was apparently quite low (the CS was described as being faint). Second, there was no salient motivating conditions for the animals to approach and depress the bar. Third, a stimulus generalization decrement of fear probably occurred.

McAllister and McAllister (1963), in an investigation of the effects of stimulus generalization on conditioned fear, conditioned one group of Ss in a shock box and the second in the start box of the hurdle jumping apparatus. The two compartments were similar but distinguishable by several observal characteristics. For half of each group, 25 hurdle jumping trials occurred 3 min following conditioning (Day one) and then again on the following day (Day two). For the other half of each group, the 25 hurdle jumping trials occurred following a 24 hour postconditioning delay (Day one) and then again on the following day (Day two). Learning occurred on Day one for all Ss with exception of the Ss who were exposed to the different conditioning and start boxes and who were tested 3 min following conditioning. Improvement for this group occurred on Day two though performance remained inferior to the other groups. In contrast the 3 min delay group that received conditioning in the start box of the hurdle jumping apparatus performed similarly to the 24 hour groups on both days. McAllister and McAllister (1963) attributed the poor performance of the 3 min different box group to a stimulus generalization decrement of fear. That is, it was concluded that the stimulus generalization gradient 3 min following conditioning is steeper than that following a 24 hour delay. In the Baron (1959) study testing occurred immediately following conditioning in a compartmert that was quite different from the conditioning compartment. The results of the McAllister and McAllister study imply that a stimulus generalization decrement of the fear response occurred in the Baron study.

Summary

The CS has been shown to control performance in several situations. The discriminative function of the CS has been clearly demonstrated in the transfer of contol situation (e.g., Rescorla, 1968) as well as in the standard delayed avoidance paradigm (e.g., D'Amato et al., 1968). Additional evidence is found in studies focusing on the differential effects of compound, serial and compound serial CSs in the standard avoidance situation (e.g., Levis &

Stampfl, 1972). The reinforcing properties of CS termination have been substantiated in acquired drive studies (e.g., Kalish, 1954) and in other situations (e.g., Dinsmoor, 1962).

Aversive Stimulation, Contrast, and Delay of Reinforcement in Instrumental Escape Conditioning

Aversive Stimulation (Drive) Intensity

Studies reviewed are restricted to those in which an escape response results in a complete reduction of aversive stimulation. In several studies, increases in the intensity of the aversive stimulus have been accompanied by increases in performance. However, in some studies employing wide ranges of intensities, an inverted U-shape relationship between stimulus intensity and performance has been indicated. In these studies, performance increases with increases in aversive stimulation upto some value of stimulation and then decreases with further increases in intensity. Moreover, resistance to extinction has been found to increase with increases in aversive stimulation.

In several operant procedures, increases in the intensity of the aversive stimulus have been accompanied by increases in performance. Dinsmoor and Winograd (1958) employed a bar press response and reported acquisition results for the four animals tested at five levels of shock intensity (0, .05, 1.0, 2.0, & 4.0 ma). One of the four animals and a fifth was tested at a sixth level (3.0 ma). Variable interval schedules were used with the mean shock-shock interval at either 30 or 60 sec and the response shock interval at 120 sec. Generally, response frequency for each animal was an increasing linear function of shock intensity. Stavely (1966) used a bar press situation and crossed five levels of shock intensity (.25, .40, .64, 1.05, & 1.65 ma) with six levels of escape duration (0, .5, 2, 8, 32, 130 sec). During acquisition, escape was contingent on two bar presses. Fifty acquisition trials were administered on each of five days; a 15 min extinction session, during which shock was constant, occurred on the sixth day. Response speed was an increasing function of both shock intensity and duration of escape. Though there were some exceptions, resistance to extinction was greater for high intensities of shock than low and greater for long durations of escape than short. Curves tended to be negatively accelerated.

Boren, Sidman, and Herrnstein (1959) employed the lever press response in an unsignalled avoidance procedure, escape contingency present, and tested four animals at eight levels of shock intensity (.1, .5, 1.2, 1.7, 2.15, 2.6, 3.2, & 3.7 ma). The shock-shock interval and response-shock interval was 20 sec. An extinction session immediately followed acquisition. Results indicated that as shock intensity increased, latency of responding decreased, and response speed and resistance to extinction increased. Generally, curves were negatively accelerated. A number of other operant studies have employed a smaller range of shock values. Hughes (1956), for example, employed two levels (.2, .4, ma) in a bar press situation. Campbell and Kraeling (1953) employed three levels (200, 300, & 400 V.) in the start and run sections of a straight alley. Shock was reduced to zero in the goal box. Though the levels of shock resulted in similar asymptotes, the rate of approach to asymptote (i.e., the rate of acquistion) was an increasing function of shock intensities. Similar results have been obtained by Dinsmoor, Hughes, and Matsuoka (1958) and Seward, Shea, Uyeda, and Raskin (1960).

Other escape paradigms have been employed. Franchina (1969), for example, used a hurdle jumping apparatus and employed three levels of shock intensity (20, 50, & 80 V.). Shock intensity was manipulated within Ss and between groups. Sixty acquisition trials were followed by nonshock-extinction trials. Acquisition performance was a direct function of shock intensity for both within and between comparisons, and resistance to extinction increased with increases in shock intensity. Consistent with Franchina'a results, acquisition performance has varied with the aversiveness of several reinforcers. Performance has varied directly with increases in noise level (Masterson, 1969), inversly with increases in water temperature (Hack, 1933), and directly with CO_2 concentration (van Sommers, 1963).

While results from a number of studies have generally indicated a positive relationship between escape performance and the intensity of the reinforcer, the results from several studies employing a large range of intensities have indicated an inverted U-shape function. Trapold and Fowler (1960), for example, trained Ss to escape one of five levels of shock intensity (120, 160, 240, 320, & 400 V.) in a straight alley by running to an uncharged goal box. Each S received 20 massed trials. Running speeds were an increasing negatively accelerated function of shock intensity, but starting speeds first increased and then decreased with increases in shock intensity. Winograd (1965, Experiment II) employed a lever press escape response and five levels of shock intensities (0, .25, .50, 1.0, 2.0, & 4.0 ma). Response rate increased upto, and stabilized at, a shock intensity of 1.0 ma, thereafter response rates decreased.

Kaplan (1952, Experiment II) employed a bar press response and six levels of light intensity (27, 111, 183, 530, 960, & 2312 ml) and ran Ss on a fixed interval reinforcement schedule. Each terminating response produced 66 sec of darkness. Response rate increased and passed through a maximum between 111 and 530 ml, declining thereafter. In a similar experiment, Kaplan, Jackson and Sparer (1965) used five intensities of light (2.5, 18, 105, 190, & 386, ft-c) and a continuous reinforcement schedule. A lever press response produced 60 sec of darkness. Escape responding again passed through a maximum.

Similarly, in an experiment by Barry and Harrison (1957), eight levels of noise intensity (3.1, 12.5, 25.0, 56.0, 106.0, 410.0, 1480, & 3750 mv) produced an inverted U-shape function on a partial reinforcement schedule, although a direct relationship was observed on a continuous reinforcement schedule. In a study by Wever (1932) a water runway paradigm and eight water temperatures were used. Removal from the goal end of the runway served as the reinforcement. Swimming speeds decreased with increases in water temperature up to 40°C whereupon speeds increased. Thus, the results from several studies indicate escape responding increases with increases in the intensity of the aversive stimulus until a maximum is reached whereupon responding tends to decrease with further stimulus intensity increases.

Contrasts

Contrast studies have generally found appropriate performance changes with shifts in the intensity of the aversive stimulus, with shifts in the magnitude of reinforcement, and with shifts in both stimulus intensity and reinforcement magnitude. Both positive contrasts (elation effect) and negative contrasts (depression effect) have been reported. Positive contrasts, however, have been a less reliable event than negative contrasts.

On 15 preshift trials, in a study by Bower, Fowler, and Trapold (1959), Ss ran from a alley where they received shock (250 V.) to a goal box where they received one of three levels of shock (50, 150, or 200 V.) for 20 sec. On 15 postshift trials, shock in the goal box was varied according to an incomplete factorial design (in volts: 50-50, 50-150, 50-200, 150-150, 200-50, 200-150, 200-200). Preshift results indicated speeds were an increasing function of the amount of shock reduction in the goal box. Postshift results indicated speeds changed appropriately with the shifts in shock reduction. For example, following a shift upto 200 V., running speed rapidly decreased to, and paralleled, the speeds of control animals who received 200 V. for the entire 30 trials. However, neither positive nor negative contrast effects were obtained.

In an experiment reported by Woods (1967), animals traversed a water runway after which they were placed in a goal tank for 20-25 sec. Water temperature in the alley was held constant at 25°C throughout the experiment; water temperature in the goal tank was either 27°C or 36°C. One control group ran at the high temperature (36°C) throughout the experiment and another, at the low temperature (27°C). Following the 60th trial, experimental groups were shifted (in degrees centigrade; 36-27, 27-36). Preshift results revealed differential reinforcement magnitude effects. Speeds following downward shifts gradually decreased below those of controls who always received the low temperature. Speeds following an upward shift gradually increased and paralleled those of high temperature controls. Thus, a negative contrast, but not a positive contrast, effect was obtained. Woods (1973) has subsequently replicated the negative contrast effect (alley water temperature 15°C, goal tank temperature either 19°C or 39°C). Negative, but not positive, contrasts have also been obtained by Cicala and Corey (1965) who employed an escape from shock procedure in a straight alley.

Thus, studies have reported appropriate shifts in performance following either shifts in drive intensity or reward magnitude (Bower et al., 1959; Woods, 1967, 1973; Cicala & Corey, 1965), and while three studies have reported negative contrasts (Woods, 1967, 1973; Cicala & Corey, 1965), none have reported a positive contrast. However, two studies have obtained both positive and negative contrast effects.

In the first experiment reported by Nation, Wrather, and Mellgren (1974), a procedure analogous to that employed by Crespi (1942) was used. For 20 trials, Ss were trained to escape one of three levels of shock intensity (.2, .4, .8 ma) in the start and run sections of a straight alley by running to an uncharged goal box. For an additional 20 trials, all Ss were shifted to .4 ma. Preshift results indicated response speed was an increasing function of shock intensity. Postshift results revealed clear positive and negative contrasts. In the second experiment reported by Nation et al., a procedure analogous to that employed by Bower (1961) was used. On half the trials an experimental group received .2 ma and on the other half .4 ma. Control groups received either .4 ma or .2 ma on all trials. On .2 ma trials, the experimental animals escaped slower than the .2 ma controls (negative contrast) and on .4 ma trials, faster than the .4 ma controls (positive contrast). Similarly, Woods and Shultz (1965) using the water runway paradigm obtained both positive and negative contrast. Goal tank temperature (i.e., reward magnitude) was held constant at 10°C above alley temperature. Controls received alley temperatures of either 12°C or 30°C throughout training. Experimental groups were either upshifted or downshifted (in degrees centigrade: 12-30, 20-12).

Delay of Reinforcement

Results steming from delay of reinforcement studies have generally indicated performance is an inverse function of the length of the delay interval and that long delays may be punishing resulting in performance decrements. For 28 massed trials, Fowler and Trapold (1962) trained Ss to run from a start box and runway, in which they received continuous shock, to a goal box where termination of the shock was delayed either 0, 1, 2, 4, 8, or 16 sec. Response speed was an inverse negatively accelerated function of the delay of reinforcement. The effect was greater for running speeds than for start speeds.

Several studies have employed a bar press escape reponse. Hughes (1959), for example, used shock and four levels of delay (0, 2, 5, & 10 sec); Keller (1966) used light and four levels of delay (1, 2, 5, & 10 sec). In both studies, response latency was an increasing function of the lenght of delay.

On each of 14 trials, shock was turned on throughout the runway at the moment the start box door was raised in the experiment reported by Hammond and Lambert (1970). Upon entering the goal box, shock termination was delayed either 0, 15, 30, or 45 sec. Results indicated long delays of reinforcement may be punishing since the latencies of animals who received either 30 or 45 sec delays increased across trials, and acquisition was not observed in the 15 sec delay group. Slight acquisition was observed in the 0 sec delay group. While the poor performance of groups receiving the long delays seems explicable in terms of punishment, the poor performance of the zero delay group, relative to that observed in the Trapold and Fowler (1962) experiment, is not.

Interactions have been investigated and found in two studies (Bell, Noah, & Davis, 1965; Woods & Feldman, 1966). Employing a shuttlebox, Bell et al. manipulated both the intensity of shock (.25, .50, & 1.0 ma) and delay of reinforcement (0, 1.25, 2.50, & 5.00 sec) in a factorial design. One-hundred acquisition and 10 extinction trials were administered. During acquisition, response speed was an increasing function of the intensity variable and a decreasing function of the delay variable. During extinction a significant delay by intensity interaction was obtained with shock intensity having its greatest effect at 0 sec delay. Employing a water runway procedure, Woods and Feldman (1966) manipulated reward magnitude (the goal box being either 0°, 5°, or 25°C warmer than the alley water temperature, 15°C) and delay of reinforcement (0, 3, & 10 sec) in a factorial design. Speed was an increasing function of reward magnitude and a decreasing function of the delay of reinforcement. A significant delay by magnitude interaction was obtained with the magnitude variable having the greatest effect at 0 sec delay.

Summary

Performance in discrete trials escape conditioning as well as in operant escape procedures is controlled by several variables. Aversive stimulation intensity, contrast procedures, and delay of reinforcement have been considered here. The results from some studies in which the intensity of aversive stimulation has been manipulated indicate a direct relationship between escape performance and stimulus intensity (e.g., Trapold & Fowler, 1960) while the results from other studies indicate an inverted U-shape function (Winograd, 1965, Experiment II). Results from contrast studies indicate performance changes in the direction of the shift in aversive stimulation intensity, in reinforcement magnitude, or in both intensity and magnitude (e.g., Bower et al., 1962). Both positive and negative contrasts have been obtained (e.g., Nation et al., 1974), though the former event has been less reliable. Results from delay of reinforcement studies indicate escape performance is a decreasing function of the length of the delay interval (e.g., Fowler & Trapold, 1962).

Two Delay of Reinforcement Functions

Decremental performance effects resulting from delays in reinforcement have been consistently found in appetitive as well as in escape settings. For example, in instrumental reward conditioning with animals, mostly with hunger, decremental effects have been found using bar pressing (e.g., Perin, 1943; Logan, 1952), straight alley runways (e.g., Logan, 1960; Holder, Marx, Holder & Collier, 1957), and different sorts of mazes (e.g., Brown, Gentry, & Kaplan, 1948; Fehrer, who used water, 1956). In experiments employing human Ss, decremental effects have been found in both the instrumental reward conditioning and selective learning of attitudes (Weiss, 1968) and in escape conditioning paradigms where the noxious stimulus was disagreement (Weiss, Lombardo, Warren, & Kelley, 1971; Weiss, Boyer, Colwick, & Moran, 1971).

Delay of reinforcement, however, has also produced incremental effects in several instrumental reward conditioning studies. If animals are delayed part way through a chain of behavior (e.g., the middle of the runway), performance preceding the delay is adversly affected (Brown et al., 1948; Holder et al., 1957), but performance following the delay has been found to be facilitated (Amsel & Roussel, 1952; Holder et al., 1957). Holder et al. (1957), for example, used a double alley procedure and found running speeds were a decreasing function of the length of delay (either 1, 15, or 45 sec) in the segment of the runway preceding the delay and an increasing function of delay in the segment of the runway following the delay. Reinforcement was immediate in the second goal box. Though failing to show a positive contrast (elation) effect, greatly improved performance has been found following a shift from long to short delays of reinforcement (McHose & Tauber, 1972; Shanab & McQuiston, 1970). Thus, delay of réinforcement has been shown to have two functions, decremental and incremental effects, at least in instrumental reward studies with animals.

Duration of Aversive Stimulation

There is some evidence to suggest that the duration of punishment functions similarly to the intensity of aversive stimulation. For example, paralleling the effects of stimulus intensity, response suppression on an appetitive task has been shown to be an increasing function of the duration of punishment (e.g., Storms, Boroczi, & Broen, 1963; Seligman & Campbell, 1965; Church, Raymond, & Beauchamp, 1967).

Response suppression has also been found to be an increasing function of CS intensity. Subjects received a blinking light CS paired with one of three levels of shock intensity (0, .05, & .09 ma) during classical conditioning in a study by Strouthes and Hamilton (1964). Shock occurred for the last 3 sec of the 4 sec CS presentation. Once on each of four days, the CSs were imposed on a food reinforced running response. Response suppression was an increasing function of shock intensity. In the second experiment reported by Anderson, Plant, and Paden (1967) food reinforced running speeds were slower for a CS paired with a strong UCS than for a CS paired with a weak UCS, and both groups ran slower than controls. (In the first experiment, Anderson et al. found that in the presence of the CS, forward conditioning Ss, in contrast to backward conditioning Ss and two control groups (shock or buzzer only), ran to food slower, reversed forward locomotion more frequently, and exhibited lower basal skin resistance.) Response suppression has also been greater for a compound CS of high intensity than for a compound CS of low intensity. For each of two Ss, Miller (1969a, Experiment II) paired, on alternate occasions, either a tonal CS (96 db, 1450 Hz) or a light CS with shock in a food reinforced bar press situation. The two CS elements were combined and presented, shock omitted, once on each of nine sessions. Following these sessions, shock intensity was increased and the conditioning of the individual CS elements was reinstated. Following conditioning at the higher shock intensities, compounding again occurred once on each of nine sessions, shock omitted. Compounding of the two highly suppressive stimuli produced more suppression of bar pressing than the compounding of the two less suppressive stimuli.

A CS+ inhibits performance in an appetitive situation but facilitates performance in an aversive situation (e.g., Rescorla & LoLordo, 1965), and several acquired drive studies have demonstrated that response speed is an increasing function of UCS intensity. Perhaps the earliest report of an increasing monotonic relationship between shock intensity and performance under the control of the CS was by Miller and Lawrence (cited in Miller, 1951, p. 448). Results since have been consistent. Classical conditioning occurred in the grid box of the hurdle jumping (7 inch hurdle) apparatus in the study by Gwinn (1951). Subjects received either 50 or 100 volt shock and either 4 or 16 CS-UCS pairings. Three minutes following conditioning, hurdle jumping, with shock omitted, began. Latency of the escape response was an inverse function of shock intensity. The effect, however, was weak for Ss receiving 16 CS-UCS presentations. Goldstein (1960) employed a compound CS (buzzer and lights) and three levels of shock intensity (100, 150, or 790 V.). In addition, Ss received either 1, 3, 9, or 20 CS-UCS presentations. Shock occurred the last second of a four second CS presentation. The day following classical conditioning, (Day three), Ss received 15 hurdle jumping trials; an additional 15 trials were administered on Day four. Shock was omitted, trials were initiated by CS onset, and CS offset was concommitant with hurdle jumping. Collapsing across the number of classical conditioning trials, response speed was an increasing negatively accelerated function of shock intensity.

During classical conditioning, McAllister and McAllister (1962a) used five levels of shock intensity (30, 40, 50, 60, or 100 V.) and a light CS (increase in illumination, 7 to 115 ft-c). Five groups, one at each level of shock, received 35 forward conditioning trials. Shock occurred for the last 2 sec of a 6 sec CS presentation. Five additional groups, one at each level of shock, received 35 backward conditioning trials. For these groups, 15 sec intervened between shock offset and CS onset. Twenty-five hurdle jumping trials (shock omitted) immediately followed conditioning (Day one); an additional 25 trials occurred on the following day (Day two). Though learning failed to occur on Day one (see McAllister and McAllister, 1963), response speed was an increasing function of shock intensity for both the forward and backward conditioning groups, with one exception, on Day two. Both 50 volt groups performed irregularly. Learning in the backward conditioning group was attributed to the conditioning of aversive properties to apparatus cues (see McAllister & McAllister, 1962b). Similarly, McAllister and McAllister (1967) found superior hurdle jumping performance for Ss receiving high shock intensity (125 V.) during classical conditioning than for Ss receiving low shock intensity (70 V.). Finally, consistent with these findings, have been results steming from studies employing response rate measures (Annau & Kamin, 1961; Hendry & Van Toller, 1965; Millenson & Hendry, 1967; James & Mastoway, 1968). Thus, in an aversive setting, performance, which is under the control of a CS, is an increasing function of the intensity of prior aversive stimulation. The functional similarity between intensity and duration of aversive stimulation (e.g., Seligman & Campbell, 1965) suggests that performance, which is under the control of the CS, may be an increasing function of the duration of prior exposure to aversive stimulation. In a signalled escape procedure, a delay of reinforcement results in a longer exposure (just following the termination of the CS and in the presence of apparatus cues and instrumental response contingent proprioceptive feedback) to aversive stimulus, and thus to greater punishment, than when reinforcement is immediate. Thus, following a shift from delayed to immediate reinforcement, it is suggested that performance may be an increasing function of the prior delay interval

Conditioning and Attraction

Central to interpersonal attraction theory is the proposition that attraction towards X varies with the rewards and punishments (i.e., with positive and negative affect) associated with X (Byrne & Clore, 1970; Clore & Byrne, in press). Similar and dissimilar attitudes have been hypothesized to function as rewards and punishments respectively (Byrne, 1969) and a number of studies have shown that similar and dissimilar impersonal attitude topics do function like other rewards and punishments. The hypothesis has received support in simple discriminative learning situations (Golightly & Byrne, 1964; Byrne, Young, & Griffitt, 1966; Byrne, Griffitt, & Clore, 1968), and for similar attitudes, in an instrumental reward conditioning paradigm (Lamberth, Gouaux, & Davis, 1972). Further support has been obtained in a series of instrumental escape conditioning studies in which the threat of disagreement and a single disagreement was terminated by agreement or yielding (Lombardo, Weiss, & Buchanan, 1972; Lombardo, Tator, & Weiss, 1972) or in which disagreement was terminated by the opportunity to speak in reply (Weiss, Lombardo, Warren, & Kelley, 1971; Weiss, Boyer, Colwick, & Moran, 1971; Weiss, Williams, & Miller, 1972). These studies have clearly shown not only the positive reinforcing and punishing properties of impersonal attitudinal topics, but also the negative reinforcing properties of dissimilar attitudes.

There have been, however, relatively few studies investigating the reinforcing properties of interpersonal evaluations, and these have employed positive evaluations and neutral statements to demonstrate magnitude of reward and shifts in reward magnitude effects in a discriminative learning situation (Lamberth & Craig, 1970) and magnitude of reward and differential reward magnitude effects in a discrete trials instrumental reward conditioning paradigm (Lamberth, Gay, & Dyck, 1972). There is, then, a need to demonstrate the reinforcing properties of interpersonal negative evaluations.

Proposal

An experiment investigating the reinforcing properties of interpersonal negative evaluations seems warranted. The proposal is based on a review of relevant conditioning and attraction literature.

A discrete trials escape conditioning procedure is employed. The dependent variable is the speed (1/latency) with which the instrumental response of pressing a button is executed. The instrumental response terminates a slide projector presentation of an evaluative statement. In addition to the reinforced trial, delay of reinforcement and a warning signal is employed. In a second phase of the study, an avoidance procedure is used during which the escape contingency is present and offset of the evaluative statement is immediate for all groups. The avoidance procedure is used not only to further assess the reinforcing properties of the evaluations but also the carryover effects of delayed reinforcement.

The first phase of the study is assumed to be analogous to discrete trials escape conditioning, and the second, to delayed avoidance conditioning. It was further assumed that response speed, which is under the control of the CS, is an increasing function of the duration of prior exposure to aversive stimulation. In the first phase of the experiment, a delay of reinforcement results in a longer exposure (just following the termination of the CS and in the presence of apparatus cues and instrumental response correlated proprioceptive feedback) to aversive stimulation, and thus, to greater punishment, than when reinforcement is immediate. Consequently, the amount of aversiveness conditioned to the CS should be greater for delayed than for immediate reinforcement. In the second phase following a shift from delayed to immediate reinforcement, it is expected that performance will be an increasing function of the delay interval received in Phase I.

Tonal onset occurs one second prior to the automated onset of the evaluative statement. Simultaneous with the onset of the statement, a clock starts. Depression of an illuminated white button terminates the clock, which controls for reading time, and starts a second clock. Depression of an illuminated red button terminates the tone and the second clock, which provides a measure of latency.

During the second phase, tonal onset occurs one second prior to the illumination of the red button. Simultaneous with the activation of the button, a clock starts. Depression of the red button within six seconds following activation of the button prevents the onset of the evaluative statement, terminates the tone, and stops the clock. Onset of the evaluative statement occurs six seconds following illumination of the button. Depression of the button, after the onset of the statement, terminates the presentation of the statement, the tone, and stops the clock.

The escape and avoidance procedures are each subsumed within a groups by trials repeated measures design with 20 trials. The ITI is ten seconds; a masking task is not employed. Subjects are randomly assigned to groups at the initiation of Phase I, and deceptive instructions indicate attitudes are being investigated.

Five groups receive the escape procedure; four receive the avoidance procedure.

1) A negative tone group receives evaluations and the tone.

2) A negative group receives only evaluations. Use of the negative group enables the assessment of the combined effects of evaluations and tone.

3) A negative tone prolonged group receives evaluations and the tone, but the offset of the tone is prolonged five seconds following the instrumental response. This group also receives the prolonged tone during the second phase. Use of the negative tone prolonged group enables an assessment of the warning signal termination contingency.

4) A negative tone slide delayed group receives evaluations and tone but the offset of the slide is delayed five seconds following the execution of the instrumental response.

5) A negative tone prolonged slide delayed group receives evaluations and tone, but the offset of both the evaluations and the tone is delayed five seconds following the instrumental response. Use of this group enables an assessment of the effects of the CS termination contingency in the negative tone slide delayed group.

6) A no evaluation or tone only group receives only the tone. This group does not receive the avoidance procedure. Instead of an evaluative statement on each of the escape trials, Ss are exposed to relatively neutral slides of various buildings and landscapes. Otherwise, Ss in the tone only group are treated the same as those in the negative tone group. The tone only group enables an assessment of the aversiveness of the tone independently of the evaluative statements.

7) A no evaluation and no tone group receives only the neutral slides of buildings and scenery. This group is a control for the negative group during the escape phase and does not receive the avoidance phase.

At the outset of the second phase, the avoidance contingency is made explicit by informing Ss that it is not necessary for them to view all the statements again if they felt the first exposure was sufficient to acquaint them with the statements.

References

Allison, J., Larson, D., & Jensen, D. D. Acquired fear, brightness preference and one-way shuttlebox performance. Psychonomic Science, 1967, 8, 269-270.

Amsel, A., & Roussel, J. Motivational properties of frustration: I. Effect on a running response of the addition of frustration to the motivational complex. Journal of Experimental Psychology, 1952, 43, 366-368.

Anderson, D. C., Plant, Carol, & Paden, P. Conditioned suppression of a running response as related to competing responses, drive, and basal skin resistance level. Journal of Comparative and Physiological Psychology, 1967, 63, 282-287.

Annau, Z., & Kamin, L. J. The conditioned emotional response as a function of intensity of the US. Journal of Comparative and Physiological Psychology, 1961, 54, 428-432.

Badia, P., Culbertson, S., & Lewis, P. The relative aversiveness of signalled vs unsignalled avoidance. Journal of the Experimental Analysis of Behavior, 1971, 16, 113-121.

Badia, P., & Culbertson, S. The relative aversiveness of signalled vs unsignalled escapable and inescapable shock. Journal of the Experimental Analysis of Behavior, 1972, 17, 463-471.

Baron, A. Functions of the CS and US in fear conditioning. Journal of the Comparative and Physiological Psychology, 1959, 52, 591-593.

Barry, J. J., Jr., & Harrison, J. M. Relation between stimulus intensity and strength of escape responding. Psychological Reports, 1957, 3, 3-8.

Bell, R. W., Noah, J. C., & Davis, J. R., Jr. Interactive effects of shock intensity and delay of reinforcement on escape conditioning. Psychonomic Science, 1965, 3, 505-506.

Bolles, R. C., & Grossen, N. E. Effects of an informational stimulus on the acquisition of avoidance behavior in rats. Journal of Comparative and Physiological Psychology, 1969, 68, 90-99.

Bolles, R. C., & Tuttle, A. V. A failure to reinforce instrumental behavior by terminating a stimulus that has been paired with shock. Psychonomic Science, 1967, 9, 255-256.

Boren, J. J., Sidman, M., & Herrnstein, R. J. Avoidance, escape, and extinction as functions of shock intensity. Journal of Comparative and Physiological Psychology, 1959, 52, 420-425.

Bower, G. H. Partial and correlated reward in escape learning. Journal of Experimental Psychology, 1960, 59, 126-130.

Bower, G. H., Fowler, H., & Trapold, M. A. Escape learning as a function of amount of shock reduction. Journal of Experimental Psychology, 1959, 58, 482-484.

Brown, J. S., & Jacobs, A. The role of fear in the motivation and acquisition of response. Journal of Experimental Psychology, 1948, 39, 747-759.

Brown, J. S., Kalish, H. I., & Farber, I. E. Conditioned fear as revealed by magnitude of startle response to an auditory stimulus. Journal of Experimental Psychology, 1951, 41, 317-328.

Brown, W. L., Gentry, G., & Kaplan, S. J. The effects of intra-maze delay: I. Delay enforced by a wheel. Journal of Comparative and Physiological Psychology, 1948, 41, 258-268.

Burros, R. H. Quantitative studies in secondary drives. Doctoral dissertation. Cited by N, E. Miller in S. S. Stevens (Ed.), Handbook of experimental psychology. New York: Wiley, 1951.

Byrne, D. Attitudes and attraction. In L. Berkowitz (Ed.), Advances in experimental social psychology. New York: Academic Press, 1969.

Byrne, D., & Clore, G. L. A reinforcement model of evaluative responses. Personality: An International Journal, 1970, 1, 103-128.

Byrne, D., Griffitt, W., & Clore, G. L. Attitudinal reinforcement effects as a function of stimulus homogeneity-heterogeneity. Journal of Verbal Learning and Verbal Behavior, 1968, 7, 962-964.

Byrne, D., Young, R. K., & Griffitt, W. The reinforcement properties of attitude statements. Journal of Experimental Psychology, 1953, 45, 97-101.

Church, R. M., Raymond, G. A., & Beauchamp, R. D. Response suppression as a function of intensity and duration of a punishment. Journal of Comparative and Physiological Psychology, 1967, 63, 39-44.

Cicala, G. A., & Corey, J. R. Running speed in the rat as a function of shock level and competing responses. Journal of Experimental Psychology, 1965, 70, 436-437.

Clore, G. J., & Byrne, D. The process of personality interaction. In R. B. Cattell (Ed.), Handbook of modern personality theory. Chicago: Aldine, in press.

Crespi, L. P. Quantitative variation of incentive and performance in the white rat. American Journal of Psychology, 1942, 55, 467-517.

D'Amato, M. R., Fazzaro, J., & Etkin, M. Anticipatory responding and avoidance discrimination as factors in avoidance conditioning. Journal of Experimental Psychology, 1968, 77, 41-47.

Dinsmoor, J. A. Variable-interval escape from stimuli accompanied by shocks. Journal of the Experimental Analysis of Behavior, 1962, 5, 41-48.

Dinsmoor, J. A., Hughes, L. H., & Matsuoka, Y. Escape from shock training in a free response situation. American Journal of Psychology, 1958, 71, 323-337.

Dinsmoor, J. A., & Winograd, E. Shock intensity in variable interval escape schedules. Journal of the Experimental Analysis of Behavior, 1958, 1, 145-148.

Fowler, H., & Trapold, M. A. Escape performance as a function of delay reinforcement. Journal of Experimental Psychology, 1962, 63, 464-148.

Fehrer, E. Effect of amount of reinforcement and of pre- and post- reinforcement delays on learning and extinction. Journal of Experimental Psychology, 1956, 52, 167-176.

Franchina, J. J. Escape behavior and shock intensity: within-subject versus between-group comparisons. Journal of Comparative and Physiological Psychology, 1969, 69, 241-245.

Goldstein, M. L. Acquired drive strength as a joint function of shock intensity and number of acquisition trials. Journal of Experimental Psychology, 1960, 6, 349-358.

Golightly, C., & Byrne, D. Attitude statements as positive and negative reinforcements. Science, 1964, 146, 798-799.

Grossberg, J. M. Pseudoconditioning, drive reduction, and the acquired fear-drive hypothesis. _The Psychological Record_, 1962, _12_, 299-307.

Gwinn, G. T. Resistance to extinction of learned fear-drives. _Journal of Experimental Psychology_, 1951, _42_, 6-12.

Hack, R. E. Learning as a function of water temperature. _Journal of Experimental Psychology_, 1933, _16_, 442-445.

Hammond, L. J., & Lambert, J. V. Punishing effects of long delays of reinforcement with shock-escape behavior. _Psychonomic Science_, 1970, _21_, 63-64.

Hendry, D. P., & Van-Toller, C. Alleviation of conditioned suppression. _Journal of Comparative and Physiological Psychology_, 1965, _59_, 458-460.

Holder, W. B., Marx, M. H., Holder, E. E., & Collier, G. Response strength as a function of delay in a runway. _Journal of Experimental Psychology_, 1957, _53_, 316-323.

Hughes, L. H. Delay of shock-escape reinforcement. Unpub lished doctoral dissertation, Indiana University, 1959.

James, J. P., & Mastoway, W. W. Conditioned suppression of licking as a function of shock intensity. _Psychonomic Science_, 1968, _13_, 161-162.

Kalish, H. I. Strength of fear as a function of the number of acquisition and extinction trials. _Journal of Experimental Psychology_, 1954, _47_, 1-9.

Kamin, L. J. Traumatic avoidance learning: the effects of CS-US interval with a trace conditioning procedure. _Journal of Comparative and Physiological Psychology_, 1954, _47_, 65-72.

Kamin, L. J. The effects of termination of the CS and avoidance of the US on avoidance learning. _Journal of Comparative and Physiological Psychology_, 1956, _49_, 420-424.

Kamin, L. J., Brimer, C. J., & Black, A. H. Conditioned suppression as a monitor of fear of the CS in the course of avoidance learning. _Journal of Comparative and Physiological Psychology_, 1963, _56_, 497-501.

Kaplan, M. The effects of noxious stimulus intensity and duration during intermittent reinforcement of escape behavior. _Journal of Comparative and Physiological Psychology_, 1952, _45_, 538-549.

Kaplan, M., Jackson, B., & Sparer, R. Escape behavior under continuous reinforcement as a function of aversive light intensity. _Journal of the Experimental Analysis of Behavior_, 1965, _8_, 321-323.

Keller, J. V. Delayed escape from light by the albino rat. _Journal of the Experimental Analysis of Behavior_, 1966, _9_, 655-658.

Kurtz, K. H., & Siegel, A. Conditioned fear and magnitude of startle response: A replication and extension. _Journal of Comparative and Physiological Psychology_, 1966, _62_, 8-14.

Lamberth, J., & Craig, L. Differential magnitude of reward and magnitude shifts using attitudinal stimuli. Journal of Experimental Research in Personality, 1970, 4, 281-285.

Lamberth, J., Gay, R. A., & Dyck, D. G. Differential reward magnitude and numan conditioning with social reinforcers. Psychonomic Science, 1972, 28, 231-233.

Lamberth, J., Gouaux, C., & Davis, J. Agreeing attitudinal statements as positive reinforcers in instrumental conditioning. Psychonomic Science, 1972, 29, 247-249.

Levis, D. J. Serial CS presentation and shuttlebox avoidance: A further look at the tendency to delay responding. Psychonomic Science, 1970, 20, 145-149.

Levis, D. J., Bouska, S., Eron, J., & McIlhone, M. Serial CS presentation and one-way avoidance conditioning: A noticeable lack of delayed responding. Psychonomic Science, 1970, 20, 147-149.

Levis, D. J., & Stampfl, T. G. Effects of serial CS presentation on shuttlebox avoidance responding. Learning and Motivation, 1972, 3, 73-90.

Logan, F. A. The role of delay of reinforcement in determining reaction potential. Journal of Experimental Psychology, 1952, 43, 393-399.

Logan, F. A. Incentive. New Haven: Yale University Press, 1960.

LoLordo, V. M. Summation of fear of different aversive events. Unpublished doctoral dissertation, University of Pennsylvania, 1966.

Lombardo, J. P., Tator, G. D., & Weiss, R. F. Performance changes in human conditioning as a function of shifts in the magnitude of attitudinal reinforcement. Psychonomic Science, 1972, 28, 215-218.

Lombardo, J. P., Weiss, R. F., & Buchanan, W. The reinforcing and attracting functions of yielding. Journal of Personality and Social Psychology, 1972, 21, 359-368.

Masterson, F. A. Escape from noise. Psychological Reports, 1969, 24, 484-486.

McAllister, W. R., & McAllister, D. E. Postconditioning delay and intensity of shock as factors in the measurement of acquired fear. Journal of Experimental Psychology, 1962, 64, 110-116. (a)

McAllister, W. R., & McAllister, D. E. Role of the CS and of apparatus cues in the measurement of acquired fear. Psychological Reports, 1962, 11, 749-756. (b)

McAllister, W. R., & McAllister, D. E. Increase over time in the stimulus generalization of acquired fear. Journal of Experimental Psychology, 1963, 65, 576-582.

McAllister, W. R., & McAllister, D. E. Drive and reward in aversive learning. American Journal of Psychology, 1967, 80, 377-383.

McAllister, W. R., & McAllister, D. E. Behavioral measurement of conditioned fear. In F. R. Brush (Ed.), Aversive conditioning and learning. New York: Academic Press, 1971.

McHose, J. H., & Tauber, L. Changes in delay of reinforcement in simple instrumental conditioning. Psychonomic Science, 1972, 27, 291-292.

Millenson, J. R., & Hendry, D. P. Quantification of response suppression in conditioned anxeity training. Canadian Journal of Psychology, 1967, 21, 242-252.

Miller, L. Compounding of pre-aversive stimuli. Journal of the Experimental Analysis of Behavior, 1969, 12, 293-299. (a)

Miller, L. Stimulus compounding with an instrumental avoidance response. Psychonomic Science, 1969, 16, 46-47. (b)

Miller, N. E. Studies in fear as an acquirable drive: I. Fear as motivation and fear-reduction as reinforcement in the learning of new responses. Journal of Experimental Psychology, 1948, 38, 89-101.

Miller, N. E., & Lawrence, D. H. Studies of fear as an acquirable drive: III. Effect of strength of electric shock as a primary drive and number of trials with the primary drive on the strength of fear. 1950. Cited by Miller in S. S. Stevens (Ed.), Handbook of experimental psychology, New York: Wiley, 1951.

Morris, R. G. M. Pavlovian conditioned inhibition of fear during shuttlebox avoidance behavior. Learning and Motivation, 1974, 5, 424-447.

Nation, J. R., Wrather, D. M., & Mellgren, R. L. Contrast effects in escape conditioning in rats. Journal of Comparative and Physiological Psychology, 1974, 86, 69-73.

Overmier, J. B., & Bull, J. A., III. Influences of appetitive Pavlovian conditioning upon avoidance behavior. In J. H. Reynierse (Ed.), Current issues in animal learning. Lincoln: University of Nebraska Press, 1970, 117-141.

Perin, C. T. The effect of delayed reinforcement upon the differentiation of bar responses in white rats. Journal of Experimental Psychology, 1943, 32, 95-109.

Rescorla, R. A. Pavlovian conditioning and its proper control procedures. Psychological Review, 1967, 74, 71-80.

Rescorla, R. A. Pavlovian conditioned fear in Sidman avoidance learning. Journal of Comparative and Physiological Psychology, 1968, 65, 55-60.

Rescorla, R. A., & LoLordo, V. M. Pavlovian inhibition of avoidance behavior. Journal of Comparative and Physiological Psychology, 1965, 59, 406-412.

Robinson, H. B. Persistence of a response in the apparent absence of motivation. Journal of Experimental Psychology, 1961, 61, 480-488.

Seligman, M. E. P., & Campbell, B. A. Effects of intensity and duration of punishment on extinction of an avoidance response. Journal of Comparative and Physiological Psychology, 1965, 59, 295-297.

Seward, J. P., Shea, R. A., Uyeda, A. A., & Raskin, D. C. Shock strength, shock reduction, and running speed. Journal of Experimental Psychology, 1960, 60, 250-254.

Shanab, M. E., & McQuisten, S. Effects of shifts in magnitude and delay of reward upon runway performance in the rat. Psychonomic Science, 1970, 21, 264-266.

Stavely, H. E., Jr. Effect of escape duration and shock intensity on the acquisition and extinction of an escape response. Journal of Experimental Psychology, 1966, 60, 323-326.

Storms, L. H., Boroczi, G., & Broen, W. E., Jr. Effects of punishment as a function of strain of rat and duration of shock. Journal of Comparative Physiological Psychology, 1963, 56, 1022-1026.

Strouthes, A., & Hamilton, G. C. UCS intensity and number of CS-UCS pairings as determiners of conditioned fear R. Psychological Reports, 1964, 15, 707-714.

Trapold, M. A., Blehert, S. R., & Sturm, T. A failure to find a response persisting in the apparent absence of motivation. Journal of Experimental Psychology, 1965, 69, 538-540.

Trapold, M. A., & Fowler, H. Instrumental escape performance as a function of the intensity of noxious stimulation. Journal of Experimental Psychology, 1960, 60, 323-326.

van Sommers, P. Carbon dioxide escape and avoidance behavior in the brown rat. Journal of Comparative and Physiological Psychology, 1963, 56, 585-589.

Weisman, R. G., & Litner, J. S. The course of Pavlovian excitation and inhibition of fear in rats. Journal of Comparative and Physiological Psychology, 1969, 69, 667-672.

Weiss, R. F. An extension of Hullian learning theory to persuasive communication. In A. G. Greenwald, T. C. Brock, & T. M. Ostrom (Eds.), Psychological foundations of attitudes. New York: Academic Press, 1968, 109-145.

Weiss, R. F., Boyer, J. L., Colwick, J. T., & Moran, D. J. A delay of reinforcement gradient and correlated reinforcement in the instrumental conditioning of conversational behavior. Journal of Experimental Psychology, 1971, 90, 33-38.

Weiss, R. F., Lombardo, J. P., Warren, D. R., & Kelley, K. A. The reinforcing effects of speaking in reply. Journal of Personality and Social Psychology, 1971, 20, 186-199.

Weiss, R. F., William, M. J., Miller, C. R. Disagreement-induced drive in conversation: A social analog of intermittent shock in escape conditioning. Psychonomic Science, 1972, 29, 342-343.

Wever, E. G. Water temperature as an incentive to swimming activity in the rat. Journal of Comparative Psychology, 1932, 14, 219-224.

Winograd, E. Escape behavior under different fixed ratios and shock intensities. Journal of the Experimental Analysis of Behavior, 1965, 8, 117-124.

Woods, P. J. Performance changes in escape conditioning following shifts in the magnitude of reinforcement. Journal of Experimental Psychology, 1967, 75, 487-491.

Woods, P. J. The effects of a sudden reduction in anticipated "relief". Bulletin of Psychonomic Society, 1973, 1, 5-8.

Woods, P. J., & Feldman, G. B. Combination of magnitude and delay of reinforcement in instrumental escape conditioning. Journal of Comparative and Physiological Psychology, 1966, 62, 149-151.

Woods, P. J., & Shultz, L. Performance in instrumental escape conditioning following a shift in drive-stimulus intensity. Procedings of the 73rd Annal Convention of the American Psychological Association, 1965, 23-24.

APPENDIX B

ANOVA TABLES

Table 1

Analysis of Variance on Speeds for Ten Trial Blocks and the First Eight Trial Blocks of Escape Training

Source	df	MS	F
Ten Trial Blocks			
Between	82	.95	
A (Groups)	6	1.77	2.00
Error	76	.88	
Within	747	.10	
B (Trials)	9	.67	6.98**
AB	54	.09	.96
Error	684	.10	
First Eight Trial Blocks			
Between	82	.78	
A (Groups)	6	1.73	2.46*
Error	76	.70	
Within	581	.10	
B (Trials)	7	.67	6.80**
AB	42	.08	.78
Error	532	.10	

* $p < .05$

** $p < .01$

Table 2

Analysis of Variance on Speeds for Unaggregated and Aggregated Groups During Avoidance Training

Source	df	MS	F
Unaggregated			
Between	61	1.09	
A (Groups)	4	1.69	1.61
Error	57	1.05	
Within	558	.09	
B (Trials)	9	.81	10.45**
AB	36	.06	.75
Error	513	.08	
Aggregated			
Between	61	1.09	
A (Groups)	1	5.23	5.11*
Error	60	1.02	
Within	558	.09	
B (Trial)	9	.81	10.62**
AB	9	.07	.97
Error	540	.08	

* $p < .05$

** $p < .01$

APPENDIX C

INSTRUCTIONS

Instructions for groups S and ST

Your task in the present experiment is simply to look at some slides. Each of the slides you are about to see will come on automatically. When you are through seeing a slide, however, it will be necessary for you to first press button number one and then button number two in order to remove the slide. Once a slide has been removed, wait for the next slide to appear. When you have seen all of the slides, the experimenter will bring further instructions.

Instructions for Phase I for groups:

N, NT, NTP, NTD, and NTPD

In the present experiment we are trying to find out if a person's attitudes can be changed by exposing an individual to a personal evaluation. Consequently, we would like for you to read an evaluation of yourself that was made by an introductory psychology student. His(her) evaluation of you was based on the Survey of Attitudes which you filled out at be beginning of this term. You were evaluated in the areas of intelligence, knowledge of current events, morality, adjustment, liking, and desirability as a work partner. Your identity was not disclosed to the student doing the evaluation.

Each of the evaluation statements will be projected on the screen in front of you, and each statement appears more than once. They are being presented by means of a slide projector so that their presentation is the same for everyone. Each evaluation item is projected onto the screen automatically. Once an evaluation item has appeared on the screen read the checked alternative; the checked alternative is one of the anonymous person's evaluations of you. Now notice that there are two buttons in front of you. Once you have read an item and are ready to move onto the next item, first press button number one and then button number two. Thus, after an item has been projected on the screen, read the checked alternative and then remove the slide by pressing buttons one and two.

Please note: Pay attention to the evaluation item that has been projected on the screen until it has gone off the screen.

After you have seen all of the statements, the experimentor will return with more instructions. It you have questions please ask the experimenter about them at this time.

Instructions for Phase II for groups:

N, NT, NTP, NTD, and NTPD

In order to insure a good exposure to the evaluations of yourself, we would like for you to view the same slides again. However, if is not necessary for you to see all or any of the slides again if you feel the first exposure was enough to acquaint you with the evaluator's opinions of you. So when you see the slides this time, the red light will go on before an evaluation is projected on the screen. If you will ignore button number one and press button number two after the red light goes on but before the opinion is projected, the opinion will not be projected. Remember, if you do not want to see the slides, just press button two after the red light goes on. If you want to see the slide, just wait for the slide to be projected on the screen, read the checked statement and then, press button number two.

Once you have ran through all of the slides, the experimenter will return with more instructions. If you have any questions ask the experimenter.