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HUMAN AGGRESSIVE RESPONSES MAINTAINED BY AVOIDANCE OR ESCAPE FROM POINT LOSS

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During 50-min sessions, 6 male human subjects could press either Button A or Button B available as nonreversible options. Button A presses were nonaggressive responses and earned points according to a fixed-ratio 100 schedule. Prior to the experiment subjects were instructed that every 10 (fixed-ratio 10) Button B presses (aggressive responses) subtracted a point from a fictitious 2nd subject. A random-time schedule of point loss was used to engender aggressive responding. The instructions attributed these point losses to the Button B presses of the subject's fictitious partner. Aggressive responding either escaped or avoided point loss by initiating an interval free of point loss. The duration of the interval was varied systematically across sessions. Avoidance contingencies maintained a high rate of aggressive responding over 30 sessions in the absence of point loss. Escape contingencies also maintained aggressive responding across sessions, with rates of aggressive responding corresponding to rates of point loss.

Key words: aggression, avoidance, escape, button press, humans

An organism's responses occasion and maintain behavior of other organisms, typically in the same immediate environment. Historically, extensions of the experimental analysis of behavior to such social behavior have been described and undertaken (Skinner, 1953; Hake & Olvera, 1978; Lindsley, 1966). The major classes of human social behavior studied in the laboratory have been cooperation and competition (e.g., Schmitt, 1984, 1987). Such social responses are defined by contingencies specifying reinforcer presentation to 1 or both subjects. Reinforcers (usually points exchangeable for money) are presented to only 1 subject following competitive responses, whereas both subjects receive points after cooperative responses. By contrast, aggressive responses are specified by their topography, such as biting and punching, rather than the particular consequence maintaining such responding. For quite sometime, social psychologists have operationally defined human aggressive responses in a laboratory setting as responses that actually or ostensibly result in the presentation of an aversive stimulus (e.g., electric shock) to another subject (Buss, 1961; Taylor, 1967).

Aggressive behavior, like other social behavior, is occasioned and reinforced by the behavior of others. Naturalistic observation of aggressive boys in the home, for example, has suggested that their aggressive behavior is occasioned by specific types of behavior (e.g., teasing by their siblings) and is negatively reinforced by a contingent reduction in the frequency of these provocations (Patterson & Cobb, 1973; Patterson, Littman, & Bricker, 1967). Although a few studies with nonhumans have demonstrated that aggressive behavior is sensitive to positive reinforcement (Reynolds, Catania, & Skinner, 1963) and punishment (Azrin, 1970), most studies of aggression have held consequences constant and focused instead on the environmental antecedents of aggressive behavior.

Typically, the social consequences of the

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subject's aggressive response have been controlled by restraining target animals (Azrin, Hutchinson, & Hake, 1966), employing stuffed animals (Azrin et al., 1966), using pictorial targets (Flory & Ellis, 1973; Looney & Cohen, 1974), or using inanimate objects as targets (Azrin, Hutchinson, & Sallery, 1964).

Laboratory studies of human aggressive behavior have also controlled consequences of aggressive responses. Kelly and Hake (1970) conducted a study in which subjects could earn money by responding on a Lindsley manipulandum and could avoid occasional noise presentations by punching a cushion. This avoidance response was selected because of its topographic similarity to human aggressive responses. Kelly and Hake found that punching increased in frequency when the concurrently available operant was extinguished. However, they did not observe a change in the frequency of avoidance responding when a response topographically different from the typical human aggressive responses was substituted for the punching response. In another study, human masseter activity, a measure of biting, increased immediately following a 2000-Hz 100-dB tone. The pattern of activity resembled the postshock pattern of biting observed in rats and monkeys (Hutchinson, 1977). In these studies each presentation of an aversive stimulus was separated by a shock- or noise-free period. These periods might have maintained aggressive responding by negatively reinforcing the biting response (or masseter activity). Adventitious reinforcement of elicited behavior has been demonstrated in studies of classical conditioning (Wahlsten & Cole, 1972).

The methods used by social psychologists, beginning with Buss (1961), to investigate human aggressive behavior have also controlled the target's behavior. This has been accomplished either by using an experimenter as the target or by instructing subjects that they are paired with a second but fictitious person. Buss cast subjects as "teachers" in a task during which they were permitted to administer shock when other subjects cast as "students" made an error. The "students" were accomplices of the experimenter. Taylor (1967) modified this procedure by changing the task to a competitive reaction time task. Each trial began with the subject and the fictitious subject setting the intensity of an electric shock. This shock was to be administered to the individual who reacted the slowest. If the opponent was slower than the subject, then the opponent was ostensibly shocked. However, if the subject was slower than the opponent, then the subject was shocked. The subject was told at what intensity the fictitious opponent had set the shock after each trial. Aggressive responding was maintained by increasing provocation (i.e., increasing the intensity of the shock set by the fictitious opponent). The intensity of shock set for the opponent by the subject's button press was the measure of aggressive responding.

In a free-operant variant of these procedures, Cherek and his colleagues provided subjects with a nonaggressive and an aggressive response option (Cherek, 1981; Cherek, Steinberg, & Brauchi, 1983, 1984; Cherek, Steinberg & Manno, 1985; Cherek, Steinberg, & Vines, 1984). Subjects were told that they could earn points exchangeable for money by pressing one button and could take points from a second subject by pressing a second button. They were also told that they might lose points during a session. Point loss was scheduled at random times throughout the session; preexperiment instructions attributed the point loss to the fictitious subject. In these studes the frequency of point loss was unrelated to the subject's frequency of aggressive behavior.

The noncontingent point-loss procedure has often been unsuccessful in maintaining aggressive responding across sessions. Representative data from 4 subjects are shown in Figure 1. These subjects were assigned to either a low (6 to 10) or high (18 to 22) frequency of point loss presented independent of aggressive responses. Point losses occurred at random times across the entire 50-min session. Aggressive responses extinguished within one to 13 sessions. As expected, the frequency of aggressive responding declined over fewer sessions under conditions of more frequent point loss. A potential problem associated with noncontingent point loss is that the instructional set is frequently compromised (i.e., discriminative control by the instructions is lost). After exposure to several sessions of noncontingent point loss many subjects reported that they did not believe there was a second subject; other subjects reported that they stopped aggressive responding because their behavior did not alter the behavior of the other subject.

The purpose of this experiment was to determine whether contingencies that permit es-

cape or avoidance of point loss would maintain aggressive responding across sessions without compromising the instructional set. This was accomplished by programming periods free of point loss contingent on aggressive responses.

METHOD

Subjects

Six males between the ages of 20 and 38 were subjects in this experiment. Data collected from 4 other subjects, which served as the basis for this experiment, are presented in Figure 1. None of the subjects reported having previous experience with behavioral research.

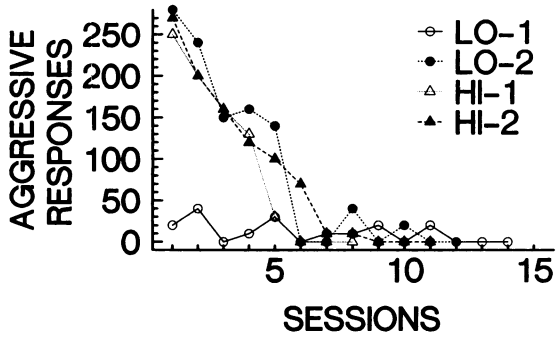

Fig. 1. Number of aggressive responses per session when point loss was presented noncontingently. LO-1 and LO-2 illustrate responding of subjects exposed to 6- to 10-point losses per session, a low frequency of noncontingent point loss. HI-1 and HI-2 illustrate responding of subjects exposed to 18- to 22-point losses per session, a high frequency of noncontingent point loss.

Apparatus

The response console was located in a room that measured 3.6 by 4.3 m. Extraneous sounds were masked by a continuously operating ventilation system located in an adjacent room. The response console contained two buttons, marked A and B, and a counter. A cable (approximately 0.5 m long) protruded from the console. A thermistor was attached to the end of this cable. The thermistor was not attached to physiological recording equipment and was used as a prop to support the instructions, which stated that the purpose of the experiment was to study physiological responses. The buttons and counter were attached via cable to standard solid-state programming equipment located in a separate room.

Procedure

Potential subjects were recruited by an advertisement in the classified section of the local newspaper. The advertisements solicited "paid volunteers" for behavioral research. Aggressive behavior was not mentioned in the ad to avoid implying that research subjects must respond aggressively in order to participate in the experiment or to earn money.

Before participating in the study, potential subjects were screened by a board-certified psychiatrist for psychiatric disorders including drug abuse. The screening exam consisted of a mental status examination and the Schedule for Affective Disorders and Schizophrenia Lifetime Version (SADS-L), a standardized psychiatric interview (Spitzer & Endicott, 1978). Individuals were excluded if any current or past psychiatric disorder, including alcoholism and drug abuse, was detected, if they reported using any licit or illicit drug (except alcohol, caffeine, and tobacco), or if they were students or employees of the medical center.

Subjects were asked to abstain from caffeinated beverages for 2 hr prior to each session. During the study urine samples were periodically obtained and screened for amphetamines, barbiturates, benzodiazepines, cocaine, marijuana, nonbarbiturate sedatives, and opiates and their derivatives. Detection of any drug in this urine sample resulted in the removal of the subject from the project. Daily alcohol intake was monitored by measuring the alcohol level in the subject's exhaled breath prior to each daily session using an Intoximeter Model 3000-III. If the subject's expired air sample contained alcohol, the scheduled daily session was cancelled and the subject received no compensation. A second occurrence resulted in the removal of the subject from the study.

Subjects received verbal instructions prior to the first session. The instructions emphasized that the subject could earn money by pressing Button A, that the subject was paired via the console with another subject, that this 2nd subject might deduct points, and that the subject could subtract points from the other subject by pressing Button B. The avoidance or escape contingencies between Button B responses and point loss were not mentioned. The complete instructions were as follows:

> The purpose of this study is to examine physiological and motor responses. Your tempera-

ture and blood flow will be monitored by this thermistor. In order to study these responses we need you about two hours each day of the week for up to ten weeks. On each day you will be able to earn money by working at a response console. This is a drawing of the response console you will work at during each daily work session. As the drawing illustrates this response console has two buttons marked A and B and a digital counter with a green light above it and a red light below it. The two buttons light up when you push them. Your console is linked to one of several other consoles just like it. Other individuals just like yourself will be seated at these consoles which are located at another facility. When the session starts the buttons will not be illuminated and the digital counter will be at zero. At this point you can press Button A or Button B or do nothing. You can earn points exchangeable for money by pressing Button A at least 100 times. When you press Button A, the A button will illuminate. This means that only the A button is effective (the B button is ineffective). After you have pressed the A button approximately 100 times your counter will advance by one point and the Button A light will extinguish. As your counter is advanced the green light just above the counter will flash briefly. Since Button A and Button B are both dark you can again select which button you wish to press. You can only change from Button A to Button B when both buttons are dark.

When you press Button B, Button B will illuminate; ten Button B presses will subtract one point from the counter of the person who is connected to your console. This point is not added to your total. After you have made ten Button B responses, Button B will darken. At this point you can press Button A or Button B or do nothing.

If during the session the red light below the counter flashes briefly and one point is deducted from your counter, then the person you are connected to via the console has taken a point from you by pressing his B Button ten times. The one point that this person subtracts from your counter is added to their counter. At the end of the session you can exchange your points for money. For example, if you have netted 100 points during the session you will be paid $10.00. How much you earn depends on how rapidly you press Button A. As a general rule the more rapidly you press Button A the more points and, therefore, money you can earn.

Subjects were scheduled for five 50-min sessions per week, Monday through Friday. When subjects arrived they were taken into the experimental area for 30 min before the beginning of the session. During this waiting period reading materials and water were available.

Five minutes before the beginning of each experimental session the reading materials were removed and the middle finger of the subject's left hand was wiped with alcohol. The thermistor was then attached with paper adhesive tape. During the session two nonreversible response options, Button A or Button B, were available. The subject's first Button A response illuminated Button A, the nonaggressive option, and deactivated Button B, the aggressive option. The Button A presses which occurred while the A light was illuminated were reinforced according to a fixed-ratio (FR) 100 schedule of point presentation. Only those responses separated by 0.17 s were counted toward fulfillment of the FR 100 requirement. A temporal contingency was added to the FR 100 requirement for the A option to maintain a relatively constant frequency of point presentation. Lever A responses occurring less than 0.17 s after a previous response did not count toward the FR 100 response requirement. Subjects typically responded at high rates (four to seven responses per second), and a number of their responses did not count toward the FR 100. This temporal contingency maintained a relatively constant frequency of point presentations despite changes in response rate. Thus, subjects could not increase the frequency of point presentations by increasing the rate of Button A responding following an increased frequency of point loss. This control was important because changes in point presentation frequency can alter the functional properties of point loss. Completion of the ratio incremented the counter by one point and extinguished the light. The subject's first Button B response illuminated Button B and deactivated Button A. Ten Button B presses (the aggressive response) extinguished the light, ostensibly subtracted a point from the fictitious subject, and either delayed or avoided point loss.

Up to 40 point subtractions were scheduled for presentation at random times throughout each experimental session. The interval between successsive point subtractions ranged from a minimum of 6 s to a maximum of 120 s. When points were subtracted the accumulated total displayed on the counter was reduced by one point (10 cents). Point loss was accompanied by an audible click and a brief

illumination of a red stimulus light at the bottom of the counter.

Although subjects had been instructed that Button B presses subtracted points from their counterpart, they were not told of the programmed contingency between aggressive responses and their own point losses. For Subjects S-169 and S-170, aggressive responding avoided point loss for 125, 250, or 500 s. For Subjects S-172 and S-173, aggressive responses after a point loss escaped point loss for 125, 250, or 500 s. This point-loss-free interval was termed the provocation-free interval (PFI). Under the escape contingency, aggressive responding could initiate the PFI only after at least one point had been subtracted. During the avoidance contingency, aggressive responding occurring at any time during the session initiated the PFI. Thus, it was possible for subjects to avoid all scheduled point subtractions. Over successive sessions, subjects were exposed to the following sequence of PFI durations: 500, 250, 125, 250, 125, and 500 s. PFI durations were changed for the session following a session in which the standard deviation of aggressive responding was less than 10% of the mean number of aggressive responses for the preceding three sessions.

Subjects S-120 and S-126 were assigned to an escape contingency for aggressive responses with a PFI of 250 s. These subjects participated in 70 sessions to determine whether aggressive responses would be maintained by the escape contingency over extended time periods.

At the end of the study, subjects were debriefed in accord with professional guidelines. Before the debriefing all subjects were asked to estimate (by written questionnaire) the number of subjects they had been paired with during the experiment. Afterwards, subjects were informed that they had not been paired with another person and that responding aggressively to provocation was an expected reaction. We explained that using this deception permitted control of the number of points subtracted during any session.

RESULTS

The 6 subjects studied under aggressive response consequence conditions indicated in their written responses to a questionnaire during the postexperiment interview that they had been paired with two or more persons during the study.

The mean frequencies of nonaggressive responses, point losses, and earnings are shown for all sessions in each PFI condition in Table 1. Earnings are not equivalent to the total number of nonaggressive responses divided by 100 minus the points lost because, although all nonaggressive responses were recorded, only those nonaggressive responses separated by 0.17 s fulfilled the FR 100 requirement. Figures 2 and 3 illustrate the session-to-session changes in the frequency of point losses and aggressive responding. Each graph has two ordinate scales. The first scale is for total points lost per session, and the second scale is for total aggressive responses per session. Because each value on the ordinate sale of aggressive responding corresponds to 10 times the value on the point-loss scale, convergence of the two values for any session indicates that the subject subtracted a point from the fictitious partner (responded aggressively by completing one FR 10) for every point subtracted by the fictitious subject.

Table 1 and Figures 2 and 3 demonstrate that aggressive responding was maintained across sessions. Although S-169 and S-170 lost fewer points during the avoidance contingencies than S-172 and S-173 lost during the escape contingencies, aggressive responding was maintained throughout the experiment. The trend across sessions of aggressive responding by S-169 paralleled the decreasing trend across sessions of point loss. During this period, increases in the frequency of aggressive responses coicided with increases in point losses. Aggressive responding by S-170 showed no downward trend despite very low rates of point loss. Although S-170 responded more aggressively during his last exposure to the 125-s PFI condition than he did during either the 250-s or 500-s PFI conditions, aggressive responding was not related to PFI duration.

Under the escape contingency, S-172 took more points from the fictitious subject than were subtracted from his earnings during Sessions 1 through 33. During the second exposure to PFI values, S-172 decreased aggressive responding at PFI 500 while increasing aggressive responding at the shorter PFIs of 250 and 125 s. The frequency with which S-173 responded aggressively during the first exposure to the 500-s and 250-s PFI escape con-

Table 1

Mean number of nonaggressive responses, aggressive responses, points lost, and money earned for each experimental condition.

Subject	Condition	M			
		Nonaggressive	Aggressive	Point loss	Earnings
Avoidance					
S-170	500	13,141	420	3.0	9.6
	250	16,547	338	3.3	9.0
	125	20,600	385	5.3	10.1
	250	20,754	298	1.4	10.5
	125	21,147	390	1.3	10.7
	500	21,354	373	0.0	10.9
S-169	500	10,825	299	9.6	8.0
	250	13,967	562	9.7	7.7
	125	16,222	440	8.6	8.4
	250	16,941	205	0.5	9.3
	125	16,553	270	7.7	8.3
	500	16,405	180	1.7	8.9
Escape					
S-173	500	13,246	84	9.4	9.4
	250	13,029	134	12.0	8.1
	125	10,894	283	17.1	7.5
	250	11,929	110	11.0	10.7
	125	11,692	183	18.3	13.1
	500	11,869	118	11.6	10.7
S-172	500	8,085	298	14.8	7.7
	250	11,375	373	12.7	9.9
	125	12,067	358	24.4	8.4
	250	12,895	321	15.1	8.9
	125	12,395	496	16.7	10.1
	500	12,741	100	10.2	11.4

tingencies corresponded to the frequency of point loss. During the initial exposure to 125-s PFI, S-172 subtracted more points than he lost. During the last three conditions, S-173 subtracted as many points as he lost.

Six cumulative records for each subject, one selected randomly from each condition, are shown in Figures 4 and 5. Inspection of the cumulative records of S-169 and S-170 shows that the avoidance contingencies maintained a pattern in which nonaggressive and aggressive responding alternated throughout the session. Escape contingencies maintained a different pattern of behavior. S-172 and S-173 responded aggressively immediately following point loss and then responded nonaggressively until the next scheduled point loss. S-172 aggressed more frequently after a point loss than S-173 did, particularly during the second exposure to each PFI value.

The mean number of aggressive responses and mean number of point losses of S-120 and S-126 maintained by an escape contingency are shown in Table 2. Inspection of Table 2 demonstrates that aggressive responses were maintained by a 250-s PFI for up to 70 sessions. Different frequencies of aggressive responses were observed. S-120 subtracted fewer points (made fewer aggressive responses) than were subtracted ostensibly by the other subject. Aggressive responding of S-126 increased slightly over the sessions. Similar differences were observed between Subjects S-172 and S-173 under escape contingencies.

DISCUSSION

The preliminary studies reported in Figure 1 indicate that noncontingent point-loss presentation frequently results in a cessation of aggressive responding over sessions and may compromise the instructional deception. Other studies have avoided or minimized this problem by conducting a short number of sessions (e.g., Cherek, 1981; Cherek et al., 1985; Taylor, 1967) or providing a history of response-

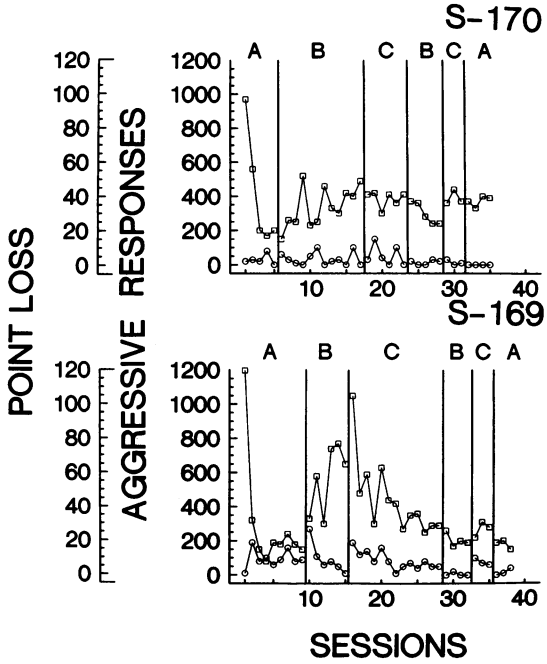

Fig. 2. Changes in the frequency of aggressive responses and points lost during avoidance contingencies across sessions and differing PFI durations. Each value on the aggressive response scale is 10 times as great as the corresponding point-loss scale because the subject was required to respond 10 times before a point loss was ostensibly subtracted from the fictitious partner. The PFI durations were 500 s, 250 s, and 125 s.

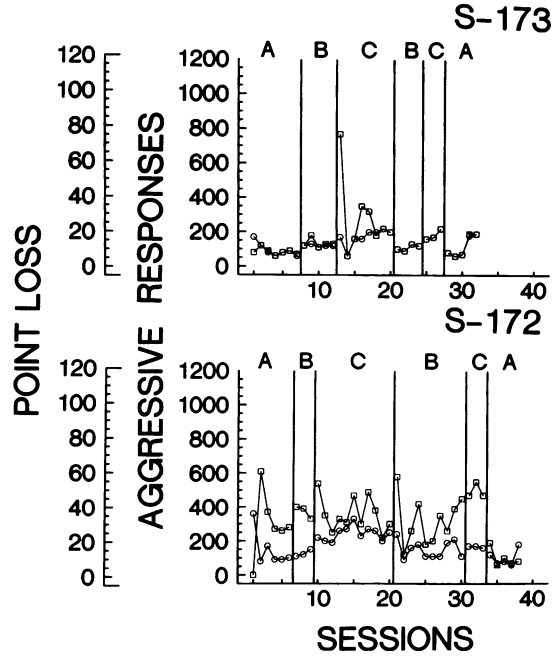

Fig. 3. Changes in the frequency of aggressive responses and points lost during escape contingencies across sessions and differing PFI durations. Each value on the aggressive response scale is 10 times as great as the corresponding point-loss scale because 10 responses were required of the subject before a point was ostensibly subtracted from the fictitious partner. The PFI durations were 500 s, 250 s, and 125 s.

contingent point-loss reduction prior to noncontingent point-loss conditions (Kelly, Cherek, Steinberg, & Robinson, 1988).

A comparison of the data from the response-contingent experiments with the preliminary data shown in Figure 1 suggests that aggressive responding, defined as responses that subtracted points from another person, was provoked by point loss and maintained by escape from or avoidance of point loss. The pattern of aggressive responding generated by avoidance contingencies differed from the pattern of responding generated by escape contingencies. The frequency of aggressive responding of S-169 and S-170, subjects exposed to avoidance contingencies, was unrelated to the frequency of point loss. However, the frequency of aggressive responding of S-172 and S-173 was related to the frequency of point loss. The differing patterns of aggressive responding generated by the avoidance and escape contingencies are similar to the patterns of avoidance and escape responding observed by Weiner (1963) and may be explained by the relations among point loss, aggressive responses, and the duration of the interval free from point loss established by each schedule.

Escape contingencies maintained aggressive responding in two ways. First, aggressive responding was reinforced by an interval free of point loss. Second, point loss was established as a discriminative stimulus for intervals free of point loss following the subject's aggressive response. The progressive control exerted by these contingencies is illustrated by the performances of S-172 and S-173 during the last sessions of the experiment. During the last exposure to the 500-s PFI condition for S-172 and the last exposure to the 125-s, 250-s, and 500-s PFI for S-173, aggressive responding corresponded closely to subtractions. However, aggressive responding for S-172 was maintained at a high rate or increased during the second exposure to 250-s and 125-s PFI values.

In contrast, point loss during avoidance con-

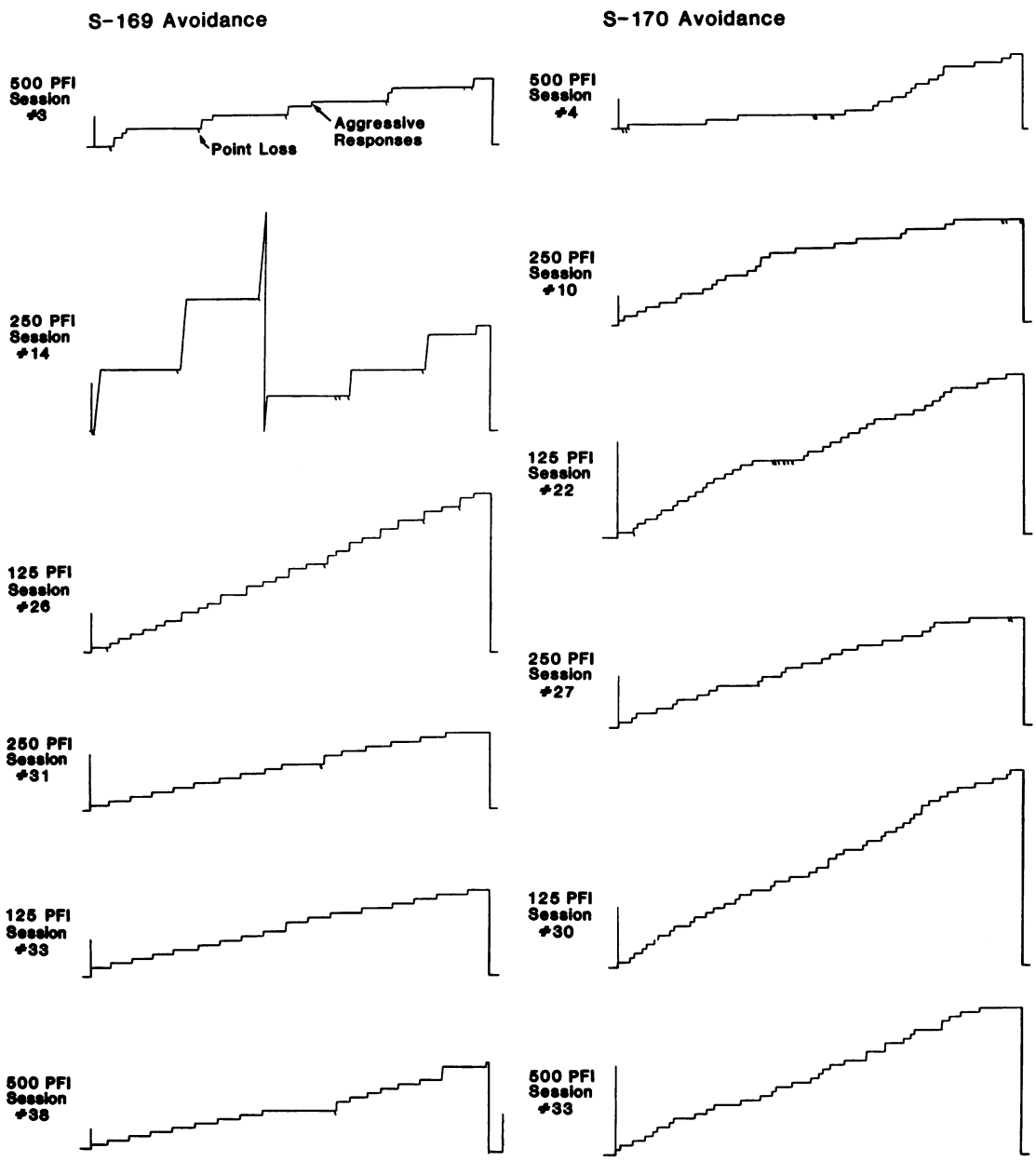

Fig. 4. Cumulative records of aggressive responses during avoidance contingencies. One record was selected randomly from each PFI condition. Downward deflections of the pen indicate point losses.

tingencies did not exert the same discriminative control over aggressive responding as during escape contingencies. This can be seen by comparing the pattern of aggressive responding of escape and avoidance subjects in Figures 3 and 4. Unlike the pattern of aggressive responding for S-173, the aggressive responding of S-169 and S-170 did not correspond to a point-loss-for-point-loss pattern of retaliation. Instead, for S-170 aggressive responding was stable across conditions, resulting in little or no difference in frequency of point loss across initial exposure to the differing PFI conditions. As a result, during later sessions the aggressive responding of S-170 appeared insensitive to changes in the frequency of point loss. For S-169 the frequency of point loss did change across sessions, and during the last ex-

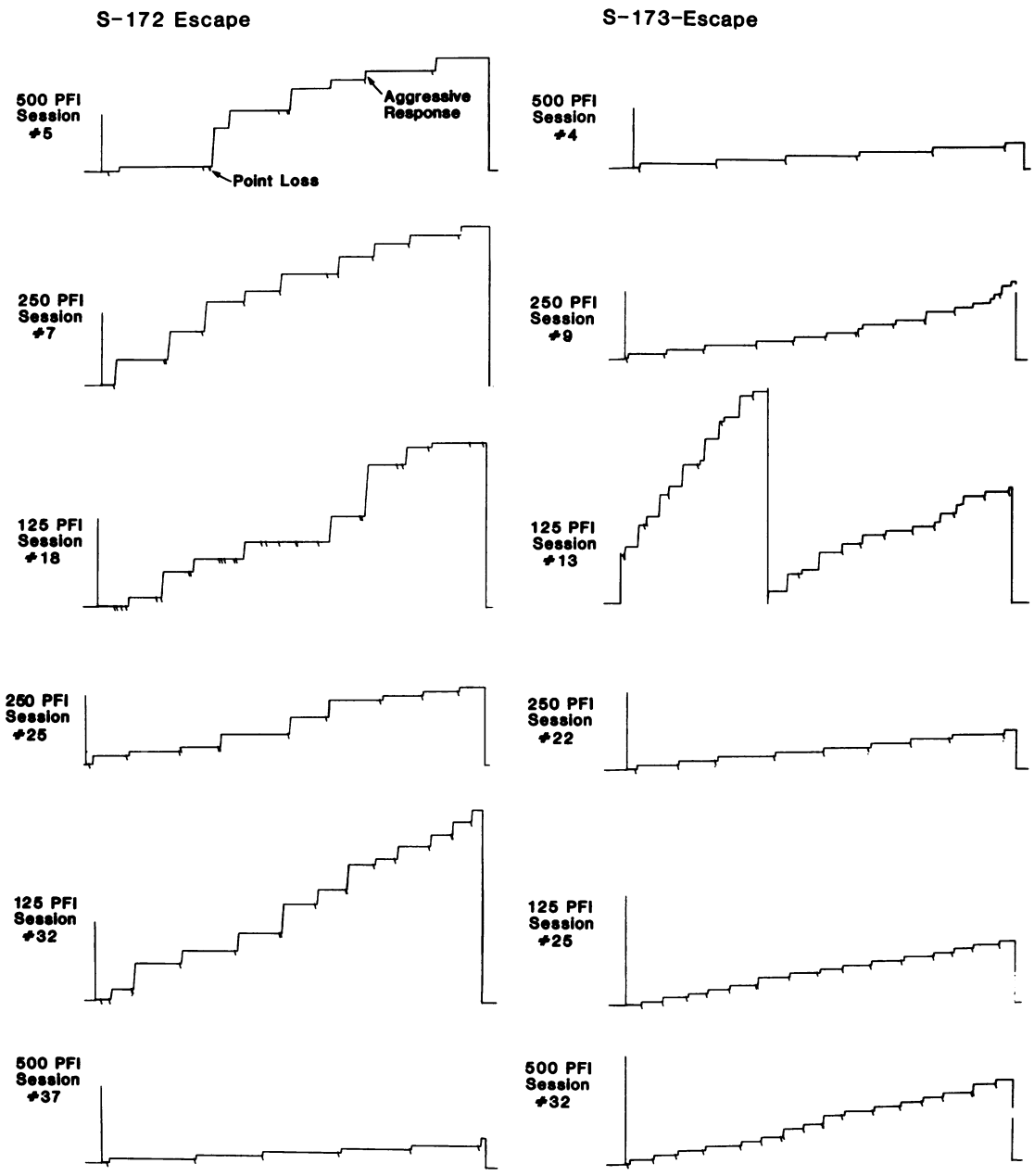

Fig. 5. Cumulative records of aggressive responding during escape contingencies. One record was selected randomly from each PFI condition. Downward deflections indicate point losses.

posures to the 250-s, 125-s, and 500-s PFI the frequency of aggressive responding changed with the across-condition changes in point-loss frequency. These results suggest that the history of exposure to point loss interacts with the ongoing reinforcement contingency to determine the discriminative control a point loss exerts.

Initially, decreases in PFI duration, which increased the frequency of point loss, increased the frequency of aggressive responding for Subjects S-172 and S-173. For example, although the frequency of point loss increased only slightly when PFI duration was changed, the frequency of aggressive responding for S-172 and S-173 increased substantially dur-

Table 2

Mean number of aggressive responses and points lost per session (±*SEM*).

Subject	Sessions 1–10	31–40	61–70
S-120			
Aggressive responses	76 (16.7)	84 (7.8)	84 (7.5)
Points lost	10.4 (0.5)	10.3 (0.5)	10.6 (0.5)
S-126			
Aggressive responses	74 (12.1)	96 (5.6)	129 (7.5)
Points lost	13.3 (0.9)	10.3 (0.5)	10.6 (0.5)

ing the session in which the PFI was changed from 250 s to 125 s. However, when the PFI duration was changed from 250 s to 125 s a second time, aggressive responding did not increase as dramatically despite the slight increase in the frequency of point loss for that session. Similar but less dramatic effects were observed in S-169 when he was shifted from 500-s PFI to 250-s PFI to 125-s PFI.

In addition to maintaining aggressive responding, the experimental procedures also had the advantage of maintaining the deception. After completing the study, subjects reported that points were being subtracted by another person and that their counter aggression effectively altered the behavior of the second (but fictitious) subject. In our previous research a contingency between the subject's aggressive responses and point loss was not specified. Instead, points were presented at random times throughout the session. As a consequence, subjects frequently ceased responding aggressively after only a few sessions (see Figure 1). Furthermore, these subjects reported that their responses had no discernible effect on the other person's aggressive behavior and, therefore, they doubted that they were paired with another person. These verbal reports suggest that noncontingent point loss was sufficiently different from natural social contingencies to permit subjects to discriminate the nonsocial task dimensions. Subjects in this experiment may not have discriminted the nonsocial nature of the experimental procedure because the escape and avoidance contingencies more closely mimic the extraexperimental social contingencies they typically experienced.

Researchers of differing theoretical perspectives have noted that social responses (aggression as well as cooperation) are often reciprocal. For example, Patterson and Cobb (1973), observing aggressive boys from problem families, found that when a boy was teased he retaliated with a tease or when hit would retaliate with a hit. This reciprocal pattern has also been observed in laboratory studies (Dengerink & Covey, 1983). The results of this study suggest that this pattern is a result of a history of escape conditioning during which respondent–operant interactions diminish and the aggressive behavior of other individuals comes to exert discriminative control over the individual's aggressive behavior. Aggressive responding maintained by avoidance contingencies appears to be under the discriminative control of overall frequency of point loss rather than any single point loss.

The social context of point loss arose in the current experiment because subjects were instructed that the point losses were initiated by another subject. Recently, we have conducted studies in which Button B responding was maintained by an escape contingency as in the current experiment, except that point losses were attributed to a machine. In these studies, the effects of diazepam and *d*-amphetamine on Button B responding were altered by the instructions regarding the source of point loss (Cherek, Steinberg, Kelly, Robinson, & Spiga, 1990). When point losses were attributed to a machine, Button B responding was increased slightly by both drugs, whereas aggressive Button B responding occasioned by point losses attributed to another person were significantly decreased by these drugs. We argue that the social context of attributing point loss to another person alters the functional properties of this aversive stimulus, and these differences are supported by differing dose–response effects of drugs under social (another person) and nonsocial (machine) conditions.

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