GENERALIZATION OF AGGRESSIVE BEHAVIOR IN ADOLESCENT DELINQUENT BOYS¹

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The generalization of conditioned aggressive and nonaggressive responses in a group of six adolescent delinquent boys was investigated. Responses were reinforced in card games where a token reinforcement system with money as a back-up reinforcer was used. Conditioning of responses was rapid. Generalization, measured in terms of frequency of physical contact, was tested in a group game for which no reinforcement was given. Generalization occurred during aggressive contingencies. During nonaggressive contingencies, responses did not return completely to the baseline level.

Recent experimental evidence (*e.g.*, Bandura and Walters, 1963; Bandura, Ross, and Ross, 1963; Brown and Elliott, 1965; Burchard and Tyler, 1965) has shown learning theory to be a fruitful approach to the study of aggressive behavior and its control. Within a learning framework, aggressive responses may be seen as instrumental responses, operating on the environment to produce reinforcement for the individual.

The definition of aggressive behavior has proven difficult. The labelling of a response as aggressive frequently involves social judgments concerning intentionality (*e.g.*, Dollard, Doob, Miller, Mowrer, and Sears, 1939) and intensity (*e.g.*, Walters and Brown, 1963) of responses. Most theorists, however, consider aggressive behavior as that which produces or is potentially capable of producing harm or pain (Bandura and Walters, 1963).

Aggressive responses, when viewed as learned responses capable of being manipulated by operant conditioning procedures, may, according to the principles of learning theory,

also generalize to similar situations. The extent of this generalization and the conditions under which it will occur are questions as yet not fully answered. Of particular interest is the possibility of the generalization of aggressive or nonaggressive responses from the controlled experimental setting to another setting that is not under experimental control.

Walters and Brown (1963) reported that high-intensity aggressive response did generalize and that subjects trained to make high-intensity aggressive and nonaggressive responses emitted more responses rated as aggressive in a generalization situation than did subjects trained to make low-intensity responses (Walters and Brown, 1964). Wahler (1969), using behavior therapy techniques with parents and children in the home situation, found no generalization to the children's behavior in school.

With social learning theory and research findings on the conditioning and generalization of aggressive behavior as a referent, this experiment was undertaken with delinquent adolescent boys. Several authors (*e.g.*, Cohen, 1955; Kvaraceus and Miller, 1959; Cloward and Ohlin, 1960) have indicated that the treatment of aggressive and/or delinquent behavior with this population is particularly difficult because a boy's peer group pressures are frequently stronger than an adult therapist's influence and usually serve to maintain delinquent, aggressive behavior. In other words, behavior modification with delinquent adolescent boys may be difficult because the reinforcers manipulated by the peer group are

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frequently stronger than those manipulated by the therapist and are usually contingent upon the deviant behaviors that are to be changed. For this reason, procedures were employed to assure that the peer group's reinforcement contingencies would be congruent with those imposed by the experimenter.

It was hypothesized that the frequency of aggressive responses would increase if reinforced in a particular situation, and conversely, that if only nonaggressive responses were reinforced in the situation aggressive responses would decrease. It was further hypothesized that the behavior reinforced in a situation would generalize to a different situation in which no reinforcement was given, provided that the two situations had a sufficient number of stimuli in common.

METHOD

Subjects

Six males, ranging in age from 11 yr, 5 months to 15 yr, 10 months, with a mean age of 12 yr, 10 months, were resident at a home for delinquent, emotionally disturbed children to which they had been referred either by a social welfare organization or by the family court. Three of the six subjects had juvenile court records at the time of the experiment and the psychiatric diagnosis for all subjects was Adjustment Reaction to Childhood. Three of the six subjects were characterized by an administrator of the home as having consistently aggressive patterns of responding; three were described as being not overtly aggressive. The length of stay in the home for the subjects ranged from two months to 2 yr, 10 months, with a mean of 1 yr, 4 months.

Setting

The experiment, which was conducted in the living-dining area of the cottage in which five of the six subjects resided, lasted for seven weeks, with approximately 20-min sessions on four consecutive evenings each week. With the exception of three vacation days, which will be discussed in more detail later, the experimental sessions followed the subjects' dinner hour and preceded their study hour.

Procedures

Subjects engaged in two game situations during each experimental session, the games

being conducted by two student assistants. On the first day, subjects were told that the same two games would be played for each session of the experiment in order "to see how you like them and to see how long you will like to play them". They were then given specific instructions for playing the games and were told that after about one week they would be able to earn money while playing the first game. Subjects were informed that no money would ever be given for the second game. They were also told that weekly payments would be given and that these payments would also be contingent upon winnings in the first game only.

For the first experimental game, each of three pairs of subjects engaged in the card game "War" (Situation A). For each of the three card games played per session, a deck of playing cards and 52 poker chips were divided evenly between the two players. Each subject's poker chips were placed in a paper cup to preclude their loss and an empty paper cup was placed between the players. A trial consisted of the playing of one card by each member of the pair, the player of the card of the highest value being the winner of that trial. Suits were given a relative value so that no tie would occur when each player played a card of the same numerical value. Two response options were open to the winner of a trial. He could either slap the hand of the loser or he could instruct the loser to forfeit one poker chip, placing it in the paper cup between the players. Any hand-slap in this game was counted as an aggressive response. Instructing the loser to forfeit a poker chip was defined as a nonaggressive response. The subjects were specifically told that the poker chips themselves had no value but that their use constituted "part of the rules of the game".

The three pairs of subjects played this game in succession, making a total of 78 trials for each session. All aggressive response for the three card games were totalled, giving a single measure of aggressive responding for each session. Although each session had 78 clearly defined trials, aggressive responses could exceed 78 per session, if on a given trial both the winner and the loser emitted a hand-slap response or if either emitted more than one slap on a trial.

At the beginning of the experiment, each subject was paired with another subject for the first game situation. Pairings were changed

for each of five consecutive sessions so that each subject was paired with every other subject during that time. After five sessions the original pairs were used. Pair rotations continued in the same order throughout the experiment regardless of the length of each experimental period.

To maintain participation in the experimental situation, particularly during the Baseline Period, money was given to each subject at the end of each week of the experiment, with payment being made after the training situation. The amount of money was based upon the number of cards won during the week and therefore was dependent upon chance. For the Baseline Period, payments were given according to rank order of the subjects' winnings and were \$3.00, \$2.50, \$2.00, \$1.50, \$1.00, and \$0.50 respectively. Weekly payment for the Baseline Period was given for the total cards won over five sessions; after the Baseline Period payment was given for the total cards won in the four sessions conducted per week. For each week after the Baseline Period, weekly payments based upon the subjects' winnings were \$2.00, \$1.00, \$0.75, \$0.50, \$0.10, and \$0.05 respectively.

After the Baseline Period, immediate reinforcement contingent upon aggressive responses was instituted in the card games. A small open cardboard box was placed on the table between the players and the following instructions were given to all subjects by the experimenter:

Beginning today, you will be able to earn anywhere from 0 to 47¢ a day. Everyone will get the same amount for each day.

Once in a while during each card game, I'll drop a bean in this box. At the end of all three card games, the beans will be counted and you will get money according to how many beans there are in the box.

Only the first response on each trial was reinforced and immediate reinforcement was given only once per trial. Aggressive or non-aggressive responses were alternately reinforced over four experimental periods, beginning with the reinforcement of aggressive responses in the first period. Throughout the experimental sessions, backup reinforcers were given immediately after the card games at a ratio of 5:3. That is, for every five beans in

the box, three cents were given to each subject.

The Baseline Period was in effect for six sessions, Experimental Period I for five sessions, Experimental Period II for nine sessions, Experimental Period III for four sessions, and Experimental Period IV for four sessions, making a total of 28 sessions or seven weeks for the entire experiment.

Following the card games each day, all subjects engaged in a game of "Steal the Bacon" (Situation B), for which two teams of three members each were formed. Team members were rotated so that by the end of 10 sessions each subject had been paired with all possible combinations of two other subjects and had played against all possible combinations of three other subjects. At the end of 10 sessions, the original groupings were used with team rotations continuing in the same order throughout the experiment. During this game, each player had a large handkerchief inserted in his belt or pocket in such a way that it was readily visible and easily removed without need of physical contact. At the beginning of this game for each session, each member of a team was assigned a number from one to three. Each team was seated on a couch at opposite sides of the game area, which was approximately 20 by 20 ft. A hand towel was placed on the floor in the center of the game area and an experimenter called out a number. Members of opposing teams identified by that number proceeded to the center of the game area. The first player to pick up the towel and to reach his seat on the couch without having his handkerchief taken by his opponent made a point for his team. The duration of this game was 8 min, during which time instances of physical contact, regardless of intensity, were tabulated to give a single measure of aggressive responding per session. In this situation, physical contact included punching, slapping, kicking, and pushing or pulling. Any time a subject's body came into contact with another subject, or with an experimenter, it was counted as an instance of aggression. Pushing or pulling with two hands, for example, was counted as two aggressive responses. Hitting another subject with an object was also counted as an aggressive response. At the conclusion of this game for each session, the subjects were simply told which team had scored the greatest number of points; no monetary reinforcement was ever delivered.

Fig. 1. Aggressive responses per session.

RESULTS

In the card game the hitting response was readily manipulated through the reinforcement of aggressive or nonaggressive responses as shown in Fig. 1. In the generalization game, the level of aggressive responses was usually related to the card game contingencies, although no reinforcement was scheduled during this situation.

Training Situation

For the first session during the Baseline Period, approximately one half of the total responses were aggressive. Thereafter, aggressive responses rapidly declined. By the fifth session and continuing through the seventh session, there were no aggressive responses. The mean number of aggressive responses per session for the card games during the Baseline Period was seven.

Aggressive responses were reinforced during the first experimental period. For the first session of this period there were no aggressive responses and thus no additional reinforcers were given. Since the generalization of a conditioned behavior was of primary interest in this experiment, and there was no opportunity

for reinforcement during this first session, data from this session were added to the Baseline Period for graphic presentation and for the computation of means. In the second session, an aggressive response was emitted on the first trial and immediate reinforcement was given. Following this reinforcement, acquisition of the conditioned response was rapid. During the second session, the first pair of players did not emit any response on three trials. No nonaggressive responses were emitted during the remainder of this experimental period. The number of aggressive responses for three of four sessions in this period was more than one per trial, even though reinforcement was given for only one response per trial. During one session there were eight trials on which multiple aggressive responses occurred, either in the form of hits by both the winner and the loser or more than one hit per trial by the winner. The mean number of aggressive responses per session for the card games during this period was 81.

On the first trial of the second experimental period, an aggressive response was emitted. When no reinforcement was given a nonaggressive response was emitted. There were six aggressive responses made during the first ses-

sion under this nonaggressive contingency. By the third game of the first session under this contingency, aggressive responses had been eliminated. The mean number of aggressive responses during the entire period was 0.9.

A nonaggressive response was emitted for the first response during the third experimental period and was not reinforced. Acquisition of the aggressive response was rapid; aggressive responses were frequently recorded at more than one per trial. For two sessions during this period, 11 and 13 multiple hits were recorded. Our casual observations indicated that there may have been other effects of this condition. For example, during the third session, a player and a bystander became involved in a fist fight, with one subject jumping from a table to attack the other, and it was necessary in our opinion to restrain them. Furthermore, by the fourth session, aggressive behavior in the form of slapping, punching, and verbal aggression, directed toward the experimenters was frequently observed. However, only game hand-slaps were counted in the measure of aggressive responding. The mean number of aggressive responses per session for the card games during this period was 85.

A nonaggressive response was emitted on the first trial during the last experimental period and immediate reinforcement was given. Aggressive responding was eliminated by the second session and no further aggressive responding was recorded for this period. The mean number of aggressive responses during this period was 0.5 in the card games.

Generalization Situation

In the generalization situation, an aggressive response was defined as an instance of physical contact, as described above. During the second experimental period, an observer reliability index was obtained by comparing the count of aggressive responses taken by the experimenter and that taken by an experimental assistant who was unaware of the numerical value of the previous counts. Comparisons were made by use of the formula $\text{Smaller/Larger} \times 100$. An observer reliability index of 97% was attained. A check of observer reliability four sessions later yielded an index of 94%.

During the Baseline Period (Fig. 1), a fairly stable amount of aggressive behavior was

noted. Much aggressive behavior, in the form of punching and slapping, occurred between teammates during this period. The mean number of aggressive responses per session was 29.

When immediate reinforcement for aggressive behavior was received in the card games during the first experimental period, an immediate and substantial rise in aggressive behavior was noted in the generalization game. Aggressive responses stabilized at this new level over four sessions. Aggression not only increased in frequency during this period but our subjective observations indicated a rise in the intensity of aggressive behavior. In our opinion, it became necessary at one point during this period to discourage one subject from throwing a 4-ft bolster from a couch at the members of the opposing team. The mean number of aggressive responses per session in this situation during the first experimental period was 48.

During the first session of the second experimental period, the number of aggressive responses continued to rise. During the second session under the nonaggression contingency, aggressive responses declined to a level within the baseline range. On the following three days of the experiment, the subjects were scheduled to go on vacation outings immediately after the experimental sessions. During those days, we observed a rise in aggressive responding. For the first of these vacation days, which were plotted separately in Fig. 1, aggressive responding in this game reached a level surpassing that of the previous period of conditioning aggressive responses in the card game. Over the next two sessions, aggression showed a gradual decline to the level of the previous conditioning period. Aggressive responses became fairly stable during the last four sessions of this period when the special outings were no longer scheduled. By the end of this period, aggressive responding had decreased to a level lower than that of the previous period. Patterns of aggressive behavior were very similar to those under the previous experimental conditions, except that little aggression was directed toward teammates. One subject directed some physical aggression toward the experimenters and this was included in the count of aggressive behavior. The mean number of aggressive responses for the generalization situation, in-

cluding sessions preceding vacation outings, was 48. The mean number per session not including vacation outing sessions was 41.

During the third experimental period an immediate rise in aggressive behavior was noted. By the fourth session, aggressive behavior was so frequent that it became difficult to conduct the game. It seemed as if almost every call of a number resulted in a fist fight or a wrestling match between subjects. The mean number of aggressive responses per session for this period was 81. For the first time during the reinforcement of aggressive responses in the generalization game exceeded the number in the card game.

An immediate and pronounced reduction in aggressive responses was noted during the first session of the last experimental period. The mean number of aggressive responses per session for this game during the last experimental period was 45.

An over-all increase in aggressive responding occurred in the generalization game when aggressive responses were reinforced in the card games. The second time that aggressive responses were reinforced, an increase of 68% in aggressive responding was noted over the mean number of aggressive responses obtained during the first aggressive contingency. A comparison of the two periods of reinforcing nonaggressive responses in the card games shows that the mean number of aggressive responses in the generalization situation decreased slightly, by 6%, the second time. However, if the data from vacation days are omitted, aggressive responding in the generalization situation shows a slight increase across periods of reinforcing nonaggressive responses in the card games.

A general increase in aggressive responding over the baseline measurement was seen for the the entire experiment. That is, the mean number of aggressive responses in the generalization situation never decreased to the mean number obtained during the Baseline Period. There was, however, a corresponding reversal of the trend of aggressive responses in the generalization game for each reversal of reinforcement contingencies in the card games.

DISCUSSION

The present results support the view that aggressive responding can be a learned be-

havior that can be modified by operant conditioning procedures. Further, the results indicate that a group's aggressive behavior reinforced in one experimental situation will generalize to a different situation in which explicit reinforcement for such behavior is not provided.

The group reinforcement contingencies used in this experiment seemed to be effective with the delinquent adolescent population. Our informal observations indicated that the peer group's reinforcement contingencies were compatible with the experimental contingencies. Some subjects frequently seemed to persuade others to emit responses in the card game that were compatible with the contingencies in effect at that time. Thus, in the card games peer reinforcement may have helped to produce the immediate and significant change in responding for each reversal of experimental contingencies.

There were also indications that these peer reinforcement contingencies generalized. Often during periods of reinforcing nonaggressive responses, subjects appeared to attempt to dissuade a few particularly aggressive subjects from aggressive responding in the generalization game. A marked difference in the type of aggressive responding was also informally noted for different experimental periods. More tackling and fighting or wrestling between three or more subjects at one time seemed to occur during aggressive contingencies than appeared to occur during nonaggressive contingencies. Conversely, during the nonaggressive contingencies, subjects seemed more often to attempt to prevent opponents' making points by taking their handkerchiefs, which could be done with no physical contact, than by using sheer physical force.

These informal observations suggest that the generalization of the peer group's reinforcement contingencies may have been a major reason for the generalization of responses that did occur.

Concerning the relative efficacy of aggressive and nonaggressive reinforcement contingencies in the generalization situation, it was noted that the generalization of nonaggressive responses was slower, more variable and less pronounced than was the generalization of aggressive responses, with no decrease below the baseline measure during nonaggressive contingencies.

Although the means for periods of reinforcing nonaggressive responses did not indicate a decrease to baseline level, response trends for each period indicate that such differences might have been observed had these periods been extended. Time limitations, however, made extension of these periods impossible.

Since the reversal of the trend of aggressive behavior from each experimental period to the next in the generalization situation may be assumed to be due to the change in reinforcement contingencies, these reversals give support to the hypothesis that conditioned nonaggressive responses and conditioned aggressive responses will generalize to another situation where reinforcement is not scheduled. Of particular interest is the fact that the reversal in trend occurred even when aggressive responses were at a very high and rapidly rising rate before the reversal of reinforcement.

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