PEER REINFORCEMENT CONTROL OF CLASSROOM
PROBLEM BEHAVIOR¹

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Peer and teacher interactions with five "disruptive" children were studied in an elementary school classroom. The intent of the study was to analyze experimentally peer reinforcement control of the disruptive children's problem behaviors. Social attention provided by all peers was found to be directed exclusively to the problem behaviors during baseline. Following baseline, several manipulations of selected peer social attention demonstrated the reinforcement function of this stimulus class.

Naturalistic approaches to child behavior modification have typically emphasized adult control of the problem child's actions. Thus, the majority of investigators have examined interactions between parents and their children (*e.g.*, Patterson, Cobb, and Ray, *in press*) or between teachers and their pupils (*e.g.*, Madsen, Becker, and Thomas, 1968). Based partly on information derived from these assessments, training programs have been devised to shift adult social attention from the children's problem behavior to their more desirable actions. As the majority of studies showed, such shifts can produce sizable therapeutic changes in the children's behavior.

Unfortunately, a third source of social contingencies, present in both home and school settings, has received little systematic inquiry. This source, provided by the behavior of the problem child's peer group, has been described as an important determinant of deviant and normal child behavior (O'Leary and O'Leary, 1972). Both Patterson, Littman, and Bricker (1968) and Wahler (1967) demonstrated that peer reinforcement controls normal child be-

haviors in preschool settings. Other investigators have shown that peers might also support the deviant behaviors of children. Two investigations (Buehler, Patterson, and Furness, 1966; Duncan, *unpublished*) presented data indicating quite systematic peer approval following the antisocial behaviors of delinquent children, but very little following the children's prosocial responses. While neither of these studies attempted to evaluate the function of these peer consequences, it is probable that the peers did contribute support to the antisocial behaviors.

It is unfortunate that the above investigations of peer influence in the maintenance of problem child behavior have not been replicated in ways that would allow experimental analyses of peer influence. Additional investigations have either assumed that peers contribute to the control of child behavior, or have merely used peers as dispensers of non-social reinforcers. For example, Patterson and Brodsky (1966) attempted to modify the aggressive behavior of a 5-yr-old boy through a point system applied to the boy and his peer group following non-aggressive interactions by either party. Although the boy's aggressive interactions declined, the causal roles of peer behavior and the adult controlled point system were confounded. In further work, Patterson, Shaw, and Ebner (1969) attempted to study the peer therapist problem by enlisting the aid of a single peer. This child was trained to dispense points and social approval following

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the classroom "work" behavior of an inattentive problem child. The procedure was followed by improvement in the problem child's attention, but the differential roles of peer social behavior and the non-social point system were confused. Finally, Surratt, Ulrich, and Hawkins (1969) showed that an elementary student could effectively alter the study behavior of younger children through monitoring and distributing non-social reinforcers for the children's classroom work.

The above investigations certainly demonstrate that peers can be incorporated as instrumental agents in behavior modification programs. However, it has not yet been shown how peers contribute to the initial maintenance of deviant child behavior and how this natural social influence might be altered to produce behavior modification. Thus, two questions generated by the previously reviewed findings require empirical investigation: (1) Do peers deliver reinforcement to members of their group for behaviors considered deviant by adults? and (2) Can the social reinforcement of peers be controlled by adults to produce changes in the problem behaviors of particular children? The present study was designed to analyze experimentally both of these assumptions.

METHOD

Subjects

Ten children, selected from a sixth-grade classroom in a rural county school, were chosen on the basis of teacher and principal reports of disruptive pupil behavior.

Discussion with the principal and teacher revealed that much of the disruptive classroom behavior was produced by five boys (out of a total of 30 children of both sexes). Informal observations supported this assumption; these children frequently violated classroom rules involving talking, out-of-seat behavior, and play. Thus, it appeared reasonable to designate the five boys as sample problem children. These subjects are now referred to as target subjects.

Since one goal of the present study was to evaluate peer control of problem child behavior, the second phase of subject selection involved choosing potential "therapists". Given that the therapists would operate as trained dispensers of social attention, two factors seemed important criteria for subject selection: (1) that the peers be of high social reinforcement value for the target subjects, and (2) that the peers be likely to cooperate with the adult-directed training program. Assuming that peer popularity is a good index of social reinforcement value, initial selection of peer therapists was conducted through a class-wide administration of a sociometric survey of student popularity (similar to one used by Lesser [1959]). Finally, the teacher was asked to rank order the most popular children in terms of "willingness to cooperate with adults". The top five in this rank ordering were chosen as potential peer therapists (three boys and two girls). These subjects are referred to as control subjects.

Setting

All observations were conducted during the social studies period of each classroom day. This setting was selected for two reasons: (1) Teacher reports indicated that problem behavior was reliably evident during the period and; (2) teacher rules as to what constituted problem and desirable behavior were clearest during this period. As the next section indicates, a precise understanding of teacher rules was critical to the scoring of dependent measures of target subject behavior.

When asked to provide a complete list of "musts" and "must nots" for this period, the teacher confidently presented the following items that referred to all pupils: must raise hand before talking; must stay in seat unless given permission to do otherwise; must not manipulate objects irrelevant to reading and writing.

Dependent and Independent Variables

Dependent measures. After a number of informal observations of the target subjects, dis-

cussions between the teacher and observers led to the formulation of six behavior categories that appeared to describe adequately the behavior of target subjects. These categories could refer to both problem behavior and desirable behavior, depending on the teacher's explicit set of classroom rules during the social studies period. Considering these rules, each behavior category could be scored as problem (p) or desirable (d) as follows:

Action (A p or d). This category referred to non-verbal interaction with objects occurring at the target subjects' desks. On virtually all occasions, behavior such as reading, writing, gesturing, and manipulation of combs, nail files, and rubber bands defined the categories. Only reading and writing were considered as desirable behaviors (d). All other object manipulations were considered rule violations (p).

Talking (T p or d). Speech composed this category. These behaviors, occurring as rule violations (p), were most often mentioned by the teacher as instances of classroom disruptive behavior. Talking that did not violate the teacher's rule was considerable desirable (d).

Out of Seat (OS p or d). These categories were scored whenever target subjects left their desks. As a (p) score, this category was also mentioned frequently by the teacher as a major contributor to classroom disruption. When this category occurred following teacher permission it was considered desirable (d).

Independent measures. Control peer behaviors constituted the broadly defined independent variable. Control subject behavior was defined as a single broad stimulus category, referred to as social attention. This category was composed of any verbal behavior or physical contact if, in the observer's judgment, these behaviors involved a target subject.

Two other sources of social attention were also recorded, primarily to evaluate their contribution to the therapeutic program. These sources, provided by teacher and "other peer" behavior were defined in the same manner as the control peer social attention category.

Sampling Techniques and Response Units

Each target subject's behavior was sampled in 6-min periods. That is, every 30-min observation was broken into five periods and one target subject was randomly assigned per period. Observers thus shifted their attention every 6 min, sequentially monitoring each target subject and social reactions to his behavior.

Scoring of target subject behavior categories and their social contingencies was accomplished by segmenting the categories into 10-sec units. Observers discriminated the units through a large wall clock containing a sweep second hand. The observers were instructed to record the first category occurring in a time interval, including social attention provided by any or all of the three stimulus sources. Thus, for each 10-sec unit, only one of the six possible behavior categories could be scored; social consequences for this category could, however, be scored for control peers, other peers, and the teacher. Pilot work revealed that this procedure produced the largest amount of information at acceptable levels of observer reliability.

Procedure

Baseline. Before beginning the observational scoring, classroom seating arrangements were modified so that one control subject was seated adjacent to one target subject. This arrangement (conducted randomly) ensured that control subjects were now in a position to influence target subjects.

Observers were stationed in the back of the classroom and on opposite sides of the room. When their records indicated agreement levels of 80% on all response and stimulus classes, the formal baseline observations began. At this point, one observer was randomly selected as the "data collection" observer and her partner served as a reliability check.

Peer training. Control peer training in behavior modification techniques was initiated at the conclusion of baseline. This involved a group meeting among the five control peers, their

teacher, and the authors. The children were asked to "help" target subjects to improve their school performance, which was in fact, poor. All control peers immediately agreed to do so. The authors then pointed to the target subjects' disruptive behavior as a cause of their poor performance. Following a brief explanation of differential reinforcement and extinction concepts, the children were told how they could reduce disruptive behavior and increase the occurrence of more appropriate classroom behavior. At this point, a video-taped baseline session was presented and the children were encouraged to "spot" instances of *p* and *d* behavior as produced by target subjects. In addition, they were asked to discuss the social contingencies for these behaviors in terms of strengthening and weakening functions of these events.

Finally, the children were given specific instructions concerning their role as behavior modifiers. They were told that they must ignore any *p* behavior by target subjects and respond positively to the *d* behavior. To facilitate this discrimination, the children were instructed to score their reinforcement of *d* behavior by marking a plus (+) on a sheet of paper; if they inadvertently responded to *p* behavior, a minus (—) must be recorded. The teacher was then designated as the children's "trainer". At the end of each school day the teacher would meet with the control subjects and discuss their records.

Experimental strategies. An ABAB single subject design was used to assess the reinforcement role of peer attention in the expected outcomes of this study. Following baseline (a) and peer training (b), the control peers were instructed to resume their baseline reactions to target subject behavior (a); when the effects of this intervention were apparent, the control subjects were again instructed to produce their "therapeutic" contingencies (b). These steps ensured three systematic manipulations of the primary independent variable (control peer attention).

RESULTS

Observer Reliability

Observer agreement was calculated for each of the six behavior categories and each of the three stimulus categories. To do so, agreements or disagreements were tabulated for each 10-sec interval containing a category. Reliability was then determined by the formula: agreements/disagreements + agreements. Agreement percentages varied from 80 to 100% (mean agreement over all sessions was 87%).

Target Subject Behavior

Figure 1 describes the mean number of problem (*p*) behavior units produced by the target subjects over all periods of the study. Reference to the first baseline period clearly confirms the "disruptive" reputations of the target subjects; for most sessions, *p* behavior accounted for more than 80% of the 10-sec intervals.

Following the training of control subjects as behavior modifiers, a gradual and clear reduction in *p* behavior was evident over the 12 sessions of Treatment I. A further examination of Figure 1 also demonstrates the causal role of the treatment operations in determining the reductions. One replication of the baseline phase (Baseline II) and one replication of the treatment phase (Treatment II) were associated with predictable increments and decrements in *p* behavior.

Table 1

Per cent problem (*p*) behaviors produced by target subjects over all baseline and treatment periods.

<i>Target Subjects</i>	<i>Baseline I</i>	<i>Treatment I</i>	<i>Baseline II</i>	<i>Treatment II</i>
1	81	43	70	30
2	87	52	75	41
3	79	55	71	40
4	81	43	69	25
5	68	17	46	10

Table 1 presents the data of Figure 1 in percentage form, compressed for each target subject over the various baseline and treatment sessions. These data indicate that the treatment

Fig. 1. Mean number of problem behavior units produced by target subjects over all baseline and treatment periods.

Table 2

Mean number of social attention units contiguous with problem (*p*) and desirable (*d*) behaviors of target subjects.

	<i>Behavior Category</i>	<i>Baseline I</i>	<i>Treatment I</i>	<i>Baseline II</i>	<i>Treatment II</i>
Control peers	<i>p</i>	2.54	0.82	4.60	0.08
	<i>d</i>	0.00	0.23	0.00	0.59
Other peers	<i>p</i>	3.20	3.63	4.47	2.17
	<i>d</i>	0.00	0.00	0.10	0.00
Teacher	<i>p</i>	0.65	1.13	0.33	0.28
	<i>d</i>	0.26	0.08	0.33	0.55

effect was observed for each target subject. Thus, it is apparent that the mean data plotted in Figure 1 reflect the behaviors of all target subjects.

Control Peers, Other Peers, and Teacher

The principal question of interest in this study was an evaluation of peer influence in the maintenance and modification of the previously described *p* behavior of target subjects. Figure 2 provides some interesting data in this respect. In examining Baseline 1, it is strikingly apparent that all peers were differentially responsive to the *p* behavior of target subjects; 100% of their social attention was made contingent upon *p* behavior. The teacher, while less likely than peers to respond to *p* behavior, also provided a good proportion of attention for these behaviors.

The reinforcement function of control peer attention is also demonstrated in Figure 2, bearing in mind the data of Figure 1. Figure 1 shows that target subject *p* behavior dropped sharply during Treatment I. As the Treatment I section of Figure 2 indicates, only the control peers changed their social attention contingencies in a direction expected to produce reductions in *p* behavior. Other peers maintained their social attention at 100% for *p* behavior, and teacher social attention actually increased for *p* behavior. In all further periods of the study, control peer

social attention shifted in perfect accordance with directions for them to respond and not respond to *p* behavior, while the other peers continued to attend almost solely to *p* behavior. Thus, it seems reasonable to conclude that the fluctuations in *p* behavior shown in Figure 1 were primarily a function of contingency changes in control peer attention. The control peers not only contributed to the maintenance of *p* behavior, they were also the central agents in the modification of that behavior.

However, these data do not reflect the extent of this shift in terms of the actual number of peer reinforcements provided for these behaviors. Table 2 describes the mean number of social attention units provided by control peers, other peers, and teacher for *p* and *d* behavior over all periods of the study. While these data for other peers and teacher follow more or less from the percentage data of Figure 2, the control peer means add further information. The comparison of mean changes between Baseline and Treatment I shows a substantial reduction in control peer attention to *p* behavior; however, simultaneously these peers provided only a small increase in their attention to *d* behavior. Further examination of other baseline and treatment periods in the study continue to confirm these contrasts in control peer attention. Thus, while these peers were remarkably successful in reducing their attention to *p* be-

Fig. 2. Mean per cent of control peer, other peer, and teacher social attention units contiguous with target subject problem behavior units.

havior, they were not so efficient in dispensing approval for *d* behavior.

DISCUSSION

This investigation confirmed its two major hypotheses: (1) our data showed how peers operate in a setting where children are known to produce behavior considered deviant by adults. In line with the findings of other investigations (*e.g.*, Buehler, *et al.*, 1966), the peers in the present study were almost exclusively attentive to deviant actions produced by problem children: prosocial behaviors produced by these children were completely ignored. (2) the present find-

ings also indicated that it is possible to shift the above social contingencies such that some peers no longer pay attention to the deviant behaviors. When this operation was performed, the problem children produced less deviant behavior and emitted more prosocial behaviors. In other words, peers who typically supported the deviant behavior of their group members, could also modify that behavior in a direction desirable to adults (*i.e.*, teachers).

No doubt the most valuable feature of this study is pragmatic. It comes as no great surprise that children do reinforce deviant behaviors of their group members, although, the extent to which they did so in this study is somewhat

alarming. However, to demonstrate that peers can also modify these behaviors under adult direction has far-reaching implications. Some children tend to produce deviant behaviors in settings where adult intervention is impossible or unlikely. For example, school trancies and stealing may have low likelihoods of immediate detection by adults and thus their modification is difficult. However, while adult intervention is often unlikely for these behaviors, such may not be true for peer interventions. As the present findings suggest, it is probably not unreasonable to suggest that peers do support these "difficult to modify" behaviors. If that indeed proves to be the case, then ways of changing social interactions among these children should certainly be pursued. Granted that some influential members of a peer group can be directly influenced by adults, one might imagine the development of "peer therapist" programs designed specifically to deal with deviant child behaviors typically supported by the peer group.

REFERENCES

- Barker, R. G. and Wright, H. F. *Midwest and its children*. New York: Harper and Row, 1955.
- Buehler, R. E., Patterson, G. R., and Furness, R. M. The reinforcement of behavior in institutional settings. *Behaviour Research and Therapy*, 1966, 4, 157-167.
- Duncan, D. F. *Verbal behavior in a detention home*. Unpublished manuscript, Juvenile Hall, Olatha, Kansas, 1969.
- Lesser, G. S. The relationship between various forms of aggression and popularity among lower class children. *Journal of Educational Psychology*, 1959, 50, 20-25.
- Madsen, C., Becker, W., and Thomas, D. Rules, praise and ignoring: elements of elementary classroom control. *Journal of Applied Behavior Analysis*, 1968, 1, 139-150.
- O'Leary, K. D. and O'Leary, S. G. *Classroom management: the successful use of behavior modification*. New York: Pergamon Press, Inc., 1972.
- Patterson, G. R. and Brodsky, G. A behavior modification program for a boy with multiple problems. *Journal of Child Psychology and Psychiatry*, 1966, 7, 277-295.
- Patterson, G. R., Cobb, J. A., and Ray, R. S. A social engineering technology for retraining aggressive boys. In H. Adams and L. Unikel (Eds.) *Georgia symposium in experimental clinical psychology*, Volume II. Pergamon Press, (in press).
- Patterson, G. R., Littman, R., and Bricker, W. Assertive behavior in children: A preliminary outline of a theory of aggressive behavior. *Monograph of Society for Research in Child Development*, 1967, 32, 1-43. (VI)
- Patterson, G. R., Shaw, D., and Ebner, M. J. Parents, teachers, and peers as behavior modifiers. *Oregon Research Bulletin*, 1969.
- Surratt, P. R., Ulrich, R. E., and Hawkins, R. P. An elementary student as a behavioral engineer. *Journal of Applied Behavior Analysis*, 1969, 2, 85-92.
- Wahler, R. G. Child-child interactions in free field settings; some experimental analyses. *Journal of Experimental Child Psychology*, 1967, 5, 278-293.

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