

*PREVENTING SCHOOL VANDALISM AND IMPROVING
DISCIPLINE: A THREE-YEAR STUDY*

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Vandalism is a major problem facing educators and taxpayers alike. The present investigation analyzed how vandalism costs and student disruption were related to the implementation of a training and consultation package designed to increase the reinforcing ambience of the school. A positive environment, it was posited, would displace previous events that may have set the occasion for vandalism, with cues to promote productive school performance. Eighteen elementary and junior high schools were involved over a 3-year period. Using a delayed treatment control design, treatment was delivered following either 4 or 13 months of baseline. During treatment, teams of school personnel attended training workshops in behavioral strategies for reducing vandalism and disruption by students in school. Each team also met regularly on its campus to plan and implement programs on a schoolwide basis. To demonstrate that reinforcing procedures were actually implemented and accompanied by change in student performance, these variables were periodically probed throughout the study. Project staff also provided consultation. Vandalism costs decreased significantly ($p < .05$) more in treatment than control schools, with an average reduction of 78.5% for all project schools. Rates of praise delivered by project teachers and other randomly selected teachers in the school increased significantly ($p < .05$), and rates of off-task behavior by students decreased significantly ($p < .05$) following treatment. The staff development model used in this study appeared to be both feasible and economical.

DESCRIPTORS: vandalism, setting events, school environment, classroom, staff management

School vandalism, a complex problem area of extreme social importance, is increasing in magnitude. Nationwide, over 5,000 assaults on

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teachers are reported each month, and over \$500 million is spent each year to repair damage done by school-aged vandals (National Institute of Education, 1978). It was reported in a recent Los Angeles County School Attendance and Welfare Bulletin (Note 1) that in school districts throughout Los Angeles County the average vandalism costs were in excess of \$8.5 million for the 1978-1979 school year, a 56% increase over the 1977-1978 school year. Additional indirect expenses are incurred by school districts for insurance, security guards, and other presumed deterrents to vandalism. These expenses appear to exceed the cost of repairing the effects of vandalism. The Los Angeles Unified School District's Security Section, for example, had a

budget of about \$10 million for personnel salaries alone, an increase of nearly \$4 million since 1978.

Superficial logic would suggest that improved methods of detection and punishment would ameliorate vandalism. However, the introduction of heavy security arrangements may well aggravate the very problem that this kind of deterrence is intended to eliminate, due to a resultant increase in the aversive nature of the environment (Greenberg, 1974). Other prescriptive approaches have also been less than successful (Gee, 1974, Ziesel, 1976). For example, Project PRIDE (Note 2), which stressed a clean campus and provided special plaques for individuals or groups who engaged in "campus pride" activities, appeared to produce only temporary effects, perhaps because they did not identify and treat factors that appear to foster vandalism.

Methods to reduce vandalism are just beginning to be experimentally investigated. For example, Mayer and Butterworth (1979) pilot-tested the first experimental intervention package that was designed to treat setting factors that appeared to foster vandalism within the elementary school environment through consultation and inservice activities. They demonstrated a 57% average decrease in the cost of repairing vandalized property for 10 experimental schools, whereas the average costs for 9 control schools increased 320%. Further, students attended more to class work, positive teacher-student contacts improved or remained significantly higher, and students' inappropriate behavior decreased more in the experimental than in the control schools.

Wahler and Fox (1981) have proposed "that behavior analysts should increase the range of environmental phenomena that they seek to manipulate and relate to the changes in socially important behaviors" (p. 328). They go on to suggest that many behavior problems such as stealing, fighting, truancy, and property destruction may be approached through operating on temporally remote stimuli, or setting events.

Several complex and temporally distant conditions of the school environment have been posited by Mayer and Butterworth (1979) to contribute toward promoting vandalism. These potential setting events include: (a) a mismatch between student reading level and the difficulty of assigned materials; (b) the prevalence of punishment as a schoolwide and classroom management procedures; and, (c) otherwise misusing behavior management procedures.

When assigned reading materials do not match the student's repertoire of skills, boredom or frustration may result. Many students, particularly those whose reading ability does not permit them to complete their assignments successfully, are more apt to experience defeat, reproach, ridicule, and other probable aversive consequences. This combination of extinction and punishment may also serve to imbue scholastic activities and materials with conditioned aversive properties.

Findings from the experimental analysis of behavior have taught us that extinction and punishment tend to provoke aggression and destruction in laboratory animals (Azrin, Hutchinson, & Hake, 1963; Azrin & Holz, 1966; Azrin, Note 3). By analogy it is reasonable to hypothesize that some proportion of the aggression and destruction in the form of vandalism that takes place in public schools is a reaction to those very same factors. This seems probable in light of findings that teacher disapproval generally occurs at least three times more frequently than teacher approval (Thomas, Presland, Grant, & Glen, 1978). Further complicating the situation is the fact that aggressive behavior is reinforced, often inadvertently, by school authorities via attention and by peers in the form of approval and media attention, thereby increasing aggression and promoting its generalization across settings (Horton, 1970).

In accordance with Wahler and Fox's (1981) proposal—"that behavior analysts should increase the range of environmental phenomena that they seek to manipulate and relate to the changes in socially important behavior" (p. 328)

—the present study, which spans a 3-year period, attempted to manipulate the potential setting events described above in an effort to reduce the costs of vandalism. Presumably then, the aggressiveness and destructiveness engendered by extinction and punishment would be supplanted by more pro-social reactions. It was this basic assumption that this program of research was designed to test.

Although the main thrust of this study was to assess the influence of the training package on rates of vandalism, it was important to demonstrate that constructive change in the performance of teachers and students was actually implemented. Consequently, periodic probes of praise by teachers and disruptive and on- and off-task behavior by students were taken. Additionally, to examine the practicality of intervening with representatives of the instructional staff rather than a more costly method of involving everyone directly in training, the "spillover" effect of the program to teachers who had neither attended the workshops nor received regularly scheduled direct consultation was also assessed.

METHODS

Selection of Schools

Twenty schools, which had not participated in the pilot study by Mayer and Butterworth (1979), from 12 districts in Los Angeles County were selected from a list of volunteers because these schools maintained systems for gathering data on vandalism costs, and their students' average reading scores on the Comprehensive Test of Basic Skills were below the 45th percentile nationally. Ten of the schools were assigned randomly to an experimental treatment condition, Group I, and 10 to a delayed treatment condition, Group II. One control school and one experimental school withdrew due to disinterest of the staff. Five elementary and four junior high schools in each group completed the first year of the project. Data were collected in an identical fashion in all schools.

The control schools in Group II were provided with the opportunity to receive services from the project staff during the second and third year. Seven of the nine participated during the second year, and six during the third year. The Group I schools were invited to continue participation in the project for second and third years, receiving essentially follow-up services. Due to administrative and other staff changes, only six of the nine Group I schools continued during the second year, and five during the third year, leaving three elementary and two junior high schools in Group I, and three elementary and three junior high schools in Group II by the third year.

Selection of Teachers

Two teachers from grades 4 through 8 were selected for extended participation in each of the 18 schools. Each site principal was asked to select two "model" teachers following the selection criteria described by Mayer and Butterworth (1979). These teachers were to have demonstrated a willingness to try new ideas, had gained the respect of their fellow staff members (enhancing their effectiveness as models to other teachers), and expressed a willingness to commit the time to work with the principal and psychologist in developing programs to reduce vandalism and disruption.

Each principal also selected two other teachers at random from the same grades to serve as barometer teachers, the only criterion being a willingness to allow observers into the classroom. These teachers were included to measure the "spillover" effect taking place within the project school. To reduce the bias of this measure, no deliberate attempt was made to consult with them.

Selection of Students

Six students in each of the project barometer classrooms were randomly selected from a pre-identified group of students who had scored 10% below their class average on the Reading Comprehension and Vocabulary sections of the

Comprehensive Test of Basic Skills and were at least 10% above the classroom average in off-task behavior (nonattending and disruptive behavior). The off-task behavior was measured during three classroom observations using the Behavioral Assessment Instrument (Mayer & Butterworth, 1979). These students were selected on the assumption that they could most benefit from the treatment program and were observed at scheduled intervals.

Consultants

Six graduate students, working toward their school counseling and school psychology credentials at California State University, Los Angeles, served as part-time consultants or data collectors to the project schools during the first two years of the study. Each graduate student had formal university training in applied behavior analysis using the texts written by Sulzer-Azaroff and Mayer (1977) and Mayer and McGookin (Note 4). Two consultants were assigned to each treatment school. One was primarily responsible for data collection and the other for consulting with school staff. During the third year, the number of graduate students was reduced to five. Two of the five were responsible for consulting. The other three were responsible for data collection and did not consult with teachers.

Workshop Presenters

A project director (second author) and a chief consultant (first author) presented the workshops. The project director had a doctorate in educational psychology, training and experience in applied behavior analysis, and experience in school psychology. The chief consultant was professor of education and experienced in staff development and in training school counselors and school psychologists in behavior analysis.

Data Collection and Measures

Vandalism was the response of primary interest, but because acts of vandalism occur surreptitiously, they are essentially impossible to

observe and one must use indirect measures. In this case it was decided that the *products* of vandalism would be measured by means of the cost required to repair the damage that had been caused. The other measures were selected for a different reason: to demonstrate that the intervention did actually take place; that teachers did indeed begin to implement the new skills they were taught during training and consultation sessions. Rates of praise by teachers and changes in task performance by students were selected because they were presumed to epitomize changes within the school climate. Further, at some time in the future it might be shown that increases in rates of praise by teachers and increases in on-task behavior by students reliably contribute toward reductions in acts of vandalism (or aggression or other antisocial acts).

Vandalism costs. Vandalism data were collected in the same manner as in the Mayer and Butterworth (1979) study. The costs of repairing and replacing vandalized property were provided for each academic month by the project schools, and included the costs to replace or repair broken glass, equipment theft, fire damage, and property damage. The data sought and obtained were the same as those reported to the state. To compare expenses among schools, costs were reported per 100 students.

Student and teacher behavior. The Behavioral Assessment Instrument was used by the project consultants to probe the six selected students' off-task and attending behavior, and each teacher's rate and kind of positive reinforcement directed toward the students. The Behavioral Assessment Instrument uses a time-sampling procedure in which the first student is observed for 10 sec and the student's behavior recorded during the following 5 sec. This process is repeated for all students being observed. During the fourth and eighth 10-sec intervals, the teacher's behavior is observed and the type of reinforcement, if any, recorded—just as with the students. This procedure is continued until 10 observations are collected for each student and

20 observations for the teacher. These observations are completed in 20 min. Three categories of student behavior were recorded. *Disruption* was defined as behaviors that disturb either the teacher or students by drawing attention to the student, such as talking without permission, hitting, yelling, making noises by voice or with objects, and out of seat behavior that causes other students to look at the disruptor. *Non task* was defined as behaviors that do not disturb others but do not contribute to completion of assignments—behaviors such as reading during math, looking out the window, or head on desk. *Attending* was defined as behaviors related to assigned activities, such as eyes directed toward teachers when they are talking, eyes directed toward work, doing assignments, answering questions, and getting supplies.

Praise included specific praise and general praise. Specific praise was defined as the delivery of praise paired with the rationale or reason for its delivery, e.g., "Great, you were able to remember that 9 times 4 is 36." General praise (a generic term used for purposes of simplicity) consisted of positive evaluative statements, rephrasing what a student said, approving gestures, positive physical contact, and recognition (without reference to a specific behavior). Typical general praise included saying, "That's good," or smiling, winking, and calling on students when they asked for recognition. Praise could have been delivered to an individual, the whole class, or to a subgroup of students within the class. In all cases, however, teacher responses were scored as praise only if directed to students when they were attending.

After allowing for adaptation, baseline data were collected each year during the last 2 weeks in November and the first week in December. Three observations, one per week, were made in each of the four classrooms (two project and two barometer) in each school during that period. An interim assessment consisting of three observations in all schools was made during February, and the final assessment, again con-

sisting of three observations, was completed during the last 3 weeks of May 1978, 1979, and 1980 following the same procedures used for baseline.

Interobserver agreement. Observer reliability assessments initially occurred during observer training with a videotape of a fifth-grade classroom. The observers had to obtain an agreement coefficient of at least .85 with a scoring key before observing a live classroom. More than 20 reliability assessments for student and teacher behavior were also completed during the adaptation, baseline, interim, and final observation periods. Each school consultant and a trained individual unfamiliar with the project simultaneously observed a classroom and independently recorded student and teacher behavior. Each reliability session lasted 20 min. The interobserver agreement was calculated by dividing the number of agreements by the number of disagreements for scored intervals (occurrences only) and ranged from .86 to 1.0 with a mean of .93.

Procedure

The schedule of implementation of staff development activities is summarized in Table 1. The table shows that the frequency of workshops and consultation contacts was gradually reduced over the 3-year period.

The consultants followed a standard procedure in that they assisted teachers in implementing programs that were either introduced in the inservice workshops or described by Butterworth (Note 5). In addition, consultants followed the consulting format outlined in Table 2 and elaborated in *Behavioral Consulting* (Mayer & McGookin, Note 4).

First project year (1977-1978). After baseline data collection, the project consultants began visiting and consulting with each project classroom teacher in the experimental schools on an average of twice a week. They arranged and conducted approximately two team meetings per month at each school. These were attended by

Table 1

Summary of Schedule of Staff Development Activities

<i>Year</i>	<i>Number of Workshops</i>	<i>Workshop Participants/School</i>	<i>Frequency of Consultation</i>
<i>Year 1</i>			
Group I	10	principal psychologist 2 project teachers	twice a week
Group II	0	none	none
<i>Year 2</i>			
Group I	3	principal psychologist	once a week
Group II	10	principal psychologist 2 project teachers	twice a week
<i>Year 3</i>			
Group I and Group II	5	principals and psychologists	every other week

the project consultant, the principal, the two project teachers, and usually two or three other interested staff members. Each team attempted to identify and eliminate the conditions that foster vandalism and that hinder academic and personal-social development. This process involved working with the school staff in developing classroom and schoolwide programs that would teach students alternative behavior to vandalism and disruption. For example, lunchroom and playground management programs and classroom management programs were planned that stressed the use of specific positive reinforcement (Bernhart & Forehand, 1975), with students being informed as to which of their behaviors were being reinforced or recognized. The teams also planned community activities, such as neighborhood walks, to inform citizens of the school's concern with stopping vandalism and to solicit their cooperation. Involvement by youth clubs was sought in some schools to help keep the campus clean and to decide how to use money saved from reduced vandalism costs. These programs are described in detail elsewhere by Butterworth (Note 5).

Ten workshops were presented between the middle of October and the end of May. The three

Table 2

Elements of Effective Consulting

1. Establish a professional working relationship and develop rapport (communication skills).
Reflection of content and affect
Pace of speech
Summarizing
"I" messages
Posture, eye contact, facial expression, and other nonverbal behaviors
How to take notes
Clarifying
Confrontation
2. Identify behaviors of concern and goals.
Role of clarification
Begin to operationalize
3. Start contingency analysis during interview.
4. Observe behaviors in classroom situation.
Contingency analysis of student behavior
Contingency analysis of teacher behavior
Measuring rate of target behavior (optional)
5. Confer with teacher; discuss what has been tried and to what degree.
6. Jointly develop treatment strategy (goal for teacher).
7. Develop and apply strategies to facilitate treatment.
Reinforcing consultees
Utilizing a variety of reinforcing sources from the natural environment
Shaping
Cues, prompts, and modeling
Providing feedback
Uses of data
8. (Optional) Observe and record frequency of target behaviors.
9. Develop and apply strategies to facilitate treatment maintenance.
Fading
Generalization
Scheduling
10. Share results!

introductory workshops scheduled prior to the onset of treatment did not include programs and strategies for dealing with discipline and vandalism problems. Rather, these workshops introduced consultation skills that participants used to assist teachers in implementing the treatment strategies which were not presented until after baseline. Because of the holidays during December and planning necessary for program implementation and enlisting student involvement, teachers and school teams were unable

to start implementing programs until January. For this reason, vandalism costs prior to January 1 (see Figure 1) were attributed to pretreatment effects.

Funds were provided to the districts to be used to hire substitutes for the 18 teachers attending the training sessions. Only the school psychologists and counselors were requested to attend all 10 workshops. Activities at four of their meetings included learning and practicing behavioral consultation skills and analyzing school and classroom environments (Mayer & McGookin, Note 4), and sharing alternative strategies and materials used by teachers to improve classroom environments (Kaplan, Kohfeldt, & Sturla, 1974; Sulzer-Azaroff & Mayer, 1977). These meetings were also attended by one or two of the school principals, although principals were not required to attend. Four of the 10 meetings were designed for the entire school team (principal, psychologist, or counselor, or both, and two project teachers) to deal with classroom and schoolwide discipline and vandalism problems encountered by different schools. Attendance at these meetings was close to 100%. The first team workshop began immediately after the collection of baseline data. A presentation of preliminary results was given at the last meeting for the principals, psychologists, and counselors.

The content of all 10 workshops is described elsewhere (Butterworth, Note 5; Nafpaktitis, Mayer, Butterworth, & Jones, Note 6) and was presented through lecture, audiovisual materials, and simulation activities. Tables 2 and 3 list the topics included.

None of the other teachers in the school, including the barometer teachers, attended the off-campus workshops. However, any teacher was welcome to receive consultation services on request. Typically three to five teachers in a school requested and received such services each year with usually one of these being a barometer teacher.

Second project year (1978-1979). The treatment that was given to the 1977-1978 experimental schools during the first year was pro-

Table 3

Topics and activities included in team training workshops.

Behavioral Concepts
Conditions that engender school vandalism and disruption
Antivandalism programs
Positive reinforcement
Methods of identifying reinforcers
Negative reinforcement
Extinction
Reinforcing alternative responses
Modeling
Differential reinforcement of low rates
Differential reinforcement of other responses
Response cost
Time-out
Overcorrection
Punishment and its side effects
Practical Applications
Using certificates and awards
Improving staff morale
Teaching students to get positive recognition
Teaching students to reinforce teachers
Readability assessment procedures
Adapting material to student reading level
Positive reinforcement bombardment
Secret Pal Game
I Spy Game
Good Behavior Game
Slot Machine Game
Other group contingency games and programs
Token systems
Daily report cards
School discipline plans

vided for the control, or Group II schools, during the second year of the project. Group I schools were provided three off-campus workshops which only the psychologist and principal were requested to attend. These workshops were intended to provide a follow-up to the work begun the previous year and to invite the participants to share programs and projects going on at their sites.

Consulting with school site personnel began during October 1978 in the Group I schools, because treatment had already started the previous year. Through on-campus team meetings, assessment of present school needs was made, and the previous year's schoolwide programs (i.e., cafeteria or playground improvement, reduc-

tion in tardiness, community improvement) were reevaluated. Consultants visited each project classroom on the average of once a week to assist the teacher in implementing programs or to collect observational data.

While consulting in the experimental schools, some of the project staff collaborated with the team that had been involved in the county workshops in conducting several workshops directly in the schools. These were attended by an interested staff and covered material similar to that of the original workshops. An average of two such workshops was held in almost every school.

Third project year (1979-1980). Consulting began in early October 1979, and continued through May 1980 in the remaining 11 schools at a reduced rate. Each consultant was required to spend one-half day every other week at each school as services continued to be phased out. Team meetings were organized and scheduled every 2 to 4 weeks. At these meetings, possible additions to and changes in existing schoolwide behavior improvement programs were discussed and planned. Consultants endeavored to work closely with the school psychologist, when available, and with the principal, while modeling consulting behavior and providing feedback and reinforcement to all who were involved in behavior change programs. Efforts were continued, as in prior years, to include as many site personnel as were willing to participate, including student groups.

A series of five workshops was presented, and involved interested principals and psychologists. Four of these workshops offered instruction in improving consultation skills (see Table 2 and Mayer & McGookin, Note 4) to enable the principals and psychologists to enhance their ability to continue the project at its termination. The material was presented through lecture, simulation activities by project staff, and role playing by participants. The fifth workshop was set aside as a sharing period, and project participants were invited to discuss programs and projects going on at their sites.

Feedback to teachers. During the first year

of the project, behavioral data on teachers' types and amount of praise and students' behavior were graphed and shared with the project teachers in the experimental schools. During years two and three, this feedback was given to all project teachers. A minimum of three informal meetings between the consultant and each individual project teacher (except in control schools the first year) were held each year to discuss the behavioral data. Feedback was accompanied by social praise to maximize its usefulness (Cos-sairt, Hall, & Hopkins, 1973). During the third year only, barometer teachers were informed by the consultant that these data were available from the consultant if they were interested in receiving them.

Experimental Design

The intervention program consisted of a "package" including inservice training of selected staff members, on-site consultation with selected teachers, consultation with other teachers who requested service, and establishing a team at each school to develop schoolwide programs. The experimental design was applied to the total intervention "package" without an analysis of the relative contributions by individual components to outcomes. A delayed treatment control (multiple baseline) design was used with schools randomly assigned to control and experimental conditions. The pre-post gain score variables were also compared between the control and experimental groups. In the case of vandalism cost, the number of schools that increased or decreased was compared. Thus, a number of different analyses were permitted due to the large sample sizes.

RESULTS

Vandalism

First year. For each school the average monthly vandalism cost per 100 students during January through May 1978 (the time span that the full complement of personnel were involved in program implementation) was subtracted

from the average monthly vandalism cost per 100 students during September through December 1977 (the "baseline" period for schools receiving treatment for the first year). Each school was identified as having increased or decreased in cost of vandalism. According to this analysis during the first year of the experiment, vandalism decreased in six of nine schools receiving treatment but in only one of nine schools not receiving treatment. Application of the Fisher Exact Probability Test (Seigel, 1956), selected for its suitability with discrete ordinal data of small sample size, determined that significantly more treated than untreated schools experienced a decrease in the cost of repairing or replacing vandalized property ($p < .05$).

Second year. For the schools that began receiving treatment in January 1979 (Group II), the average monthly vandalism cost per 100 students during January through May 1979 was subtracted from the average monthly vandalism cost per 100 students during September through December 1978. On this basis, each of these schools was identified as having increased or decreased in costs of vandalism during the second year of the experiment. It was previously determined that one of nine of these schools improved without treatment during their first year as controls in the study. This compared with five of seven of the same schools that improved after treatment during the second year. Application of the Fisher Exact Probability Test indicated that significantly more schools experienced a decrease in the cost of vandalism after treatment (i.e., the second year) than before treatment (i.e., the first year) ($p < .05$).

All three years. Figure 1 shows the dollar cost per 100 students of repairing and replacing vandalized property (without adjusting for inflation) for all schools that participated in the study for at least 2 years. The graphs covering all three years of the study indicate that 10 out of 13 schools (schools A, B, C, E, G, H, I, J, L, & M) receiving treatment experienced decreases in the cost of vandalism or maintained their very low levels during intensive staff training. These

included all the schools with vandalism greater than \$200/100 students in any month of baseline. Two schools (schools D and K) showed increases, and one school (school F) showed little change during intensive staff training. During the entire follow-up period, six of the 10 schools remaining in the study maintained vandalism cost reductions (schools A, B, G, H, I—except one month, & J), one increased (school F), and three showed little change (C, E, & M) from baseline. However, with inflation, costs would be expected to increase over the 3-year period, not remain about the same. Thus, the treatment package appears to have been effective in nine of the 10 schools.

Generally there is less vandalism from September through December than from January through May. This finding has been consistently borne out by data collected by the office of the Los Angeles County Superintendent of Schools. For example, the average for all Los Angeles County Schools was \$766,917/mo in vandalism costs during September through December 1980, and \$1,004,667/mo during January through May 1981. Thus, when interpreting the graphed data, it is best to compare treatment months back to the same nontreatment months.

Comparing the baseline period September through December with the same months during treatment years shows the effect of treatment in reducing vandalism in Group I schools. A similar comparison can be made between the January through May period for Group II schools. Thus, maximal reduction in vandalism costs occurred following the onset of treatment in both experimental groups.

Table 4 depicts a further analysis of the cost data. The initial average mean cost during the 1977 baseline period of September through December for Group I schools was compared to the same time periods during treatment for 1978 and 1979. A similar comparison was done for Group II schools. However, these schools had a much longer baseline and received treatment only from January through May in 1979. Thus, the 1978 January through May baseline for

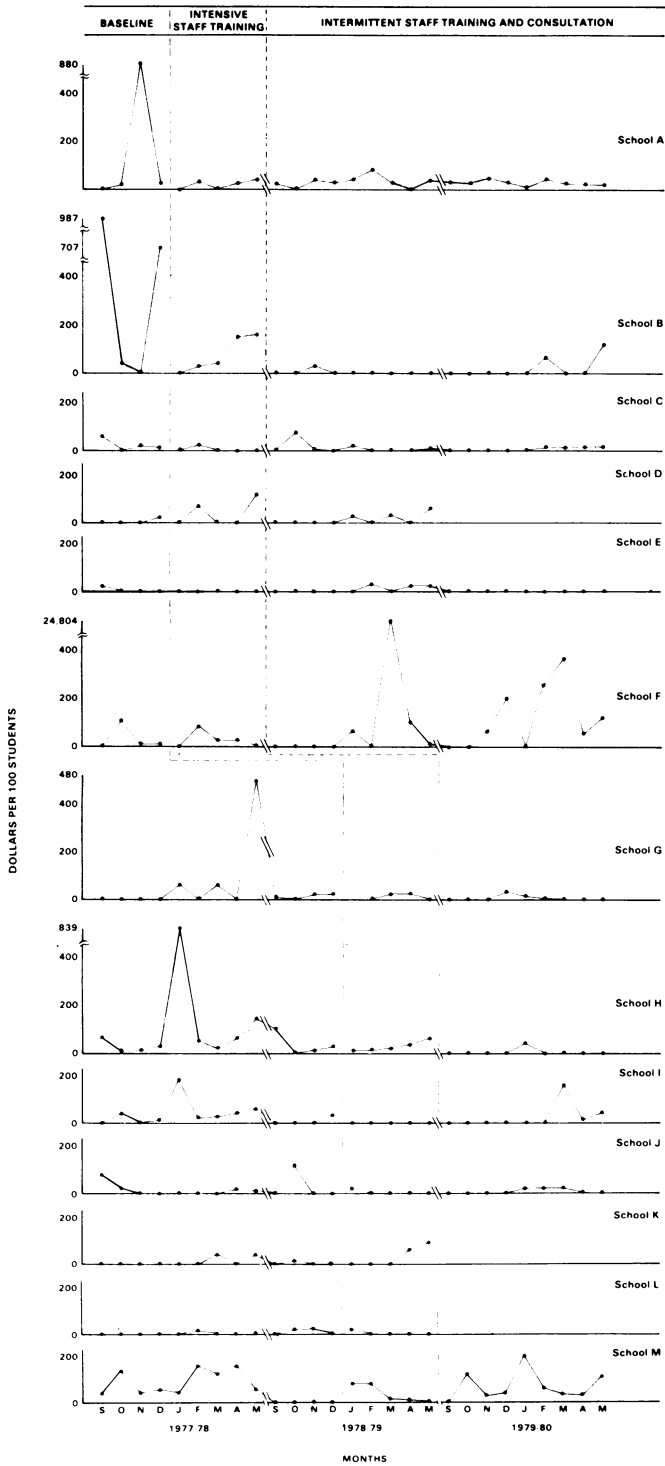


Fig. 1. The cost of repairing or replacing vandalized property in each school. During baseline, data were collected but no staff development workshops and weekly or twice weekly consultation took place. During follow-up, there were fewer workshops and consultation was available every other week.

Table 4
Mean Monthly Vandalism Costs/100 Students

	<i>Group I Schools</i>		<i>Group II Schools</i>	
	<i>September to December</i>	<i>Decrease from Baseline</i>	<i>January to May</i>	<i>Decrease from Baseline</i>
Baseline (1977-1978)	\$121.35	—	\$77.12	—
Treatment (1978-1979)	\$ 10.10	91.7%	\$14.29	81.5%
Follow-up (I) or Treatment (II) (1979-1980)	\$ 30.85	74.6%	\$26.00	66.3%

Group II schools was selected to compare to the same time periods during treatment for 1979 and 1980. An average reduction in vandalism cost for all schools of 78.5% was obtained without adjusting for inflation.

Teacher Behavior

Due to the large number of teachers involved in the study, behavior observations of a teacher's delivery of praise were averaged. The mean of baseline observations was subtracted from the mean of posttreatment delivery of praise for each teacher for each year of the study.

A 2×2 factorial analysis of variance (i.e., elementary and junior high grade level by treatment and control groups) was used to analyze changes in teacher praise between baseline and treatment observations. The following is a brief summary of the results that were found when teachers from Group I schools receiving treatment were compared to teachers in Group II control schools during 1977-1978.

1977-1978. Project teachers in schools receiving treatment significantly increased rates of praise by the interim assessment while improvement by barometer teachers in the same schools was not significant until the posttreatment assessment ($p < .05$). Junior high school project and barometer teachers showed a significantly greater mean increase in their delivery of praise than that shown by elementary project teachers ($p < .05$). (The junior high school teachers started at a lower level than the elementary

teachers.) Elementary barometer teachers in control schools not receiving treatment decreased their rate of delivering praise during the school year significantly more than elementary teachers in schools receiving treatment ($p < .05$).

The following results were found when teachers from Groups I and II schools were compared to their control year (1977-1978):

1978-1979. Teachers from project and barometer classrooms showed a significantly greater increase in their delivery of praise ($p < .01$). Project and barometer teachers attained significant increases in delivery of praise by the interim assessment ($p < .05$) and rates continued to increase by the posttreatment assessment ($p < .01$).

1979-1980. There was no significant effect of follow-up treatment on the amount of praise delivered by teachers.

Student Behavior

Students were dropped from the analysis if they were not present at least once during the baseline and once during posttreatment data collection periods. Disruptive behavior and non-task behavior were combined and designated as off-task behavior—the reciprocal of attending behavior. Baseline observations of off-task behavior were averaged for each student. The mean of baseline observations was subtracted from the mean posttreatment off-task behavior for each student for each year of the study. (No significant interim changes were noted.) The

student was selected as the unit of analysis because analysis of variance results are identical "irrespective of whether group means or individual observations are employed. The use of individual observations also allows the exploration of other interesting questions pertaining to interaction and generalizability" (Hopkins, 1982, p. 5).

A 2×2 factorial analysis of variance (school level by treatment) was used to evaluate changes in student off-task behavior between baseline and posttreatment observations. (A multiple baseline comparison, though preferable, was deemed impractical due to the limited number of observations and resources.)

The following results were found when students from schools receiving treatment were compared to students in control schools during 1977-1978: Students from project classrooms in schools receiving treatment showed a significantly greater ($p < .05$) mean decrease in off-task behavior during all 3 years of the study. There was a significantly greater mean decrease in student off-task behavior for the elementary than the junior high grades during 1977-1978 ($p < .05$). Students from barometer classrooms in schools receiving treatment showed a significantly greater ($p < .05$) mean decrease in off-task behavior during all 3 years of the study.

DISCUSSIONS AND CONCLUSIONS

Statistically significant reductions in vandalism were obtained for two consecutive years. A multiple baseline design also compared the vandalism costs of both treatment groups throughout the 3-year duration of the study. Because vandalism costs tend to be higher during certain months than others, it is best to compare treatment months back to nontreatment months in interpreting the graphed data. Recognizing this, it can be seen that maximum vandalism cost reductions occurred only following implementation of treatment in both groups. Further, decreases from baseline, though some-

what smaller, were obtained during the third year, as shown in Table 4. These smaller decreases were probably due to the double digit inflation that was occurring at the time.

Off-task behavior (e.g., hitting, yelling, throwing objects, not doing assigned work) of target students in both experimental project and barometer classrooms decreased from baseline significantly more than did the behavior of similar students in control project classrooms, throughout each of the 3 years of the study. Similarly, the average rate of positive teacher-student contacts improved significantly more in both the experimental project and barometer classrooms than in similar controls during the first 2 years of the study.

These findings are substantiated by a 1979 survey of the teachers and principals who participated in the project. All team members were given a questionnaire and a structured interview was conducted with team members. Fewer discipline problems, greater cooperation, and more positive feelings among students and staff were reported to be a result of the project programs. The survey was developed and completed by outside evaluators for the project and reported elsewhere (Jones, Mayer, & Butterworth, Note 7).

The present study indicates that the total school climate might be affected by initially working with the strong, influential members of a school staff, while making some additional consultation contacts with other staff members on request. Barometer teachers, a sample of other teachers in the school who did not attend off-campus workshops, changed positively in the way they interacted with their students, giving strong support to a schoolwide generalization of these results. Unfortunately, records were not kept of how many barometer or other teachers requested consultation. However, several reported events indicated that numerous teachers were influenced by the project teachers and other team members. Project teachers shared materials with other teachers and involved them in departmental or grade-level programs to provide students positive reinforcement for pro-social be-

haviors. Some principals suggested to groups of staff members and individuals that they try activities introduced by the project staff. Principals also praised project teachers at faculty meetings for their participation in the project. During the second year, consultants and school team members gave inservice training to all interested staff members. Thus, the staff development model used in this study appears to be both feasible and economical. It is difficult and often economically impossible to provide workshops and frequent ongoing consultation services to all members of a staff.

The intervention was also cost-effective in another respect. When average vandalism costs during treatment were compared with baseline, reductions of 66-92% (mean = 78.5%) were obtained without adjusting for inflation. These reductions occurred while schools throughout Los Angeles County were experiencing *increases* of 56% during 1978-1979 and 35% during 1979-1980 (compared to the baseline year 1977-1978). When the data from Table 4 for the 1978-1979 school year were averaged with the pilot study data from 1976-1977 (Mayer & Butterworth, 1979), a mean vandalism cost reduction of 73.5% for 23 elementary and junior high schools was obtained. Thus, vandalism costs within project schools were reduced by at least two-thirds. A junior high school containing 1,500 students with an average monthly vandalism cost of \$121.35/100 students could potentially save from \$10,861 to \$24,197 over a 9-month period. (The \$10,861 figure is based on the two-thirds decrease only, whereas the \$24,197 figure is the estimated savings if the vandalism cost had increased 56% rather than decreased 91.7%.)

Some bias could have entered into reports of vandalism by school principals. Principals might appear to be doing a better job if reported rates of vandalism were kept to a minimum. In actuality, it is quite unlikely that such biasing occurred. On the contrary, it is far more probable that data on vandalism costs from the "treated" schools were biased in the other direction, be-

cause the project staff visited those school sites weekly and reported any occurrences of damage that they noted. These were added to those of the principals. Naturally, because staff were not visiting the "control" schools at the same rate, supplementary reports could not have been added to the total figures. Thus, reported differences would reflect an underestimate rather than an overestimate.

Student and teacher behaviors were assessed both in target and in barometer classrooms to provide assurance that changes were implemented and to probe for possible spread of effects within the schools. Financial and other practical considerations (e.g., training, supervision, familiarity with contingencies in the classroom) limited the number of observations made and required that some of the observers also participate in the consultation during the first 2 years of the study. Thus, it is quite possible that their presence served to cue the teachers to practice their skills. However, only two of the six observers consulted extensively with teachers. These two did not collect data in the classroom. The other four only consulted sporadically. The three people who observed during the third year had no history as consultants to any of the teachers. Further, the experimental data showing improved student behavior also indicates that the teachers' performance probably did change. Thus, any reactivity during that period of time was probably no greater than that which is integral to any applied situation in which the behavior of the participants is under direct observation.

No one study, of course, provides a definitive answer. The area of vandalism involves more complex and temporally distant behavior than the immediate antecedents and consequences to behavior emphasized in current applied behavior analysis research (Wahler & Fox, 1981). Further, any investigation that uses a treatment package, or as broad an intervention program as was used in this study, will have a number of problems. Thus, this study should be viewed as a beginning ". . . an inspection of global

categories . . . a reasonable first step in methodology" (Wahler & Fox, 1981, p. 332) pointing to a possible direction of future research.

For future research, many modifications could be made in systematically replicating the present study. For example, even though it is almost impossible to measure directly the acts of vandalism, future investigation might attempt to assess the reliability of vandalism cost and frequency data by using two independent observers or reporters. Also, some investigators may wish to exclude verified *accidental* property damage from their data. In the present study, it was not possible to separate out those data because the figures were obtained from totals reported to the state. More frequent classroom observations could also supply more valid means of measuring teacher and pupil behavior, and permit independent observers to verify the extent to which consultants followed any standard procedure.

Because the treatment consisted of a "package" of procedures, it was impossible to determine to what degree classroom changes, planned community activities, involvement of youth clubs, or other aspects of the project were responsible for the obtained changes. Thus, further research should also attempt to tease out these differential contributors to the effectiveness of the program. In particular, we would like to see investigations on the refinement and relative contribution of various setting events.

The present study attempted to assess the environment, to determine whether it was becoming less punitive and more positive, by measuring rates of praise delivered by teachers. Behavior of other staff members (i.e., administrators) and interactions among peers could also be measured. Degree of match between students' reading levels and the difficulty of assigned materials could be assessed and compared or correlated to frequency of vandalism and differential costs. Similar investigations could be made with other potential setting events.

The present study and a previous one by Mayer and Butterworth (1979) focused on just

a few factors that might provoke school disruption and vandalism. Because of the limited number of variables examined and the global measure of vandalism that was used, the magnitude of the results is impressive. The data solidly support the conclusion that educators can act successfully to reduce vandalism and inappropriate student behavior. However, much more work needs to be done to isolate effective treatment programs. We may find that certain treatment programs are best suited to preventing specific categories of vandalism such as theft or property damage. Currently, we are attempting to see if aspects of this approach can be shown reliably to bring about similarly marked changes at the secondary school level. It is hoped that the conditions that contribute to vandalism within the school can ultimately be identified and managed, permitting us then to direct our efforts to some of the factors that influence vandalism from the outside.

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