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APPLICATION OF THE "GENERALIZATION MAP" TO A SELF-CONTROL INTERVENTION WITH SCHOOL-AGED CHILDREN

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The assessment of generalization has become a priority of applied behavior analysis. This study provided a thorough assessment of the generality of a comprehensive self-control intervention. This intervention incorporated a number of self-management skills and was designed to increase the math performance of an underachieving student in a regular elementary school classroom. All possible classes of generalization as outlined by Drabman, Hammer, and Rosenbaum (1979) were assessed. An ABAB design with follow-up was used to determine the effectiveness of the intervention for the treated student's math performance in the school setting as well as the degree of generalization across the following untreated dimensions: behavior (disruptiveness); setting (home); subject (classmate); and time period (follow-up). The effective intervention produced: subject, behavior, subject-behavior, setting, subject-setting, behavior-setting, subject-behavior-setting, time, subject-time, setting-time, subject-setting-time, and subject-behavior-setting-time generalization. Generalization was not obtained for behavior-time, subject-behavior-time, and behavior-setting-time generalization. Features of this intervention which may have promoted generalization are discussed.

DESCRIPTORS: generalization, self-control, academic behavior, children

Spiraling costs of psychological and educational services coupled with sharp reductions in governmental support have placed a premium on the need for effective and economical behavioral treatments (Barth, 1983; Keisling, 1983). Educational and psychological researchers must make the effects of their treatment interventions "carry over" or generalize to nontreated behaviors, settings, persons, and time periods.

In recent years, this crucial dimension of generalization has become a priority of clinical behavior therapy. Extensive reviews of the behavioral literature (Drabman, Hammer, & Rosenbaum, 1979; Hayes, Rincover, & Solnick, 1980; McLaughlin, 1979; Stokes & Baer, 1977) have underscored the importance of intensive investigation of generalization of effective behavioral techniques. These researchers have exhorted behavior analysts to go beyond analogue demonstrations of promising classroom techniques and assess the durability and generalization capabilities of these techniques.

One promising classroom behavior management strategy that has received a considerable amount of attention in recent years is self-control training (Gross & Drabman, 1982; O'Leary & Dubey, 1979; Rosenbaum & Drabman, 1979). Self-control training, diffusely defined, encompasses a variety of techniques which are designed to help students assume more and more of the direct management of their own academic achievement and classroom deportment. Self-control researchers have demonstrated: (a) Grade school children can effectively be taught to self-monitor, self-evaluate, and self-reinforce contingently for academic and classroom behaviors under externally imposed, experimenter contingencies (Ballard & Glynn, 1975; Bolstad & Johnson, 1972; Clement, Anderson, Arnold, Butman, Fantuzzo, & May, 1978; Glynn, Thomas, & Shee, 1973). (b) Self-administered reinforcement procedures under externally determined contingencies have been documented as

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equally effective (Bolstad & Johnson, 1972; Fredericksen & Fredericksen, 1975) or more effective (Edgar & Clement, 1980; Parks, Fine, & Hopkins, 1974) than externally administered and determined procedures. (c) Students can determine their own performance standards and contingencies, and when combined with reinforcement, these self-determined contingencies are either as effective (Felixbrod & O'Leary, 1973, 1974) or more effective (Brownell, Colletti, Ersner-Hershfield, Hershfield, & Wilson, 1977; Lovitt & Curtiss, 1969) than externally determined contingencies. (d) In comparison with externally determined reinforcers, some data suggest that grade school children are more productive and will work harder for self-selected reinforcers and the opportunity to choose reinforcers (Brigham & Stoerzinger, 1976). Moreover, these self-control procedures have evidenced a greater generalization capability than externally mediated procedures (Brownell et al., 1977; Fantuzzo & Clement, 1981; Johnson, 1970; Parks et al., 1974). To maximize this treatment impact and generality, O'Leary and Dubey (1979) have urged researchers and clinicians to combine these effective self-control skills into comprehensive intervention packages. Combinations of self-administered and self-determined procedures would produce self-control strategies in which the student is more truly the behavior change agent.

Self-control researchers have hypothesized that the effectiveness and generalization capability of self-control procedures are due to the omnipresence of the behavior change agent (i.e., the child). The rationale is that the child is the best contingency manager because she or he can deliver reinforcement immediately at all times and across all settings (Clement, 1973). Despite the logic of this hypothesis, only a handful of studies have investigated the generality of self-control interventions across persons (Fantuzzo & Clement, 1981; Fantuzzo, Harrell, & McLeod, 1979), settings (Burgio, Whitman, & Johnson, 1980; Drabman, Spitalnik, & O'Leary, 1973; Robertson, Simon, Pachman, & Drabman, 1979; Turkewitz, O'Leary, & Ironsmith, 1975; Varni & Henker, 1979), behaviors (Ballard & Glynn, 1975), and time periods (Arnold & Clement, 1981; Brownell et al., 1977; Felixbrod & O'Leary, 1974; Robertson et al., 1979). These studies differ from our investigation in that they were either conducted in contrived settings or the assessment of generalization was not the primary focus.

The purpose of this investigation was to determine what types of generalization might occur when implementing a comprehensive self-control program. This intervention contained a combination of self-determined and self-administered procedures and was designed to increase the math performance of an underachieving student in his classroom setting. Fifteen of the 16 categories of generalization identified by Drabman et al. (1979) were assessed.

METHOD

Participants and Settings

The participants in this study were two fifth-grade black males from a regular classroom in the Pasadena Unified School District. In consultation with the principal and a fifth-grade teacher, five students were identified who might benefit from a self-control intervention. The following criteria were used to select the participants: (a) a history of not completing math assignments as evidenced by teacher's reports; (b) at least one grade level behind in math skills as measured by the Comprehensive Test of Basic Skills; (c) living within a 2-mile radius of one another; and (d) demonstration of disruptive classroom behavior. Anecdotal observations indicated that although the boys demonstrated similar problematic behaviors, their frequency of joint disruptive activity was negligible. Therefore, it appeared that the alteration of one boy's behavior did not inevitably impinge on the action of the other, giving a spurious illusion of generalization. One participant was randomly selected to serve as the treated student and the other served as the untreated student.

The research was conducted in a standard fifth-grade classroom (with a teacher, an aide, and 31 students) and in the home of the treated student.

In the school setting, data were collected in the context of regularly occurring math drill sessions. The two participants sat adjacent to one another in the classroom and home settings. Home data were collected in the context of "homework" sessions. These sessions were held in a relatively distraction-free area of the treated student's home (at a table in a 3 m × 6 m dining room) following the dinner hour (approximately 7:00 p.m.). This time period and specific work area were selected because the treated student was typically expected to complete his homework at this time and in this location. The parents of both children were informed that this "extra" tutoring program was designed to improve their child's math performance.

General Procedures

Math drill sessions in the school setting occurred at the same time each school day (10:00 a.m.). In these sessions, the teacher distributed math worksheets to the class. For research purposes, a computer program generated the problems for the participants' worksheets to standardize the math sheets (i.e., to ensure each sheet contained the same number of problems, the same percentage of addition, subtraction, multiplication, and division operations, and was within the participants' ability level). Additionally, this procedure was designed to minimize practice effects. The computer program randomly determined the number combinations for the problems on each sheet, such that no two math sheets were the same. After the teacher distributed the math sheets, she instructed the students to complete accurately as many problems as possible. At the end of 10 minutes, she collected the math sheets, corrected them, and gave them to the students who wanted immediate feedback. Also during treatment conditions, the teacher was instructed to notify the treated student that he could use the treatment procedure if he chose. This was the extent of the teacher's involvement in the intervention; she provided no other prompts and no contingent reinforcement if the treated student chose the procedures. The teacher's aide, a 22-year-old college student, collected data on the participants' disruptive classroom behavior during the math drill sessions.

The procedure in the home setting was identical to the school setting except that the tutor transported the untreated student to and from the home of the treated student and assumed the role of the teacher. In this setting, neither student received contingent reinforcement for deportment or math performance at any time during the investigation.

Treatment Conditions

Habituation. For the first four sessions, formal data were not gathered. This period facilitated habituation to the settings and general procedures of the study.

Baseline. The teacher and home tutor collected data on the number of accurately completed math problems and percentage of disruptive behavior for both students in the school and home settings. No contingent reinforcement was given to either student for disruptive behavior or math performance.

Self-control intervention. During this phase, the treated student used a comprehensive self-control intervention in the school setting to increase his number of accurate math problems. This intervention involved both self-determination and self-administration of reinforcement contingencies. Before treatment began, the treated student was approached by one of us, a 24-year-old black male, called the "employer," and offered a "job." He told the student that the purpose of this job was to teach children how to coach themselves. More specifically, he was instructed that the job involved learning how to: (a) set a goal for the number of problems he wanted to complete accurately; (b) count the number of problems he completed accurately and record the number on the chart; (c) compare the number with the predetermined daily goal; (d) award himself a gold star if he made his goal; and (e) exchange his gold stars for various items from a self-determined menu of backup reinforcers. After the student accepted the job, he was trained by the "employer." It took two 2-hour sessions to train the treated student to a 95% level of competence. In the first session, we used modeling, behavior rehearsal, and matching procedures

(Robertson et al., 1979) to teach the treated student the tasks of the self-control components and the appropriate sequencing of these components. The second session involved six simulated math drills in which the treated student was expected to use the treatment intervention. Prior to each simulation, the employer reviewed the description of each task and the sequence of tasks with the student. During implemention of the treatment procedures, an independent observer assessed accuracy on a checklist, which contained behavioral definitions of each task in the self-control sequence. After each simulation the treated student was praised for the correctly performed tasks and he practiced the inaccurately performed tasks before moving to the next simulation. Competence was determined by dividing the number of tasks completed accurately without coaching by the total number of tasks. Additionally, during treatment conditions the employer met with the treated student weekly and reviewed with him all the self-control procedures. This review was intended to minimize drift.

Prior to the first day of treatment, the treated student met with the employer to select: (a) his goal for the daily number of math problems to complete accurately (although the treated student's selection was not restricted, he was told his mean base rate and was prompted to choose a stringent criterion in a manner similar to the one used by Brownell et al., 1977); (b) his backup reinforcers from a long list of reinforcers in the school and home environments; and (c) the number of gold stars each backup reinforcer was worth. During each treatment session, he obtained his math sheet from his teacher after she had corrected it and counted the number of problems that he had completed accurately. Next, he went to his chart, which was posted on the bulletin board near his desk, and recorded the number. Then he compared his number with his goal. At the end of each week, he met with the employer to review the number of stars that he earned and to determine if he wanted to save his weekly earnings or to exchange them for backup reinforcers from his menu. The treated student received no contingent reinforcement for his deportment in the classroom during this phase and no contingent reinforcement for either math performance or deportment in the home setting. The untreated student received no contingent reinforcement for deportment or math performance in either setting. The self-control procedure effected by the treated student was not specifically explained to the untreated student. If he asked "Why not me?" he was told that the treated student was learning to be his own coach. If the treated student did not want to implement the procedure, the teacher was instructed to refrain from further prompts and to continue the math drill as usual. There were only two occasions on which this took place; on both, the treated student appeared tired and complained of not feeling well.

Follow-up. This phase was similar to the baseline condition. During these sessions no contingent reinforcers were delivered to either student.

Measures of Outcome

Math performance. Math performance was determined by counting the number of correct problems completed each day during the standardized math drill sessions conducted in both settings. To determine the reliability of this measure, we randomly selected math sheets completed by both participants during each experimental phase and rechecked the initial evaluation. If the numbers were not identical, the smaller number was divided by the larger number to determine the reliability measure.

Disruptive behavior. This measure included the occurrence of any of the following behaviors: (a) out-of-seat—the student leaving his seat (i.e., buttocks not in contact with the chair seat) for more than 2 s; (b) talking-out—any off-task vocalization (i.e., not germane to academic task, such as speaking out loud without being called on); (c) excessive physical movement—any off-task physical movement (e.g., waving arms, turning around in his chair); and (d) any other behavior that required a teacher reprimand. The teacher's aide and the home tutor used an interval-recording technique to register the disruptive behavior of both students during math drill sessions. They recorded the presence or absence of disruptive behavior within a given interval. Each 10-min math drill produced 50 observation intervals of 10-s duration; therefore, a student's disruptive behavior score could range from 0 to 50. These raw scores were multiplied by 2 in order to represent the percentage of all intervals in which the students were disruptive.

Prior to formal data collection, we trained the teacher's aide and the home tutor until they consistently achieved interobserver agreement scores of 80% or higher on recorded disruptive behavior. Interobserver agreement was computed by dividing agreements by agreements plus disagreements. To maintain adequate levels of interobserver agreement throughout the study, spot checks were made every seven data points by one of us.

Accuracy of self-determined contingencies. During the treatment conditions, the teacher's aide and the home tutor used the same behavioral checklist, which was previously used to determine competence, to assess the accuracy with which the treated student used the intervention. One of us checked reliability on the accuracy of the teacher's aide and the home tutor's assessment once during each treatment phase. Additionally, the accuracy of the treated student's self-administered reinforcement was determined by counting the number of problems marked correct on the math sheet and comparing this number with the number of points he recorded on his chart. Accuracy was determined by dividing the smaller number of the comparison by the larger.

Experimental Design

We used an ABAB design with follow-up to assess: (a) the efficacy of the self-control intervention for the treated student's math performance in the classroom; (b) the effect this intervention had on untreated dimensions for the treated student; and (c) the effect the intervention had across untreated dimensions for the untreated student. Data were collected across the following untreated dimensions: (a) subject (math performance for the untreated student); (b) setting (performance during home-tutoring sessions); (c) behavior (disruptive behavior for treated and untreated student); and (d) time (during the follow-up phase when treatment was removed and effect was assessed during a 2-month period).

The degree of generalization was quantified by using the generalization ratio, a descriptive statistic designed by Fantuzzo and Clement (1981). This statistic indicates the percentage of treatment effect that generalized to untreated student's target behavior (i.e., math performance).

RESULTS

Interobserver Agreement

The mean (and range) interobserver agreement scores for the teacher's aide in the school setting were as follows: baseline = 89% (86%–91%); self-control intervention = 87% (87%); return to baseline = 92% (92%); return to intervention = 94% (93%–95%), and follow-up = 95% (95%–96%). For the home tutor, the mean (and range) interobserver agreement scores were as follows: baseline = 91% (88%–94%); self-control intervention = 100% (100%); return to baseline = 97% (97%); and return to intervention = 96% (95%–97%). The mean (and range) reliability of accurate evaluation for the student's daily math performance for the teacher was 99% (98%–100%) and for the home tutor was 99% (99%–100%). The mean (and range) reliability of the teacher's aide and the home tutor's accurate evaluation of the treated student's use of the self-control intervention was 94% (92%–97%). Excluding the 2 days that the treated student declined to use the intervention, he accurately implemented the procedure 100% of the time in both treatment phases.

Self-Control Intervention

Figure 1 displays the academic performance and disruptive behavior of the two students across all five phases of the investigation in both school and home settings. Tables 1 and 2 show phase means for academic performance and disruptive behavior, respectively.

The mean accurate number of math problems for the treated student in the school setting was 28.7 during baseline. Using the self-control inter-

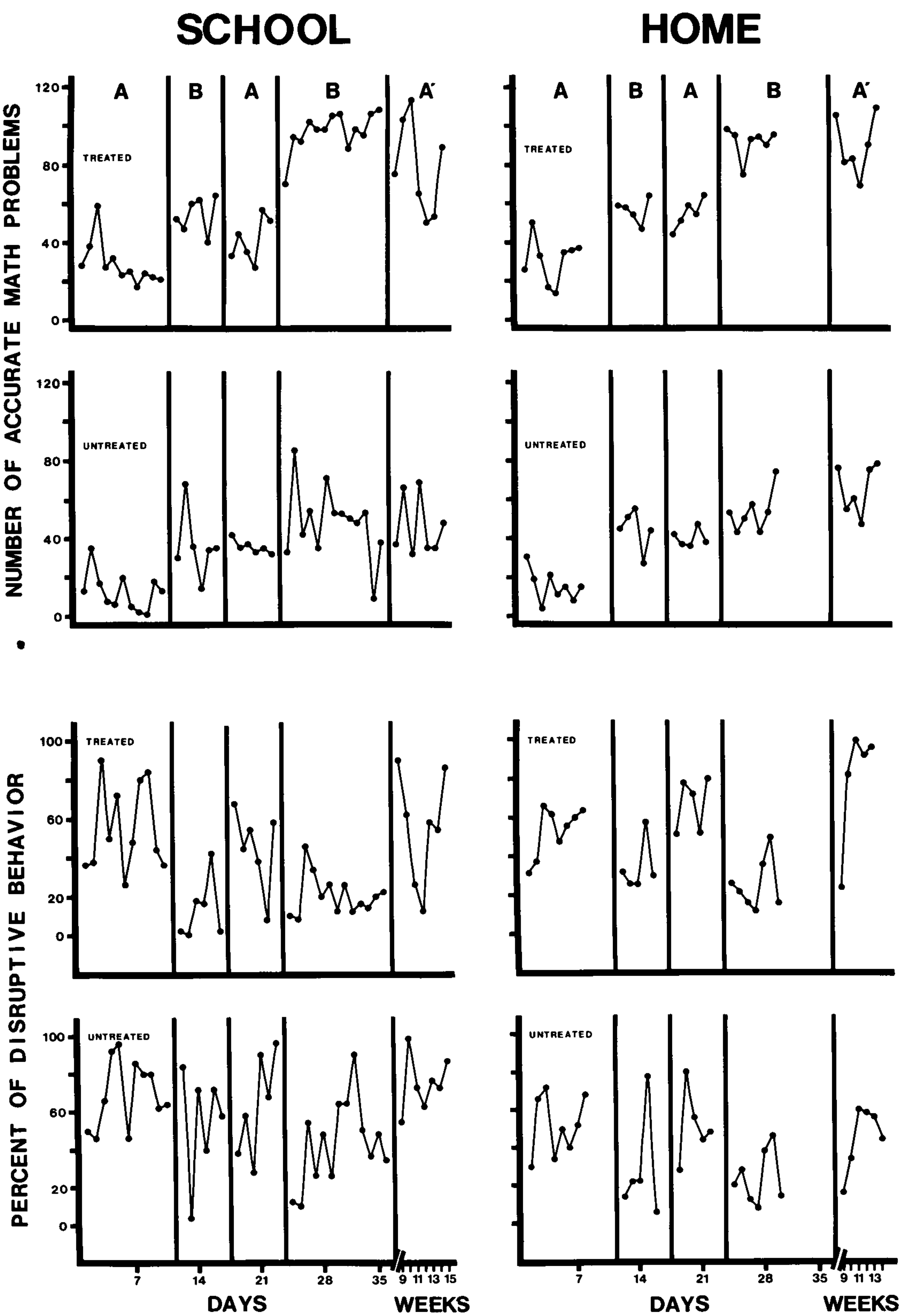
SCHOOL
HOME
NUMBER OF ACCURATE MATH PROBLEMS
A
B
A
B
A′
TREATED
UNTREATED
PERCENT OF DISRUPTIVE BEHAVIOR
DAYS
WEEKS

Table 1
Mean Number of Problems Completed Correctly Within the Math Period

Student	Setting	Condition A	B	A	B	A′
Treated	School	28.7	54.2	41.2	96.9	78.2
	Home	35.4	56.4	54.4	91.4	89.5
Untreated	School	12.5	36.2	35.7	48	46
	Home	15.5	44.4	40	53.3	65.2

Table 2
Mean Percentage of Intervals of Disruptive Behavior

Student	Setting	Condition A	B	A	B	A′
Treated	School	54.9	13.3	45	20.4	55.4
	Home	60.9	34.4	66.8	25.4	78.8
Untreated	School	69.8	55	63	43.2	74.3
	Home	51.5	28.4	51.2	23.7	37.3

vention for math accuracy resulted in an increase in accuracy to a phase mean of 54.2. Withdrawing the treatment was followed by a decrease to a mean level of 41.2, whereas reinstituting the intervention increased the mean to 96.9 problems.

Generalization Assessment

Table 3 displays the generalization ratios for 15 out of the 16 classes of generalization listed by Drabman et al. (1979) (the maintenance class was not assessed in this study). The treated student's successful implementation of the self-control intervention yielded generalization across the following classes for the treated student: (a) *behavior* generalization (decreases in disruptive behavior in the school setting); (b) *setting* generalization (increases in math performance in the home setting); (c) *behavior-setting* generalization (decreases in disruptive behavior in the home setting); (d) *time* generalization (sustained treatment levels of math performance in the school setting during follow-up); (e) *setting-time* (increases in math performance that were maintained in the home setting during follow-up). Generalization was not present across the following classes for the treated student: (a) *behavior-time* (decreases in disruptive behavior in the school setting during follow-up); (b) *behavior-setting-time* (decreases in disruptive behavior in the home setting during follow-up.

The effect of the treated student's intervention on the untreated student resulted in: (a) *subject* generalization (increases in math performance in the home setting); (b) *subject-behavior* generali-

Table 3
Percentage of Generalized Treatment Effect from the Treated Student's Math Performance to Untreated Variables

Generalization	Experimental phases B1 (%)	B2 (%)	A′ (%)
Behavior	161.7	96.5	
Setting	78.7	70.1	
Behavior-setting	93.6	108.7	
Time			134.0
Setting-time			127.6
Behavior-time			−2.1
Behavior-setting-time			−61.7
Subject	138.3	45.6	
Subject-behavior	44.7	54.4	
Subject-setting	138.3	43.9	
Subject-behavior-setting	95.7	94.7	
Subject-time			155.3
Subject-setting-time			161.7
Subject-behavior-time			−12.7
Subject-behavior-setting-time			59.6

←

Figure 1. Number of accurate math problems and percentage of disruptive behavior across experimental phases for treated and untreated students in school and home settings. Phase sequence: A = baseline; B = self-control intervention; A = return to baseline; B = reinstatement of self-control intervention; A′ = follow-up phase.

zation (decreases in disruptive behavior in the school setting); (c) *subject-setting* generalization (increases in math performance in the home setting); (d) *subject-behavior-setting* generalization (decreases in disruptive behavior in the home setting); (e) *subject-time* generalization (increases in math performance in school setting during follow-up); (f) *subject-setting-time* generalization (increases in math performance in the home setting during follow-up); (g) *subject-behavior-setting-time* generalization (decreases in disruptive behavior in the home setting during follow-up). There was no generalization for the *subject-behavior-time* class (decreases in disruptive behavior in the school setting during follow-up).

DISCUSSION

These findings document the effectiveness of a comprehensive self-control intervention to increase accurate math performance of an underachieving student in the context of his classroom. Furthermore, the treatment had a positive effect on this student's classroom disruptive behavior and his math performance and disruptive behavior in the home setting. The treated student's classroom disruptive behavior decreased (behavior generalization); his home math performance increased (setting generalization); and his disruptive home behavior decreased (behavior-setting generalization). Two months of follow-up data revealed that the treated student maintained his treatment gains in math performance across school (time generalization) and home settings (setting-time generalization) but evidenced an increase in disruptive behavior across time in both settings.

Exposure to the treated student's self-control intervention targeting math performance in the school setting resulted in parallel math performance and disruptive behavior across school and home for the untreated student. The untreated student's math performance in school increased 268% from initial baseline to second exposure to the treated student's self-control intervention (subject generalization), and his disruptive behavior decreased 38% in this setting (subject-behavior generalization). Likewise, in the home setting his math performance increased 244% (subject-setting generalization) while his disruptive behavior dropped 54% (subject-behavior-setting generalization). Follow-up data for the untreated student revealed maintenance of high levels of math performance in school and home settings (subject-time and subject-setting-time generalization, respectively) with concurrent increases in disruptive behavior. Although the untreated student's disruptive behavior in the home setting increased during follow-up, it was still below his original baseline rate (subject-behavior-setting-time generalization).

Follow-up data indicated that low levels of disruptive behavior for the treated student's school and home behavior and the untreated student's school behavior evidenced during treatment were not maintained. Therefore, generalization was not obtained for the behavior-time, behavior-setting-time and subject-behavior-time classes of generalization. The lack of generalization across these dimensions may be explained by the fact that the students (particularly the treated student) learned more effective and efficient means of maintaining a successful level of math performance. This increased efficacy may have allowed them more opportunity to engage in disruptive behaviors.

In this investigation, the math performance and disruptive behavior for both students did not return to original baseline levels when the math performance contingency was withdrawn for the treated student. This lack of a clear reversal effect following a successful treatment for math performance has been documented by other investigators (Fantuzzo & Clement, 1981; Hay, Hay, & Nelson, 1977; Kirby & Shields, 1972). Hay et al. (1977) reported a rapid drop in on-task behavior when the on-task contingency was withdrawn; however, there was a negligible drop in math performance following the withdrawal of the math contingency. Quite possibly these data suggest that academic contingencies are more resistant to extinction than deportment contingencies and less likely to show a clear reversal effect when the return to baseline phase covers a short period of time.

The conclusions derived from this study must be qualified because this research involved only one pair of participants, but these findings are nevertheless consistent with investigations that have documented both the effectiveness and the generalization capability of self-control procedures applied to academic behaviors (Ballard & Glynn, 1975; Bolstad & Johnson, 1972; Brownell et al., 1977; Fantuzzo & Clement, 1981; Fantuzzo, Harrell, & McLeod, 1979; Robin, Armel, & O'Leary, 1975; Varni & Henker, 1979). This study extends the literature by assessing the impact of a comprehensive self-control intervention conducted in a classroom setting across all possible classes of generalization. These findings add to the self-control literature with children, by indicating that a comprehensive self-control package has the capability of generalizing across subject-setting, behavior-setting, subject-behavior-setting, subject-time, setting-time, subject-setting-time, and subject-behavior-setting-time dimensions.

The intervention used in this study combined documented self-control strategies to maximize effectiveness and generalization. These components are as follows: (a) From the outset, the treated student's involvement was voluntary and in the context of a "job" (i.e., as opposed to a mandatory disciplinary or counseling referral) (Clement et al., 1978). (b) The treated student received competency-based training with an employer of the same sex and race which incorporated a matching procedure and weekly booster sessions during treatment. (c) The procedures were designed to be used readily across school and home settings (i.e., no extraordinary instrumentation or gimmick). (d) The package included the self-determination of goal and schedule of reinforcement (with prompts to select stringent standards) (Brownell et al., 1977), and backup reinforcers (Brigham & Stoerzinger, 1976) in combination with self-recording, self-evaluation, and self-reward procedures. This intervention package provided the treated child with "freedom within form"; that is, the freedom to participate more actively as his own contingency manager in the context of experimenter support (training, prompts to select stringent standards, and booster sessions). It is this combination of choice and experimenter support that we believe accounts for the treated student's accurate implementation of the procedures and the generalization effect.

This investigation reflects an important two-step process. First, researchers need to take advantage of previous investigations and bring together effective self-control skills into single packages (O'Leary & Dubey, 1979). Second, comprehensive generalization assessments are necessary to identify fully the impact of the intervention (Drabman et al., 1979). These are the prerequisite steps toward maximizing the potential self-control strategies for grade school children.

REFERENCES

Arnold, J. H., & Clement, P. W. (1981). Temporal generalization of self-regulation effects in undercontrolled children. *Child Behavior Therapy*, **3**, 63–68.

Ballard, K. D., & Glynn, T. (1975). Behavioral self-management in story writing with elementary school children. *Journal of Applied Behavior Analysis*, **8**, 387–398.

Barth, R. S. (1983). Educators can come through the crisis of self-confidence. *The Education Digest*, **48**, 19–21.

Bolstad, O. D., & Johnson, S. M. (1972). Self-regulation in the modification of disruptive behavior. *Journal of Applied Behavior Analysis*, **5**, 443–454.

Brigham, T. A., & Stoerzinger, A. (1976). An experimental analysis of children's preference for self-selected rewards. In T. A. Brigham, R. Hawkins, J. W. Scott, & T. F. McLaughlin (Eds.), *Behavior Analysis in Education* (pp. 47–55). Dubuque, IA: Kendall/Hunt.

Brownell, K., Colletti, G., Ersner-Hershfield, R., Hershfield, S. M., & Wilson, G. T. (1977). Self-control in school children: Stringency and leniency in self-determined versus externally imposed performance standards. *Behavior Therapy*, **8**, 442–455.

Burgio, L. D., Whitman, T. L., & Johnson, M. R. (1980). A self-regulation package for increasing attending behavior in educable mentally retarded children. *Journal of Applied Behavior Analysis*, **13**, 443–459.

Clement, P. W. (1973). Training children to be their own behavior therapists. *Journal of School Health*, **43**, 615–620.

Clement, P. W., Anderson, E., Arnold, J., Butman, R., Fantuzzo, J., & May, R. (1978). Self-observation and self-reinforcement as sources of self-control in children. *Biofeedback and Self-regulation*, **3**, 247–268.

Drabman, R. S., Hammer, D., & Rosenbaum, M. S. (1979). Assessing generalization in behavior modification with children: The generalization map. *Behavioral Assessment*, **1**, 203–219.

Drabman, R. S., Spitalnik, R., & O'Leary, K. D. (1973).

Teaching self-control to disruptive children. *Journal of Abnormal Psychology*, **82**, 10–16.

Edgar, R., & Clement P. W. (1980). Teacher-controlled and self-controlled reinforcement with underachieving, black children. *Child Behavior Therapy*, **2**, 33–56.

Fantuzzo, J. W., & Clement, P. W. (1981). Generalization of the effects of teacher- and self-administered token reinforcers to nontreated students. *Journal of Applied Behavior Analysis*, **14**, 435–447.

Fantuzzo, J. W., Harrell, K., & McLeod, M. (1979). Across-subject generalization of attending behavior as a function of self-regulation training. *Child Behavior Therapy*, **1**, 313–321.

Felixbrod, J. J., & O'Leary, K. D. (1973). Effects of reinforcement on children's academic behavior as a function of self-determined and externally imposed contingencies. *Journal of Applied Behavior Analysis*, **6**, 241–250.

Felixbrod, J. J., & O'Leary, K. D. (1974). Self-determination of academic standards by children: Toward freedom from external control. *Journal of Educational Psychology*, **66**, 845–850.

Fredericksen, L. W., & Fredericksen, C. B. (1975). Teacher-determined and self-determined token reinforcement in a special education classroom. *Behavior Therapy*, **6**, 310–314.

Glynn, E. L., Thomas, J. D., & Shee, S. M. (1973). Behavioral self-control of on-task behavior in an elementary classroom. *Journal of Applied Behavior Analysis*, **6**, 105–113.

Gross, A. M., & Drabman, R. S. (1982). Teaching self-recording, self-evaluation, and self-reward to nonclinic children and adolescents. In P. Karoly & F. H. Kanfer (Eds.), *Self-management and behavior change from theory to practice* (pp. 285–314). New York: Pergamon.

Hay, W. M., Hay, L. R., & Nelson, R. O. (1977). Direct and collateral changes in on-task and academic behavior resulting from on-task versus academic contingencies. *Behavior Therapy*, **8**, 431–441.

Hayes, S. C., Rincover, A., & Solnick, J. V. (1980). The technical drift of applied behavior analysis. *Journal of Applied Behavior Analysis*, **13**, 275–285.

Johnson, S. M. (1970). Self-reinforcement vs. external reinforcement in behavior modification with children. *Developmental Psychology*, **3**, 148–149.

Keisling, P. (1983). How to save the public schools. *The Education Digest*, **48**, 2–5.

Kirby, R. D., & Shields, F. (1972). Modification of arithmetic response rate and attending behavior in a seventh-grade student. *Journal of Applied Behavior Analysis*, **5**, 79–84.

Lovitt, T., & Curtiss, K. A. (1969). Academic response rate as a function of teacher- and self-imposed contingencies. *Journal of Applied Behavior Analysis*, **2**, 49–54.

McLaughlin, T. F. (1979). Generalization of treatment effects: An analysis of procedures and outcomes. *Corrective and Social Psychiatry*, **25**, 33–38.

O'Leary, S. G., & Dubey, D. R. (1979). Applications of self-control procedure by children: A review. *Journal of Applied Behavior Analysis*, **12**, 449–465.

Parks, A. L., Fine, J. J., & Hopkins, B. L. (1974, October). *A study of teacher-managed and self-managed reinforcement with young children on an academic task.* Paper presented at Fifth Annual Conference on Behavior Analysis in Education, Kansas City.

Robertson, S. J., Simon, S. J., Pachman, J. S., & Drabman, R. (1979). Self-control and generalization procedures in a classroom of disruptive retarded children. *Child Behavior Therapy*, **1**, 347–362.

Robin, A., Armel, S., & O'Leary, K. D. (1975). The effects of self-instruction on writing deficiencies. *Behavior Therapy*, **6**, 178–187.

Rosenbaum, M. S., & Drabman, R. S. (1979). Self-control training in the classroom: A review and critique. *Journal of Applied Behavior Analysis*, **12**, 467–485.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis*, **10**, 349–367.

Turkewitz, H., O'Leary, K. D., & Ironsmith, M. (1975). Generalization and maintenance of appropriate behavior through self-control. *Journal of Consulting and Clinical Psychology*, **43**, 577–583.

Varni, J. W., & Henker, B. (1979). A self-regulation approach to the treatment of three hyperactive boys. *Child Behavior Therapy*, **1**, 171–192.

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