

To the Graduate Council:

I am submitting herewith a thesis written by Patricia Ann Shonk entitled "The Effects of Reinforcement and Economic Status on Student Performance: A Comparison of Two Elementary Schools." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

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THE EFFECTS OF REINFORCEMENT AND ECONOMIC STATUS
ON STUDENT PERFORMANCE: A COMPARISON
OF TWO ELEMENTARY SCHOOLS

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ABSTRACT

One purpose of this study was to discover the effects which both reinforcement and economic status have on student performance. Using a reward system designed to promote scholastic performance, the study investigated the differences in performance of children in two elementary schools, one comprised of students mainly from upper-middle economic backgrounds and the other comprised of students from mainly low economic backgrounds. A further concern of this study was to observe naturally-occurring teacher attention to determine whether approval affects performance.

The two measurement procedures employed were direct observation by trained observers and daily record keeping by the teachers. The observed behaviors of concern to the present study were sustained schoolwork, teacher approval, and teacher disapproval. Teachers kept data on the children's work units, recording units assigned as well as units actually completed satisfactorily. From these data, a "percentage completed" figure, or total points, was obtained.

Experimental conditions involved taking baseline measurements and establishing a contingency management program in each classroom. This program's reward system consisted of the children's earning a trip to an "achievement store" (containing free books and toys) contingent upon their completing a required amount of assigned work units in a certain period of time.

The statistical procedure employed was the Mann-Whitney U, computed on the percentages of occurrence of selected behaviors. Mann-Whitney U

data provided statistical evidence of whether there was a significant difference between performance during baseline and that during treatment.

The results of the study indicate that, in general, the reward system was ineffective. Mann-Whitney U tests showed there were no treatment effects for either the performance level (sustained schoolwork, total points) or the amount of teacher attention (teacher approval, teacher disapproval) for any class, with one exception: Teacher approval in the fourth grade of the upper-middle economic group decreased significantly during treatment. A comparison of the fourth grades of the two schools indicates that the upper-middle-class children received a greater amount of approval than did the low-class children during baseline, and they received about the same amount of approval during treatment. Furthermore, they performed at a much higher level than did the low-class children during both baseline and treatment.

To explain this higher level of performance, one's first inclination is to turn to teacher approval. However, throughout all phases of the study, performance levels of the two economic classes were significantly different while the differences in approval levels of the two groups were negligible. Thus, performance must be attributed to variables other than those observed in the present study. A likely explanation of the differences in performance levels may lie in the economic classes of the two groups. As indicated in the literature, upper- and middle-class parents provide a more educationally stimulating home environment for their children than do low-class parents. Having been motivated to scholastic achievement, upper- and middle-class children perform at higher levels than do low-class children.

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I. INTRODUCTION

An area of concern relevant to student performance involves the economic status (ES) of the children, measured by their parents' status. Studies have shown a strong positive correlation between ES and achievement; i.e., high ES children perform better than low ES children (Curry, 1962; Mayeske et al., 1973; Havighurst & Neugarten, 1975; Raven, 1977; Rubin, Dorle, & Sandidge, 1977). It is believed that upper and middle ES parents provide for their children a more intellectually stimulating environment and thus motivate them to greater scholastic achievement than do low ES parents (Jensen, 1968; Mayeske et al., 1973; Havighurst & Neugarten, 1975).

It is further well known that a strong relationship exists between teacher classroom behavior and student behavior. Especially important to student achievement and performance is the amount of teacher approval the students receive (Ausubel & Robinson, 1969). Studies have indicated that through teacher warmth, encouragement, and contingent positive social reinforcements (e.g., attention and praise), appropriate student behaviors, including scholastic performance, can be successfully established (Harvey et al., 1968; Spencer, 1973; Touliatos, Lindholm, & Rich, 1977). Thus, it is quite apparent that teacher attention does affect performance, with increased teacher approval resulting in increased student performance.

One of the purposes of the present study was to discover the effects which both reinforcement and economic status have on student performance, determining whether reward does indeed enhance performance

and whether ES correlates with performance as predicted from the literature. Using a reward system designed to enhance scholastic performance, this study investigated the differences in performance of children in two elementary schools, one comprised of students mainly from upper-middle economic backgrounds and the other comprised of students from mainly low economic backgrounds.

A further concern of this study was to observe naturally-occurring teacher attention to determine whether approval affects performance. From the literature, one would predict that increased approval would result in increased performance. This study was interested in testing this prediction to see if approval is indeed correlated with performance. In general, then, the present study was concerned with sociological and psychological factors and was designed to discover which of these factors is more important in determining performance.

II. METHOD

Subjects

The subjects were public elementary school pupils in two classrooms (grades three and four) of Sequoyah Elementary School and three classrooms (grades one, four, and five) of Park Lowry Elementary School. There was a total of 122 students: Sequoyah's third grade class had 26 students and its fourth grade had 24; Park Lowry's first grade class had 21 students, its fourth grade had 25, and its fifth grade had 26. As measured by their parents' incomes, Sequoyah children were determined to be of upper-middle economic status and Park Lowry children of low economic status.

Apparatus

The measurement procedures employed in this study were twofold: direct observation by trained observers and daily record keeping by the teachers. Observers used the Standardized Observational Coding System (SOCS) developed by Wahler, House and Stambaugh (1976). Data gathered by SOCS observers provide a time sample (30-minute duration, with alternating 10-second observation and 5-second recording intervals) that is converted to percentage rates of occurrence for the behaviors. Behaviors are scored as occurrence/nonoccurrence according to the ostensive definition, which may include a stipulation that the behavior was sustained for the full 10-second interval of observation. Observers trained in SOCS directly code 20 target behaviors and 6 stimuli received

from others in the classroom. However, only five of the recorded categories were of concern to the present study, defined as follows:

1. Sustained Schoolwork (SS)—scored for a full ten seconds of schoolwork by the target child.
2. Teacher Social Attention, Nonaversive (SA^+)—scored for teacher noninstructive, nonaversive contacts with the target child.
3. Teacher Social Attention, Aversive (SA^-)—scored for teacher noninstructive, aversive contacts with the target child.
4. Teacher Instruction, Nonaversive (IA^+)—scored for direct, nonaversive commands from the teacher.
5. Teacher Instruction, Aversive (IA^-)—scored for direct, aversive commands from the teacher.

Each teacher kept data on the children's work units (e.g., spelling assignments). This involved recording the work units that each child was assigned as well as the actual number of units completed satisfactorily. From these data a "percentage completed" figure was obtained.

Observers

Observers for this study were trained in the Standardized Observational Coding System (SOCS) of Wahler, House and Stambaugh (1976). The observers were recruited from students at The University of Tennessee, Knoxville, and included two at Sequoyah and three at Park Lowry. Their reliability in the school setting was checked by a supervisory observer. To establish interrater reliability in the classroom, the supervisor

periodically recorded simultaneous in-class observations of 30-minute duration. The supervisor's and the observer's records were then compared, and interrater reliability was measured as the percentage of intervals in which the records agreed. In this study, a reliability of 85% or more was determined for each of the five observers.

Experimental Conditions

This study was designed to determine the effect of both reinforcement and economic status on student performance. Using two classrooms of upper-middle ES children and three classrooms of low ES children, baseline measurements were taken and a contingency management program instituted in each classroom. The management program involved the teacher's assigning work units to each student at the beginning of each school day. The students recorded their assignments on a personal work ticket and checked off the work units upon completion. At the end of each day the teacher recorded on a weekly summary sheet the work units assigned and completed by each student.

The reward system of the contingency management program consisted of the child's earning trips to the "Achievement Store," which contained free paperback books and toys. The store was available about every two weeks, and the children earned a trip to it upon completing all work units except one. This program lasted 28 weeks at Sequoyah and 10 weeks at Park Lowry.

Observers collected SOSC data during both the baseline and the treatment (contingency management/reward) phases, and they observed their respective target children at a set time every day (9:30 a.m.).

These observations lasted 30 minutes and were taken on a selected child. The child to be observed was chosen by the observer from a class roster which listed the children's names in each class according to a random number table.

Data Analysis

The statistical procedure employed in this study was the Mann-Whitney U, computed on the percentages of occurrence of selected behaviors. As stated earlier, not all SOSC behaviors were considered relevant to the study; only aversive and nonaversive teacher instruction (SA^- , SA^+), aversive and nonaversive teacher social attention (IA^- , IA^+), and sustained schoolwork (SS) were analyzed. Another category that was analyzed, added for the purpose of the study, was total points (TP), the percentage of work units completed by an observed child at the end of the school day. Mann-Whitney U data provided statistical evidence of whether there was a significant difference between performance during the baseline and that during treatment.

III. RESULTS

The results of this study show that, on the whole, the treatment (reward system) was ineffective. The raw data alone point to little difference between the pretreatment and treatment phases (Table 1). The Mann-Whitney U was employed to determine whether there were in fact differences between baseline and treatment percentages of total points (TP), sustained schoolwork (SS), teacher approval (SA^+/IA^+), and teacher disapproval (SA^-/IA^-). The results of the tests indicated there were no treatment effects for either the performance level (TP, SS) or the amount of teacher attention (SA^+/IA^+ , SA^-/IA^-) for any class, with one notable exception: Teacher approval in Sequoyah's fourth grade significantly decreased during treatment ($p < .05$).

Although data from all the grades are presented, it is more appropriate to compare only the two fourth grades of the respective schools (Table 2; Figures 1-4). It is apparent that Sequoyah children received a greater amount of teacher approval (SA^+/IA^+) than Park Lowry children during baseline (22.3% as compared with Park Lowry's 7.0%), and they received approximately the same amount of approval during treatment (4.8% as compared with Park Lowry's 4.2%). It is interesting to note, furthermore, that Sequoyah children performed at a much higher level than Park Lowry children during both baseline and treatment, as reflected by their respective percentages of total points and sustained schoolwork (see Table 2). Thus, even though the Sequoyah teacher markedly reduced her level of positive attention, it is also clear from

Table 1

Mean Percent Occurrence of Performance Level and Teacher Attention During Baseline and Treatment

	Park Lowry				Sequoyah					
	Grade 1		Grade 4		Grade 5		Grade 3		Grade 4	
	B	T	B	T	B	T	B	T	B	T
TP	88.7	76.6	83.5	79.9	100.0 ^a	84.5	79.2	75.9	93.5	95.9
SS	40.7	35.6	42.0	43.8	48.5	46.6	39.9	40.5	53.4	58.2
SA ⁺ /IA ⁺	12.3	10.6	7.0	4.2	9.5	3.9	8.8	5.9	22.3	4.8 ^b
SA ⁻ /IA ⁻	0.3	0.2	0.0	1.4	0.5	0.5	0.0	0.4	0.2	0.3

Note: B = Baseline; T = Treatment (contingency management program)

^aUnreliable since only one baseline percentage was retrieved.^bSignificant at the .05 level.

Table 2

Mean Percent Occurrence of Performance Level and Teacher
Attention for Grade Four During Baseline and Treatment

	Park Lowry		Sequoyah	
	Baseline	Treatment	Baseline	Treatment
TP	83.5	79.9	93.5	95.9
SS	42.0	43.8	53.4	58.2
SA ⁺ /IA ⁺	7.0	4.2	22.3	4.8
SA ⁻ /IA ⁻	0.0	1.4	0.2	0.3

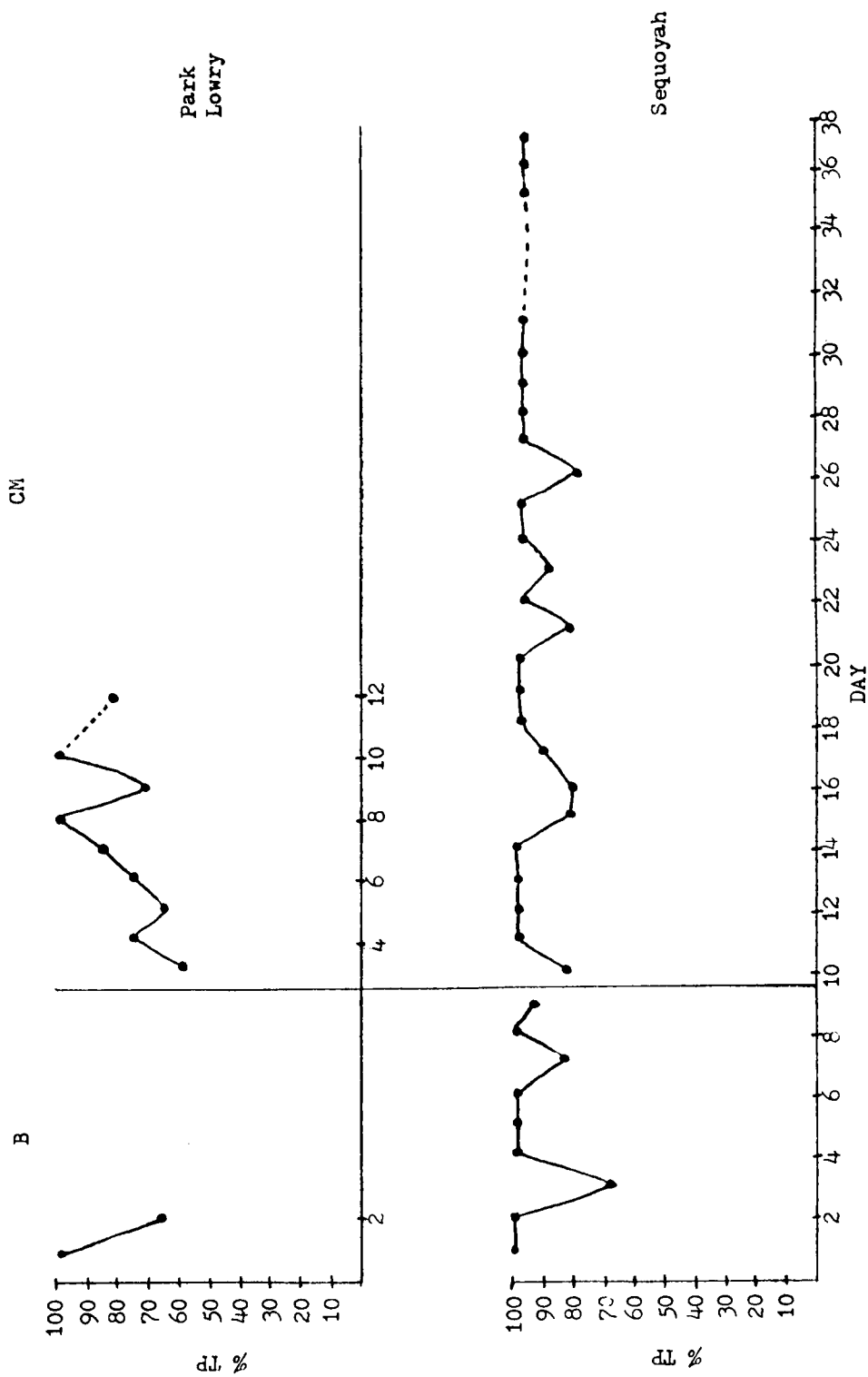


Figure 1. Comparison of percent of total points (TP) for grade four, Park Lowry and Sequoyah.

Note: B = Baseline; CM = Contingency Management

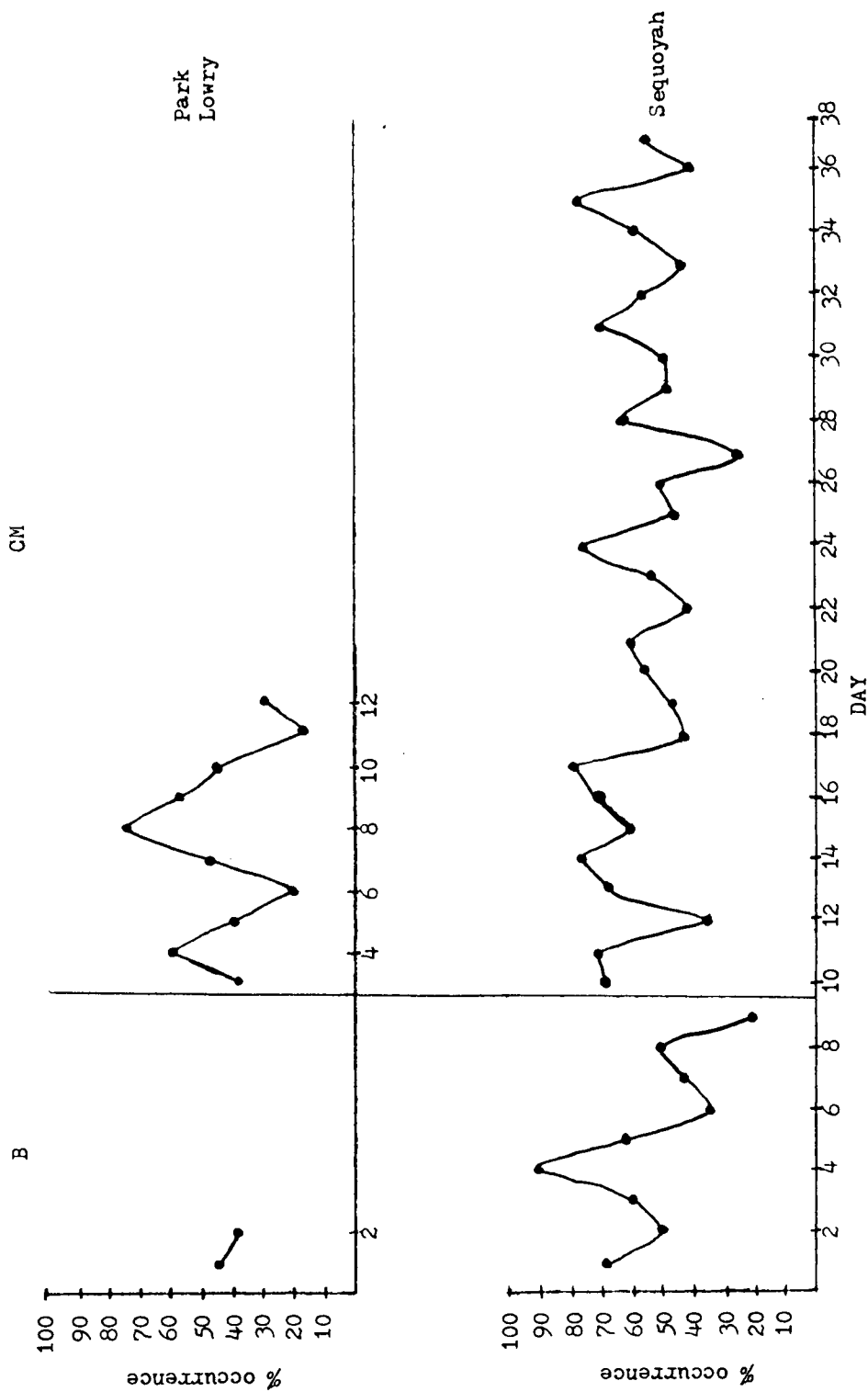


Figure 2. Comparison of percent occurrence of sustained schoolwork (SS) for grade four, Park Lowry and Sequoyah.

Note: B = Baseline; CM = Contingency Management

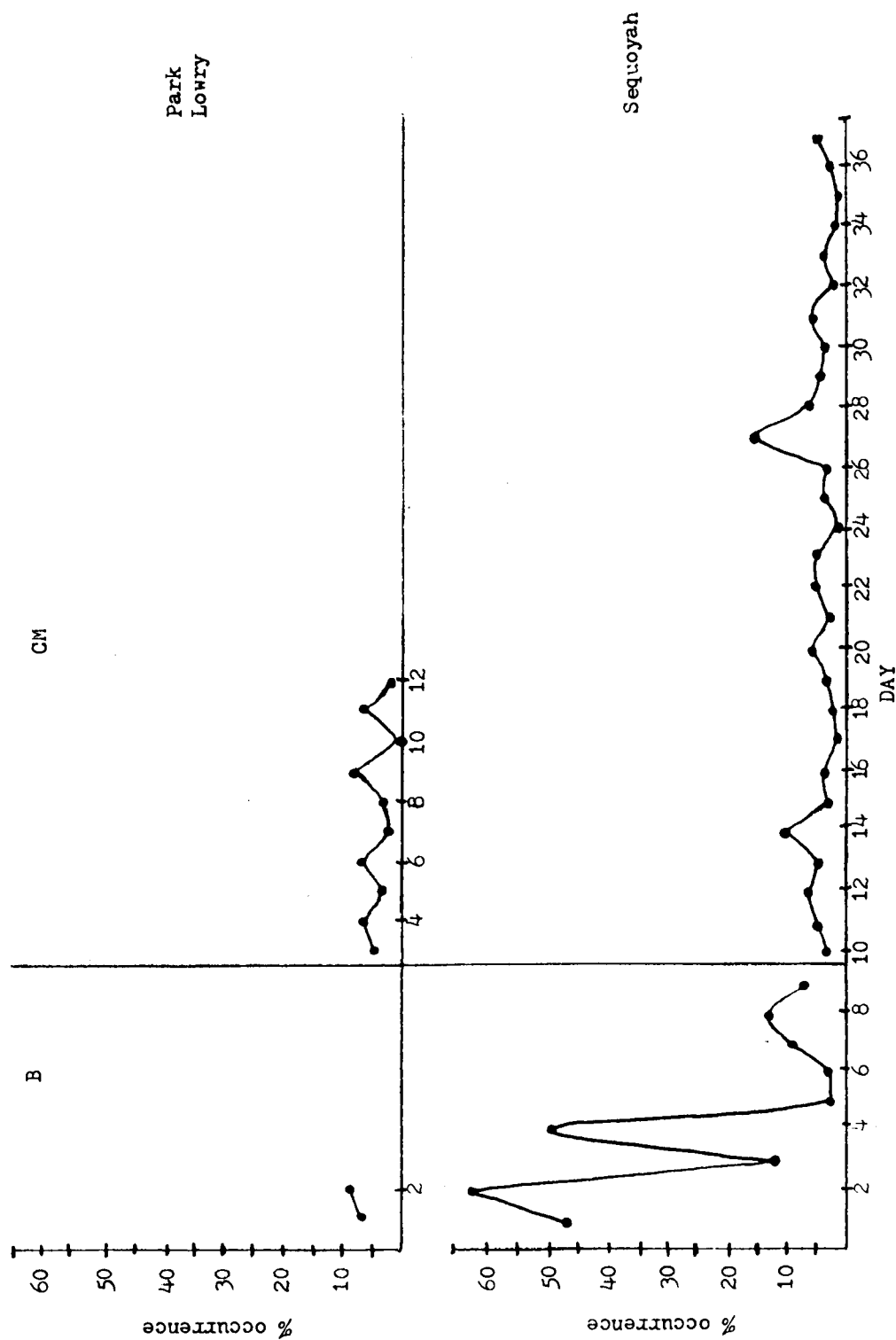


Figure 3. Comparison of percent occurrence of teacher approval (SA^+/IA^+) for grade four, Park Lowry and Sequoyah.

Note: B = Baseline; CM = Contingency Management

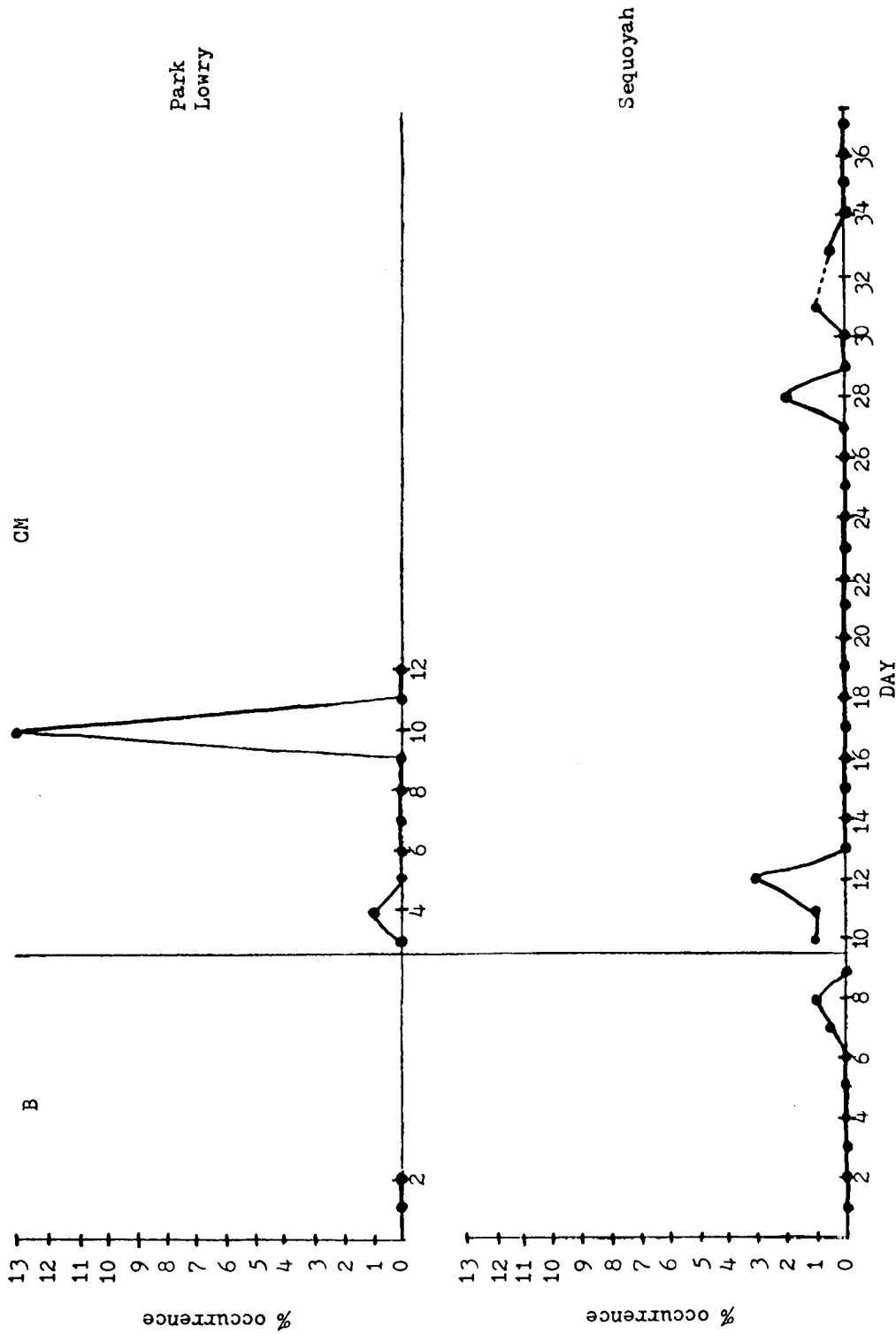


Figure 4. Comparison of percent occurrence of teacher disapproval (SA^-/IA^-) for grade four, Park Lowry and Sequoyah.

Note: B = Baseline; CM = Contingency Management

Figure 3 that this reduction was not a function of treatment. This teacher had already reduced her level of approval on the last five sessions.

IV. DISCUSSION

It is clear from the results of this study that the particular reward system employed was ineffective in raising the students' performance levels. However, it is apparent that, in general, the Sequoyah children did perform at a higher level than did Park Lowry children. One's first inclination is to turn to teacher approval to explain this higher level of performance. The research cited in the Introduction suggests that increased teacher approval promotes increased student performance. However, the results presented in this study call for an alternate explanation. Although the two fourth grades served as the primary focus of the data analysis of the study, parenthetically it should be noted that in Sequoyah's third grade, the high performance level was maintained although teacher attention neither increased nor decreased. More importantly, in Sequoyah's fourth grade, performance was maintained while teacher approval actually decreased significantly. Therefore, in this case the higher performance level cannot be the result of increased teacher approval. Throughout all phases of the study, performance levels of the two economic classes were significantly different; however, the differences in approval levels of the two groups were negligible. Thus, performance must be attributed to variables other than those observed in the present study.

A likely explanation, then, of the difference in performance levels of Sequoyah and Park Lowry children may lie in their respective economic classes. As indicated in the literature, studies have found that

upper- and middle-class parents provide a much more educationally stimulating home environment for their children than do low-class parents. The implied consequences are hardly surprising: having been motivated to scholastic achievement, upper- and middle-class children perform at higher levels than low-class children. With a higher economic home background, Sequoyah children come to school with a greater desire to perform well and, in fact, do so.

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VITA

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