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ABSTRACT

The purpose of this practicum was to develop, implement, and evaluate a system of behavior modification on a school-wide basis. The system developed was that of a token economy. Baseline data was gathered during the first three school months on behaviors identified as "avoidance." The system was implemented during the fourth school month and comparative data generated during the fourth and fifth school months. Target behaviors identified were increased punctuality, increased productive hours, and increased credit production. The system generated significant increases in credit production and productive hours but was not as successful in the area of punctuality. (Author)

BEHAVIOR MODIFICATION: A MODEL FOR IMPLEMENTATION OF THEORY IN A PROBLEM SITUATION

by Richard E. Stevens

Submitted in partial fulfillment of the requirements for the degree of Doctor of Education, Nova University

Los Angeles Cluster
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May, 1975

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BEHAVIOR MODIFICATION:
A MODEL FOR IMPLEMENTATION OF THEORY
IN A PROBLEM SITUATION

by

Richard E. Stevens[1]

INTRODUCTION

For most pupils, praise, teacher attention, stars, grades, and threat of punishment provide adequate incentive to behave in a socially approved manner. For some students, however, these methods are relatively ineffective. This is particularly true for school "dropouts," aggressive children, and some mentally

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[1]The author is principal of Del Paso High School, a small continuation high school in the Walnut Valley Unified School District, Walnut, California.

retarded children. Where the usual methods of social approval have been ineffective, token reinforcement systems have proven effective.

Many studies have used token reinforcement programs for the management of classroom behavior (Birnbrauer, Wolf, Kidder, and Tague, 1965;[2] McKensie, Clark, Wolf, Kothera, and Benso, 1968;[3] O'Leary, Becker, Evens, and Saudargas, 1969;[4] McLaughlin and Malaby, 1972;[5] O'Leary and Becker, 1967;[6] Phillips, 1968[7]). Although token reinforcement systems have proved effective in modifying

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[2]J. S. Birnbrauer, M. M. Wolf, J. D. Kidder, and Cecilia E. Tague, "Classroom Behvior of Retarded Pupils with Token Reinforcement," Journal of Experimental Child Psychology (Vol. 2, 1965), pp. 219-235.

[3]H. McKensie, M. Clark, M. Wolf, R.Kothera, and C. Benso, "Behavior Modification of Children with Learning Disabilities Using Grades as Token Reinforcers and Allowances as Back-up Reinforcers," Exceptional Children (no. 34, 1968), pp. 745-752.

[4]K. D. O'Leary, W. C. Becker, M. B. Evens, and R. A. Saudargas, "A Token Reinforcement Program in a Public School: A Replication and Systematic Analysis," Journal of Applied Behavior Analysis (Vol. 2, 1969), pp. 3-13.

[5]Thomas F. McLaughlin and John Malaby, "Intrinsic Reinforcers in a Classroom Token Economy," Journal of Applied Behavior Analysis (Vol. 5, 1972), pp. 263-270.

[6]K. D. O'Leary and W. C. Becker, "Behavior Modification of an Adjustment Class: A Token Reinforcement Program," Exceptional Children (Vol. 33, 1967), pp. 637-642.

behavior, most of the studies that employed token systems utilized a small number of subjects. Elery L. Phillips[8] utilized three boys in a home-style rehabilitation setting for "pre-delinquent" boys. In the J. S. Birnbrauer, et. al.,[9] study, a classroom of 17 retarded students was used and there were four teachers in the classroom at all times. O'Leary and Becker[10] had as subjects 17 nine-year-old children described as emotionally disturbed. McLaughlin and Malaby[11] studied the effects of token reinforcement on a combination fifth and sixth grade classroom where the class size ranged from 25 to 29.

The aim of the present research was to develop and evaluate the results of a token economy (based on naturally available reinforcers) in a continuation high school.

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[7]Elery L. Phillips, "Achievement Place: Token Reinforcement Procedures in a Home-Style Rehabilitation Setting for "Pre-Delinquent" Boys," Journal of Applied Behavior Analysis (Vol. 1, 1968), 213-223.

[8]Ibid.

[9]Birnbrauer, Ibid.

[10]O'Leary and Becker, Ibid.

[11]McLaughlin and Malaby, Ibid.

METHOD

Subjects and Setting:

The entire student body of a small continuation high school in the Walnut Valley Unified School District, Walnut, California, was involved in the study. The school size fluctuated between 45 and 79 students during the time span of the study. The author served as principal of the school.

The continuation high school provides an alternative educational environment for students who have difficulty in adjusting to the environment of the traditional comprehensive high school. Generally the student served is a young person with problems, many of which are emotional. All too frequently he may not have learned to read. He may express an attitude of not caring. This attitude, in turn, hinders academic achievement and, with each passing year, he falls farther and farther behind, until he reaches the conclusion that school and trying to learn is useless. He adopts "avoidance"[12] behaviors. He becomes tardy a great number of times, causes disruption in the classroom,

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[12]Robert F. Mager, Develping Attitude Toward Learning, (Palo Alto, California, Fearon Publishers, 1968).

becomes a truant, a drop-out, or a "school-phobic."

The continuation high school attempts to work with these students in both the academic and counseling/guidance areas. One difficulty in working with these students is the transient rate. Students enter the program at any time during the year and leave -- run-away, armed services, involvement with the law enforcement agencies, marriage, move out of the district -- at any time of the year. During any one school month the student population may change drastically.

Though the token reinforcement system was implemented for the entire school, only 30 student were enrolled for the full time span of the research. These students form the population reported in this paper.

Target Behaviors:

The behaviors selected for study were punctuality, productive time, and credit production. These were defined as "approach" behaviors -- ". . . an action that indicates a moving toward ... an object, activity, or situation . . :"[13]

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[13]Mager, op. cit., p. 21.

Increased punctuality, or decrease in tardiness, was defined as an approach behavior. A student who finds himself frustrated in the school situation avoids that situation. He is tardy, truant, or drops-out.

An increase in productive work time was also identified as an approach behavior to be encouraged. Productive work time was defined, following Carroll, as "the time during which the person is oriented to the learning task and actively engaged in learning."[14] Researchers at the University of Chicago studied the amount of time students spend in active learning. They found that the amount of time the student spends directly on learning is highly predictive of the learning achievement of the student.[15]

The third target behavior was increased credit production. Students in the continuation high school earn credits (units) for demonstrated mastery of material at an established criterion level of achievement. The credits are awarded singularly rather than following the

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[14] J. B. Carroll, "A Model of School Learning," Teachers College Record (Vol. 64, 1963), pp. 723-733.

[15] See Benjamin S. Bloom, "Time and Learning," American Psychologist (September, 1974), pp. 682-688.

procedure used in many schools of awarding credits at the end of a semester. This allows for charting the students' productive output over a period of time. We assume that as students reach an adequate level of achievement -- earn a credit -- over the preceding task, their confidence and interest in the task increases. This is an approach behavior we wished to encourage.

The effect of increased productive time and increased credit production is cumulative. As the student finds success in achievement -- earning a credit -- he gains in confidence and desire to learn, thus putting more time into the learning task. The opposite is also true. As the student devotes more time to the task he reaches achievement. We wished to reward both behaviors.

Token Economy:

The mechanics of the token economy were established through a committee of students and staff with the aid of two consultants from the Los Angeles County Schools Office. Token reinforcers took the form of "paper money."[16]

[16]Daniel L. Logan, "A "Paper Money" Token System as a Recording Aid in Institutional Settings," Journal of Applied Behavior Analysis (Vol. 3, 1970), pp.183-184.

Tokens Awarded:

Table I shows the number of tokens that could be earned for various approach behviors. There was some variability allowed. For example, Table I indicates that a teacher could award tokens for "special contracts," this being broadly defined as any approach behavior observed by the teacher. Examples would be: helping another student on a learning task, cleaning the work space or bookcases, helping another student to locate necessary learning materials, etc..

In the case of improving punctuality, a mathematical mean of tardiness time was calculated for the third school month. If the student entered the classroom during the fourth school month any amount of time earlier than that arithmetic mean, he would receive a token reinforcer for "improving punctuality." The mean was recalculated for each student at the end of the fourth month, the student notified of that average amount of time tardy, and thus given a new goal to achieve.

TABLE I

Approach Behaviors and Number of Tokens Earned

Behaviors that earned tokens	Number of tokens
1. Being on time	2
2. Improving Punctuality	1
3. Beginning Productive Work (within 10 minutes)	1
4. Each class hour of productive work	1
5. Completion of a credit	5
6. Special contracts	1

Privileges:

The tokens the student earned could be exchanged for the privileges shown in Table II. A special "Free Time" area was established in which these activities could take place.

TABLE II

Privileges and Token Cost

Privilege	Token Cost
1. Half Class Hour of Free Time a) Listening to Records b) Playing Board Games c) Watching Television	10
2. One Class Hour of Free Time a) Listening to Records b) Playing Board Games c) Watching Television	20

Mechanics of the Token Economy:

On the first day of the token reinforcement period each teacher placed a chart on the wall indicating the methods of earning tokens and the privileges to be earned. Each item was explained and discussed.

Each teacher was provided with an adequate supply of tokens and a special chart on which to record the tokens earned. Rather than color-coding tokens to indicate for which behavior they were awarded, a color scheme was used on the recording chart. Tokens were carried by each teacher and handed out immediately. If, for example, the student was punctual, he received his tokens immediately upon the start of class. Tokens for productive hours were distributed at the end of each class hour, and tokens for credits were awarded at the time the credit report was made out and signed by the teacher. The recording of the tokens was done at the close of each class hour by the teacher.

EXPERIMENTAL CONDITIONS

Base Period:

To obtain data which reflected the avoidance behavior

of the students, a base period was established. The teachers were asked to handle the students as they normally did. During the first two school months, the teachers were requested to keep accurate records on punctuality and productive hours. Punctuality was recorded by the number of minutes tardy each day. Credit reports, which are mailed immediately upon award of a credit, were recorded on a newly devised summary card.

Beginning in the third school month a series of in-service training session in Behavior Modification were held at the school. These sessions had as their objectives:

1. To increase the knowledge and understanding of the staff in the theory and use of behavior modification.
2. To provide the staff with new and/or improved methods of modifying individual student behavior.
3. To provide consultant service to the staff and student committee in the establishment of a system of reward for positive behavior.

Token Reinforcement Period:

Beginning with the fourth school month, the token economy was put into effect. The teachers continued to keep accurate records of behavior. The fourth and fifth

school months would used for purposes of comparison.

RESULTS

Punctuality:

Table III shows the total number of tardies, total number of minutes tardy, and average minutes tardy for the 30 students for the first five school months. During the first three school months, prior to the introduction of the token economy, there was a steady increase in the total number of tardies, total minutes of tardiness, and average minutes tardy. The fourth school month, upon introduction of the token economy, shows a slight decrease in the number of tardies but a significant increase in the total number of minutes tardy and the average minutes tardy. By the fifth school month the total number of tardies, the total minutes of tardiness, and the average minutes tardy had decreased significantly.

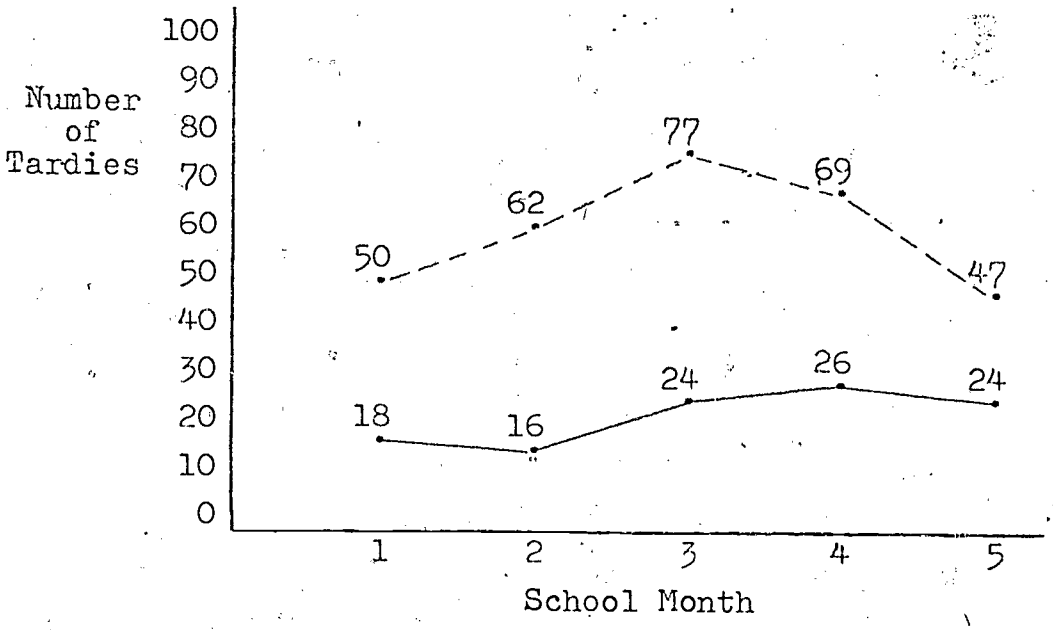
TABLE III
Punctuality

School Month	1	2	3	4	5
Total Number of Tardies	68	78	101	95	71
Total Minutes Tardy	1996	2300	3596	4269	2402
Average Minutes Tardy	29.35	29.48	35.60	44.93	33.83

Ten students accounted for 84% of the total minutes tardy and 73% of the total number of tardies for the five school month period. Figure I indicates that the pattern of the number of tardies for these students began a strong descending curve during the fourth and fifth school months. The pattern for the other twenty students showed a slight increase for the fourth month with a minor decrease for the fifth month.

FIGURE I

Total Tardies Per School Month
Ten Least Punctual as Compared
to Other Twenty Students



Ten Least Punctual ------
Other Twenty Students _____

Figure II, pages 15-17, presents data for each of the ten students who evidenced the greatest amount of tardiness. The figures make evident a general decrease in number of tardies and average minutes tardy per individual. Of these ten students, nine demonstrated a downward trend in number of tardies, eight demonstrated a downward trend in total minutes tardy, and eight evidenced a downward trend in average minutes tardy.

Credits:

Credit production increased significantly during the period of time under study. One can suggest that the first school month may be, in a sense, atypical. Students often enter with the resolution to study hard and do well. Teachers refer to this as the "honeymoon" period. This resolution tends to diminish around the fourth school week. Thus, it can be suggested that the first month provides a good standard to use in assessing if a student is working at his "best" rate.

Figure III indicates that the average number of credits earned per school day increased dramatically during the fourth and fifth school months, the time period of the token reinforcement sytem, reversing a

FIGURE II

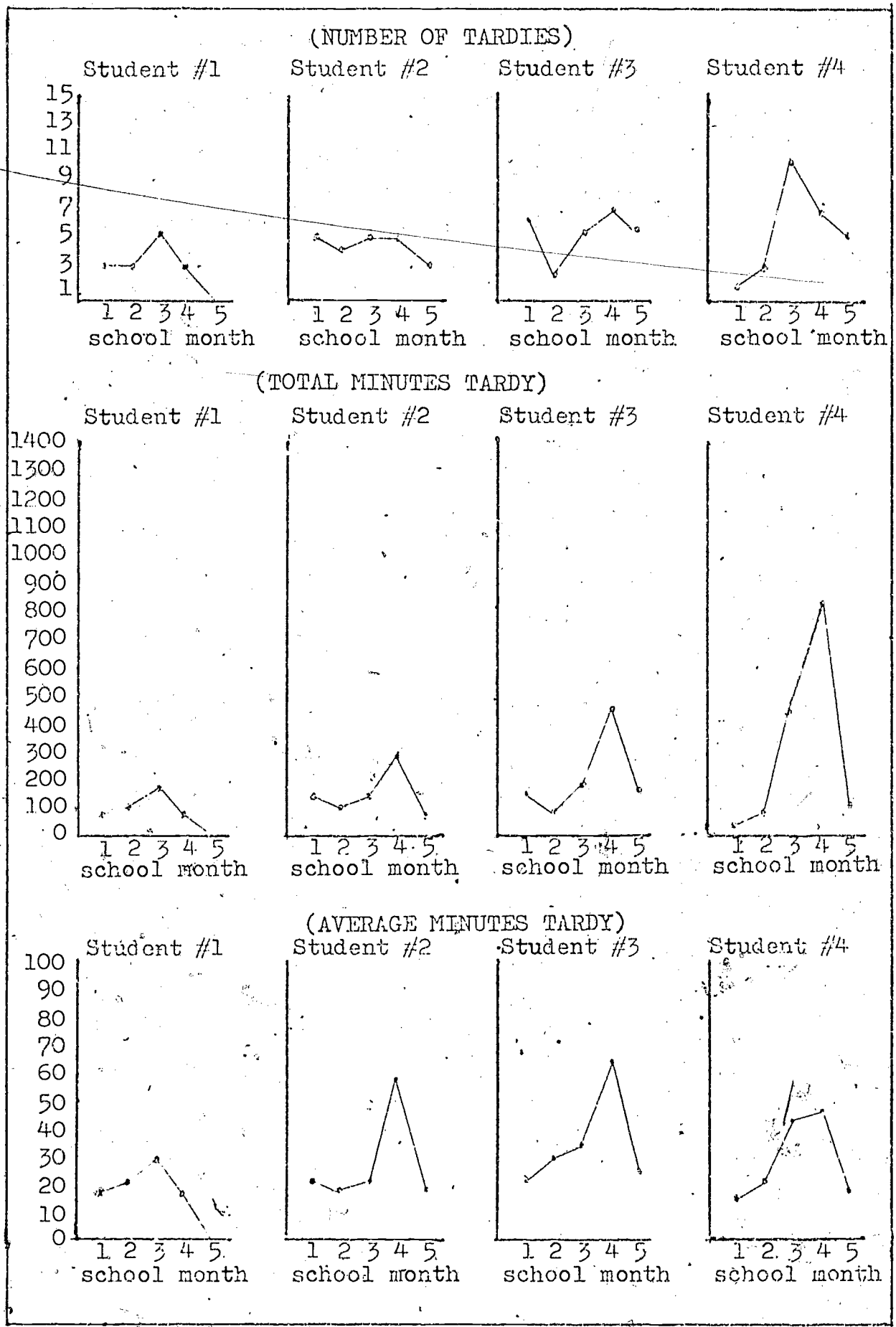

(NUMBER OF TARDIES)
Student #1
Student #2
Student #3
Student #4
15
13
11
9
7
5
3
1
1 2 3 4 5
school month
(TOTAL MINUTES TARDY)
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
(AVERAGE MINUTES TARDY)
100
90
80
70
60
50
40
30
20
10
0

FIGURE II (cont.)

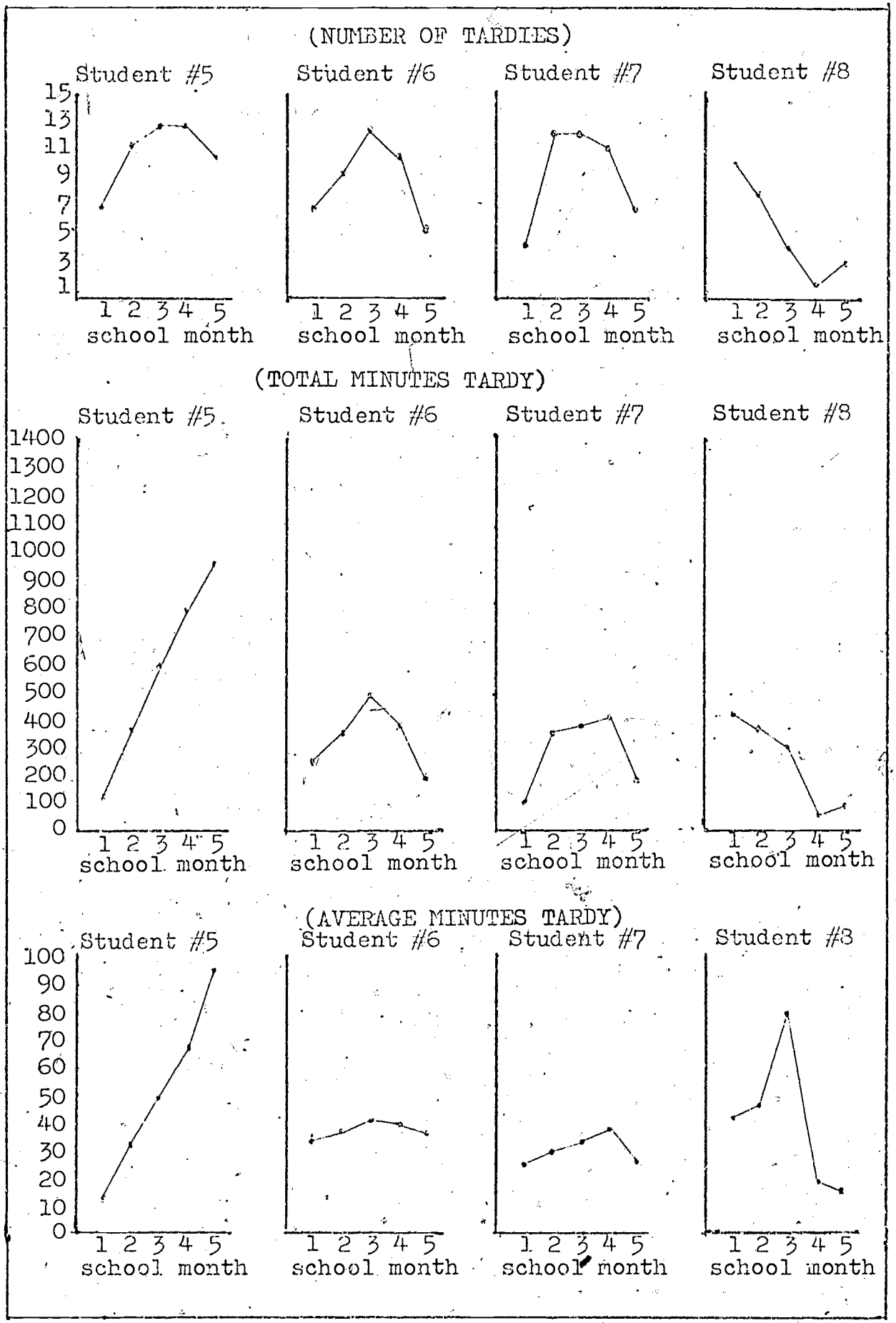
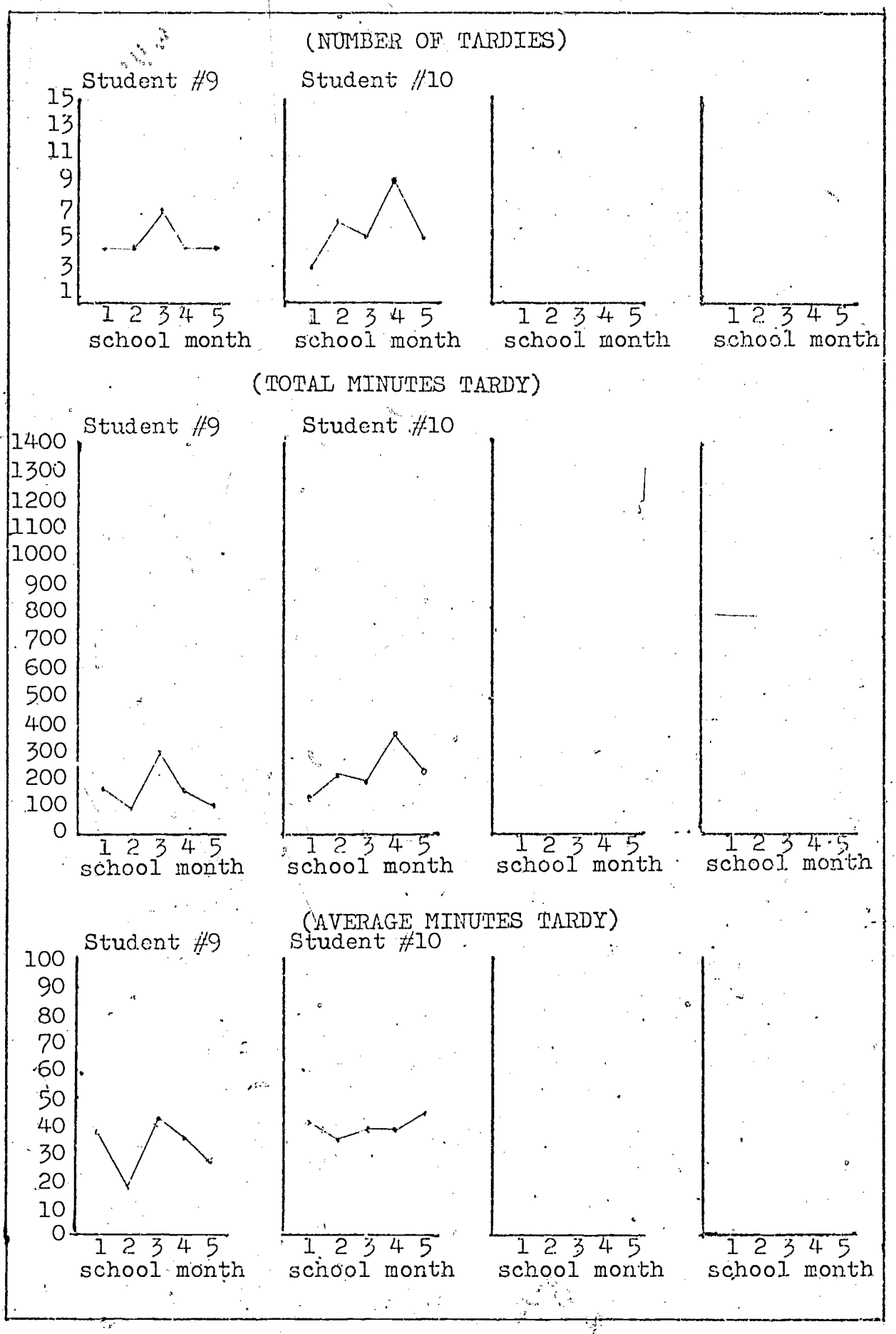


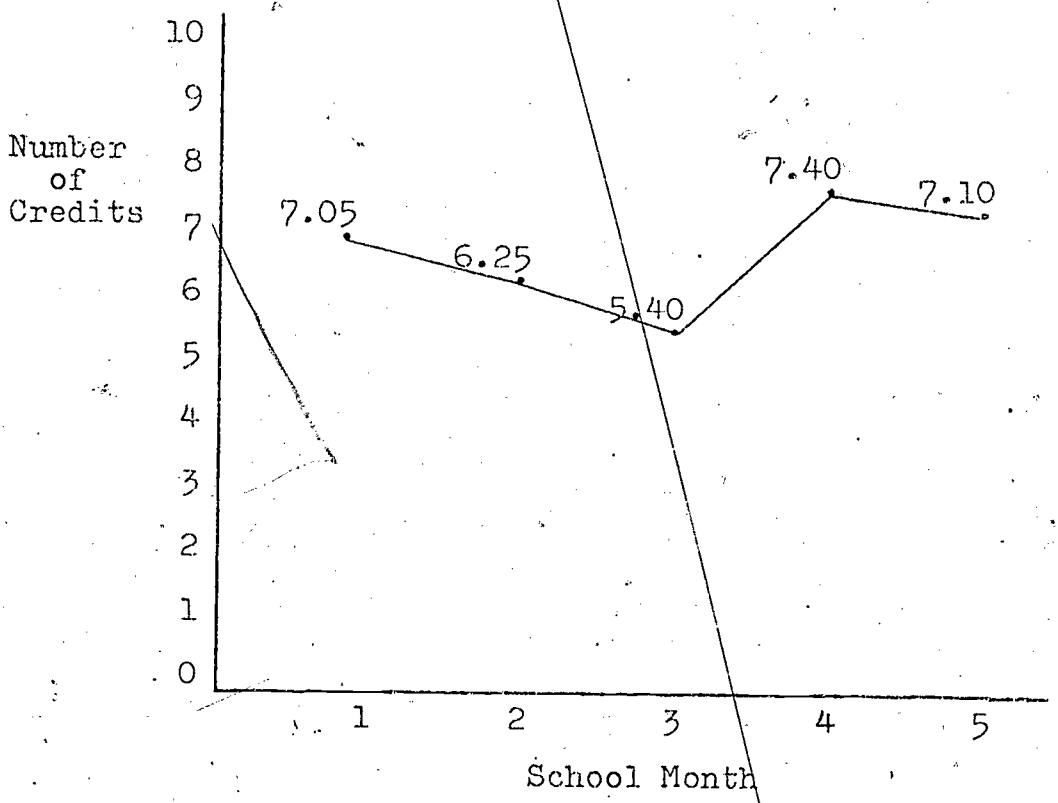
FIGURE II (cont.)



downward trend.

FIGURE III

Average Number of Credits Earned per School Day



Though there is a slight decrease in the fifth month, the arithmetical mean is slightly higher than the mean for the first school month.

When one compares the average credits earned per day

of the ten students identified above as poorest in punctuality with the other twenty students an interesting pattern emerges.

FIGURE IV

Average Number of Credits Earned per School Day - Identified Ten as Compared to Other Twenty Students

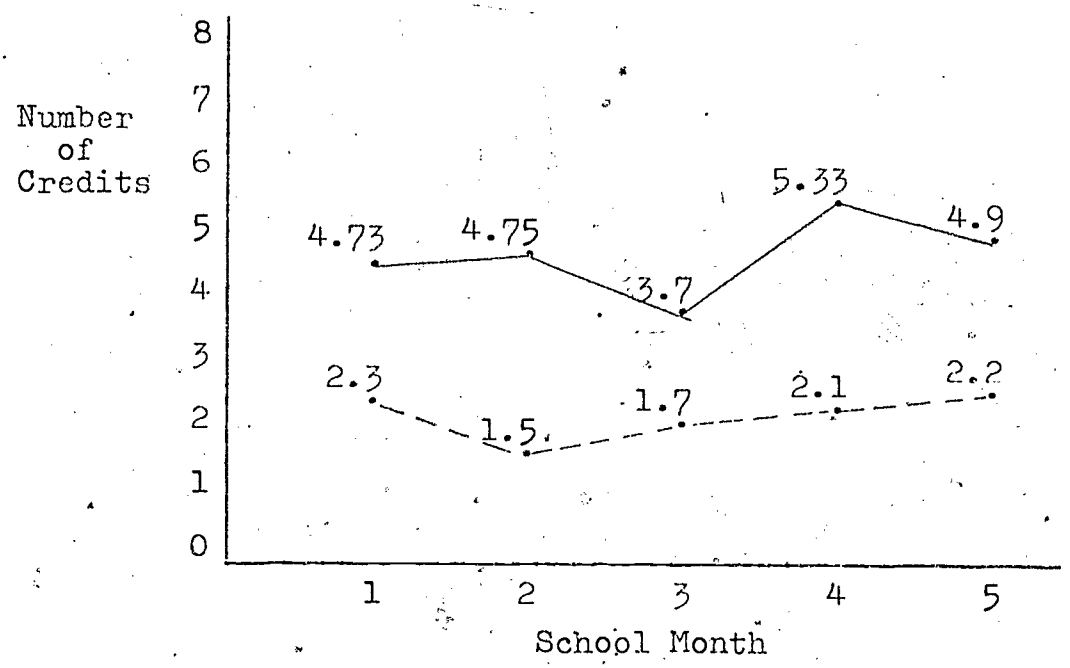


Figure IV indicates that a slight tendency developed in the "identified ten" towards increased credit production, however the greatest immediate effect

was upon the other twenty students. The difference between the third school month and the fourth school month is dramatic.

Productive Hours:

Productive hours were defined as that 55 minute class period during which the student is oriented to the learning task and actively engaged in learning.

By law, continuation students are required to attend 180 minutes of schooling per day or 2700 minutes per week -- a total per week of 15 hours. Some continuation schools operate on a period day, much like the comprehensive high schools, and thus allow the student to attend as many hours as he wishes per day above that minimum number. Other schools operate separate sessions -- morning and afternoon -- of 180 minutes each which allows for smaller class size and more individual attention. Our particular school operates in the latter manner. In addition, we utilize the structure of self-contained classrooms. It is then possible for the students to earn 15 productive hours per week and, dependent upon the number of school days

in the school month, a given number per month.

It was decided, for the purposes of the research, that earned "free time" hours would be considered as productive hours for the purposes of comparison. Tokens would not be awarded, however.

Since these hours were not available to the student during the first three months, and were added as an incentive, they must be considered as productive hours. Further, since the number of school days vary so much from school month to school month, total hours of productive work is not a valid measurement. The best measurement is the percentage of time spent in productive work.

Students entering the class tardy could not receive a token for an hour of productive work via definition of a productive hour.

Table IV, page 22, indicates the percentage of productive hours in relation to the total possible productive hours and in relation to the number of productive hours excluding tardiness. Two significant points emerge. If one was to plot curves for both percentages they would indicate a significant downward

trend for the first three months with a sharp upward sweep in the fourth and fifth months. Secondly, the percentage of time spent in productive work during the fourth and fifth months was much higher than during the first and second months.

TABLE IV

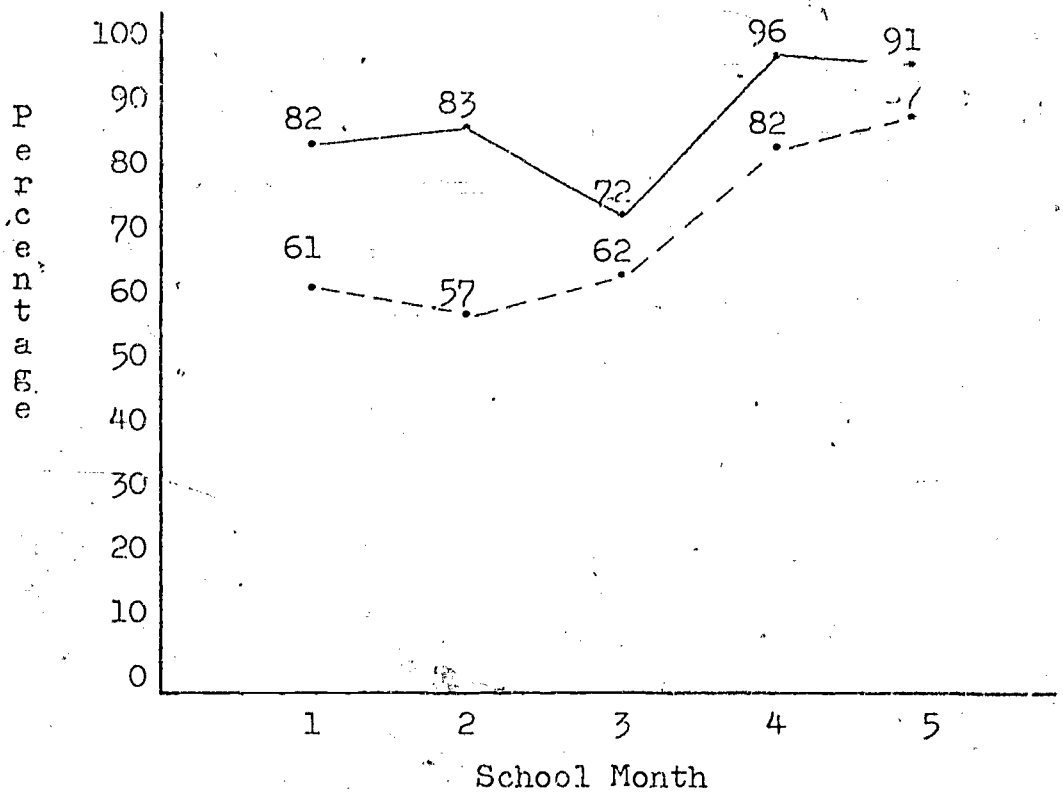
Productive Hours

School Month	1	2	3	4	5
Number of School Days	19	20	17	15	14
Total Possible Productive Hours	1710	1800	1530	1350	1260
Total Hours Lost via Tardiness	68	78	101	95	71
Number of Productive Hours Possible Excluding Tardiness	1642	1722	1429	1255	1189
Actual Number* of Productive Hours Achieved	1248	1224	964	1174	1071
Productive Hours as a % of Total Possible Hours	73	68	63	87	85
Productive Hours as a % of Possible Hours - Excluding Tardiness	76	71	67	93	90
Average Hours of Non-Productivity per Student	15.4	19.3	18.8	5.8	6.3

*Corrected to account for absences. Each student absent was awarded the productive hours.

Figure V examines the differences in productive time for the identified ten students as compared to the other twenty students. It is significant that the other twenty demonstrated an increase of 24% from the third to the fourth school month while the identified ten increased 20%. Even more significant is the fact that the ten continued to increase percentage of productive time while the others showed a slight decrease.

FIGURE V
Percentage of Time Spent in Productive Work - Identified Ten as Compared With Other Twenty Students



EVALUATION

Punctuality:

One purpose of this investigation was to cause drastic decrease in the number of tardies and amount of tardy time. Though bringing about some decrease, the amount was not that wished.

The system had its greatest effect upon those students who were identified as the least punctual. The number of tardies did decrease for the fifth school month below that for the first school month, but not significantly. For the other twenty students the number of tardies actually increased.

The staff and student committee evaluated this aspect of the system. The conclusion they reached were that tardiness is a difficult behavior to alter, therefore punctuality must be rewarded to an even greater degree.

Their recommendation was to increase the number of tokens for being on time to three while retaining the concept of awarding one token for improving tardiness. It was felt that this would be an added incentive to those who were rarely tardy to make even a greater effort and could act as a greater incentive to others also.

Credits:

Credit production increased significantly during the time span of the present research. Though the greatest immediate effect was upon the twenty students there was a gradual increase among the identified ten.

The data presented does not take into consideration the fact that students were using their tokens to purchase "free-time," and, in effect, were earning more credit in less time. Evaluation of this aspect of the program indicated very good response to the token system.

Productive Hours:

Productive hours showed the most dramatic increase. Students were using their time for learning to a much greater degree. The most significant growth was for those students who had evidenced the greatest amount of tardiness. During the first three school months only 60% of their time was spent in productive work while during the fourth and fifth school months 84.5% of their time was spent in productive work.

Modifications in the System:

The staff and student committee suggested a number of alterations to the system. Some of the modifications were adopted during the sixth school month. The recommendations were:

1. The addition of more alternatives for the "free-time" period, such as:
   a. the privilege of working outside the school;
   b. the ability to purchase items with their tokens; and
   c. the privilege of purchasing two hours of free time rather than just one.
2. To increase the number of tokens for punctuality.
3. The subtraction of tokens for not working and/or for being tardy more than the individual student's tardiness average.

It was decided to implement recommendations numbered 1a and 3 during the sixth school month. Evaluation of data for that month would contribute toward the decision on the other recommendations.

The data presented in this paper is for the first five months of the 1974/75 school year. The program, however, was continued for the entire school year at Del Paso High School, and, although the data is not included in this report, the degree of success continued. Tardiness

showed a continuing downward curve, credit production and productive hours continued to curve slightly upwards, plateaued during the seventh through ninth school months, and jumped upwards again during the tenth school month.

Variations were made in the program during the year. One major variation was that of introducing the ability to "purchase" items with the tokens. Aid was sought from businesses in the community and over $150 worth of donations were received. The donations took the form of merchandise - jigsaw puzzles, record albums, handicraft kits, hand tools, baseballs, softballs, cosmetics, etc. - which were made available for purchase at the school office. Token costs were established by a student committee under supervision of the principal. Merchandise items "sold-out" very quickly and served to illustrate that this was a direction the students really wanted to move in.

The student committee also developed the idea, too late in the year to be implemented, to hold a weekly raffle. Each token received would be like a "raffle ticket," thus the more earned the better the opportunity of winning. A weekly drawing would be held and the winner presented with some prize. The student group suggested

having a profit making venture early in the 1975/76 school year to obtain funds to finance this addition.

The students did promote a "Chili-Dinner" in April of 1975 to raise funds to provide more materials for the "Free-time" area. Over $400 was raised and used to purchase more record albums, bean-bag chairs, and a new stereo tape and record deck with head sets. The event indicated the students desire to improve the token economy, like for the system, and had the effect of coalescing the student body into a tight-knit, positively functioning body.

PRACTICUM APPLICATIONS

The token system worked extremely well at Del Paso High School. It will be continued during the 1975/76 school year with the modifications noted. At this point, I have set dates with local service and community organizations to discuss the program and seeking financial aid for purchasing merchandise. I will be speaking to the local Optimist, Rotary, Kiwanis, Junior Chamber of Commerce, and Women's Club in August and September to

seek their support again. The data, as represented in this report, should provide the data to sustain their support. Again, the program will be continued at Del Paso High School during the 1975/76 school year.

This paper will be published in the October issue of Continuation Education. I am also, as intimated above, reviewing the data for the other school months and preparing a paper for presentation to other journals as to the program's functioning over a total school year. It is my intention to seek publication in the Journal of Applied Behavior Analysis and/or the Journal of Experimental Child Psychology. Such articles, it is wished, would lead to similar programs in other, perhaps similar situations.

I will be presenting this paper at the Fall (October, 1975) California Continuation Education Association Conference and the Annual Association of California Child Welfare and Attendance Officers Convention (April). Each conference will provide the opportunity to explicate our system and may lead to other schools adopting and adapting the program.

Introduction and implementation of this program at other continuation schools in the state has not occurred. The major reason is the lack of communication. Although the paper presented showed significant success and held promise for even greater success, a full years collection of data would be more valid. Therefore, I have not "publicized" the program. Such data is now available, the paper is being rewritten, and the presentations scheduled should lead to implementation in other, similar, situations.

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