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ABSTRACT

Program descriptions are introduced by theories of the reasons for the apparent low IQ of many black ghetto children. The theories are the genetic, the stimulus deprivation, the expectation, and the learning-exchange theory. Five experiments with ghetto underachievers are described. The first was designed to use token exchange in a remedial class with good work completion resulting from the top two-thirds of the class of 33. The second experimental group showed marked improvement in a delayed exchange, after-school program. Social communication and increased verbalization resulted in experiment three with continuous token exchange being utilized with four non-verbal children. Student-peer tutoring in the fourth coupled with immediate exchange produced good improvement, and the entire group showed marked improvement in reading ability and IQ at the end of the full year program (experiment five). A case study and tables of results are included. (JM)

REPORT 2

PROGRAM ACTIVITY 12

DIRECTOR: ROBERT L. HAMBLIN

STRUCTURED EXCHANGE AND CHILDHOOD LEARNING: GHETTO CHILDREN

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GHETTO CHILDREN

Because of its many long-term ramifications, the education of Negro and other minority children who inhabit the ghettos may be one of the most serious crises of our time. While the depths of the problem have been documented by data from several investigations, none are as definitive or, for that matter, as discouraging as those presented in the Coleman report (Coleman, 1966). The data, most of which is summarized here in Tables 4.1, 4.2, and 4.3 show that Negro and other minority children start behind white children in verbal ability, reading ability, and mathematical ability, and that the gap progressively widens in the older grades.

As an extreme indication, Negro children in the twelfth grade in non-metropolitan schools in the northeast test out 5.2 years behind in verbal ability, 4.9 years behind in reading comprehension, and 6.2 years behind in mathematical achievement. This, mind you, is the comparison between twelfth graders who are in school. If those who had dropped out by the twelfth grade were also included, the differential would be all the greater.

Why? Why should minority children fare so poorly in the present educational system? Social scientists have developed several theories to explain the initial and cumulative deficit in the case of Negro children. We will focus on each of these theories.

TABLE 4.1

VERBAL ABILITY: NUMBER OF GRADE LEVELS BEHIND THE AVERAGE WHITE IN METROPOLITAN NORTHEAST FOR ALL GROUPS

Race and Area	Grade Levels Behind		
	6	9	12
White, nonmetropolitan:			
South	0.7	1.0	1.5
Southwest	.3	.4	.8
North	.2	.4	.9
White, metropolitan:			
Northeast	...	...	...
Midwest	.1	.0	.4
South	.5	.5	.9
Southwest	.5	.6	.7
West	.3	.3	.5
Negro, nonmetropolitan:			
South	2.5	3.9	5.2
Southwest	2.0	3.3	4.7
North	1.9	2.7	4.2
Negro, metropolitan:			
Northeast	1.6	2.4	3.3
Midwest	1.7	2.2	3.3
South	2.0	3.0	4.2
Southwest	1.9	2.9	4.3
West	1.9	2.6	3.9
Mexican American	2.0	2.3	3.5
Puerto Rican	2.7	2.9	3.6
Indian American	1.7	2.1	3.5
Oriental American	.9	1.0	1.6

TABLE 4.2

READING COMPREHENSION: NUMBER OF GRADE LEVELS BEHIND THE AVERAGE WHITE IN METROPOLITAN NORTHEAST FOR ALL GROUPS

Race and Area	Grade Levels Behind		
	6	9	12
White, nonmetropolitan:			
South	0.5	0.8	1.0
Southwest	.1	.3	.5
North	.2	.3	.5
White, metropolitan:			
Northeast	...	...	...
Midwest	.1	.1	.3
South	.3	.4	.4
Southwest	.4	.7	.4
West	.2	.5	.8
Negro, nonmetropolitan:			
South	2.7	3.7	4.9
Southwest	2.4	3.3	4.5
North	2.2	2.6	3.8
Negro, metropolitan:			
Northeast	1.8	2.6	2.9
Midwest	1.8	2.3	2.8
South	2.1	3.0	3.9
Southwest	2.1	3.0	4.1
West	2.1	3.1	3.8
Mexican-American	2.4	2.6	3.3
Puerto Rican	3.1	3.3	3.7
Indian American	2.0	2.3	3.2
Oriental American	1.0	.9	6.1

TABLE 4.3

MATH ACHIEVEMENT: NUMBER OF GRADE LEVELS BEHIND THE AVERAGE WHITE IN METROPOLITAN NORTHEAST FOR ALL GROUPS

Race and Area	Grade Levels Behind		
	6	9	12
White, nonmetropolitan:			
South	0.7	0.9	1.4
Southwest	.3	.3	.8
North	.2	.1	.8
White, metropolitan:			
Northeast	...	...	...
Midwest	.1	.0	.1
South	.4	.6	1.2
Southwest	.6	.7	.6
West	.3	.3	.8
Negro, nonmetropolitan:			
South	2.6	3.7	6.2
Southwest	2.4	3.2	5.6
North	2.2	2.8	5.2
Negro, metropolitan:			
Northeast	2.0	2.8	5.2
Midwest	2.1	2.5	4.7
South	2.4	3.1	5.6
Southwest	2.3	3.0	5.7
West	2.4	3.1	5.3
Mexican American	2.2	2.6	4.1
Puerto Rican	2.8	3.4	4.8
Indian American	2.0	2.4	3.9
Oriental American	1.0	.4	.9

The Genetic Theory

The oldest, the most unkind theory, which has been offered to explain the apparent retardation of so many Negro children argues that the Negroes are biologically inferior. Low scores on IQ tests, reading difficulties, poor mathematical ability are interpreted as reflecting an innately inferior mental capacity. Negro children, according to this view, are less capable of learning than are whites and any attempt to alter the genetic deficit is doomed to failure (Garrett, 1961; Schuey, 1958).

This theory has been discredited to some extent by the research of Otto Kleinberg (Kleinberg, 1935) in the 1930's and E. S. Lee in the early 1950's (Lee, 1951) which showed that the IQ scores of Negro children improved significantly with the length of residence in New York City and in Philadelphia. The findings suggested that intelligence is intimately related to environment and will increase as children are moved from an inferior situation in the rural south to a more positive stimulating one in New York City.

Since Kleinberg's and Lee's pioneering efforts, numerous studies of the problem point to the powerful influence of"...lean, hostile and constructive environments..." in reducing both Negro and white intelligence scores. On the whole, these studies suggest that race may not be a significant variable of learning, but suggest instead the following hypotheses as formulated by Pettigrew: (Pettigrew, 1964)

1) When environments approach being equally restrictive for both Negro and white children, the intelligence test means of both groups will be low and approximately equal.

2) On the other hand, when the environments of Negro and white children are equally stimulating, the intelligence tests means in both groups will be high and approximately equal.

3) When a group of children of any race move from a comparatively restricting to a comparatively stimulating environment, their IQ's on the average will increase substantially, that is, ten points.

While the evidence for the above is not as clearcut as it might be, in a poll of the members of the American Psychological Association, who as a group are perhaps the most competent of any to adjudge the evidence, roughly 21,000 agreed with the above conclusions and only 3 support a "scientific racist" position. (Pettigrew, 1964) Be that as it may, investigations of the genetic or racial theory of retardation of ghetto children have invariably led to alternative hypothesis that the difficulties in educating disadvantaged minority children are largely due to factors in the social environment.

The Stimulus Deprivation Theory

Best expounded by Martin Deutsch (Deutsch, 1967), the deprivation theory suggests that the root of the problem lies in early years before the child attends school. Deutsch maintains that many disadvantaged children do not receive the stimulation in their homes necessary to promote development of the prerequisite academic skills, that these children suffer from what is generally known as "stimulus deprivation". The suggestion is that since the range of input experiences for the disadvantaged is restricted, they do not develop normally and their output therefore is inferior. Overcrowded urban living, according to

Deutsch, limits the range of experience with colors, shapes, language and object relations. Individualized training is apparently rare. Because he is ignored so much by adults, the child is offered little opportunity to manipulate and to organize the properties of his environment. Parental training focuses on discipline and obedience. They infrequently reward the sensory, emotional and cognitive skills which are required for the first and higher grades.

Deutsch admits that ghetto schools are not doing an adequate job. However, he seems to feel that their failure is due largely to discrepancies between the teachers' expectations of the first grader and the skills he actually possesses. If these skills can be developed by age 6, according to the theory, the child and the school would not experience such frustration with one another. An obvious corrective strategy then is to establish pre-school programs which provide educational stimulation prior to the first grade level. These pre-schools would theoretically provide ghetto children with the skills and attributes that they would need at the first few grades. Such a head start would lead to a better educational future and would eliminate the early frustration which develops into eventual failure and dropout.

Deutsch's argument has a logical appeal and a number of studies have shown that certain pre-school programs do improve the IQ scores as well as the achievement of deprived children (Clark, 1965; Deutsch, 1967). However, as Deutsch admits, the success is not universal. The quality of the educational experience in the pre-school appears to be crucial, and at the present time, pre-schools apparently involve many diverse educational approaches which are differentially effective.

The problem with Deutsch's theory is that it fails to specify the kind of educational experience which the deprived child must go through to benefit or improve IQ or achievement. Furthermore, even if the pre-school program does provide a beneficial educational experience, there is no necessary expectation of or evidence for long term success. Several years in a blackboard jungle may very well undo the educational advantage which might accrue from one year or part of a year in a pre-school program such as Headstart.*

The Expectation Theory

The Haryou data show that on the average Harlem youth drop in IQ 4.3 points between the third and sixth grades (Clark, 1964). However, a summary of these data in Table 4.4 suggests that this average drop from 90.6 to 86.3 is largely the result of what happens in about half of the schools. Thus not all of the schools in Harlem are equally good or bad. Some apparently had little if any negative effect on IQ. However, 50% did have a substantial negative effect and the worst was a calamity. School S showed a drop in measured IQ from 98.7 (which is about normal) in the third grade to 82.2 (which is the upper edge of the so-called borderline defective range) in the sixth grade. Thus it is evidently quite possible to put normal children in a school situation and "educate" them to be deficient. How could such a catastrophe occur?

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*Several studies, including the Haryou and Coleman reports, show that achievement and IQ scores for ghetto children fall farther and farther behind national norms as the children go through school.

TABLE 4.4

MEDIAN I.Q. SCORES OF THIRD, SIXTH, AND EIGHTH GRADE PUPILS, CENTRAL HARLEM ELEMENTARY AND JUNIOR HIGH SCHOOLS

Schools	3rd Grade	6th Grade	8th Grade
A	88.8	79.8	...
B	86.5	85.4	...
C	89.3	87.7	...
D	90.4	84.1	...
E	89.0	87.5	...
F	90.0	86.2	...
G	85.9	81.8	...
H	92.7	91.3	...
I	89.9	84.8	...
J	92.4	89.4	...
K	91.9	86.3	...
L	89.4	85.0	...
M	95.7	93.1	...
N	94.0	85.7	...
O	91.2	88.1	...
P	91.0	82.9	...
Q	89.7	89.7	...
R	89.0	85.4	...
S	98.7	82.2	...
T	93.0	90.9	...
W	...	...	87.0
X	...	...	85.9
Y	...	...	87.7
Z	...	...	90.3
All Schools	90.6	86.3	87.7

One theory, which we will call the expectation theory, was developed by another group of social scientists well represented by psychologist Kenneth Clark (Clark, 1965). Biological inferiority and cultural deprivation theories assume an important place in Clark's thinking but for reasons other than we have encountered previously. Clark argues that these are important not because of the explanation they offer for the educational failure of Negro children but for the "expectations" they create in the mind of ghetto teachers. Clark asserts that derogatory labels such as retarded or deprived probably condition a teacher to expect inferior work from ghetto children, and her expectations are then likely to be self fulfilled in a vicious cycle of behavior which fails to exceed low expectations and thus confirms the "correctness" of the expectations. In this sense, deprivation theories are just as damaging as genetic explanations since they, too, needlessly produce low expectations of the children's capabilities.

Clark does not maintain that impoverished backgrounds, overcrowded classes, inadequate plants and unimaginative curricula are not important factors in educational failure. He does argue, however, that by far the most powerful forces in determining the educational future of ghetto children are the competence of the teacher and her attitudes of acceptance or rejection of her students. Competent teachers are those who have confidence in their children's ability to achieve and who systematically stimulate them to increasing development. Clark suggests that without this confidence, pre-school programs, improved textbooks, and smaller classes will be of little help. The real key to educational success, according to Clark, is high expectation of achievement and confidence in human intelligence.

Clark's ideas have received some direct support in the work of Dr. Samuel Shepard and his Banneker School District in St. Louis (Clark, 1965). A program was developed in these schools to raise the expectations which the teachers had of their children and to develop more positive attitudes toward the educational possibilities of the children. Under this program, eighth graders went from 7.7 years in reading, to 8.8 in two and one-half years; from 7.6 in language to 9.9; and from 7.9 to 8.7 in arithmetic. In addition, children assigned to the brightest educational track jumped from 7% to 22% while those in the slowest track fell from 47.1% to 10.9%.

Additional support for the"expectation theory" comes from a similar although much more expensive project in a New York junior high school (Clark, 1965). The "Higher Horizons" project emphasized academic courses, strengthened school guidance facilities, offered numerous field trips, and tried to involve the parents in an effort to improve both the students' image of themselves and the teachers' expectation of the students. After the program began, six times as many students (25%) went to college than before (4%); the dropout rate fell from 50% to 25%, IQ's in the 11th grade went up an average of 8 to 9 points in two academic years, and the average student gained 4.3 years in reading scores. Since only average or above average students participated in the study, however, it is impossible to know whether the slower students would also have benefited.

A third research program which supports the "expectation theory" is the work of Robert Rosenthal (Rosenthal, 1967). Teachers were told that a randomly selected group of children were potential

"bloomers" and could be expected to perform well in school. Although in reality there was no objective reason to expect the children to perform better than the control group, they did, particularly in the lower grades. First graders in the experimental group gained 15.4 more IQ points than did the control children, and in the second grade, the relative gain was 9.5 IQ points.

While it is probably true that the ghetto teachers' lack of confidence in the children hinder the teaching-learning process in school, the theory neglects the details of how learning occurs or fails to occur in the classroom setting. This has led some critics such as Thomas Pettigrew, Robert Rosenthal and others to suggest the possibility of a Hawthorne effect for ghetto education (Pettigrew, 1964; Rosenthal, 1967). They conclude that any intervention could bring an improvement simply because those who are running the experimental program will give extra attention to the teachers and to the students. Such an interpretation is undocumented and, we feel, untrue.* Success or failure of an educational program probably depends on the degree to which that program is consistent or inconsistent with the laws of human learning.

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*The "More Effective Schools" program in New York City has shown that the Hawthorne Effect does not always work. In this massive intervention, classes were reduced to a maximum of 15, team teaching was developed, a large clinical team of specialists was assembled, and teachers received intensive training. Teacher morale and attitude improved considerably. Yet, although the program required twice the per pupil costs of most ghetto schools, the "...program has made no significant difference in the functioning of the children..." (Urban Review, May, 1968).

Learning Theory

According to learning theory, as we have noted, the exchanges which the teachers structure in the classroom are crucial to the students' progress. He will learn academic subjects to the extent that he is rewarded consistently for academic work and progress in exchanges with the teacher. On the other hand, if he is rewarded consistently in such exchanges for sitting still, for parrotting, for disrupting, for aggressing, then he will learn to sit still, to parrot, to disrupt, and to aggress. Thus, as we have seen with the hyperaggressive and the normal children, the exchanges which the teachers have inadvertently or advertently structured will to a large extent determine what learning and/or other behavior occur in the classroom.

What are the characteristics of the classroom exchanges in the ghetto? What effects do these have on the children who are supposed to learn in such systems?

It is not possible to generalize about all ghetto classrooms. By and large teachers structure exchanges in the classroom and teachers vary in style, in ability, and in method. However, most of the better teachers in our culture use structured exchanges where grades and their own approval are used as extrinsic rewards for the academic performances of their students. These positive structured exchanges, weak as they usually are because the rewards are so delayed and fleeting, are usually supplemented with negative structured exchanges, which involve consistent punishment for disruptive or other behaviors which are aversive to the teacher. This system works best where it is supplemented with positive and negative exchanges which the parents

structure using their approval, disapproval and other extrinsic rewards and punishment for good deportment as reported in teacher/parent conferences and for academic achievement or failure as reflected in grades. In a ghetto, the system appears to be less effective, in part because the children may not be socialized initially to value their teacher's approval and to value academic achievement. Also grades may not be meaningful rewards because they have not been backed up with other appropriate rewards at home. In other words, the traditional positive exchanges may not be very meaningful in the ghetto school. Consequently, the teachers are essentially left with negative exchanges which become exaggerated in the absence of meaningful positive exchanges. Therefore, many ghetto schools, at least those manned by teachers who are of the same minority as the students, use the rattan or bamboo whip. (This whip is about a half inch in diameter and about 18 inches long. It is flexible enough to sting without breaking skin or bones.) When a child gets out of line, he is simply taken to the boiler room and whipped soundly.

According to exchange theory, when a meaningful positive exchange for academic work and progress is absent in the school and when negative exchanges are predominantly used to control the children in school, then a) the children should fail to work and therefore learn to capacity, b) they should fail to develop study habits and c) they should develop an avoidance pattern which might show up variously as daydreaming in class, sleeping in class, skipping class, and ultimately dropping out of school. This is precisely the predominant pupil response pattern that one observes in ghetto schools.

If this analysis is correct, then the remedy is again relatively straightforward. Train ghetto teachers to structure meaningful positive exchanges for academic work and achievement, and to avoid punishment by ignoring disruptions; or, if the disruptions cannot be ignored, to time out the disruptive child in an effective way. In other words, the remedy for education in the ghetto is similar to the remedy for the education of hyperaggressive boys and for the young normal child. However, the reasons for adopting it are somewhat different.

Experiment No. 1

The first of the experiments to be described here was conducted in cooperation with a local school district. The subjects were 11 of a group of 33 Negro students in a remedial first grade. These were children who had completed kindergarten (many of them Head Start), but who were judged not to be prepared for regular first grade work. Thus, they were placed in a special class in the hope that remedial training would improve their school performance. From a more cynical point of view, this was a class of first graders already segregated to become the slow learners, the truants, the dropouts, et cetera.

According to the Superintendent in charge of the school district, the teacher of this class was one of the better teachers in the system. To us she appeared to be dedicated, well prepared, and, in general, quite able. She was effusive in her praise for the children when they were doing well, and she would, on occasion, reward the children with a piece of penny candy. However, she did not countenance

any nonsense. She ruled the class with a sharp tongue when they got out of order. And, as with the other teachers in the school, when the children didn't respond to the sharp tongue, they were either sent to sit in the hall for long, long periods or thrashed with a rattan whip in the boiler room.

Data were taken during one-half hour each day on just eleven of the thirty-six children who were taught by an assistant teacher who was hired by our laboratories and trained by our staff. At the beginning of this period each day, she simply assigned the lessons and instructed the children how to do their assigned work. During ten of the thirty minutes, she moved from child to child in the group, helping them, answering their questions, giving them individual instruction, and on occasion, disciplining them. During the rest of the time, the students were left alone--first with the assistant teacher absent, and the regular teacher supervising all 33 students, and then with both teachers out of the room.

The experimenter and his data-taker sat in the corner of the room and, using a special recording device, measured the time which each of the children actually worked at the assigned task during each of the ten-minute periods. The work assigned involved discrimination exercises, rhyming exercises, and other such paper and pencil, crayon, tasks which required them to draw lines between objects which were alike or which rhymed, and then to color each pair a specified color.*

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*The sequence of these three experimental periods was changed each day so that no one condition would be disproportionately affected by variables related to time.

The data in Figure 4a show that during this first period, the ten experimental children worked about 75% of the available time when both teachers were present. However, it is significant to note that the trend line was downward from about 80% at the beginning of this baseline period to about 70% toward the end. When the first teacher was out of the room, the percentage dropped to between 65 and 55%, and when both teachers were out, to something less than 50%.

When the token exchange was instituted, there was a dramatic change in the children's work pattern. From almost the first day the children worked at their studies 90 to 95% of the time, whether both teachers were present, or one or both were absent. In other words, the data suggests that the incentives provided by the structured exchange were sufficient to maintain a strong work pattern with or without teacher supervision. We had somewhat expected a substantial improvement, but not the disappearance of such a differential work pattern.

In the history of our research, this is a crucial result for it suggests that a token exchange is easily adapted to the usual classroom. Our experience to this point had been with continuous token exchanges which are too time consuming to be practicable in all but a special classroom. At best a good teacher can handle only ten students on a continuous exchange. However, this was not a continuous, but a delayed exchange where the rewards were given only for work correctly done. With the more limited children, the hyperaggressive, or the very young, an exchange system to be effective must be continuous. A delayed system will simply not work until a child is relatively well socialized. Until this experiment was run with this class of slow

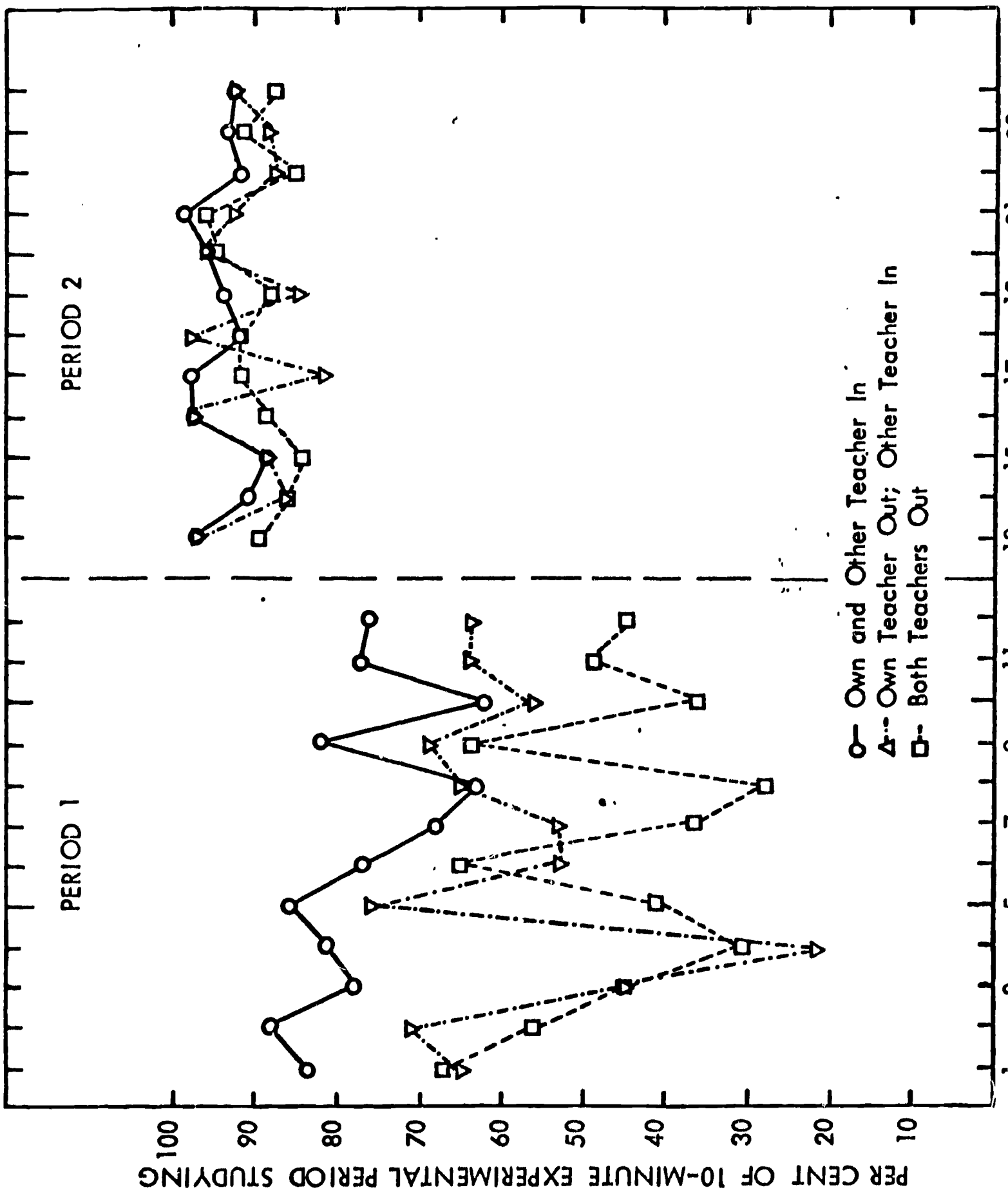

FIGURE 4a. Comparison of per cent of time children spent in independent work with their own and another teacher in the room, with their own teacher out and another teacher in, and both teachers out of the room under the traditional classroom system in Period 1 and under a structured token exchange system in Period 2.

learners, we were unsure where that cutting point might be. The experimental group represented the top third of the class, at least according to the teachers' initial judgment of academic ability. The second group started the token exchange with the other teacher at the same time the first group started, and their response was similar, although we never took accurate measurements. However, a third group, adjudged lowest in academic ability by the teachers, did not respond to the delayed token exchange. They worked, or at least went through the motions, but most did not learn.

In our laboratories when one system fails, rather than give up on children, shunting them off, we routinely turn our attention to developing a more powerful system that might work. To us, non-learners or slow learners represent a greater challenge and hence, to us, the greater interest. This slow group was therefore singled out for special instruction, the details of which will be discussed later.

Experiment No. 2

While it, too, is not entirely without flaws, an experiment by Montrose Wolf and his associates in Kansas City, Kansas, is most instructive (Wolf, 1968). Unable to get the cooperation of a local school board to run a demonstration project in a regular ghetto classroom, Wolf and his associates established a private school which pupils attended after regular school, for approximately three hours each evening. The students who were invited to attend were sixth graders, a 50% random sample of a population of 30 who had the most academic problems in that grade in two local ghetto schools. These students were asked if they wanted a job to earn money for doing additional school work

in the evening. Every one of them agreed with parental permission, except one whose parents would only give permission if the younger brother could participate also. So one fifth graderwas included in the experimental class.

A delayed exchange was used in this school, similar to that used with our remedial first grade. Points were exchanged for assignments completed, and the number of points increased with the quality of the work. With their points, the children could buy dinner, toys, sundries, candy, soda in the school store, admission to a field trip that was scheduled for each Saturday morning, or they could redeem their points in money. The children earned points for doing their homework which had been assigned that day in the regular school, for working through remedial programmed learning texts designed to supplement the regular school work, and for making progress in grades given by the regular teacher on the regular report card every six weeks. The children worked at their own speed. They received help from a teacher or assistant teacher at any time and, when an assignment was completed, had the work graded immediately. The points were passed out as part of the grading process.

What were the results? Before attending this evening school, the children in the experimental group had averaged a D- on their report cards. Within a year, that average had increased to a C, with a number of the students doing B and A- work. On the Stanford Achievement Tests in prior years, the experimental and control group had been able to progress at the rate of .6 grade level per academic year, on the average. During the academic year in which the experimental

group was on the exchange, they improved 1.5 grade levels and the control group improved .8. There were, of course, individual differences; some of the students were able to earn a B average where others improved only to a D average. There was one boy who made essentially no progress. With him, the exchange system failed for reasons that are not too clear. However, it is interesting to note that this is the only boy who was arrested for stealing or any other delinquent act during the duration of the experiment.

While impressive, Wolf's demonstration would be even more so had it taken place in a regular ghetto school, had the children been able to make such marked academic progress during the regular school day. However, such demonstrations will come in time as educators allow themselves to be persuaded by experimental data.

Experiment No. 3

What happens to children, usually the very worst students, who do not or possibly cannot respond to a delayed token or point exchange? We have seen some of these students in the experiments described thus far. Can they be helped? The evidence suggests they can, by increasing the power of the exchange, 1) by making the exchange more immediate, less delayed, and 2) by using more valuable rewards and 3) by making the work required to initiate the exchange less costly.

At our laboratory at the Mullanphy pre-school, 22 Negro children ages 3 to 5 attended regularly. All lived in or near the notorious Pruitt-Igoe Housing Project, the majority coming from families on ADC.

As in the other experimental schools, the teachers were instructed to ignore the aggressive-disruptive behavior and to reward attention and cooperation with social approval and the plastic tokens, which later on were exchanged for milk, cookies, admission to the movies, and for toys at a shop, et cetera. The children quickly caught on to the system and as they did, the disruptions diminished and cooperation increased. Within three weeks, most of the children were participating in the lessons and disruptive behavior had become only an occasional problem.

After the token exchange system was well established and was well understood by both teachers and students, attention was focused upon seven of the children with verbal problems--those who,in spite of the introduction of the token exchange,were still talking and otherwise progressing far below the normal rate. Seven were involved. They seldom initiated verbal exchanges with the teachers or with other students, but they would sometimes answer with a word when queried directly. Although this pattern of non-talking may be unusual in the middle classes, it is quite common among children in the ghetto. Past research (I.R.C.D. Bulletin, 1965) has shown that non-talking or verbal deficiency is characteristic of the children of certain ghetto families and that children so afflicted are almost uneducable since typically, they do not develop adequate speech as they attend school.

As we investigated the particular non-verbal children in our school, we became convinced that their problem was not so much that they were unable to talk as that they were too shy to talk to strangers,

i.e., to non-family. In their homes, we overheard most of them talking brokenly, but in sentences, with their mother or with siblings. This suggested to us that the causes of their non-talking were probably social and not genetic. Consequently, we did decide to put these children through an experimental series with a continuous token exchange designed specifically to develop a pattern of talking with non-family, particularly with teachers and other children in school.

However, bad luck was with us. By the time the baseline (A^1) period had been completed, three of the seven children had dropped out of school for various reasons apparently not related to their performance in school, e.g., their family moved to another area in the city. So the results reported in Figure 4b represent averages for four, not seven children.

What happened? During the baseline period A^1 when a token exchange for talking was not specifically in effect, the four children said something in about 8% of the 15-second observation periods. In period B^1, the teacher was instructed to elicit talking in various ways and was trained to issue tokens and social approval only after a correct verbalization occurred. Headshaking, finger-pointing, and all other forms of non-verbal communication were no longer sufficient to initiate an exchange. Note that the per cent verbalization increased gradually until it finally leveled out at approximately 48%.

To reverse the experimental conditions, beginning in A^2, a second teacher who was new to the school took over the experimental group. What was the result? As may be seen in Figure 4b, the rate of talking dropped off immediately, then increased gradually, sporadically, until talking was occurring on the average in 23% of the sample periods.

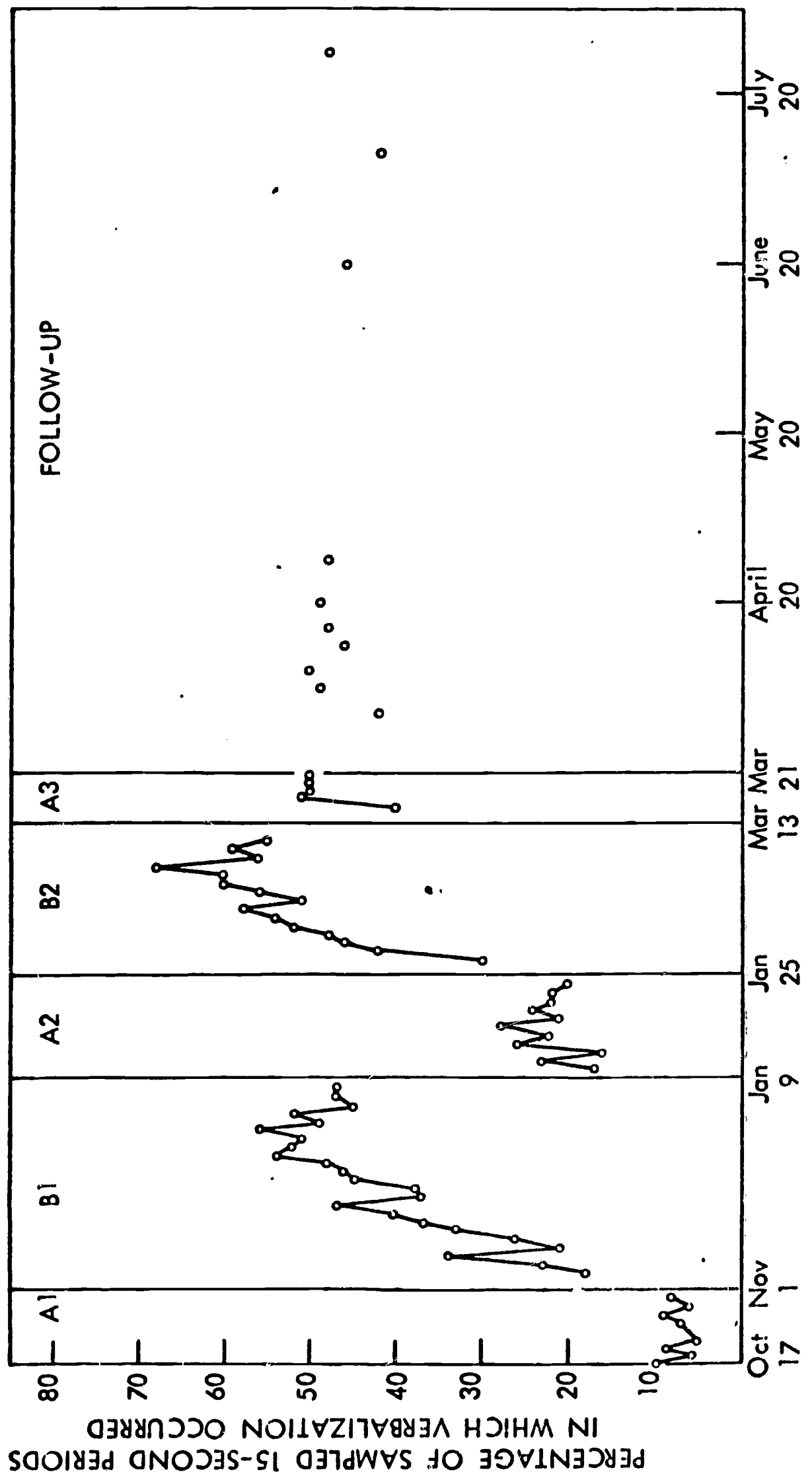

FIGURE 4b. Percentage of sampled periods in which talking occurred through time for 4 non-verbal "culturally deprived" children and through five experimental conditions. In each of the A conditions a new teacher was introduced who structured a token exchange for participation in lessons. In the B conditions the teacher then structured a token exchange for talking. The follow up was similar to the A conditions.

When we had the new teacher reintroduce the token exchange for talking at the beginning of B^2, the talking rate increased rapidly, much more so than the first time, until it equilibrated at about 60%.

In the final reversal, we again took out the token exchange for talking and gave the experimental group to a new teacher. This time, the drop was small, to 47%. During the three months following the termination of the formal experiment, occasional checks showed that the 47% equilibrium continued to obtain. There was no appreciable dropoff in the average rate of talking. This was higher than the 40% median rate for other children in their class, and the 42% median rate for the upper middle class children in our laboratory at Washington University.

However, there were other qualitative changes which are just as interesting. According to the observers, the children toward the end of B^1 were saying something in 48% of the 15-second sampling periods, but the responses were hesitant, usually single words or broken sentences. In contrast, during B^2, the children typically talked in sentences, used better syntax, and frequently initiated conversations. In fact, two of the children, the boys, began to resemble compulsive talkers.

At home, all of the mothers reported a substantial increase in talking. In fact, some of them complained that their children were now talking too much. This comment, by the way, leads to the suspicion that the mothers purposely socialized their children not to talk much. After all, at the time of this complaint, these children were talking at a rate just slightly higher than average.

Finally, the mothers, the teachers, and the neighbors all reported spontaneously that the four experimental children became

much more friendly, less withdrawn, more assertive. In fact, one of the boys appeared to change from extreme introversion to extreme extroversion. He not infrequently walked down the street saying hello to everyone, friends and strangers, shaking their hands. (Perhaps he should become a politician.)

We would refer those critics who have questioned whether exchange therapy can produce any lasting behavioral or personality changes to the results of this experiment. The answer appears to be yes, if existing exchanges in the culture reinforce the change produced. Since the reinforcement for talking is substantial in our culture, it is to be expected that once a talking pattern is established, it will be maintained. The same appears to be true of reading, but not, for example, of mathematics beyond the simple arithmetic which most people use and remember.

Experiment 4

This experiment was done with eight of the children from the bottom third of our remedial first grade class, the eight children with most substantial deficits. It may be recalled that we found the delayed token exchange not to be effective with this group. Most of them would go through the motions of working at their assignment but their learning was so painfully slow that they may never have finished first grade work.

As noted before, when one exchange which we structure fails to be effective with certain children, rather than give up on their education, we routinely structure a new, more powerful exchange which

they might choose to work. In this instance, we increased the power by increasing the value of the reward and by increasing the immediacy of reciprocation. The experimenter, Mr. David Buckholdt, began working with these children in groups of four on what we call a food exchange. Twice daily, for twenty minutes each session, a bite of cooky, ice cream, soda, fritos and candy was exchanged each time a child followed simple directions for identifying colors, for responding appropriately to instructions involving various prepositions, for counting, et cetera. The children enjoyed these exchanges because the questions were at such a low level that most of them were able to respond appropriately. Those who could not were rewarded for imitating the correct response of another child or of the experimenter. Over a six weeks period, the material was gradually increased in difficulty until the children had completed most of the readiness tasks usually done in kindergarten (e.g., following directions, responding to questions, et cetera).

Then there was the problem of beginning to teach them how to read. Back in their regular group, these eight children worked with the teacher trying to learn the sounds of different symbols for about a month without any success whatsoever. None of the eight were able to learn to associate a single sound with the appropriate symbol. So instead of perseverating longer, again we structured a more powerful exchange where the childre would receive individual instruction from tutors. As in our experience with suburban children, we used the most advanced children in the class as tutors, those who had been able to learn best in the usual teacher-student context.

For the purpose of the experiment, we randomly divided the eight children into two experimental groups, A and B. In addition, a

third group, C, was recruited from another classroom. Although the teacher of the four children in C had been trying to teach them sounds over a period of six weeks in the regular class setting, none of these had learned the sound of a single symbol.

The children in all three groups were assigned peer tutors. Every day each tutor would take his or her student to a small room at the opposite end of the building from the classroom to work uninterruptedly without supervision for twenty minutes on the sounds.

Thirty-three sounds were selected for the students to learn. Alphabet symbols of the sounds (for example, "a" or "th") were pasted in the upper left hand corner of a language master card. The sound itself, plus a word beginning with that sound, was recorded on one sound track of the card. For example, if a card had an "m" on the upper left hand corner, when the child ran the card through the language master, he would hear"m", "monkey", "m". This procedure reduced the chance that the student might learn to associate the wrong sound with the symbol. The second sound track on the card was available to the student to record the sound for himself.

After their twenty minutes for working with the language master and the cards on the different sounds, our observer would arrive to test the student. She would hold up the cards, one at a time and would ask the student to identify the sound symbolized on the card. The student was given about ten seconds to make the correct response. If he did not identify the appropriate sound by then, he was not given credit for knowing the sound. The experiment was terminated for each tutor-student pair either after twenty days

or after he had successfully completed all thirty-three sounds, whichever occurred first.

For Group A, an exchange was structured where both the student andthe tutor were rewarded according to the student's progress in learning the different sounds. Both could earn six tokens if the student correctly identified all of the sounds he had identified correctly before during the previous experimental session. In addition, both could earn two additional tokens for each new sound which the student identified. Each day that the student learned two new sounds, both the student and his tutor earned a special prize--ice cream, candy, or a popsicle.

In Group B, the tutors and students each received eight tokens at the beginning of each twenty-minute session which they attended, regardless of their progress. In other words, a student and his tutor would receive eight and only eight tokens each time they worked together, regardless of how many sounds were correctly associated with the symbols or how many mistakes were made.

Group C received no tokens or other material rewards. Rather, the tutor-student pairs simply met every day for their twenty-minute period, during which the tutor tried to teach the student his sounds. As in the other conditions, the observer tested the students each day to see how many sounds had correctly been associated with their symbols. As the teacher does in the usual classroom, the observer gave the tutor and his student approval when the student demonstrated progress.

What happened? The summary data for the three groups are given in Figure 4c. While the differences among the three groups are

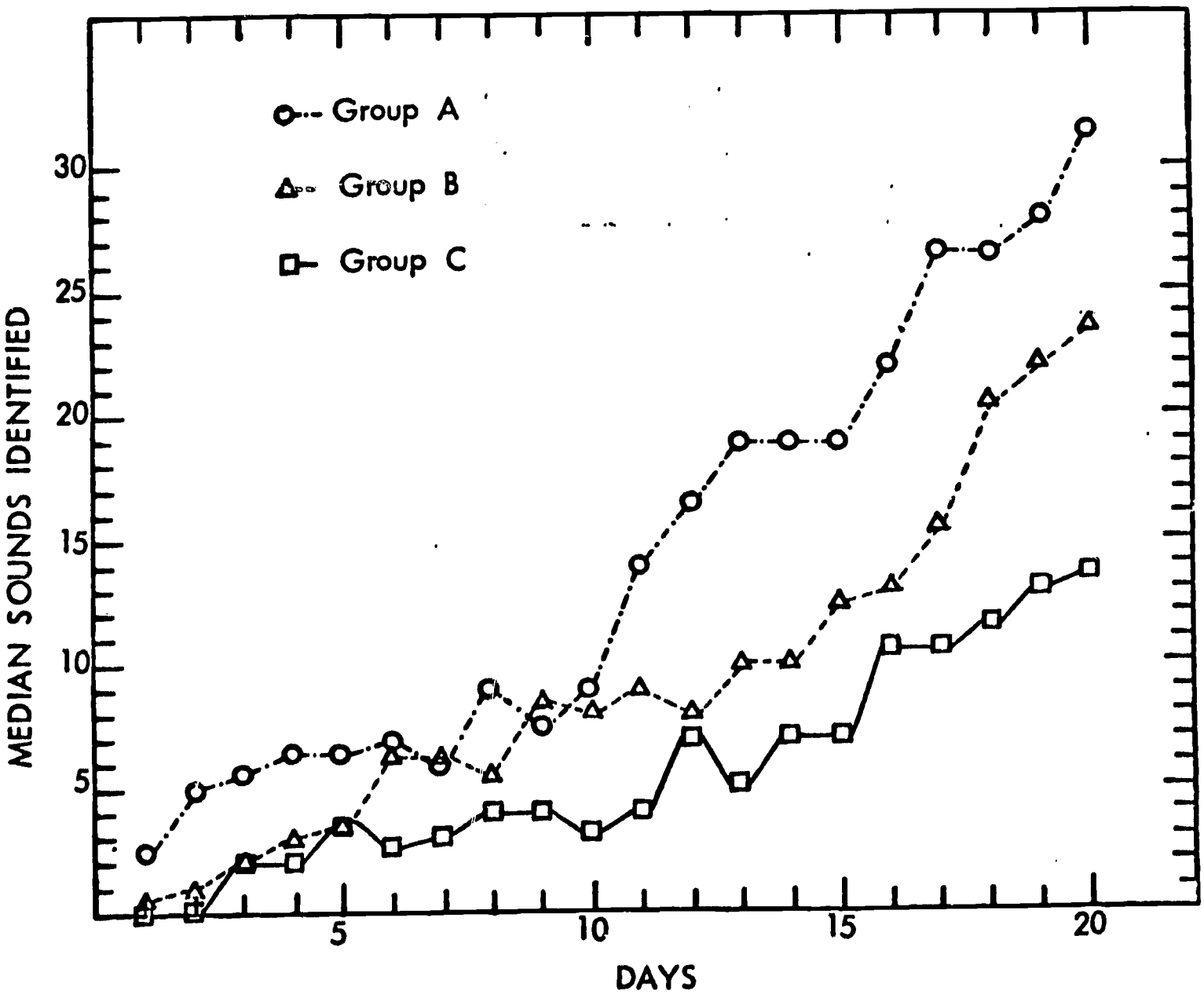

FIGURE 4c. Effects of peer tutoring for (1) Group A with contingent rewards; (2) Group B with non-contingent rewards; and Group C under control conditions.

substantial, it is obvious that peer tutoring itself had a powerful educational effect. Even C, the group which showed the least progress, learned the sounds of a significant number of symbols; their median at the end of 20 days is 13.5. Remember that prior to the experiment, none of these children had been able to learn to associate the correct sounds with the symbols in a month's instruction (in Group C's case, more) with their regular teacher. Prior to the experiment, the students' work in class had been generally sloppy, mostly incorrect. The students had appeared dull, listless, apathetic. However, the peer tutors were more patient than the regular teachers; also, they were better able to communicate at the student's level. With individual attention, with the aid of another child, these students seemed to discover a new capacity for learning, even a capacity to learn the sounds of those difficult symbols!

Even so, peer tutoring had its greatest effect in Condition A where the tutor-student pairs received praise, tokens and sweets according to the progress demonstrated by the student. A full twenty minutes work was characteristic of the tutor-student pairs in this condition; only rarely did a tutor complain that a student had not worked and only once did the observer find it necessary to locate a student who had left the room. The tutors were thorough and patient in their duties and the students responded with enthusiasm. Two of the students, Debby and Carmel, learned all thirty-three sounds in seventeen days. Barbara also learned the thirty-three sounds but it took her the full twenty days. Ronnie learned 21 sounds in the 20 days. Thus, the median for this group is 33 sounds correctly associated with their symbols.

Peer tutoring was somewhat less effective in Condition B, where in effect the tutor-student pairs received tokens for attendance and were limited to the observer's approval for progress, the student's learning to associate sounds correctly with their symbols. Even so, these children were always anxious to begin work. Their intentions were good. However, they did not appear to be able to sustain as much effort as the children in Condition A could, particularly after the fifth or sixth day of the experiment. The observer frequently reported that the student or the tutor were playing when she arrived for testing, or that only one child was in the room, the other being off to the bathroom or to the water fountain. Even so, they made substantial progress. By the twentieth day, Melvin learned all of the thirty-three sounds; Jamie, Fred and Terry respectively identified correctly 24, 22, and 21 sounds by the last day. Hence the median for the group is 23 sounds correctly associated with their symbols.

As noted previously, peer tutoring worked least well with the tutor-student pairs in Condition C. The tutors and students in this condition were eager enough to go to the special room. However, the students were obviously unable to sustain their efforts to learn the sounds for a full twenty minutes. Frequently, the tutor in this condition would return early to the classroom complaining either that his student would not pay attention or that he had wandered off. Our tutors seemed willing enough to work even without a token exchange but the student seemed more interested in playing. The observer frequently reported that the students were "foolin' around" when she arrived to administer the daily test. Sometimes the students would be under the

desk or hiding behind the cabinet. Even so, some of the children made substantial progress. Rochelle learned 27 sounds in twenty days; Andrew was able to learn 22. However, Linda learned only 5 sounds in the twenty day period, and Jerry did not learn any. Thus, the median for the group was 13.5 sounds correctly associated with their symbols.

Experiment 5

While some of the students were participants in the experiments reported above, the entire remedial first grade class was used for a year-long demonstration. After the first month which we used as a baseline for the first experiment, a delayed token exchange was instituted for the entire class where academic work and progress earned tokens which could be used to buy recess, morning and afternoon, cookies and ice cream in the late morning, toys and other rewards in the late afternoon.

Throughout the year the class followed the kindergarten and then the first grade curriculum that was used in that particular school. However, once the delayed token exchange was structured, most of the children made very rapid progress through these curricula. The exceptions, of course, were the children in the bottom third, particularly the famous eight who participated in the food exchange with the experimenter and then in the peer tutoring experiment. However, as noted, these later experiments were successful in helping even these slow ones to learn the required material. While they all failed the reading readiness test the first time it was given, after the peer tutoring experiment,

all passed with quite satisfactory scores (see Table 4.5). From that period in time, the peer tutoring with token exchange for student progress was used for any of the children who seemed to have problems with any other subjects. The one exception is an experiment with Terry, which will be described later. The teachers proceeded otherwise to teach the usual material, focusing in the last months on reading, writing and arithmetic.

By the end of the year, most of the children were beginning to read. Not all were fluent, but two-thirds knew most of the 58 words used in the primers which first graders are supposed to have read before being passed to the basic reading tests of late first or early second grade. In arithmetic, again most of the class was working at a middle to late first grade (a token exchange provides a very meaningful context in which to learn to count, to add, to subtract). Their writing as a group was about at the same level.

Even so, their progress is indicated most graphically by the before-after IQ scores on the California Mental Maturity Test, Short Form. As noted in the previous chapter, we do not consider IQ scores to be a measure of a person's genetically determined intelligence. Rather, we consider it to be a standardized achievement test which measures the combined results of both training and heredity. An IQ score of 100 indicates an achievement which is average or normal for the nation as a whole.

The before-after IQ data are given for the children who were in the school all year in Table 4.6, together with the after data for those children who transferred into the class from another school sometime after the first test was given.

TABLE 4.5

READING READINESS TEST SCORES FOR THE FAMOUS EIGHT
BEFORE AND AFTER PEER TUTORING EXPERIMENT

Child	Test Scores*	
	Before Peer Tutoring (February)	After Peer Tutoring (April)
Ann	41	55
Howard	36	56
Dan	5	52
Terry	21	57
Bob	33	54
Tim	28	55
Ed	22	54
Susan	31	56

*Passing Score is 52.

TABLE 4.6

I. Q. MEASURES AND CHANGES

Children*	Fall I.Q.	Spring I.Q.	Change
Top Half of Class			
1	88	103	+15
2	106	85	-21
3	84	95	+ 9
4	114	95	-19
5	103	111	+ 8
6	99	115	+16
7	98	136	+38
8	104	119	+15
9	116	127	+11
10	93	126	+33
11	121	107	-14
12	97	141	+44
13	88	105	+17
Median	99	111	+15
Difference in Medians	12 points		
Bottom Half of Class			
1	71	102	+31
2	53	95	+42
3	79	125	+46
4	49	88	+39
5	77	91	+14
6	59	97	+38
7	70	94	+24
8	57	131	+74
9	... (untestable)	70	+70
10	53	93	+40
11	77	102	+25
12	55	97	+42
13	64	107	+42
Median	59	97	+40
Difference in Medians	38 points		

*NOTE: Five other children were transferred into this class after the I.Q. tests were administered in the fall. Their I.Q. scores in the spring were 105, 121, 111, 99, and 99.

Note that the upper half of the class as judged by their initial IQ scores had a median IQ of 99 in the fall. The range was from 84 to 121. By spring the median IQ was 111, an overall increase in median of 12 IQ points. The range in this group was from 85 to 141 IQ points in the spring.

However, there were three in this group who experienced a substantial decline in IQ; Ted, minus 21 IQ points; Chet, minus 19 IQ points; and Rudy, minus 14 IQ points. Ted transferred into our class from another first grade class in the same school precisely because he was having considerable problems in that class. We were unable to determine specifically what the problems were; however, he was transferred late in the year and by that time, in spite of his high initial IQ, was well behind the Famous Eight scholastically.

Chet and Rudy were among nine children whom the regular teacher sometimes ratan whipped and otherwise punished during the half days which the experimenter spent at another school. While the other children seemed to withstand her punishment, Chet and Rudy did not. They progressively withdrew as the year wore on. While the teacher was excellent in many ways, she simply could not avoid reverting occasionally to her old punitive style when the experimenter was away. These boys apparently paid for her lapses.

The bottom half of the class as adjudged by initial IQ had a median IQ of 59 in the fall. As may be noted in Table 4.6, their IQ's ranged from 0 (this child was unable to make any of the standardized responses which would give him any mental age at all on this test) to 79. All were in the so-called defective range (an IQ score of 79 or below supposedly predicts the inability to learn the usual academic subjects.)

However, as the data in Table 4.6 indicate, these were the children who experienced the greatest improvement by working the exchanges which the teacher structured for them. The median IQ for these children increased from 59 in the fall to 97 in the spring, a change of 38 IQ points! Even the individual changes in this group are impressive. The smallest improvement was made by Mike (No. 5) who increased 14 IQ points from 77 to 91. The largest gain was achieved by Terry (No. 8) from 57 to 131 IQ points, an increase of 74 IQ points. Terry received rather special treatment that will be described later, but even so, he progressed from the very bottom to the very top of his class scholastically.

Of course, not all children have the hereditary potential of Terry; yet the data from this year's experimentation suggests that most of the little Negro children who fail in school do not have brains which are physically or hereditarily deficient. Like Terry, most are apparently suffering from a mild to moderate autistic withdrawal as a result of the relatively harsh isolating environment in which they live. Change that environment as we began to do this year by structuring meaningful exchanges for academic work and progress in school, and the children will respond intelligently. This class, who had been segregated for failure, is now slightly above average. Where will they be in another year or perhaps two?

While the change in IQ is crucial in gauging the class's progress last year, there were other important changes. As noted in previous chapters, by limiting ourselves to positive exchanges where rewards are contingent upon academic work and progress, the children

1) change their habit patterns, and 2) gradually develop positive rather than negative feelings about their academic work, about their teacher, about school. While as noted there was some unplanned punishment in our experimental ghetto classroom, and some withdrawal as a result, the situation was 99% positive.

Habit Patterns

One would predict that as the children repeatedly worked our positive exchanges, they would gradually develop habitual patterns of learning, of responding. A particularly telling incident happened in March which illustrates this development. Another teacher with a normal rather than a remedial first grade had been quite oral in criticizing our non-punitive procedures when our experiments started in October. She was bothered particularly that our teachers ignored the small disruptions that sometimes occurred during that 5% of the time when the children were not working; they might talk to one another or wander around the room. Several times she complained about this, and pointedly suggested that our children needed a few hard whippings to get into line. She referred with pride to her own children who sat quietly with almost no disturbances. To such criticism, we ordinarily respond at a very low key, "Perhaps you're right , but we just want to see what can be done without punishment." Even so, she kept it up, criticizing at almost every opportunity.

Then in March, at a time when the experimenter was away, this teacher came to our room in tears. She was holding a beautiful paper snowman and pointing to it, she told through her tears how her class would not or could not identify its parts and its clothes. She

was simply crushed. Our assistant teacher, ever alert to opportunities, asked her to "Try our children". She decided to, and using her prior knowledge of our class, went unerringly like an eagle to the kill, to the table where the Famous Eight sat. "What's this?" "A mitten!" "What color is it?" "Red" "What's this?" "A carrot nose!" "What color is it?" "Orange!" And so it went, a spontaneous chorus of correct answers to perhaps a dozen questions. Afterwards, she shook her head almost in disbelief. Then in a quiet voice, she said, "I'll have to hand it to you", and then she left.

What had happened to her class of normal first graders? When a person hates someone who is perceived as being over-powering, if not omnipotent, he will typically experience pleasure when that other experiences pain or frustration. This apparently happened in this situation. Over the year, because of the frequent beatings, the children came to resent, if not hate this teacher. They had almost no way of "getting back at her." Finally, however, they found that this teacher wanted them to respond, to learn, and as a consequence, that she would be frustrated and at times even cry when they did not respond, when they did not learn. Hence, they had implicitly structured and were working a tragic exchange which was pleasurable to them but aversive to the teacher. While they were successful in the short run, they themselves would pay a heavy price in the long run. By not responding, by not learning, they would become part of that vast group of ghetto children who fall farther and farther behind national norms. In contrast, even the most limited children like the Famous Eight can progress faster than average and thus improve their standardized

achievement scores if they can work positive educational exchanges such as that which was structured in our ghetto laboratory.

Feelings

One would predict that the children would develop positive attitudes toward school as they repeatedly worked our positive exchanges. There were many indications that this happened. Some of the children would ordinarily show up at school on weekends and on holidays. Once the positive exchange systems were put in, tardiness, absence, sleeping in class, daydreaming--all typical ailments of ghetto classes--suddenly became minor problems. In fact, the children usually "bugged" their parents to allow them to go to school. There were absences in our ghetto class because of illness, because the parents would sometimes go away for three or four days, because the children ran out of clothes, et cetera. However, when these children did have to miss school, it was obvious that they had suffered.

A Case Study

When Terry Holder initially entered first grade, adults terrified him. If a teacher approached his desk, Terry would tremble with fear and often cover his face with paper or with his hands. He was also terribly withdrawn. When a teacher was not close, Terry would sit quietly, constantly rocking back and forth in his chair, sometimes humming, smiling to himself, but usually in complete silence. Other children did not disturb or frighten Terry, but they were unable to converse with him or interest him in any other way. Often they would talk to him or attempt to interest him in a game but he ignored them

completely. In other words, Terry had erected a silent rocking shell around himself which was impenetrable except by adults who, if they happened to approach Terry, frightened him into nervous paralysis.

Terry's condition, which would probably be diagnosed by most clinicians as moderate if not severe autism, must have been caused by his alcoholic parents who lived in a state of constant drunkenness. Terry received little notice in the home and was rarely allowed to play outdoors with friends. What little attention he did receive came in the form of whippings and tongue-lashings. According to a neighbor, his parents never "paid him no mind unless he was messing up."

Terry's difficulties at school centered around his verbal deficiencies. His ability to communicate verbally had been so inhibited that it was difficult, if not impossible, to teach him even the most rudimentary materials. He could not identify shapes, he could not name the colors, he could not count; in other words, he simply did not have basic skills which kindergarten children are expected to have mastered.

The teachers believed initially that Terry was merely shy. "In a few weeks", they argued, "he will come around." However, they were wrong. After two months in the first grade, Terry had progressed very little. Some of the fear of adults had subsided but he was still practically mute and virtually unteachable.

In December, Terry with seven other slow-learners began working food exchanges with the experimenter twice daily for twenty minutes each session. Bites of cookies, ice cream, soda, tokens and candy were exchanged for following simple directions, for counting and for

identifying colors, et cetera. As noted, Terry and the other children progressed as they worked this exchange; in fact, they learned the basic pre-reading skills which we hoped would allow them to participate effectively in the normal classroom lessons.

Although Terry progressed a little, he remained considerably behind the other children in his group, so much so that the teachers now believed he was "retarded". "Look at all that effort and so little progress", they often stated. One even suggested that we would be wasting any further time spent with him and she recommended that we therefore ignore him and those like him to concentrate our efforts exclusively on the more promising children.

However, we were not ready to abandon Terry. Although he did progress slowly, we sensed an untapped intelligence: Terry appeared to "understand" what was happening in the classroom even though he was not participating. On numerous occasions, he tried to answer questions which the teacher posed in the lessons but his words would not usually come. Sounds would be perched twisted on his lips but he usually could not develop them into words. However, he was able to do some work and he responded enough to our tester to earn a 57 IQ score on the California Mental Maturity Test.

In early February, the experimenters therefore decided to try a new approach with Terry to structure a therapeutic exchange which would focus on his language problem. His verbal skills had not developed by imitation of other children so we decided to work directly on these verbal deficiencies. The first goal was to teach him to respond to questions from the teacher. As noted, he had occasionally

tried to answer the teacher's questions but he was able to respond only after long delays and much prodding. To correct this problem, the teacher structured an exchange which only rewarded his prompt answers.

Terry loved chocolate M&M's, so these were selected as the initial rewards. Twice a day, the teacher would call Terry to her desk and display eight to ten M&M's in her hand. If he would name the color of each M&M as she pointed to it, he received it. If he did not know the color or would not verbalize it, it was placed back into the can. Since Terry had demonstrated earlier that he knew all of the colors, reward was contingent only upon his prompt, correct verbalization.

For the first two or three sessions, Terry was unable to earn most of the M&M's. By the fifth session, however, he was responding quickly enough to earn all of the candy and he continued to do so for the remaining five sessions.

With his ability established to answer quickly questions about colors, the exchange was then re-structured with escalated requirements. M&M's were still used as rewards, but now they were exchanged for the prompt naming of familiar objects (book, pencil, eraser, chalk, et cetera) which the teacher would present to Terry. The verbal skill which he had developed in the previous sessions generalized rapidly and Terry was usually able to work this new exchange by giving the correct names as he learned them.

Although within one and one-half weeks, Terry was responding promptly and consistently to the teacher's questions, he still had a verbal deficiency. To the teachers he responded with one-word

answers or with short abrupt phrases. In other words, he still lacked the ability to talk in syntax in the free style which marked the conversation of most of his classmates. Also, he still refused to talk to classmates.

Therefore, with the teacher's help, two strategies were designed to continue Terry's verbal development. First, he was reinforced with praise and tokens whenever the teachers noticed him talking with other children. Also, if he responded to a question in class or initiated conversation with the teacher, he was immediately rewarded. Even so, the pressure of thirty-three other children in the class prevented the teachers from approximating a continuous exchange which would have been more effective.

Secondly, a new, more demanding exchange was structured especially for Terry. During two fifteen minute periods each day, one of the teachers began teaching him how to tell a story. She would first show him a picture of some farm animals, birds, jungle beasts, Indians, et cetera, and then make up a story about the picture. When she had finished, she would ask Terry to re-tell the story or preferably, to make up a new version. Terry was rewarded with praise, tokens, and M&M's for about every 20 seconds of story talk.

At first, he talked only fifteen to 30 seconds, but by the second week he was able to continue for two minutes telling a story without stopping. By the end of the third week, he reached a maximum of six minutes without interruption. His stories were not smooth; he often told the same parts over and over again, but nevertheless he was talking in sentences most of the time and was able to continue

his monologue for a full six minutes, more than twelve times what he could do in the beginning.

By the end of this three-week period, Terry had become quite verbal, in fact, he now talked too much in the teachers' opinion, as though he was trying to compensate for those years of silence. He would talk to anyone who would listen and often to those who would not. He would answer any question asked of him, and often return with a question of his own. His speech was now spontaneous and free, at least by the standards of the usual classroom.

While his rapid speech development was gratifying, similar effects had been observed the previous year in the Mullanphy Pre-School experiment. What surprised us most was the improvement in his school work. All at once he seemed motivated, interested in learning and he began to make amazing progress. To illustrate it, shortly before his speech therapy began, Terry scored a miserable 21 points out of a possible 58 on a test on skills which are preliminary to success at reading. After therapy, he learned enough in four weeks to earn a re-test score of 57 on the same pre-reading skills test. Only one child in the whole class had ever earned a higher score.

Terry's new-found skills and motivation continued to propel him throughout the rest of the school year. Via peer tutoring, he quickly learned most of the pre-reading sounds and was soon able to identify complete words, then groups of words. In the last weeks of school, the teacher gave each child a list of words they must know if they were to complete the series of introductory readers before the end of school. On the last week, a contest was held to determine who

had learned the most words. Terry won; he was the only one of the children in the whole class who knew them all.

Terry had become a completely different child by June. The previous September, he seemed dull, autistic. His IQ score of 57, if anything, overestimated his classroom performance. He seemed to be unteachable. Nine months later, after working a series of well-designed therapeutic exchanges, he seemed to be bright, spontaneous, motivated. Furthermore, his new IQ score mirrored his progress. It was now 131. Terry had made a remarkable change from the bottom to the top of his class.

Of course, not all children are as bright as Terry, yet the data suggests that most of the little Negro children who fail in school do not have genetic deficits in the brain which prevent them from learning. Most are apparently suffering from a mild autistic withdrawal as a result of the relatively harsh, isolating environment in which they live. We have already noted the IQ change of the children of this class by the initial ability groupings by the teachers. The changes are more dramatic, however, if the grouping is by initial IQ. The data in Table 4.6 show that the top half of the class experienced a median increase in IQ of 15 points during the year. In the spring their median IQ was 111. However, the bottom half of the class experienced a median increase in IQ of 40 points; while they still had not caught up with the top half of the class, their median IQ was 97 which is about average. We had somewhat expected a substantial improvement, but not the disappearance of such a differential work pattern.

In general, however, the results are quite consistent with our general theory of what is wrong with the ghetto classroom system. Yet there are several additional features about this experiment which are well worth noting. First, this was not a continuous exchange system, as was the case with the hyperaggressive boys, and with the normal preschoolers, but a delayed exchange system where the rewards were for work correctly done. With the more limited children--hyperaggressive or the very young--an exchange system to be effective must be continuous. A delayed system simply will not work until a child is relatively well socialized. Hence, that the delayed exchange worked, even with this class of slow learners, is crucial, for a continuous exchange system is too time-consuming to be practicable. At best, a good teacher can handle only ten students on a continuous exchange. However, in this instance, the delayed exchange allowed the teacher to spend only a third of her time with, in effect, what was approximately a third of the class. Hence, with a delayed exchange system such as the one used here, it is feasible for a teacher, particularly with a teacher's assistant, to handle effectively a regular class, i.e., one with thirty to forty students.

Secondly, there were a number of effects obvious even to a casual observer which we did not measure but which, as impressions at least, are worth reporting. First, once the token exchange had been established in the classroom, various escape responses, but particularly daydreaming, sleeping in class, and truancy, dropped off precipitously. There was one little girl, for example, who contrived to miss half of almost every school day during the baseline period.

However, beginning with the second day after the token exchange was established, this little girl has been a steady attender. The classroom evidently had suddenly become a more desirable place to be than home or the streets. Also, it was almost pathetic to see the children so happy over so little--over the cookies and ice cream that they could buy with their tokens in mid-morning, or the little toys and sundries they could buy with their tokens at the end of the day. Also, it was heartwarming to see these children excited about learning, especially when they began to read their primers.

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