DOCUMENT RESUME

ED 030 683 UD 003 606

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Classroom Behavior Modification Techniques Applied to Educationally Deprived, Primary Age Children. Special Study Report #1.

Durham Education Improvement Program, N.C.
Pub Date Jan 67
Note-46p.
EDRS Price MF-$0.25 HC-$2.40
Descriptors-*Behavior Change, *Behavior Problems, Behavior Rating Scales, Class Management, *Disadvantaged Youth, Females, *Grade 1, Males, *Reinforcement, Reinforcers
Identifiers-Spaulding Coping Scales

The purpose of this study was to "demonstrate the application of behavior modification techniques upon three children with behavior problems in a first grade class for culturally deprived children." A systematic reinforcement program was set up in which the student was reinforced with candy the first time he showed acceptable behavior and at five minute intervals thereafter. A second phase of the program involved only verbal praise as a reinforcer. Behavior observations of two boys and one girl were recorded on the Spaulding Coping Scales. The two boys showed positive behavioral changes but the girl moved in the direction of more intensified negativism. Further application of this technique appears fruitful but should be preceded by careful consideration of the behavioral dynamics of specific children. Problems of behavior management in classes for the disadvantaged might be helped by these reinforcement techniques. (NH)

# THE EDUCATION IMPROVEMENT PROGRAM

2010 Campus Drive
Duke University
DURHAM, NORTH CAROLINA

# Special Study Report #1

# Classroom Behavior Modification Techniques Applied to Educationally Deprived, Primary Age Children

James J. Gallagher



January, 1967

## ABSTRACT

### Classroom Behavior Modification Techniques Applied to Educationally Deprived, Primary Age Children

James J. Gallagher

The purpose of the present study was to demonstrate the application of behavior modification techniques upon three children who were proving to be behavior problems in a first grade class for culturally deprived children. The total program of environmental changes is noted below:

| | | |
|---|---|---|
| Baseline | No intervention | 5 days |
| Food and Social | Candy and verbal praise | 8 days |
| Social | Verbal praise | 5 days |
| Follow-up | No intervention (3 weeks after Social) | 5 days |

A systematic reinforcement program was set up so that the teacher or a teacher aide would give food reinforcement (M & M candy) to the student the first time he was observed engaged in acceptable behavior and at five-minute intervals thereafter. In the second phase of the reinforcement program, only verbal praise was used as reinforcement.

The behavior observations in the present study were provided by means of the Spaulding Coping Scales which include thirteen different categories

and are based on observations taken by observers every ten seconds. Good reliability between judges was obtained in the present study. The five days' observations mean that virtually the entire behavior of the child throughout the school day was under observation during that time.

All three children seemed to be influenced by the intervention methods. The two boys who were being overtly aggressive in class significantly reduced their aggressive behavior, and this reduction remained through the follow-up period taken three weeks after the systematic reinforcement had ceased. In one instance, there appeared to be instant behavior modification upon reinforcement, whereas in the second case, no immediate changes were noted immediately upon reinforcement, but longer range changes in behavior were observed.

The girl, whose problems were negativism and limited cooperation, showed a significant change also in withdrawal tendencies, but it was in an unfavorable direction! It appeared that reinforcement by the teacher intensified the negativistic response of the girl who was assumed to be fighting against adult control. This negative response was noted immediately upon the reinforcement.

It was concluded that the behavior modification techniques were effective in influencing the behavior of specific children upon whom the methods were tried. Careful prior consideration of the behavior dynamics of the children involved should precede the application of such reinforcement techniques. Since classes for the culturally deprived often have such problems of behavior management, it would seem that the present experience would suggest that such techniques as utilized in the present study could be of positive assistance to such control.

## ACKNOWLEDGMENTS

A project such as this required the cooperative assistance of a large number of persons connected with the Education Improvement Program at Duke University.

A large measure of thanks is due to the teachers, Miss Marilyn Rothbard, Mrs. Barbara Cooper and Mrs. Louisa Douglass at the Southside School in Durham, North Carolina, for participation in the current study. The introduction of additional personnel into the classroom for the necessary observations in the present study is always an additional burden for a teaching staff. It is the mark of the professional that these teachers took such necessary intrusions with equanimity.

The research assistants who collected the classroom data, Miss Betty Cooper, Mrs. Rebecca Gordon and Miss Jean Hoppe, provided the key data upon which the study was based and upon which the final results depended. Their persistence in a difficult task is appreciated.

Other assistants who participated in the analysis of data were Mrs. Teresa Leonhardt and Mrs. Anne Funderburk. Mrs. Sue Meadows provided quality secretarial work in the preparation of the final manuscript.

The author of this report also profited by the wide variety of critical comment and sage advice from various staff members of the Education Improvement Program as the project developed. Dr. Sally Sibley and Dr. Robert Spaulding were especially helpful in this regard. The author, though, takes full responsibility for the final manuscript.

Acknowledgment is also made of the initial and very generous support of the Danforth Foundation through the Southern Association of Colleges and Schools and the subsequent ample funding of the Durham Education Improvement Program by the Ford Foundation. The Southern Association of Colleges and Schools, the College Entrance Examination Board (Southern Section), and the Ford Foundation provide additional support through continuing informational and consultative services. Durham City and County Schools, Duke University, North Carolina College, and Durham's Operation Breakthrough cooperate in the work of the Durham EIP. Their substantial contributions, in terms of space allocations, generous amounts of time of key personnel, and full administrative support are gratefully acknowledged.

J.J.G.

It is possible to note important trends in research in child development influencing the methodology of research and the emphasis placed upon various problems. These moves, such as the influence of early childhood on personality proposed by Freud or stages of development by Piaget, cast long shadows on the entire field for a substantial number of years. One recent development that seems to predict a quite different approach from those noted above deals with a new emphasis on operant conditioning and behavioral modification. Instead of painting broadly, if somewhat sketchily on a broad canvas, those researchers interested in behavioral modification deal with specific and clearly measurable behaviors always at the risk, of course, of losing the broad patterning and sequencing of developmental behavior that was the strength of the Piagetian approach.

Nevertheless, this operant conditioning approach as sponsored by Skinner (1963) and the social reinforcement models proposed by Bandura (1966) come closer to the educational environment and needs of the teacher. If, as Bijou states,

> Learning can, with good reason, refer to experiments and theory on the relationships in the strengthening and weakening of stimulus and response function[1]

then he is describing what the teacher is doing day-by-day and moment-by-moment in the classroom, albeit without much conscious or systematic application. There would seem to be some potential then for cooperative use of such psychological methods as has been shown successful in the

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[1]Bijou, S. W. Ages, stages and the naturalization of human development. Presidential address, Division of Developmental Psychology, American Psychological Association, New York, September 1966.

laboratory to attempt to accomplish the behavior modification goals of the teacher. The teacher has the problem of getting children to the stage where they are ready to learn. For children from poor environmental backgrounds, these attempts often make up the major expenditure of teacher time and energy.

Recent volumes by Krasner and Ullmann (1965) and Ullmann and Krasner (1965) have summarized much of the current literature on behavior modification and indicated that the applications of these techniques have been extended to children who are emotionally disturbed, mentally retarded, or who exhibit behavior problems. To this author's knowledge the application has not been made to culturally disadvantaged children and rarely has it been applied within the classroom milieu itself. (See, though, Quay, and others, 1965; and Allen, and others, 1964.) More often, a laboratory type schedule of training has been established in which the child is moved out of the classroom, or special equipment or personnel introduced into the classroom setting. Also, the most distressing and bothersome sets of behaviors to teachers are undesirable social interaction patterns which may not respond as well to the laboratory intervention on an individual basis. Accordingly, it was felt important to attempt these techniques, in situ, to see if they could be applied to behaviors that interfere with effective classroom management and student learning.

## Purpose

The purpose of the present study was to apply behavior modification techniques to a classroom setting for culturally disadvantaged children to see if teachers can intervene meaningfully in the unacceptable behavior patterns of three first grade children.

## Subjects

The three children that were chosen to participate in the experiment were nominated by the teachers as being the most difficult children to handle in the classroom. For the purposes of this report, these children are given the names PETER, PAUL and MARY. The two boys presented a problem in the management of aggression. They both tended to get into physical battles with other children and to not pay attention to the attempts of the teacher to control and reduce these outbursts. MARY's problem was one of withdrawal and noncooperation.

PETER was a large and good natured child whose ebullient and occasionally aggressive behavior seems to be part of a general excitability or an abnormal amount of energy as much as from any deep seated hostile feelings. He was the fourth of six children in a family in which the father works in a semi-skilled position and appears to play a significantly positive role in the family. The mother does part-time domestic work, but her major responsibility seems to be the care of the six children. They recognize that PETER is a highly excitable and easily stimulated youngster and have often found it necessary to discipline PETER. Although they prefer the discipline to be merely isolation, they will use physical punishment on him when he does not respond to any other means.

There have been some indications in the extensive medical examinations that some endocrine imbalance may be playing something of a role in PETER's behavior. In the classroom, PETER would show tremendous bursts of energy and would get up from his seat and trot around the classroom area for ten or fifteen minutes at a stretch if he were not restrained. One observer referred to him as the "long distance runner" since this was the gait and continuous energy of the boy. However, subsequent examination revealed that his activity could not be ascribed to observable physiological imbalance.

PAUL comes from a family beset by a multitude of problems. He is the eleventh of twelve children in a family in which the husband is separated from the family. He has had a long history of alcoholism and mental illness. The mother appears to be a tense and dependent woman who seems overwhelmed by the magnitude of the problems facing her. Although she has been working in a semi-skilled position in a local industry, she has been recently discharged and has been attempting to care for the children on money from various agencies.

At the present, four of PAUL's twelve siblings are married, and two more are enrolled in a institution for mental retardation. PAUL has been somewhat the butt of jokes and teasing in the home, and this is partially attributed to his visual problems since he is measured as having only 20/300 vision, even with glasses. One indication that his adjustment has not been an easy one is that he has continued bedwetting up to the present time.

PAUL has had a number of aggressive outbursts that were generally unpredictable. His visual and perceptual problems led to the suspicion that he has mild neurological involvement. In the classroom, he was completely noncooperative, and the teachers were reduced to giving him puzzles and other items to keep him occupied as preferable to his destructive social interaction behavior.

MARY also comes from a broken home situation in which her mother and father have been separated for some years. Although the mother is very solicitous of all of her three children and devotes her entire energy to their care, her observed behavior suggests that she has spent little time in attempting to discipline her children. As a result, MARY still seems to be in a rather omnipotent stage of personality development in which she

tries to gain security by dominating her mother and those around her. She has given up the 'bottle' only a month or two ago and engages in all sorts of unrestrained behavior at home without controls being applied by the mother. MARY would appear to be denying her dependency situation by attempting to control adults through this unrestrained behavior. If this is true, this accounts for the negativistic behavior that shows in social interactions.

MARY presented a classroom problem of nonresponsiveness. She did not participate effectively in the classroom and was initially resistant to any suggestions. She seemed to the teachers to be the original "No" girl. Furthermore, her curiosity could not be whetted, nor could she be enticed with the usual approaches of teachers of the primary grades. These resistant episodes were punctuated with periods of withdrawal and some aggressive outbursts.

Table 1 shows the intellectual and the learning readiness characteristics of the three children in the present study. One can note that PETER shows one pattern of an educationally deprived youngster who has higher performance IQ than verbal IQ. This result would confirm the observations of the teachers that he is a well coordinated and physically active youngster whose major deficiency would seem to be in the language area. His performance was too low to be measured on the Metropolitan Readiness Test, although his skills in the areas of vision, hearing and speech are normal or near normal. There was some suggestion of stuttering which was related to PETER's growing awareness of his language deficiency. Considering his total IQ score, PETER would be considered substantially below potential in his first grade performance.

Table 1

Characteristics of Children under Study

| | | PETER | PAUL | MARY |
|---|---|---|---|---|
| WISC | Verbal | 87 | 92 | 90 |
| | Performance | 100 | 71 | 74 |
| | Full | 93 | 80 | 80 |
| Metropolitan Achievement | | --- | 5 | 14 |
| Vision | | 20/40, 20/30 | 20/200, 20/200 | 20/30, 20/30 |
| Hearing | | Normal | Slight loss | Normal |
| Speech | | Normal (Stutter?) | Normal | Normal |

PAUL shows a strong pattern of verbal over performance IQ skills, a pattern which sometimes marks the organically involved child. His full scale IQ of 80 is somewhat better than his performance on the Metropolitan Readiness, but not too much. It would seem that with his substantial vision handicap, limited IQ and family history that he might very easily be labelled a retarded child in circumstances where adequate psychological diagnosis were not available. As it is, his verbal IQ would seem to indicate very clearly that he is not in the mentally retarded range even though his achievement is not up to even this below average intellectual standard.

MARY shows a similar pattern to PAUL in intelligence test results despite the fact that impaired vision would have little or nothing to do with her performance. She seems slightly better in verbal than performance area, but her Metropolitan Readiness Test shows again a limited readiness for first grade work. In vision, hearing and speech, MARY seems to be normal enough. The family history seems to provide the basis for MARY's difficulties in an academic setting.

Each of the three youngsters appears to provide a substantial learning as well as behavioral problem, and the modification of behavior into more acceptable channels merely represents the first step in a remedial process which must be followed by other academic procedures if these youngsters are to perform effectively in an academic setting.

## Classroom Setting

This study was carried out in a school environment designed by the Education Improvement Program at Duke University for culturally disadvantaged children. The total enrollment of this first grade class was 28. There

were two adjoining rooms involved in the present setting. The classroom program activities move from room to room during the course of the day, with the usual variety expected of a first grade program. There is a third room in which a kindergarten program is being run, but the first graders rarely venture into this room. There is adjacent to both first grade rooms an observation room with one-way glass where the observations are often but not always taken.

There are three teachers involved in the class planning and activities. When the class is addressed as a whole, the teachers take turns in handling the total group. Most of the day each of the teachers is working with small groups of children.

The three children in the present study were so unmanageable during the planning stages of the study that a quiet room was designed as an intermediate step towards sending children home for discipline problems. This quiet room consisted of a partitioned-off section of one of the two classrooms and was used as an isolation device for the youngster who became overly stimulated or overly aggressive. The explanation given to the child when he was placed in the quiet room was that this would allow him the opportunity to gain control of himself. He was to be the judge of when he was ready to rejoin the group. Puzzles, crayons and other materials for quiet activities were included in the quiet room. This device proved to be a useful classroom management tool.

## Measuring Instruments

The instrument that measured behavioral change within the classroom was the Spaulding Coping Scale. This scale is a standardized observation

## Table 2

### A Coping Analysis Schedule for Educational Settings (CASES)* (Brief Form for Quick Reference)

1. Aggressive Behavior:
   Direct attack: grabbing, pushing, hitting, pulling, kicking, name-calling; Destroying property: smashing, tearing, breaking.

2. Negative (Inappropriate) Attention-Getting Behavior:
   Annoying, bothering, whining, loud talking (unnecessarily), noise making to get attention, belittling, criticizing.

3. Manipulating and Directing Others:
   Manipulating, bossing, commanding, directing, enforcing rules, conniving, wheedling, controlling.

4. Resisting Authority:
   Resisting, delaying; passive aggressive behavior; pretending to conform, conforming to the letter but not the spirit; defensive checking.

5. Self-Directed Activity:
   Productive working; reading, writing, constructing with interest; self-directed dramatic play (with high involvement).

6. Paying Rapt Attention:
   Listening attentively, watching carefully; concentrating on a story being told, a film being watched, a record played.

7. Sharing and Helping:
   Contributing ideas, interests, materials, helping; responding by showing feelings (laughing, smiling, etc.) in audience situations; initiating conversation.

8. Social Interaction:
   Mutual give and take, cooperative behavior, integrative social behavior; studying or working together where participants are on a par.

9. Seeking Support, Assistance and Information:
   Bidding or asking teachers or significant peers for help, support, sympathy, affection, etc.

10. Following directions passively and submissively:
    Doing assigned work without enthusiasm or great interest; submitting to requests; answering directed questions; waiting for instructions as directed.

11. Observing Passively:
    Visual wandering; watching others work; checking on noises or movements; checking on activities of adults or peers.

12. Responding to Internal Stimuli:
    Daydreaming; sleeping; rocking or fidgeting; (not in transaction with external stimuli).

13. Physical Withdrawal or Avoidance:
    Flight; moving away; hiding; avoiding transactions by movement away or around.

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schedule which places student behavior into thirteen different categories as seen in Table 2. Some of these categories seem consistently nonadaptive to constructive school performance. The first four categories deal with various types of aggressive behavior from outright physical attack to passive aggressive behavior, and the last three categories are indicative of a withdrawing type of behavior which shades from lack of attention to the task at hand to actual physical retreat.

In between these two maladaptive extremes, there are a variety of personal and social behaviors that seem generally calculated to help the youngster adopt an effective learning posture in the classroom (categories 5-10). The child can be engaged in socially desirable behavior even if it is not officially sanctioned by the teacher, i.e. a child may help another child with the zipper on his jacket, or he may be responding directly to teacher directed activities. The goal of the present project was naturally to increase acceptable and reduce unacceptable behavior.

## Reinforcement Schedule

A week was set aside for collecting baseline data. During this time, a team of two and sometimes three observers were in the observation room and collected data on the children via the Spaulding Coping Scale. This requires the observer to mark the behavior the youngster was manifesting in ten second intervals. The goal was to collect as much continuous data as possible on the students. With three observers present most of the time, it was possible to get a continuous day record on all of the youngsters. The exceptions to this rule were when a child was in the quiet room for some misbehavior or when the judges were engaged in

Table 3

Judge Reliability - Spaulding Coping Scales

Judge Agreement - Exact

| | A | B | C |
|---|---|---|---|
| A | | 78% (40 mins.) | 80% (40 mins.) |
| B | 94% (40 mins.) | | 83% (50 mins.) |
| C | 93% (40 mins.) | 96% (50 mins.) | |

Judge Agreement

(Acceptable- )
(Unacceptable)

reliability studies. The reliability units were taken for a ten minute period, during which two of the judges would fix on a particular child. The amount of exact agreement of judges in their categorization can be noted in Table 3.

The next period was designated as food and social reinforcement. Each of the three students was informed by the teachers that, in order to help him learn, he would be given a candy reward every time his behavior was good. This reward was given whenever the child was first noted as performing acceptably at a particular task, and then again at approximately five minute intervals if he continued his acceptable behavior. Whenever the candy reward was dispensed, it was accompanied with a verbal statement such as, "Good, PETER, I see you are paying attention this morning," or, "Fine, MARY, you are doing a good job helping Ruth." The teachers rotated the responsibility of giving the candy rewards. The teachers were instructed to place the verbal emphasis on the task a child should have been doing such as, "PAUL, you should be with your reading group now. If you had been, you would have gotten your candy," and not to call attention to his misbehavior, the natural thing to do, such as, "You are strangling Josie, PETER, and you must stop!" The verbal reinforcement also was to be made as specific as possible to help the child to understand what it was he was being rewarded for. This schedule lasted for two weeks. However, only eight days of the ten were used since the first day's data were discarded as a trial period, and the second day was a school holiday. The next consecutive eight days were used as the data for the current experiment.

The next segment of the data collection was labelled as social reinforcement. During the next week, the teachers were instructed to dispense with the candy reward and inform the students that they were doing so well now that the teacher will merely tell them when they are doing a good job and that they do not need the candy as a special reminder any more. Data were then collected for five consecutive days under this schedule.

Finally, a second baseline level collection of observational data was taken on all three children with two weeks intervening in order to see, when systematic reinforcement procedures were abandoned, whether the child regressed to previous levels of maladaptive behavior or whether he continued the gains he might have shown during the training period.

## Analysis

The students' behavior under the different forms of reinforcement was analyzed with the baseline data forming the 'expected' behavior. Mann-Whitney U tests (Siegel, 1956) were employed to see if the 'observed' behavior during the reinforcement and second baseline periods was significantly different from the first baseline.

# Results

The results in the present study will be presented both graphically and statistically. The key component in behavior that was being modified will be presented first, then the specific influence of the reinforcement, and finally the total behavior patterns of the students under the different environmental conditions.

## Modification of Behavior Components

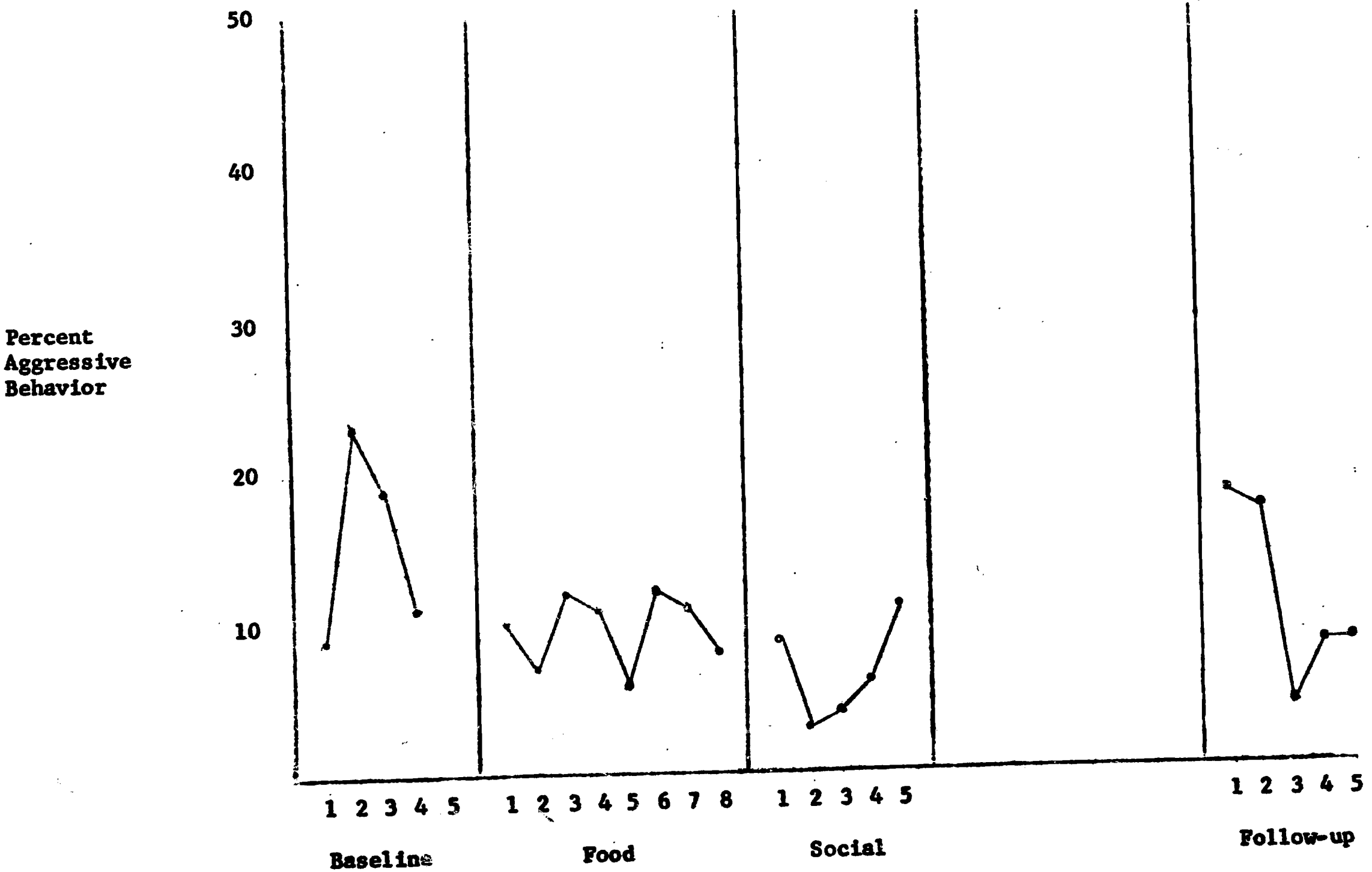
Figure 1 charts out the behavior of PETER in terms of the total percentage of aggressive categories in the Spaulding Coping Scales that were noted for each of the days. During the baseline period, PETER had two days in which his aggressive behavior reached about the twenty percent level. This high percentage of aggressiveness represents extremely unruly behavior in the classroom reaching the point where he cannot be acceptable as a group member. Since the norm of aggressive behavior for that class for boys was below five percent, the extent of PETER's atypical behavior can be easily noted, and the reasons for his nomination for this study easily imagined. There are only four days in the baseline period for PETER since he was absent on one of the days in the baseline week.

The reinforcement program can be seen in Figure 1 to have had an impact on PETER. His behavior during the food and social reinforcement set seems to be reduced to close to norm level, and this pattern remained at a reasonably low level through the social reinforcement period. While the follow-up

Figure 1

Aggressive Behavior Change Under Reinforcement

PETER



data taken three weeks later reveals a substantial percentage of aggressive behavior during the first two days, this would seem to be accounted for by factors outside the classroom environment since he had had a death in the family and had been absent a few days prior to this observation period. Overall, there appeared to be an indication that the reinforcement schedules were having an impact on PETER and that that impact continued after the use of the food reinforcement (candy drops) was eliminated.

Figure 2 shows the graph of aggressive behavior of PAUL throughout the study. Again a general reduction in aggressive behavior can be noted in PAUL from the baseline period to the food reinforcement set. With the exception of one quiet day in the baseline period, which may have been the result of his being sent home for unfavorable behavior the day before, there was substantial evidence of his aggressive behavior. This behavior was all the more disturbing because of its unpredictability. He would thrash out for reasons that seem buried in his own needs and personality, not like PETER whose response had a 'back alley' quality or 'eye for an eye' approach to social interaction. There was a noticeable reduction in his overt aggressive behavior under reinforcement conditions except for one memorable day during the social reinforcement period when he and MARY got into a prolonged altercation which zoomed their aggressive scores to an extraordinarily high level.

For the two boys, PETER and PAUL, it would appear that the reinforcement program was effective in reducing their aggressive behavior and that this reduction remained influential even after the food reinforcement was discontinued. Such reduction does not bring to an end the teachers' problems since both boys still exceed the norm for aggressive behavior for the class.

**Figure 2**

**Aggressive Behavior Change Under Reinforcement**

**PAUL**

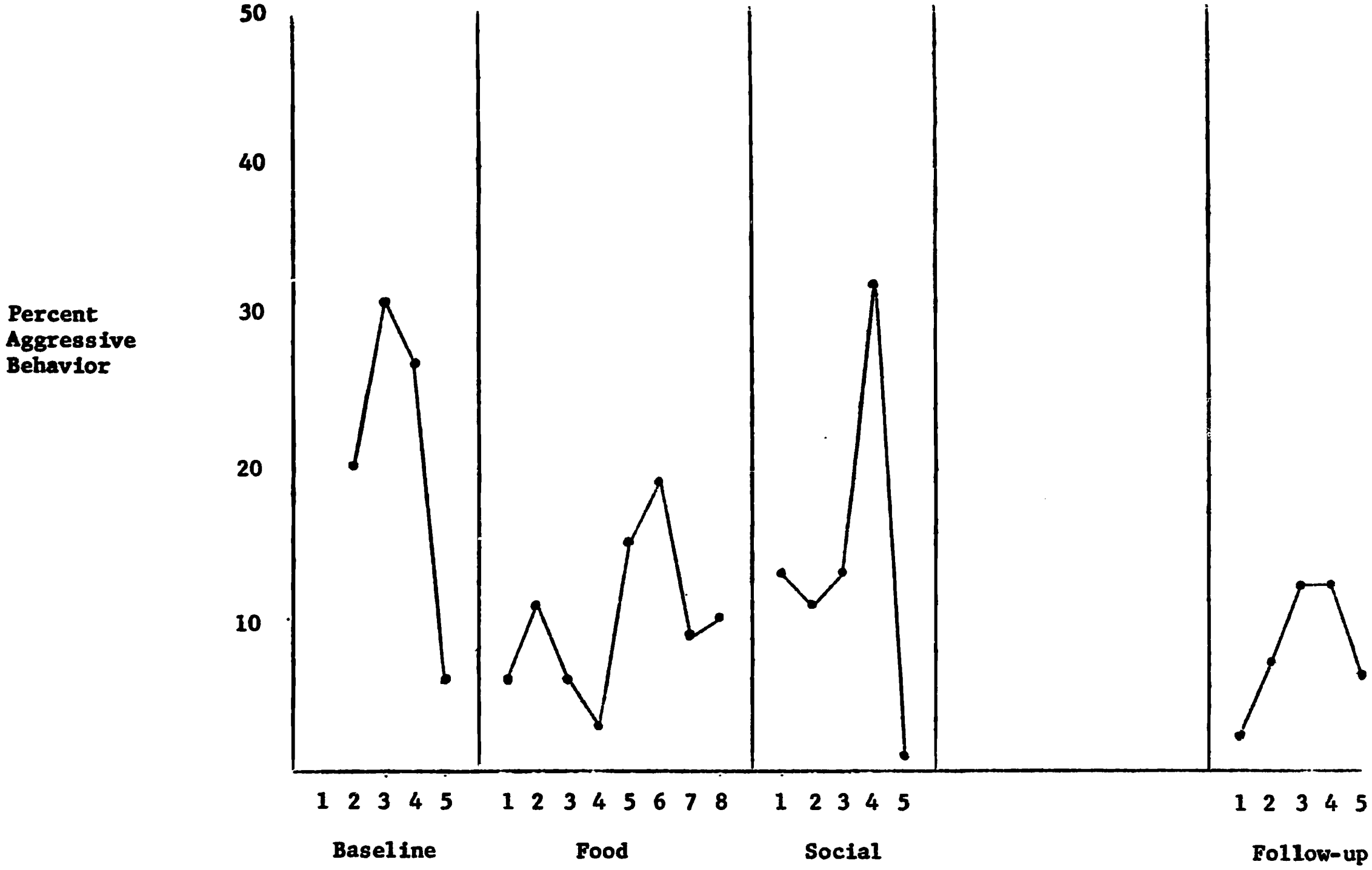
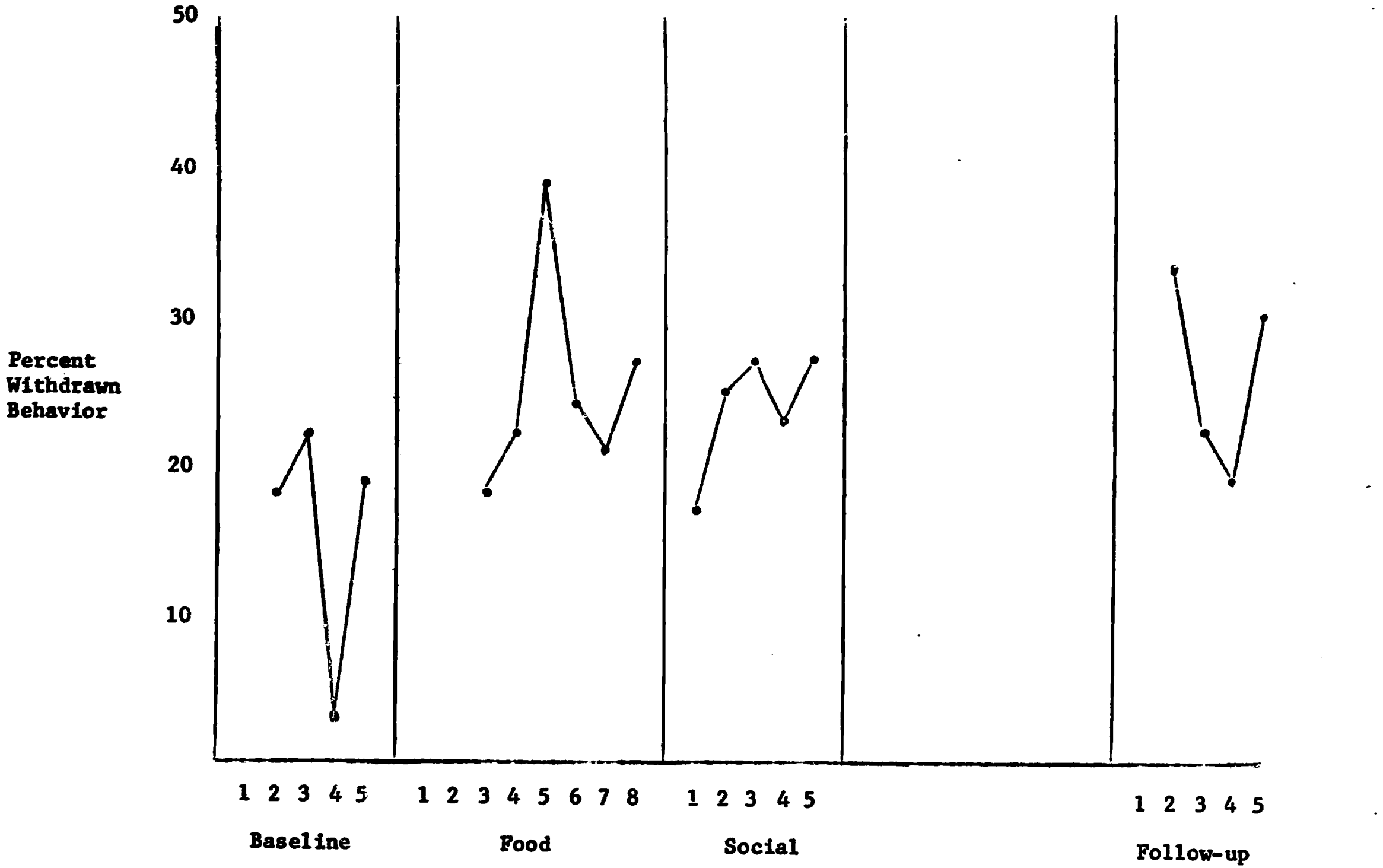


Figure 3

Withdrawn Behavior Change Under Reinforcement



even on their good days, but it appears to have brought their everyday behavior into some kind of manageable form.

Figure 3 shows the results obtained on MARY in terms of changes in her withdrawn behavior throughout the current experiment. As was the case with the boys, MARY's baseline behavior reveals an abnormal percentage of withdrawn behavior in the Spaulding Coping Scales. This was not the withdrawal pattern of an autistic child but rather the negativistic response of a child who sees cooperation with adults as somehow threatening her psychic integrity. Reinforcement for appropriate behavior did not lead to improvement. As a matter of fact, there seems to be a distinct trend toward an increase in this withdrawal behavior on her part during the reinforcement periods. MARY, whose major characteristic seems to be an unwillingness and resistance to adult supervision, continued to show that kind of resistance during the study and into the second baseline period. It can only be concluded that as far as the reinforcement program for MARY was concerned, it did not have the desired influence.

Table 4 gives a summary of the Mann-Whitney U Test calculations to determine if significant changes took place in each of the three subjects from their measured baseline. This table, in effect, is a complement to the figures which show the changes in the particular behavioral area under attack.

As indicated, PETER shows change in terms of aggressive behavior in a positive direction, and this change maintained itself at a probability level of .10 or below throughout the food and social reinforcement and again during the follow-up period three weeks later.

Table 4

Mann-Whitney U Test for Significant Changes on Reinforcement

| PETER (Aggressive %) | | | | PAUL (Aggressive %) | | | | MARY (Withdrawn %) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Base line | Food | Social | Follow up | Base line | Food | Social | Follow up | Base line | Food | Social | Follow up |
| 9 | 10 | 9 | 18 | 20 | 6 | 13 | 2 | 18 | 18 | 17 | 33 |
| 23 | 7 | 3 | 17 | 31 | 11 | 11 | 7 | 22 | 22 | 25 | 22 |
| 19 | 12 | 4 | 4 | 27 | 6 | 13 | 12 | 3 | 39 | 27 | 19 |
| 11 | 11 | 6 | 8 | 6 | 3 | 32 | 12 | 19 | 24 | 23 | 30 |
| | 6 | 11 | 8 | | 15 | 1 | 6 | | 21 | 27 | |
| | 12 | | | | 19 | | | | 27 | | |
| | 11 | | | | 9 | | | | | | |
| | 8 | | | | 10 | | | | | | |
| U | 8 | 2 | 4 | U | 6 | 7 | 3 | U | 4 | 3 | 2 |
| p | .107 | .032 | .095 | p | .055 | .089 | .056 | p@ | .057 | .056 | .057 |

@ opposite to predicted direction

In terms of PAUL's aggressive behavior, significant change was found in a positive direction during food reinforcement at the .06 level. Social reinforcement continued to show a similar trend below a p of .10, and this change retained its positive direction under the follow-up observations three weeks later. Therefore, it's possible to conclude that despite the fact that their aggressive behavior is still considerably above the two - three percent baseline for the entire class, both boys had shown movement in a positive direction and that this movement maintained itself three weeks after the systematic reinforcement was discontinued.

In the case of MARY, a distinct change was also seen in the withdrawn behavior that was under attack. However, in this case, the changes went opposed to the predicted direction! Indeed, under all three conditions of food reinforcement, social reinforcement and the follow-up period, the percentage of withdrawn behavior indicated by MARY was significantly greater than during the baseline period. The result of this coincided with the general negativistic pattern that MARY has shown in which she tends to do exactly the opposite to what she perceives is the significant adult's goal. So in her case, as well as the two boys, it seemed like systematic reinforcement did have an influence although in a reverse direction.

## Effects of Immediate Reinforcement

Since the observations on the three children were taken on ten-second intervals, it was possible to observe if there was an immediate effect of the reinforcement on acceptable behavior. This was done by taking the two minutes prior to reinforcement and the two minutes following reinforcement as the behavior units. There was a maximum of twelve time intervals or

Table 5

The Immediate Effect of Reinforcement
on Acceptable Behavior

| | Post Reinforcement > Pre Reinforcement | Pre Reinforcement > Post Reinforcement | Pre Reinforcement = Post Reinforcement | P |
|---|---|---|---|---|
| PETER | 22 | 14 | 8 | .12 |
| PAUL | 12 | 12 | 8 | --- |
| MARY | 8 | 15 | 4 | .10 |

observations during that period that determined whether the child showed acceptable behavior or not. If the proportion of positive or acceptable behavior was greater during post-reinforcement than pre-reinforcement, then this was one instance in column 1 in Table 5 under 'post-reinforcement greater than pre-reinforcement.' If the acceptable behavior prior to the reinforcement was greater than that obtained after the reinforcement, then it was placed in the second column, 'pre-reinforcement greater than post-reinforcement.' If there were no differences in the proportion of twelve observations from pre-reinforcement to post-reinforcement, then the instance was placed in the third column.

In Table 5, PETER showed twenty-two instances in which the proportion of acceptable behavior was greater immediately after reinforcement than before, while in fourteen occasions the behavior before reinforcement was more acceptable. On eight occasions, there were no differences between the pre- and post-reinforcement periods. A binomial test was applied to this data and reached a probability level of .12 that such a result would not be achieved by chance. If one can accept this figure as a trend, this would mean that PETER was manifesting more positive behavior immediately upon the application of reinforcement and would confirm its influence on his behavior previously noted in the other analyses.

In PAUL's case, Table 5 indicates no differences between the post- and the pre-reinforcement in terms of more acceptable behavior. Whatever the ultimate or long range influence on PAUL of the reinforcement procedures, there were few indications that it was having any direct or immediate effect. PAUL's general vagueness or aloofness in interpersonal contact would no doubt confirm this result. This should not rule out a delayed response to these procedures.

In MARY's case, again there is a rather intriguing result in which her behavior immediately after reinforcement was less acceptable (see Table 5) than it was prior to the reinforcement in twice as many reinforcement situations. This would tend to support the general negativistic approach that MARY has towards adults in normal social interaction. MARY was plainly not unaffected by the reinforcement procedures, but they were not achieving expected goals.

Of the three children, it can be noted that the number of instances of acceptable behavior reinforced was different between the three children. PETER had a total of half again as many reinforcements in the same time period as MARY and more also than PAUL. One of the limitations of this technique, of course, is that the children must do something acceptable before they can be reinforced so that PETER received more rewards than MARY because of his more positive response.

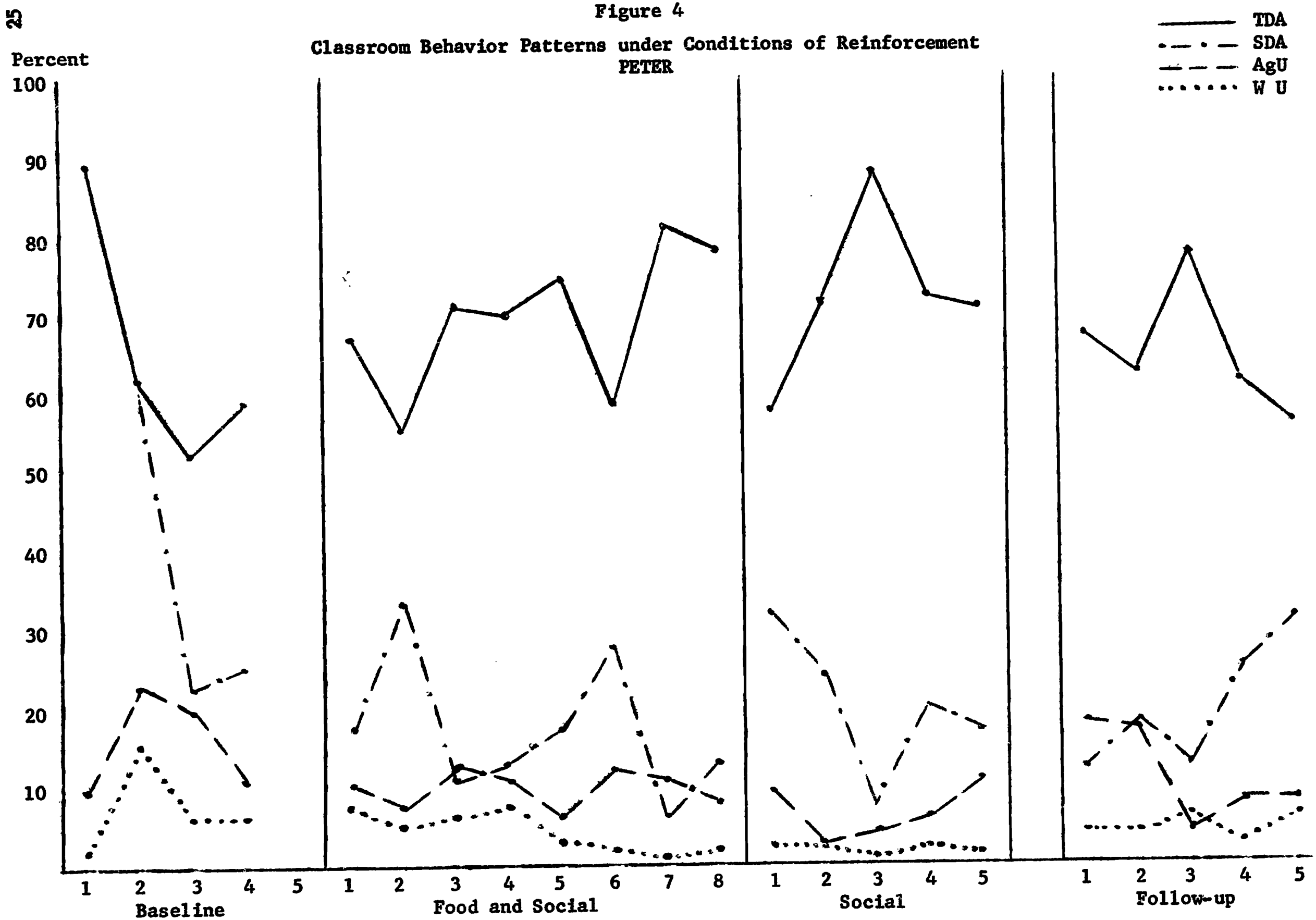
## Changes in Total Behavior Patterns

Figures 4, 5, and 6 show the total pattern of performance on the Spaulding Coping Scales of the three children under study in the variety of reinforcement situations. The four lines on the figures represent a collapsing of the thirteen Spaulding Coping categories into four major areas. The first of these marked TDA represents acceptable behavior that was teacher-directed. In other words, the teacher was expecting certain kinds of behavior from the student, and the student performed that behavior. For example, in a reading class, the children would be expected to sit quietly and wait their turn to read.

Figure 4

Classroom Behavior Patterns under Conditions of Reinforcement

PETER



The second line labeled SDA represents acceptable behavior within the social context of the classroom, but behavior which was not asked for by the teacher. This would be illustrated by behavior in which the child, instead of staying with the reading group, would wander off and look at a magazine or do a puzzle. This is socially acceptable behavior within the context of the social situation, but it still falls short of what is expected in the classroom.

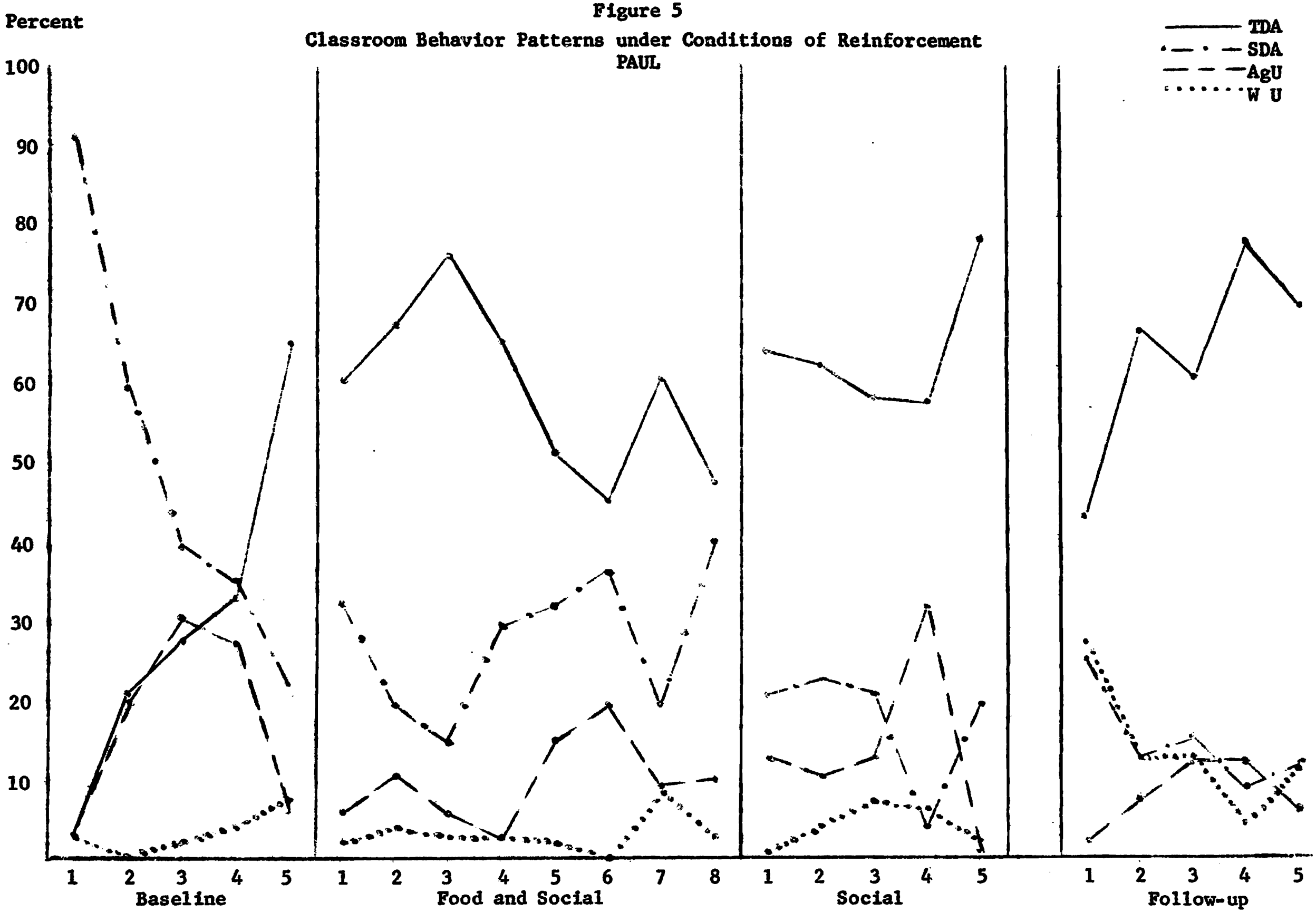
The next line, AgU, represents aggressive behavior and includes Spaulding Coping categories from 1-4. These behaviors represent relatively unacceptable behavior on the part of the child and one which the teacher will, no doubt, take steps to counteract. The final category in the figure, W U, is unacceptable withdrawn behavior which ranges from daydreaming to physical withdrawal of oneself from the academic setting. Actual physical withdrawal is a relatively rare occurrence, and the majority of instances are noted by a type of psychic withdrawal from classroom activity or social contact.

Figure 4 shows the performance of PETER over the four different reinforcement situations; a baseline period of five days where nothing special was done; a second set of eight days where food, in terms of candy pellets, was presented for acceptable behavior; a week following this period where social reinforcement was in effect in which the child was rewarded by verbal praise but not candy; then, a gap of three weeks passed, and a follow-up observation after the reinforcement procedures were discontinued. In the case of PETER, one can see his proportion of teacher-directed activity that he engaged in stays at a high level following the reinforcement situation. We have already seen his diminution in aggressive behavior, but it is important to note that his withdrawn behavior reduced somewhat as well.

Figure 5

Classroom Behavior Patterns under Conditions of Reinforcement

PAUL



Thus, a greater proportion of his behavior was going into acceptable channels, and this would represent the typical pattern hoped for under behavioral modification. PETER still has his outbursts of aggression, but these do not represent as strong a problem as represented in the baseline area.

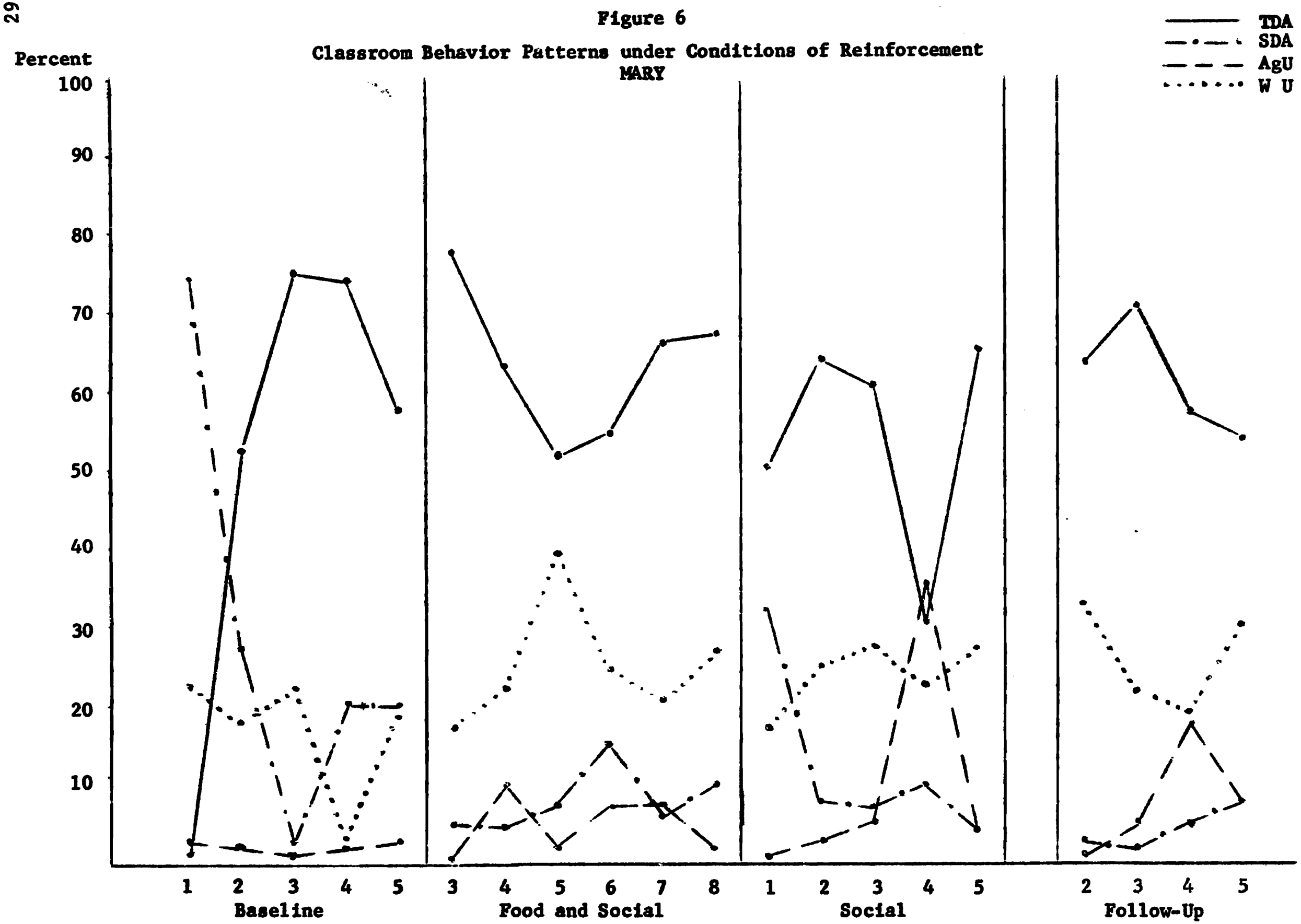
Figure 5 shows the performance of PAUL over the four different reinforcement situations. Here again, one can see a steady increase in response to teacher-directed activity and corresponding decrease in socially directed activity. This represents a change in PAUL's becoming more involved in classroom affairs and less of an isolate wandering around the room playing with toys or puzzles and not being bothered by children or teachers since either might provoke a hostile outburst. As PAUL became more responsive, the teachers made a greater effort to involve him in the educational program.

As noted in previous analyses, PAUL's aggressive behavior also goes down significantly. An indication of how extraneous factors can influence these results is the relatively high proportion of withdrawn behavior in the follow-up period which probably has something to do with the fact that his glasses were broken and not replaced over the first few days of this period.

Figure 6 shows the behavior patterns revealed by MARY during the four different conditions of the study. The outstanding feature of MARY's patterns of behavior is the high proportion of withdrawal behavior falling between twenty and thirty percent of her total performance. As previous analyses have shown, this type of behavior <u>increased</u> under conditions of food and social reinforcement. The unusual percentages on the first day of the baseline data are represented by MARY's being completely separated

Figure 6

Classroom Behavior Patterns under Conditions of Reinforcement
MARY



from the educational process at that time. Because of her extraordinarily negativistic performance, she was allowed to look at books or do puzzles or other activities which had nothing to do with the educational program but which avoided the periodic aggressive outbursts which would occur when she was pressed too hard by adults. One such aggressive outburst can be noted under the social reinforcement period on day 4 in which the amount of aggressive behavior reached an outstanding level and required her removal from the class.

The data obtained on the follow-up on MARY reveals roughly the same pattern and the same problems as seen during the first baseline except that they might be intensified somewhat. Future plans are being made to introduce a different kind of reinforcement situation which does not involve direct reward from adults and thus, hopefully, avoiding the automatic negativistic response that she would give to any situation.

## Behavior Patterns in Classroom Activities

One of the questions asked by the investigator was whether these children showed a standard pattern of response regardless of the educational situation or environment or whether the particular task that they were faced with in the educational environment brought forth different patterns of behavior.

Chi squares were calculated to determine if different patterns of behavior were revealed in the six major areas of classroom activities. These Chi squares were statistically significant beyond the .001 level for all three children. This would seem to indicate quite clearly that different styles of behavior were elicited by placing the child in different sets of environments. The next question would be, are these patterns consistent?

Do individuals reveal patterns which would give the teachers some clues as to situations that they would like to increase or avoid for that particular person?

Figure 7 shows some of the responses of the students under varying educational environments. In this case, the columns indicate different types of educational tasks. As noted in the key, TDWL represents a teacher-directed type of activity with the pupils watching and listening, such as represented by a story-telling period. As Figure 7 indicates, only those areas which showed behavior well beyond general expectations were noted.

Under TDWL it can be seen that PAUL has a tendency towards withdrawal, revealing a more than expected behavior in the withdrawal area under food and social reinforcement and the second baseline. It may be concluded, therefore, that some special teacher adjustment or program adjustment needs to be made for PAUL for him to participate under these kinds of situations. PAUL's aversion to this type of activity is underlined by the fact that in only one other situation did he show a greater than expected pattern of withdrawal.

The next column TDP represents a kind of activity where the teachers are still directly involved and controlling the activity, but the pupils are more actively participating. This would be illustrated by some kind of reciting activity or perhaps a show-and-tell period. Under these situations, MARY showed tendencies toward greater than expected aggression in the food reinforcement period and again in the second baseline. In addition, MARY evinced a greater than expected student-directed socially accepted behavior, but in her case, this would indicate a kind of withdrawal or negativistic performance. It is clear that, for some reason, MARY does not like this

Figure 7

Behavior Greatly Exceeding Expectations in Various Classroom Activities

| Reinforcement | | TDWL | TDP | TDWLP | PDLM | PDCM | F |
|---|---|---|---|---|---|---|---|
| Food | TDA | | | | O | | |
| | SDA | O | M,X | | | | |
| | AgU | | M | | X | | O |
| | W U | O | | M | | | |
| Social | TDA | | | | | M,O | |
| | SDA | | X | | | | |
| | AgU | | | X | O | | |
| | W U | O | | | M | | |
| Baseline II | TDA | | | | | O,X | |
| | SDA | | | | | | |
| | AgU | | M,X | | | | |
| | W U | O,M | | O | | | |

TDWL = Teacher directed - Pupils watching and listening
TDP = Teacher directed - Pupils participating
TDWLP = Teacher directed - Pupils watching, listening and participating
PDLM = Pupil directed - Linear Model
PDCM = Pupil directed - Choice Model
F = Free play

X = PETER
O = PAUL
M = MARY

kind of activity perhaps because it forces her into a situation where she reveals her own skill or lack of it in 'public.'

The next category, TDWLP, is a combination of the first two where you have teacher-directed pupils watching, listening, and participating. This is a relatively infrequent category used in this particular classroom and refers only to music class in which the students alternately listen, watch and participate. As can be seen, there's no really consistent pattern of performance here-- MARY showing greater than expected withdrawn behavior under food reinforcement, PETER showing a little more aggressiveness under social reinforcement, and PAUL showing more withdrawn behavior in the second baseline period. It needs to be stressed that, with first grade children, the immediate environmental pressures can be more behavior influencing than the more general environmental situation. For example, if someone happened to push PETER as they sat down for the music lesson, this would likely bring forth an aggressive response not because of the music but because of the incidental behavior that accompanied the situation.

The next category, PDLM, represents pupil-directed, linear model, and this type of classroom activity is represented by a kind of workbook activity in which the students are expected to progress systematically through a series of activities in which they have a limited choice. Their choice is, in fact, limited to doing the exercises or not doing them, with the sequence of events already established by the teacher through his design of a sequence of arithmetic problems, or what have you. Under these conditions, we find no set pattern for the three children in the present study. PAUL, for example, showed greater teacher-approved behavior than expected under food reinforcement but greater aggressive behavior than expected under social reinforcement. No consistent patterns can be noted.

The next category, PDCM, indicates a pupil-directed, choice model. In this situation, the pupils are on their own and have a set of materials whereby they would choose what is to be done next. Art work on a subject of their choice would be one example of such an activity and playing with Cuisenaire rods another. Under these situations, PAUL tended to show greater than expected teacher-accepted behavior in both the second baseline and social reinforcement. Similarly acceptable behavior is shown by both MARY and PETER from one time to another. Such activities seemed to have within them less the seeds of aggressive or withdrawal behavior than do the teacher-directed activities.

Finally, in Figure 7 one can see the category of Free Play where little differences were obtained from the expected behavior on the part of the three children. Only under the condition of food reinforcement did PAUL show a greater than average aggressive behavior. Again, it must be remembered that incidents occurring within the situation itself may be more important in stimulating certain kinds of behavior than the environment. An accidental collision on the playground can dramatically increase the aggressive behavior of either of the two boys in the present study.

Overall, it can be noted in Figure 7, that while some patterns and consistent responses were noted on the part of the youngsters, the Figure is generally characterized by a lack of consistent response. This would seem to indicate that, in the first grade environment, while some patterns can be noted, such as PAUL's tendency to withdraw under teacher-directed pupil-listening situations, many changes in behavior are momentary and apparently determined by the situation that prevails at that point in time rather than by any long range or consistent response to differing environments.

This would also tend to account for the great differences in the student performance in the differing environments.

In summary, it can be said that each of the three children was influenced by the conditions of reinforcement, but that their reactions to reinforcement were quite individual in nature. In MARY's case, it was not in the direction approved or expected. It should be realized that while we are introducing a type of experimental condition through systematic reinforcement of acceptable behavior, that the total behavior of the youngster is what is under observation. There are many different variables that could and do have an impact on the child's total behavior that fall quite outside the reinforcement program. Two such notable instances that the experimenter was aware of was a death in PETER's family, which caused his absence from school for a period of time and might conceivably have influenced his second baseline performance, and PAUL's breaking his glasses. This accident, to a boy with a severe visual problem, could certainly have an impact on his behavior during that second baseline period.

These represent only the more dramatic and noticeable instances. The kind of treatment that the children were getting in their home the day before they came to school, the kind of social interaction with other members of the class on a particular day that is impossible to predict in advance--all of these have their influence on the total behavior patterns of the student. Under these situations, it is somewhat encouraging that the reinforcement program did seem to have some impact anyway as part of the multitude of other factors that were impinging upon the student.

## Conclusions and Implications

The purpose of this particular study was to determine if behavior modification techniques, as used in laboratory studies, would have an impact on the behavior of students when presented in the classroom environment. The results of the study would seem to indicate that these systematic reinforcement techniques used in the classroom by the classroom teachers or aides can have a significant role in the changing of behavior. These results are particularly interesting in view of the many other external influences that are impinging upon culturally deprived first grade children and which undoubtedly also play a part in influencing the total classroom behavior patterns of the youngster.

It would probably come as a surprise to many teachers, after hearing the esoteric language of the psychologist, to realize that what is being attempted here is nothing more than systematic rewards for appropriate behavior. There is no magic, no special equipment, no exciting new techniques that the teacher is not aware of already. It is the systematic nature of their application that is the key to success. What <u>is</u> different, however, is that the use of these techniques trains the teacher to reward positive responses instead of punishing negative responses. The seemingly natural reaction of a teacher in a group situation, where behavior control is always a problem, is that he spends most of his time putting out brush fires through attempting to inhibit unfavorable behavior. When the child's behavior is appropriate, then the teacher does not really pay attention to it or reward it. She instead

sees this good behavior as a rare opportunity to continue on with the lesson. The student can only conclude that he obtains a great deal of attention for his negative behavior but very little attention for his positive behavior.

If the growing literature in this area is correct that these behavior modification techniques do play an important role in modifying unfavorable behavior in the classroom, then the application of such techniques needs to be systematically inserted in teacher training programs. This is particularly true for those teachers who are planning to work with children who are not "ready for learning" and in which a substantial aspect of the educational program is taken up preparing the youngster to adapt a proper 'learning set.'

It would seem also important, from the teacher training standpoint, to emphasize the point that stopping a child from doing something wrong is not the same as getting him to perform properly. There are innumerable ways in which the youngster can misbehave, and stopping one of them is no guarantee that a second unfavorable one will not be elicited. On the other hand, substantial positive reinforcement for appropriate behavior does carry with it the expectations that such behavior will be more likely repeated in the future and this is what the teacher is really seeking.

Another implication from the present study was that, for all three of the children, the positive response to food reinforcement continued over into the social reinforcement period, and also into the follow-up observations. Some teachers' initial reactions to the giving of candy or food rewards to children is that they fear that they will become a cafeteria dispenser, doling out a variety of "goodies" to the children. This is a wrong conception, however. The food rewards merely highlight the proper behavior being reinforced. There are good reasons to believe that once the proper behavior

is manifested, and the student realizes he's being rewarded for it, then the food reward becomes unnecessary, and systematic verbal praise can be substituted. One advantage of the food reward was that it gave the teacher a concrete goal and action to follow. The tendency of the teacher, when verbal praise is being called for, is to let the pressures of the situation overcome her wishes, and she slips back into the same unsystematic behavior as proved ineffective in the past.

The performance of MARY in <u>increasing</u> her undesirable behavior under the reinforcement program merely stresses the need for the techniques to be applied with a full knowledge of the individual child. The meaning of reward to one child is not the same as to another, and this fact is much more complicated than just finding the kind of food for them that they like the best. In this case, a future attempt will be made to modify MARY's behavior with another system of reinforcement which does not involve direct adult contact, apparently the irritant in this particular girl's current problem.

In the general area of education of the culturally disadvantaged, such behavior modification techniques as used in the present study would seem to carry substantial promise for aid to the teacher, who often spends a great deal of time unsystematically attempting to modify behavior patterns of the children in her class. A planned program of systematic reinforcement should become a part of any educational program that must spend a substantial amount of time helping the students obtain proper behavior patterns that are substantially different from the ones that they brought to the educational scene. For many years, those who have been concerned with the

education of exceptional children have realized that one of the most important educational goals has been the establishment in their students of positive social patterns. The culturally disadvantaged child has helped us realize how important these goals are for other children as well.

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