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Application of Reinforcement Principles to the Modification of Isolate Behavior in a Withdrawn Child

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APPLICATION OF REINFORCEMENT PRINCIPLES TO THE MODIFICATION OF ISOLATE BEHAVIOR IN A WITHDRAWN CHILD

by

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INTRODUCTION

The successful application of reinforcement principles to modify problem behaviors with children has been demonstrated in numerous ways. Hyperactivity (Patterson, 1965), tantrums (Williams, 1959), thumbsucking (Baer, 1962), stuttering (Flanagen, Goldiamond and Azrin, 1958), crying (Hart, Allen, Buell, Harris and Wolf, 1964), excessive scratching (Allen and Harris, 1966), abnormal crawling (Harris, Johnston, Kelley and Wolf, 1964), and hostile behaviors (Hawkins, Peterson, Schweid and Bijou, 1966) have been reduced or eliminated through the use of these principles. Behavior problems associated with schizophrenia and autism (Ferster and DeMyer, 1962; Hewett, 1965; Hingtgen, Sanders and DeMyer, 1965; Lovaas, 1965; Lovaas, 1966; and Wolf, Risley and Mees, 1964) have also been found amenable to techniques applying reinforcement principles. These included speech problems, eating problems, and self-destruction problems.

There are an increasing number of studies which find the classroom setting well suited for the implementation of reinforcement principles. The techniques can be applied to just one child or to the class as a unit, and they may be applied to modify social behavior as well as academic learning. Some of the studies describing work directed toward one child in a regular classroom have already been mentioned (Harris, et al, 1964; Hart, et al, 1964; and Patterson, 1965). In addition to those studies, there have been experiments in which excessive crawling, isolate behavior and crying were decreased or eliminated by systematic application of teacher attention as a reinforcer (Harris, Wolf and Baer, 1964). Teacher attention was found by Zimmerman and Zimmerman (1962)

to be the reinforcer maintaining unproductive classroom behavior in two emotionally disturbed boys in a special class. In the Zimmerman study, more appropriate behavior was shaped and maintained through attention from the teacher following desirable responses by the children, and inappropriate behavior was ignored and gradually extinguished.

It is also possible to develop a design for the entire classroom which makes use of the systematic application of reinforcement principles. Hewett (1967) describes the "engineered classroom" for emotionally disturbed children as one in which "The teacher is assigned the role of behavioral engineer; she attempts to define appropriate task assignments for students, provide meaningful rewards for learning, and maintain well defined limits in order to reduce and hopefully climinate the occurrance of maladaptive behavior." (p. 460) The special classroom for emotionally disturbed children, as seen from a learning theory approach, is one conducted economically and realistically toward a goal of teaching the pupil the necessary skill--social and academic--for him to function as a student in a regular classroom and as a member of the general society. The learning theory approach employed in the present study is the operant conditioning approach. It consists of the attempt to apply basic behavioral principles in a classroom situation. (These principles are described briefly in Whelan and Haring, 1966; in Valett, 1966; and more comprehensively in Staats and Staats, 1963).

The child in the behavior modification class is seen somewhat differently from the way he would be seen if in a more traditional setting. "Rather than view the emotionally disturbed child as a victim of psychic conflicts, cerebral dysfunctions, or merely academic deficits,

this approach concentrates on bringing the overt behavior of the child into line with standards required for learning." (Hewett, 1967, p. 459) The child's problems are viewed in terms of external, observable events rather than as hypothetical internal states of the organism. For example, rather than consider the anxiety level of the child as the cause of hyperactive behavior, the hyperactive behaviors are defined and approached directly. The teacher concentrates on the unique behavior of each child and attempts to strengthen specific behaviors that are desirable in the classroom or in general living. These responses might include such behaviors as paying attention, appropriately expressing anger, answering correctly, cooperating, controlling odd mannerisms, asking relevant questions, and participating during a group situation.

Quay, Werry, McQueen and Sprague (1966) suggest that "the present effort by clinicians to help teachers understand their pupils is less likely to be successful than the problem behavior oriented approach in which attention is focused on overt problem behavior as exhibited in the classroom . . ." (p. 514) The classroom teacher needs a theoretical framework which will give her methods to maintain enough order in the class so that the academic projects may be presented. This framework should suggest how adaptive behaviors may be elicited, what reinforcers will most likely be successful in eliciting the behaviors, and with what immediacy and consistency these reinforcers should be scheduled.

Valett (1966), in suggesting a design for classroom management of behavioral problems, states, "What is necessary is the development of a reinforcement system around the appropriate responses that have been clearly identified." (p. 189) Continuing, Valett mentions six principles

considered basic in modifying the pupil's behavior and improving his learning. The principles are:

1. Pupils must be educationally programmed according to their level of development and achievement.

2. Material to be learned must be systematically organized and able to elicit response and success from the pupil.

3. Success in learning (e.g., desirable behaviors) should be immediately rewarded. If necessary, primary reinforcement (food, praise, etc.) should be used.

4. Immediate primary reinforcements should be part of a broader system involving varying rewards and social reinforcement.

5. Rewards should be attainable after a reasonable period of effort (lessons should not take too long and may have to be broken down into smaller units) with subsequent reinforcement as necessary.

6. The pupil must be able to understand the desired behavior change, the rewards involved, and the operation of the total system. The system should be available (e.g., written out) and as concrete as possible. (p. 186)

These principles are to be applied with the idea that, "As long as the child is part of a class, he is a member of a social system that can be managed to control his behavior." (p. 186) Valett proposes that the system include primary rewards such as candies and cereals, the dispensing of which would be accompanied by verbal praise and other forms of social reinforcement. Token reinforcers such as chips or checks might be used to earn stars. These stars could then be placed on a chart which would indicate weekly membership in a student council or society (in the classroom). Membership for several weeks consecutively might further qualify the child for a special award pin, gift, or specific

privilege or trip. The parents may be brought into the situation by informing them of the system used in the class, and they thus could lend strength to the system by their reinforcement to the child for his progress in the class.

This description is one of numerous possibilities for a practical classroom system employing modification techniques. Studies which have actually carried out a behavior modification design are encouraging. Hewett (1967) utilized a work record card which the child carried with him through the day, receiving checks on a fixed interval, fixed ratio basis, every 15 minutes, for those behaviors on which the teacher decided to concentrate. Whelan and Haring (1960) suggested the use of a staging technique, in which one child's behavior is modified and he then provides a model for the second child who is admitted to the program. This process is repeated, the children who are already class members providing models for each new child admitted to the room, until a workable classroom size is reached. Phillips and Haring (1959) describe a special classroom in which play and recreation breaks and periods were contingent upon the child finishing his work assignments. They found that the children in the experimental classroom had made significantly increased gains in social and academic behavior over their counterparts in a control classroom. Quay, et al (1966) developed a system to deliver reinforcement to each child at his desk for being attentive during a group considerably over that of the children in the control group. Wolfson (in Michael, 1964) employed a paper money system with a normal fifth grade class, "dollars" being exchangeable for activities and trips.

He found the system extremely successful.

Hawkins, McArthur, Rinaldi, Gray and Schaftenaar (1967) described two school-adjustment classrooms designed to systematically employ the principles of behavior modification. The classrooms were fairly structured, with the day separated into specific periods, each period being separated into shorter time blocks. The children were taught individually and in groups, with rest breaks and play periods being contingent upon finishing specific assignments. The classrooms each had a teacher and an aide. The presence of the aide made it possible to proceed along individualized lines where a child's behavior suggested that this might be necessary and fruitful. In such cases, the teacher worked with the children who were able to behaviorally cooperate and work in a group situation at their desks or at a table. Working individually with a child who could not adjust and learn in the group situation, the aide concentrated on both the behavior and learning skills of that child.

The present experiment was conducted in one of the experimental classrooms described by Hawkins et al, (1967). This study was designed to demonstrate that reinforcement principles and techniques could be employed to modify the behavior of a somewhat withdrawn, extremely nervous, and quiet child. The goal in terms of treatment was to have the child learn to play with other children, so that the play situation itself might become reinforcing and thus maintain more outgoing social behavior.

METHOD

Subject

The child in this study was a nine year-old boy, Tim,[1] in a classroom for emotionally disturbed children. His previous teachers described him as being an extremely quiet, nervous, somewhat withdrawn and unemotional child. Some teachers also used the word "loner" in their descriptions, and they mentioned that Tim had hand tremors. He did not look at people speaking to him, talked in a rambling way, seemed very constrained in social responses and in general, needed to develop appropriate social behavior. One teacher reported that Tim seemed to be abnormally concerned with death, and often spent time killing bugs. Teachers agreed that Tim was easily distracted and tended to daydream. He had repeated second grade. During the course of the present study, Tim was receiving the drug Ritalin, for the purpose of making it easier for him to concentrate on school work.

Setting

The experiment was conducted in a special "adjustment classroom" located in a regular public elementary school. There were five children in the class with one teacher and one aide. The classroom was essentially divided into two areas, a recreation area and an academic work area.

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[1]The name supplied in this paper is fictitious.

Division of the room was accomplished by the side-by-side placement of the children's five work booths or "offices" in the center of the room. The booths consisted of three sides, each five feet high. They made distraction of the child, who was seated at his desk within the booth, less probable than in the normal classroom situation. The fronts of the booths were open, facing the teacher's desk to the left of them, a supply table to the right of them, and a wall chalkboard directly in front. The recreation area was located behind the booths. It consisted of three tables, a number of chairs, a bulletin board, and chalkboard, as well as games, toys, and arts and crafts supplies.

The classroom activities were scheduled so that the opportunity for a child to participate in the recreation area activities was contingent upon his finishing his academic assignment for that period. The arithmetic lesson time, during which the data for this study were collected, was fairly representative of the design of other periods during the day. It was divided into four fifteen-minute periods. The first period was usually used to teach the necessary concepts. The last three periods were designed for the children to work individually at their desks on arithmetic problems programmed for their level of skill. At times, all four periods were utilized for individual work, the teaching of concepts being accomplished on an individual basis. If the child finished his assignment for a period before the 15 minutes were over, he was allowed to go into the recreation area for a reinforcing play time which lasted until the beginning of the next period. Working assignments were gradually lengthened and so were the work periods, until,

at the end of the year, the children were working for 20 to 25 minutes at a time, with only five to ten minutes of contingent play.

PROCEDURE

It was during these reinforcing play periods in the recreation area that the present experiment was conducted. Although there was a teacher and an aide in the classroom, they were not always present during the play periods. During the course of the experiment, E and at least one observer were present in the play situation. The observer did not enter into any activities, but sat quietly in a chair in the corner of the recreation area, where he could hear and see all that occurred. If the children questioned him, he ignored them or said simply that he was busy or was working. Since the children were accustomed to having observers present in the front working area of the classroom, little attention was given to the observer's presence in the play area.

Tim had been casually observed during the first part of the year and his isolated and withdrawn behavior noted. Prior to the beginning of the experiment, Tim was observed more intensively, and definitions which described a major portion of his behavior repertoire during play periods were worked out. These included three mutually exclusive classes of behavior: (1) isolated play, (2) playing with others, and (3) watching. The second class was broken into two other mutually exclusive categories: (1) playing in a group that included adults and (2) playing exclusively with children. Data were also obtained on two additional classes of behaviors: verbalizations and responses to questions. The observer held a stopwatch and clipboard with a data recording

sheet on it. The frequency of a behavior was determined by recording for each successive ten second interval whether or not the behavior occurred during that interval. The total time that a behavior occurred was found by counting the ten second intervals in which it appeared, and when this number was divided by the total number of intervals in the play period a "percent of occurrence" for the behavior was obtained. Data were recorded for approximately 20 minutes at the same time each day, recording time ranging from 14 to 30 minutes. The recording began when Tim entered the play area and at least one other child was present. If Tim left the play area, the watch was stopped. Recording resumed when he returned. Leaving the play area was defined in terms of a specific line marked on the floor. Crossing this line indicated that Tim was out of the play area.

The six behaviors were precisely and objectively defined (see Appendix A) so that two independent observers, observing from different corners of the play area at the same time reached a percentage of agreement between 88 and 100 percent as to the frequency of occurrence of the behavior. The percent of agreement for the verbalization behavior was somewhat lower, having a range from 71 to 100 percent with an average of 85.3 percent. These percentages for all behaviors were arrived at by constructing a ratio comparing the total number of ten-second intervals in which one observer judged the behavior to have occurred to the total number of intervals in which the other observer judged the behavior to have occurred. The smaller number was placed in the numerator to insure a percent not greater than 100. This was done approximately nine times for each behavior dictated by session numbers

under each figure.

Poker chips were employed as token reinforcement, exchangeable for phonograph records, small toy cars, a large scale model truck, and other smaller toys available for purchase in the classroom. Social reinforcement in the form of attention, thanks, and praise for playing was also employed. Since all five children in the class were at one time or another involved in comparable individualized treatment, it was quite acceptable to the other children that Tim should be receiving special attention at this time. Later in the experiment the other children were to be brought into the reinforcement situation by reinforcing them for playing nicely with Tim and for asking him to play with them. This was explained to them in groups of two, with E suggesting to the children that they were going to help Tim learn how to play more with other children and enjoy the things they did. The E at this time also asked the children how they thought they could help Tim and what specific things they could say or do.

The experiment was divided into five phases: a baseline phase, an experimental phase, a reversal phase, a reconditioning phase, and a transition phase. The specific procedures of each phase will be presented separately.

Baseline phase. During the first eleven days the E became acquainted with the children in the play situation. He did not respond with social reinforcement to any of the children's behaviors except to play with those children who asked him. At this time his responses were directed toward all the children.

Starting with day 12 (see letter A on all Figures) and continuing through day 26, E concentrated his attention on Tim. He approached Tim three times during every session, each time asking him one of three questions: (1) Would you like to join _____ in a game? or, Why don't you ask _____ to play with you? (2) Would you like to take my place? (3) Will you play with me? The form that question one assumed depended on the situation which existed and which question was more appropriate. Question two referred to a situation in which E had begun a game with the other children and then invited Tim to join by taking E's place. Tim's responses to these questions were recorded by noting whether he played, a positive response, or remained isolated, a negative response. The order in which the questions were asked was question one or two asked first and question three asked last. This was done to give Tim the opportunity of playing with other children first. If he did not want to do this, he was then asked to play with E. The E attempted to respond by playing with Tim when appropriate, but not praising him for playing. Later, in the experimental phase, these same questions were asked, but E then reinforced Tim's positive responses with praise. The questions were introduced by E in order that the responses of interest--playing with others--might easily be elicited during the experimental phase. To maintain the questions as a controlled variable, they were also presented during the baseline period.

Experimental phase. On the first two days of this phase, days 27 (see B on all Figures) and 28, Tim was praised for positive responses to the questions. This praise was in the form of "Thanks for playing with

me," or, "You played well with _____." The attention Tim received while playing with E was also a form of social reinforcement, possibly stronger than the praise. Although social reinforcement in the form of praise and attention did seem to effect an increase in playing with adults, it became evident that it did not have an immediate effect of increasing the desired behavior of Tim's playing with other children. Since the reinforcement for Tim consisted in play and attention from E and adults, it was difficult to make the situation in which he played with children more reinforcing than playing with adults. For this reason, the procedure was changed and a token system introduced immediately rather than in a later experimental phase as had been planned.

The token reinforcement with poker chips was carried out on days 29 (see C on all Figures) through 39. Prior to this, on day 28, E arranged with Tim, his parents, and the school to go with Tim after school to pick out some things which he would be interested in earning. Tim was told that he would be able to earn chips in the play situation by playing with the other children, the teacher and aide, and E, and that these chips could be exchanged for the truck and records he had picked out. At this time Tim was also told he could earn more chips by playing with children than by playing with adults. The E also arranged for a short time after each session during which he and Tim could count the number of chips Tim had earned that day and record this on a graph. The graph was drawn to illustrate for Tim his own progress toward winning the special truck. It also indicated several points at which smaller, more immediate reinforcements could be received. The E arranged

it so that Tim earned approximately 20 chips each day. Each chip had the monetary value of slightly less than one cent.

For five sessions (29-33) Tim did make an effort to engage other children in play activities, but he was not always successful. To increase the likelihood of the other children joining him in play activities, on day 34 (see D on all Figures) reinforcement for the other children was introduced in the manner mentioned previously. Other experimenters (Levin and Simmons, 1962) have found that with some groups of disturbed children social reinforcement in the form of praise may not be effective, and that material reinforcers may at first be necessary. With this taken into consideration, material reinforcement in the form of poker chips was employed. The children were very cooperative in this attempt to help Tim, and each earned approximately three chips each session. These were exchangeable for small toys and trinkets displayed in a cabinet in the room. On day 35 (see E on all Figures) E discontinued asking the questions, because by this time during the experimental phase Tim's playing behavior had changed drastically. There was no opportunity for E to ask any questions, Tim was playing with other children almost 90 percent of the play session.

Reversal phase. During days 40 through 46 E remained in the play situation and Tim's classmates continued to receive reinforcement, but Tim no longer received token reinforcement for playing with others--children or adults. The E resumed asking the questions. This was possible because Tim's play behavior assumed an isolate quality again and the opportunity to ask the questions was present much as it had

been in the baseline phase. Playing with others was apparently not yet reinforcing enough to be maintained without material reward. The reversal procedure made it possible to determine whether the material reinforcement of Tim's social interaction was the significant variable producing his behavioral changes.

Reconditioning phase. At the beginning of this phase E suggested to Tim that perhaps he might be interested in earning some chips again, this time toward the purchase of two phonograph records. It was explained that the chips could be earned by playing with other children and also by verbalizing while playing. The verbalization contingency was added in an attempt to have Tim extend the degree of his social interaction. The E arranged that Tim could earn approximately eight chips each day. During the last two days of this phase the aide was brought into the situation, so that both aide and E administered reinforcement. This was done in anticipation of having the aide assume entirely the role of administering reinforcement.

Transition phase. On day 57 E left the play situation and classroom entirely. The aide attempted to administer reinforcement to Tim and at the same time to shift Tim to the regular reinforcement system in which the rest of the class was participating at that time. This system consisted of reinforcement every five minutes throughout the day. Five minute intervals were indicated by a prerecorded tone on a tape recorder in the room. When the tone sounded, there was a possibility of three token reinforcements (poker chips) based on individualized contingencies. The contingencies were individualized so that each child

could work on the specific behaviors which the E and teacher had found to be an important part of that child's adjustment problem. For Tim during playtime, these behaviors included playing with other children, verbalizing, and generally participating in group activities. The results of the transition phase would allow E to see how effectively this type of treatment might be carried on by an aide or teacher in the classroom situation with emotionally disturbed children.

RESULTS AND DISCUSSION

The changes in frequency of the different recorded behaviors have been indicated in Figures 1, 2, 3, and 4 in the form of graphed percentages of total time. Figure 1 shows the percent of the session time that Tim spent in isolated play (solid line) and the percent of the session time that he spent playing with others (dotted line). These behaviors together account for nearly 100 percent of the play session time.

During the baseline phase (see Figure 1) Tim's isolate play accounted for a large percent of his behavior during play sessions (solid line). The range of the percent of time spent in isolated play was 3.5 to 99.1 percent. Of the 26 baseline sessions, 17 indicated that Tim remained isolated for over 50 percent of the play period. In a session-by-session comparison of isolated play and playing with others, it can be seen that on 19 of the 26 baseline sessions, isolate play behavior was more frequent than playing with others. The letter A indicates the session on which E began asking the set of three questions. Figure 1 suggests that this did not have an effect on the behaviors recorded.

In general, Tim spent his play periods in isolate behavior (see Figure 1) or playing with adults (see Figure 2). During the 14 sessions for which baseline data were taken in Figure 2, in only two did Tim spend

more than 22 percent of his time playing with children (dotted line). In six of the 14 sessions Tim did not play with children at all.

It will be noted that there is great variability of both playing with others and isolate play. This variability might partially be accounted for by the fact that the number of other children present in the play periods varied, as well as did the length of the period itself.

During the experimental phase, Tim's social behavior changed drastically, as shown in Figure 1. When social reinforcement was employed on the first two days of the experimental phase (see B on all Figures), Tim spent over 90 percent of the session time playing with others. However, this was not adequately achieving the therapeutic goal for Tim; namely, skill at playing with peers. Figure 2 shows a breakdown of the category "play with others" into two component subcategories, play that included adults and play exclusively with children. It can be seen that although the praise given Tim in sessions 27 and 28 produced a high rate of playing with others, (see Figure 1), this play was for the most part play with adults (see Figure 2). When token reinforcement was introduced (session 29, C on all Figures), Tim began playing more and more with peers, for which heavier reinforcement was given (see Figure 2).

In Figure 1 it can be observed that in sessions 31 and 33 Tim spent a great amount of time in isolated play. This is probably a result of the fact that on these days E refused several play invitations from Tim in an attempt to direct him toward playing with the other children. Tim did make an effort to engage the other children in play activities, but

was consistently rejected on these two sessions (nine and five times respectively). With the introduction of a token reinforcement system for the other children (reinforcement for joining Tim in play activities), Tim's isolate behavior dropped to zero percent on four of the next six sessions (see Figure 1, D). Conversely, playing with others was well above 90 percent on five of the last six experimental sessions. As seen in Figure 2, after session 34 (D), playing with other children stabilized and accounted for an average of 88.5 percent of the session time. This was a clear increase over the frequency of this behavior as compared to the baseline phase. The letter E in both Figures 1 and 2 indicates the first session during which the questions could no longer be asked because of Tim's high rate of playing with others, particularly other children.

The shift to the reversal phase brought dramatic changes in behavior. There was an immediate increase in isolate play behavior and decrease in play with others (see Figure 1), and what play behavior did occur could be accounted for by play with adults (see Figure 2). The frequency of playing with children dropped to the same level it had been during the baseline phase. Even though the other children were still being reinforced for joining Tim in play activities and continued to ask him to play, this was not effective in maintaining the high level of play with children observed in the experimental phase. Playing exclusively with other children apparently did not yet bring sufficient intrinsic reinforcement to Tim such that this behavior could be maintained without extrinsic reinforcement. In general, in both Figures 1 and 2, the variability during the reversal phase is much the same as during the

baseline phase.

The results during reconditioning were clear. In Figure 1 it can be seen that isolate behavior occurred during only two sessions of the ten, and that playing with others occurred over 85 percent of every session and over 95 percent of eight of the sessions. Here again as during the experimental phase, there was no opportunity for E to ask the set of three questions. Although E began the first day of reconditioning by starting with the first two questions, they were not necessary after that day. It should be mentioned, however, that E did continue during this phase to arrange games and play activities so that the children would find it easy to play together.

Playing with children during the reconditioning phase accounted for at least 80 percent of each session time (see Figure 2), with the exception of session 53 (F on all Figures). On this particular day, a new game which necessitated adult explanation and demonstration was introduced into the play situation, so playing with adults was considerably higher this day than on other days. The favorable results during the reconditioning phase support and strengthen the confirmation that the material reinforcement of Tim's social interaction was the significant variable. During the last two day of this phase, the aide joined E in dispensing reinforcement. This was done in anticipation of complete changeover to the aide during the transition phase. Since he had been involved in the play situation at various times, this did not seem to change the children's behavior.

The transition phase was unfortunately short because of the termination of the school year. It will be remembered that during this phase E had withdrawn himself from the play situation and left all extrinsic reinforcement to the aide. During this time Tim spent slightly more time in isolated play than he had during reconditioning (see Figure 1), but the frequency of this behavior was still lower than it had been during baseline conditions. This slight increase might partially be explained by the fact that there were fewer token reinforcements available and the system for Tim was the same as the system for the rest of the class. These changes plus the fact that the aide was not yet used to setting up play activities for the children as a group undoubtedly account for some of the increase in percent of isolate play during the transition phase.

Although Figure 2 suggests a slight decrease in playing with other children and an increase in playing with adults, this was partly a function of the fact that the aide, when present, was generally (more than E) an active participant in the play situation. The definition of playing with children excluded a group situation in which an adult was directly involved in the play activity. The aide was not instructed to change his behavior with the children and thus continued to join in their activities.

Figure 3 shows the percent of time that Tim spent verbalizing while he was playing with others. The broken lines in this figure are used when Tim did not play at all with others, or when play with others lasted under one minute during a session. Data were recorded for

percent of verbalizations while playing because it seemed that this might be indicative of some of the more complex social skills that Tim should learn. By interacting more with peers, Tim was in an environment which would essentially force upon him the opportunity to learn this skill for himself. This might appear to be the case as seen in the baseline, experimental, and reversal phase data of Figure 3. During these phases Tim was never told that reinforcement was contingent upon verbalization, although E was attempting to differentially reinforce (with more chips) playing behavior during which verbalization occurred. It is interesting to note that although the verbalization rate is somewhat higher during experimental, reconditioning, and transition phases, even after Tim was told that he would be reinforced for verbalizing while playing (session 47, Figure 3), his verbal behavior does not greatly increase. Possibly the complexity of this behavior would demand some sort of shaping procedure.

Watching others is the behavior described in Figure 4. Data were recorded on this behavior because in the early stages of observing Tim, it occurred at a fairly high rate. Towards the end of the baseline phase, shortly after the introduction of the set of questions, watching others decreased considerably. This may possibly be explained by the suppression effect of the questions. When Tim was standing around watching others, E considered this an opportunity to ask one of the three questions aimed at involving Tim in an activity. In effect, the questions could act as a discriminative stimulus meaning, "Stop standing around watching and play!" During the experimental phase, the slight

rise in watching might be accounted for by the fact that Tim was learning to approach others and ask them to join him in an activity. Reversal data suggest that the suppressive effect of the questions was lost, and that the consequences or lack of consequences was important. As long as he was not being reinforced, Tim would rather watch than enter into play situations. Reconditioning would support the notion that the consequences were important. Since the questions were not asked after the first session (session 47, Figure 4), they could not be suppressing watching behavior. Although there is an increase during the transition phase as compared to the reconditioning phase, watching is still lower in frequency than it was during reversal. This suggests that a stable and durable change in this behavior may have occurred.

During the course of this experiment, Tim's behavior was changed considerably. Comparison of his behavior during the baseline phase with that of the transition phase has illustrated this change. Data referring to the set of questions also illustrates the change. During the baseline phase E had the opportunity to ask 35 questions to which Tim responded positively to 8 or 22.8 percent. During the experimental phase 28 questions were posed, 22 or 78.5 percent of which Tim responded to positively. During the reversal phase 26 questions were posed, and only 5 or 19.2 percent were responded to positively. During the reconditioning phase E had the opportunity to ask only four questions, all of which (100 percent) were responded to positively.

The brief period of treatment (the experimental phase) was apparently insufficient to teach Tim the social skills and establish the relationships necessary so that the social reinforcement of his peers would be

sufficient to maintain his interaction. Longer treatment would be suggested for the establishment of more permanent changes in Tim's behavior. The transition phase suggests that some degree of durability was already being established at the time the experiment was terminated.

Generally, isolate and withdrawn were the terms which described Tim's behavior during the baseline phase. He typically refused invitations to play or played for only a brief period before withdrawing himself from the play activity. For the most part Tim exhibited a poker-face expression and seldom if ever smiled. He behaved very much like the "loner" that his teachers had described. This contrasts drastically with a picture of his behavior during the final phase of the experiment. Play behavior was maintained by only six to eignt tokens depending on the length of the play period. Tim's social interaction had in general increased and, particularly important, his peer interaction had clearly increased. He had begun to smile and laugh on occasion. Several times while engrossed in a game, Tim expressed genuine excitement. This contrasts sharply with the bored, unemotional quality of behavior seen in early stages of the experiment.

In summary, a growing body of literature suggests that reinforcement techniques based on reliably and scientifically established principles of behavior are extremely practical in the classroom. Academic skills (Staats et al, 1963, and Birnbrauer, Bijou, Wolf and Kidder, 1963) and social skills have been investigated. Whelan and Haring (1966) and Valett (1966) discussed some of the particular techniques that might be used by the classroom teacher. A few studies

(Quay et al, 1966; Phillips et al, 1959; Hawkins et al, 1967; and McArthur, 1967) have reported actual classroom results. These included improvement in individual academic and behavioral problems as well as modification of behavior involving the entire class. The present study suggests that reinforcement techniques have considerable therapeutic value when applied to changing the behavior of one withdrawn child in a special adjustment classroom.

The various techniques that can be derived from behavioral principles are particularly useful from the standpoint of flexibility, economy and practicality. First, the manner in which techniques are developed depends largely on the situation in which they are to be applied, limitations being enforced by only a few basic principles and the imagination of the teacher, social worker, or psychologist involved. Second, if the teacher learns how to maintain appropriate social behavior and productive academic behavior in the classroom with emotionally disturbed children, then other professional workers can be freed for service in other areas. Third, the approach gives the teacher a technique that can be employed immediately in the classroom situation with much less training than some of the other more involved clinical procedures require. School psychologists and social workers might also find the general approach described in this paper useful when analyzing classroom situations and advising teachers. Further research should continue to demonstrate the usefulness of techniques derived from behavioral principles and broaden the situations in which they may be applied.

APPENDIX A

APPENDIX A

Definitions of Behavioral Categories

Isolated play - occurred in situations where Tim was by himself, involved in play behavior which did not include another child or adult. This included playing alone with a puzzle, reading by himself, playing ring toss by himself. If other children were working on the same puzzle (even though not talking), if they were at a table together working at related tasks and involved in verbal exchange--this was not isolated play.

Playing with others - this behavior was recorded when Tim was involved in social or physical interaction with another child or an adult. This includes games, building Tinker Toy models together, doing same puzzles, sitting in close proximity while drawing (same table) arguing, and fighting.

Playing with children - this behavior was recorded when play activities involved only children. If an adult was explaining or scoring a game, this was also recorded as "playing with children." If the adult was actually playing the game with Tim, this was recorded as playing with adults, even though other children were also playing that game.

Watching - this behavior was recorded when Tim was not playing, but rather standing, directing his eyes toward the activity of a group or individual, while not verbalizing or interacting with the group or individual.

Verbalizing - was recorded whenever Tim entered into any sort of verbal exchange with another individual or group. This did not include talking to himself, humming, or sounds made in imitation of motors.

APPENDIX B

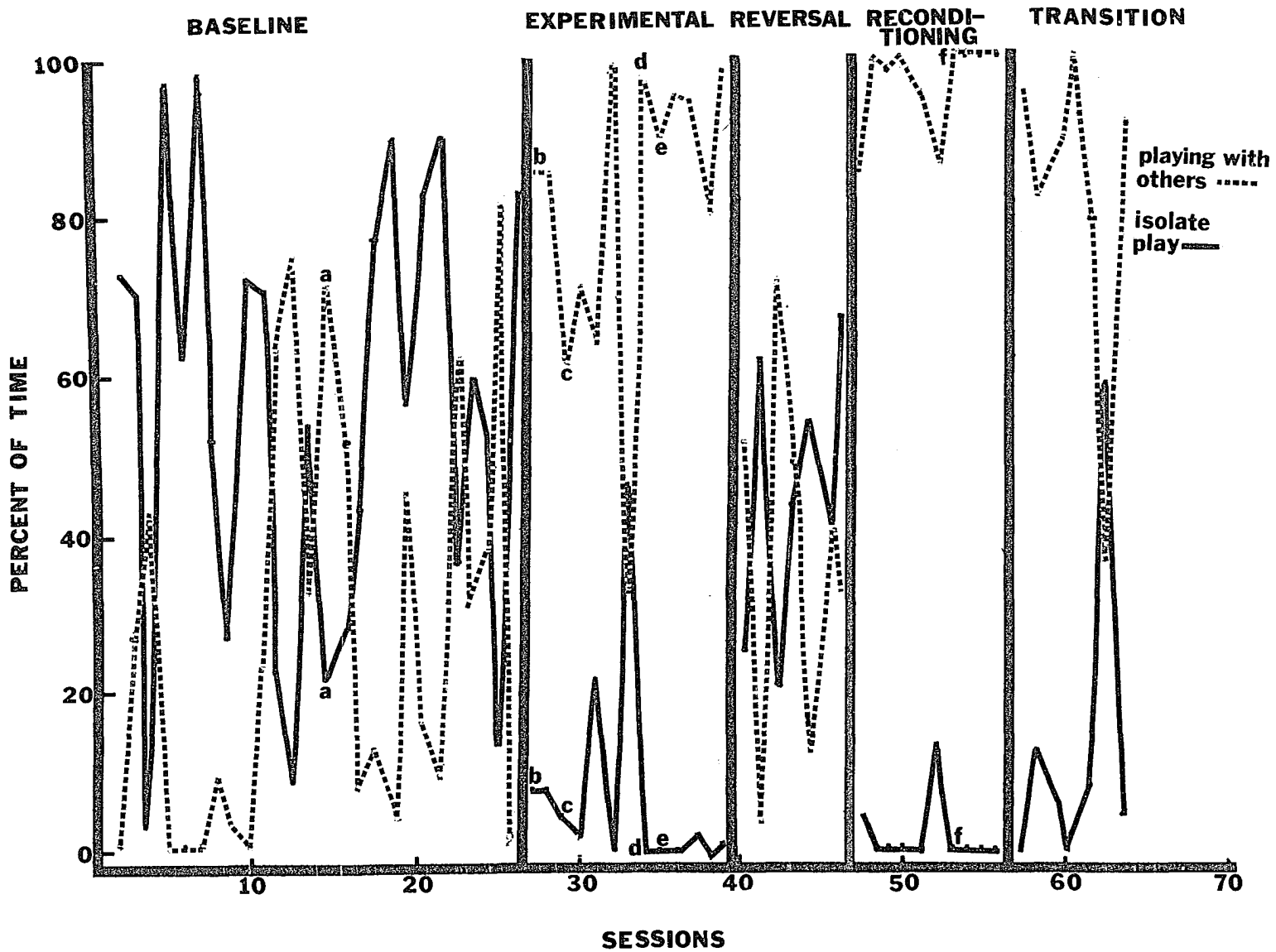

Fig. 1. The effects of token reinforcement on increasing social interaction. Interjudge reliability recorded during sessions 8, 9, 10, 13, 16, 28, 33, 37, 43, 52 and 57.

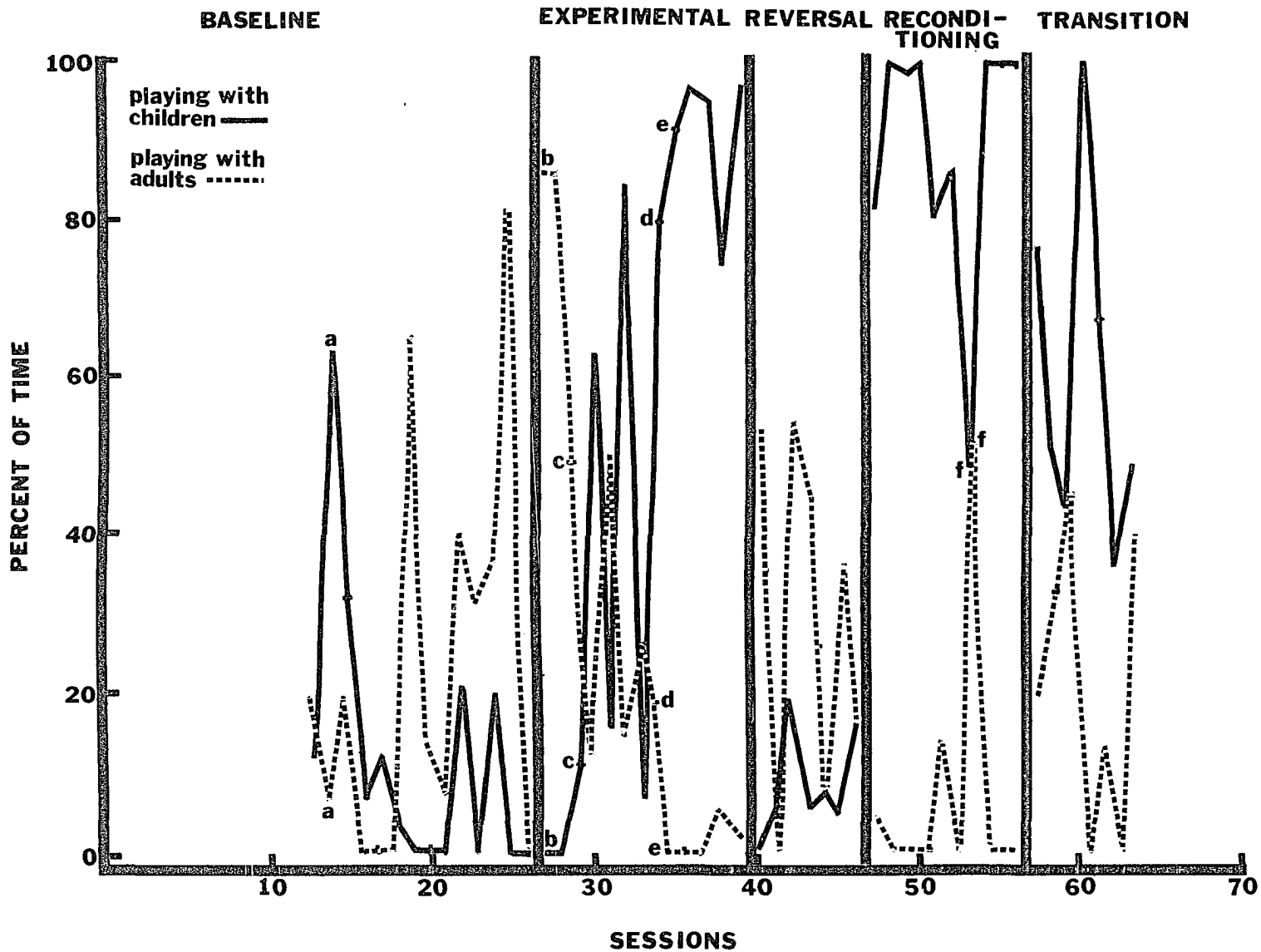

Fig. 2. The effects of token reinforcement on increasing social interaction with children. Interjudge reliability recorded during sessions 13, 16, 28, 33, 37, 43, 52 and 57.

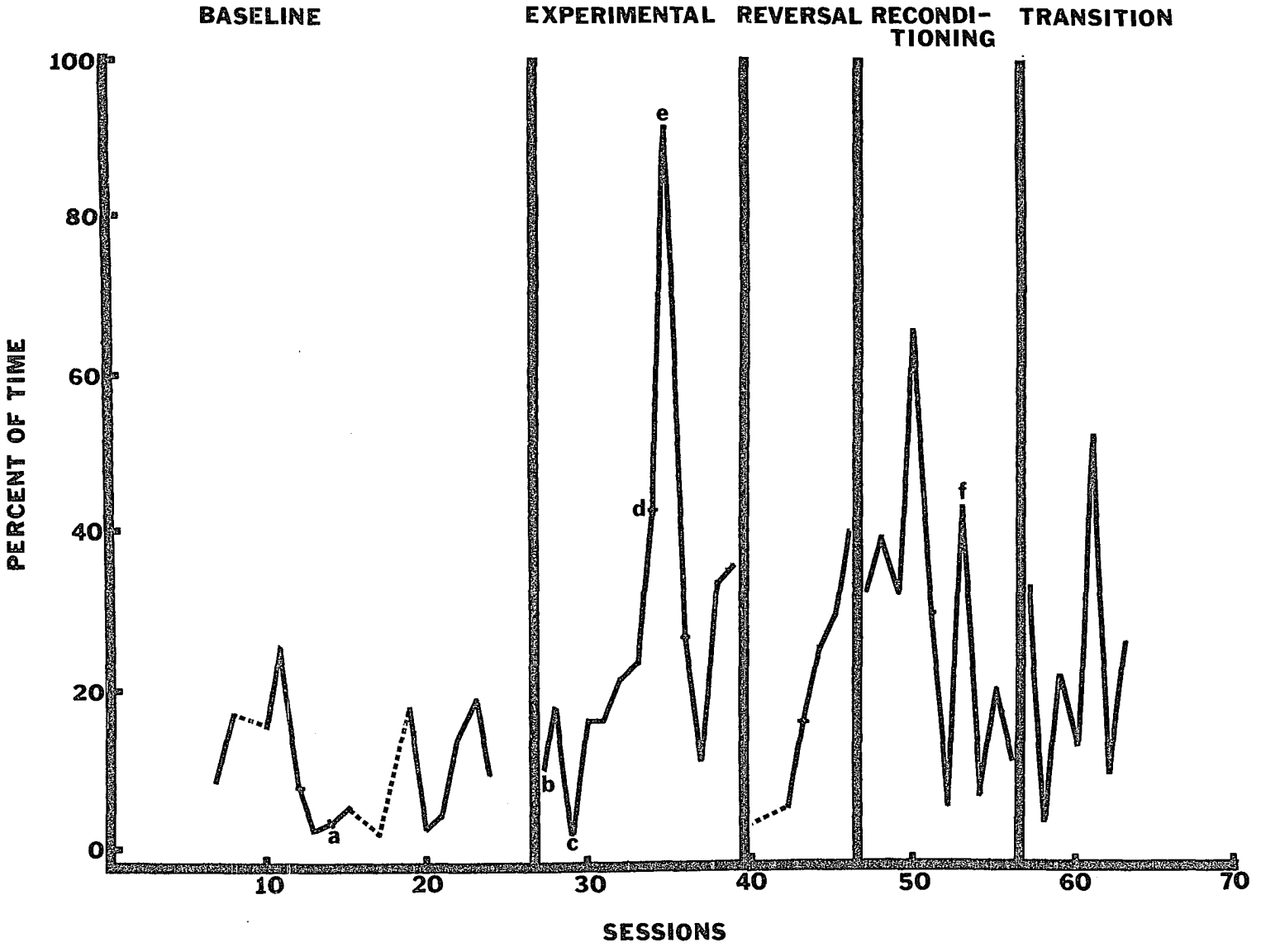

Fig. 3. The effects of token reinforcement on increasing verbalization while playing with others. Interjudge reliability recorded during sessions 8, 9, 10, 13, 16, 28, 33, 37, 43, 52 and 57.

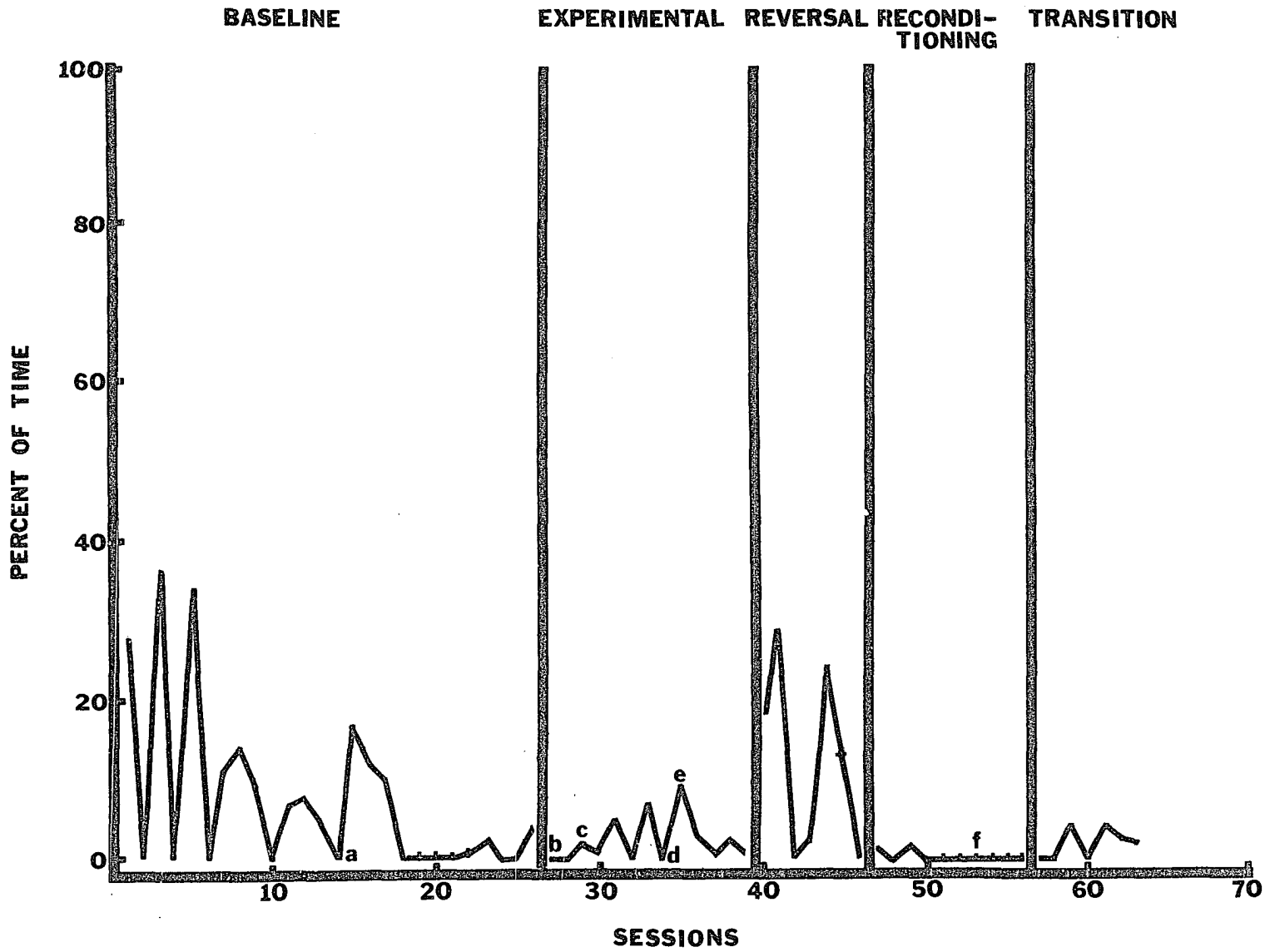

Fig. 4. The effects of experimental procedures on time spent watching others. Interjudge reliability recorded during sessions 8, 9, 10, 13, 16, 28, 33, 37, 43, 52 and 57.

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