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"COMPARISON BETWEEN SEVERAL OPERANT
PROCEDURES WITH SEVERELY RETARDED
CHILDREN"

A THESIS SUBMITTED TO THE UNIVERSITY
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SUMMARY

This study was designed to examine:

- (a) The effects of social and token reinforcement in increasing instruction-following behaviour in retarded children, where the class was addressed as a whole;
- (b) The effects of time-out and verbal reprimand as methods of reducing disruptive behaviour;
- (c) The effects of the administration of social reinforcement (verbal praise), in increasing behaviour defined as helping other children.

Results show that token reinforcement is significantly more effective than social reinforcement in generating and maintaining instruction-following behaviour in a sample of severely retarded children. This supports the results of a growing body of literature relating to both the theoretical and applied aspects of reinforcement procedures.

The time-out procedure was found to reduce disruptive responses at a more rapid rate than that of verbal reprimand and the effects were more lasting over time. This result was achieved using a 60 second isolation period. Verbal reprimand was found to reduce disruptive responses to slightly below the non punished level. Suggestions are made as to further developments in both procedures.

The administration of verbal praise, delivered contingent upon one child helping another, led to an increase in this class of response in three children. No general conclusions can be made as to the effectiveness of this type of reinforcement in increasing helping

behaviour in a group situation.

The results obtained in this study further suggest that the approach taken can be successfully applied to the problem of altering the behaviour of individuals treated as a group, in a group setting. This applies to both the reinforcement and punishment conditions. The results further indicate that the systematic application of operant learning principles will both increase adaptive and decrease maladaptive behaviour in retarded children.

CHAPTER I: THE RESEARCH PROBLEM

This study is concerned with the application of operant conditioning procedures to a sample of severely retarded children in a classroom setting. The study had three major goals:

- (a) Comparison of social and token reinforcement in control of instruction following;
- (b) Comparison of social and time out (T.O.) in the control of disruptive behaviour;
- (c) Use of social reinforcement to control helping others.

Investigations using retarded children as subjects, have employed three major treatment designs:

- (1) Applications of reinforcement and punishment stimuli to children on an individual basis (Risley, 1968);
- (2) To individual children in a group setting (Burchard 1967);
- (3) The concurrent exposure of all class members to a single, specific set of reinforcement contingencies.

The present study falls into the third category. This is particularly the case with the instruction following and helping behaviours.

The only study using the procedure mentioned in (3) above, seems to be that of Zimmerman, Zimmerman and Zimmerman (1969), in which a specific set of reinforcement contingencies were applied to a group of retarded children using instruction following behaviour as the dependent variable. Burchard (1967) applied a similar type of programme to a small sample of retarded delinquents. The dependent variable was the same for all class members but reinforcement contingencies were delivered

on an individually tailored basis.

There is a need to develop techniques to control and increase the instruction-following behaviour of retarded children. This should lead to the increased learning of academic behaviours. In terms of the scarcity of trained personnel the application of a common set of instructions and reinforcers to groups of subjects would be an advantage. In order to further develop, or improve techniques, this may be done under conditions in which the rate of responding and the procedures employed can be accurately monitored. O'Leary and Drabman (1971) note that academic behaviours as such, are the most difficult to change under reinforcement programmes since children involved in these programmes often have some of the appropriate social behaviours in their repertoires but not the academic skills to progress without considerable instruction.

Programmes not utilizing the principles of operant psychology, have been applied to groups of children in New Zealand classrooms. Many of these have not been successful in increasing adaptive classroom behaviours. This study attempts to generate and maintain adaptive classroom behaviours with a group of severely retarded subjects exhibiting little instruction following behaviour.

While it has been suggested that token reinforcement could be the most effective means of developing appropriate behaviour in classroom situations (Skinner, 1953), there is little evidence to show that it is clearly superior to that of a single reinforcer. As this study involves a comparison of token with social reinforcement, that is; with a particular social reinforcer a general case cannot be established.

Presumably when a single reinforcer is used the reinforcing strength of the social reinforcer is quite variable depending upon the degree of deprivation of the subject. This effect should presumably be attenuated by tokens with extensive back-up social reinforcers. The present study seeks to further evaluate this question through the application of both verbal and token reinforcement to instruction-following behaviour.

Punishment procedures applied to retarded children have involved:

- (a) Electric shock delivered contingent upon the disruptive response;
- (b) Physical restraint;
- (c) Time-out from positive reinforcement combined with a response cost procedure;
- (d) Time-out from positive reinforcement.

This study falls into the fourth category where time-out from positive reinforcement is used as the consequence for disruptive behaviour. This procedure is compared with verbal reprimands with respect to their effectiveness in reducing disruptive behaviour.

The time-out procedure, in which the subject is removed from the source of positive reinforcement which is maintaining the disruptive behaviour, has been widely used in clinical applications with retarded children. The majority of studies have placed the subject in an isolation room for periods varying between ten minutes and two hours (Wolf, Risley and Mees, 1964; Tyler and Brown, 1967; Hamilton and Allen, 1967; Risley, 1968). These extended lengths of time have also included the conjunctive contingency of change-over-delay (C.O.D.) for

disruptive behaviour in time-out. This involves additional time in the isolation room for disruptive behaviour emitted during the time-out period. Recent comments by Bandura (1969) have indicated that shorter periods of time in isolation may be as effective as longer periods in reducing this class of behaviour. Research carried out by Bostow and Bailey (1969) with two severely retarded subjects, indicated that a two minute isolation period was effective in reducing the target behaviour. This question is further evaluated in this study where a sixty second isolation period without a change-over-delay, is employed.

Although verbal reprimand and censure, delivered by teachers, are the most common methods of attempting to reduce disruptive behaviour, little research has been performed examining the effectiveness of verbal reprimand as a means of reducing this class of behaviour in retarded children. This is especially the case with verbal reprimands delivered in a louder than normal tone of voice. Furthermore, no research has been performed investigating this form of behavioural control compared with others used with retarded children. There is also the question as to whether verbal reprimand actually acts as a punishing stimulus. This study assesses the effectiveness of verbal reprimand as compared to a time-out procedure and to a no punishment condition in reducing three classes of disruptive behaviour defined as: being out of seats, interfering with another person and interfering with another person's work tools.

Many of the studies involving a punishment stimulus in an applied situation have used neither a multiple baseline design nor a reversal

design in which the target behaviour is first recorded in the absence of any punishing stimulus. The punishment stimulus is then applied and any reduction in behaviour is recorded. The punishment stimulus is then removed and the behaviour during the non punished period is observed. Without the use of either a multiple baseline or a reversal design it is difficult to adequately measure the direct effect of the punishing stimulus and its effect over time. This problem has often been further complicated by the addition of other variables which may influence the behaviour being monitored, that is: the existence of an alternative response which is positively reinforced. Although it is realised that a reversal design is often impracticable in an applied situation, that is: teachers do not want the disruptive behaviour to return to a high level once it has been reduced, it is often essential to do so in order to measure the effects of the possible punishment stimuli. This study has utilized a reversal design and this has been applied to both the verbal reprimand and time-out conditions. The design of the procedure was based partly on the restricted length of time the experimenter was permitted to run the programme and the experimental room being available for only short periods each day.

One of the aspects of retardates behaviour is the absence of responses which can be defined as those of helping other children. Such behaviours as helping others with school tasks, playing together, rarely occur. There have been a number of attempts to develop co-operative responses in this class of retardate (Whitman, Mercurio and Capognigri, 1970). Much of this research has been performed with individual children but little has been performed in a group situation. Zimmerman et al (1969) informally observed an increase in helping behaviour over

the course of their programme. This study attempts to increase the incidence of helping behaviour through the administration of positive reinforcement contingent upon behaviour defined as that of helping another child.

The above points are treated in greater detail in the review of the literature in the following chapter.

The advancement and refinement of operant methodology depends to a large extent upon replication. It is unfortunate that many of the studies cited in various journals are unable to be replicated because of inadequate descriptions of the procedures employed. Behaviours have often been poorly defined as have the methods of presentation and effects of reinforcing and punishing stimuli. There is a need for studies which are detailed in their description of the design used. This is especially true of those investigations that are performed in the field. In order to attempt to overcome such defects, one of the objects of the present study is to provide a fuller account of procedure than has customarily been given.

CHAPTER II REVIEW OF THE LITERATURE

Children with intelligence quotients of 35 or less fall into the class of retardates labelled as severely or profoundly retarded (Heber 1961). Their behaviour is characterized by stereotyped responding such as: hand waving, body rocking, head shaking. These children are generally described as being unable to attend to even the most simple of classroom instructions. Bijou (1965) has noted that most texts have described children with intelligence quotients of under 50 as being capable of learning only self care activities and a few rote words. Until recently this class of children has been regarded as hopeless, from a training point of view, and were viewed as being custodial problems. The children's lack of improvement under "special" training programmes developed for their education led educationalists to conclude that the children were incapable of acquiring complex behavioural patterns.

With the development of programmes based on the principles of operant psychology there have been some notable advancements in the training of retarded subjects. Applying the methods of behavioural control developed in the laboratory it has been possible to both eliminate disruptive behaviour and to develop behaviour which is considered more adaptive (paying attention, instruction-following). As many of these children do not possess well developed language skills such a form of treatment has the advantage that it requires little language skills in order to be effective (Ayllon and Michael, 1959; Ayllon and Azrin, 1965).

In a review of the research with retarded children Watson (1967) noted that if the principles of behaviour are clearly determined and then applied in a systematic manner the final result will be a more effective programme. Retarded subjects have been taught to be toilet trained (Hundziak, Mowrer and Watson, 1965), taught self care behaviours and to respond to verbal directions (Bensberg, Colwell and Cassel, 1965; Minge and Ball 1967; Roos 1965).

Central to operant conditioning methodology is the definition of reinforcement which states that reinforcement delivered contingent upon a defined response increases the probability of that response occurring at a future point in time (Skinner 1953; Reynolds and Risley 1968). Programmes employing the use of contingent reinforcement have been carried out with retarded subjects on an individual basis (Patterson 1965; Fuller 1949), in groups (Giles and Wolf 1966), and increasingly, in the classroom situation (Zimmerman, Zimmerman and Russell 1969; Burchard, 1967; Staats, Staats and Wolf 1962).

Punishment procedures have been used to eliminate or inhibit disruptive behaviour in retarded subjects. Punishment is often used in conjunction with a reinforcement programme which is applied to an adaptive response (e.g. Edwards and Lilly 1966). Regardless of the specific punishment procedures used subjects not only have alternative response possibilities available in the punishment situation but in addition are, usually, provided positive reinforcement for more suitable alternative behaviours. As Spradlin (1966) has pointed out, one of the dangers of using aversive consequences to eliminate disruptive behaviour, may lie in the failure to permit alternative behaviours to

substitute for those that were eliminated. When this occurs there is always the possibility that the entire range of the retardates behaviour may become even more restricted.

On the basis of operations followed, punishment procedures, as performed with retardates, can be grouped into two major classes:

- (1) Involves the presentation of an aversive stimulus which follows a response that is to be eliminated. Examples of this class are: primary aversive stimuli such as electric shock (Tate and Baroff 1966), physical restraint (Giles and Wolf 1966), and conditioned aversive stimuli such as the word "no" paired with the removal of food and physical restraint (Henricksen and Doughty 1967).
- (2) Procedures which result in the removal of certain stimulus conditions following the disruptive response. Examples are: "time-out" from positive reinforcement (Tyler and Brown 1967), and "time-out" combined with a response cost which involves the loss of reinforcers (Weiner 1962).

There is some confusion as to what combination of procedures is the most efficacious in eliminating the disruptive behaviour in retardates. Some investigators prefer a reinforcement programme combined with an extinction procedure; i.e. the removal of the stimulus conditions which reinforce disruptive behaviour. According to operant theory any behaviour can be eventually returned to operant level merely by discontinuing those conditions which reinforce it. Applications of the extinction procedure are seen in the work of Wolf, Birnbrauer, Williams and Lawler (1965) and Bucher and Lovaas (1968). Spradlin and Girardeau

(1966) in referring to tantrums and aggressive behaviour in the severely retarded conclude, "Probably the most effective procedure for reducing the frequency of these behaviours is to withhold reinforcement when they occur, i.e. extinguish them". (p.290)

There is a large body of opinion (Hamilton and Stephens 1967; Azrin and Holz 1966), that questions the efficacy of the extinction method when applied to retarded children. It may not be possible to define and control the large number of reinforcers controlling the disruptive behaviour and for this reason investigators such as Watson (1967) believe that other reductive methods (punishment), must be used. There is both the possibility that disruptive responses may actually increase during the initial extinction period (Lovass, Freitag, Gold and Kassorla 1965) and the other consideration that the disruptive responses may be so severe that a method that will rapidly reduce the number of such responses is called for. Furthermore, if the experimenter has only partial control over the reinforcement contingencies, the child may in effect be on an intermittent reinforcement schedule and this type of schedule makes a response pattern more resistant to extinction than that of continuous reinforcement.

The evidence would tend to suggest that as the extinction procedure is often difficult to employ in a field situation more aversive punishment stimuli should be used. Watson (1967) concluded that the use of positive and negative reinforcers (punishments), used together, seem to be more effective in shaping the behaviour of retarded children than the combination of positive reinforcement and an extinction procedure.

Reinforcement Procedures with the retarded

(a) SOCIAL REINFORCEMENT:

Social reinforcement consists of words of praise, hugs and paying attention to the child. Martin and Powers (1967) who have increased the short attention span of brain damaged and retarded children have suggested that for individuals who present gross deficiencies in conditioned reinforcement and who are responsive to only primary physical consequences, an important initial objective of treatment is to endow social stimuli with reinforcing qualities. As most people attempt to maintain behaviour with social reinforcers, the absence of sensitivity to social reinforcers is a critical problem.

Madsen, Becker and Thomas (1968) found that praise was an effective reinforcer in increasing appropriate classroom behaviours, that is: sitting at a desk, working on assignments. Reynolds and Risley (1968) used social reinforcement (praise and attention), to improve the low level of verbalizations in a four year old retarded negro girl.

Allen, Henke, Harris, Baer and Reynolds (1967) successfully controlled hyperactivity by reinforcing attending behaviour in a four year old boy (talking to boy and smiling were used as reinforcers). The results of the study indicate that attending behaviour is teachable and can be shaped and maintained using adult social reinforcement.

Burchard (1967) noted that previous studies have demonstrated that verbal reinforcement (praise, attention) is not an effective reinforcer for individuals frequently displaying anti-social behaviour (Johns and Quay 1962; Quay and Hunt 1965).

A review of the literature suggests that verbal reinforcement is generally effective in developing and maintaining adaptive behaviour in retarded and young children.

Buell, Stoddard, Hamis and Baer (1968) successfully used social reinforcement to improve social contacts with other children and to develop complex motor skills with a 3 year old pre-school girl. Approval, touching the child, smiling and displaying delight contingent upon behaviour defined as playing on outdoor equipment was administered. There was a marked increase in this behaviour from a 2 per cent use of equipment during the baseline to a 70 per cent rate of use at the end of the study. Correspondingly, the amount of autistic type behaviour (baby talk, hand flapping) decreased over the course of the study.

There appear to be a number of variables affecting the influence of social reinforcers. For example: there is some evidence to show that children who have developed strong dependency behaviour are more influenced by social reinforcers than are children in whom dependency responses have only recently been developed (Cairns 1961), and the same principle would appear to apply to the development of imitative behaviour (Jakubczak and Walters 1959).

Another variable which seems to be of importance in assessing the effectiveness of social reinforcement with children is the degree to which the stimulus indicates correctness. Some investigators have reported that being correct is more reinforcing for the middle class child than for the lower class child. Zigler, Hodgden and Stevenson (1958) investigating this question found that while verbal reinforcement primarily connoting praise improved the performance of middle socio-economic class retarded children, it did not affect the performance of

lower class children.

(b) TOKEN REINFORCEMENT

In less than a decade there has been a steady growth in the use of token reinforcement programmes and many of these have been applied to the classroom situation (Burchard 1967; Zimmerman, Zimmerman and Zimmerman, 1969).

Operant conditioning theory defines that a stimulus that has been associated on numerous occasions with many types of primary as well as secondary reinforcements obtains the capacity to function as a generalized reinforcer. Tokens, points, grades have been used as generalized reinforcers and these are used to merely "stand" for something which is exchangeable for certain desired items or activities. The tokens are presented contingent upon correct responding. Token reinforcement systems are often used when normal classroom reinforcers such as praise and attention are not effective in modifying behaviour.

The token reinforcement procedure should have a number of advantages over single reinforcement alone, although these are hypothetical, logical and supposed and are rarely demonstrated. The Token systems have the advantage of being more resistant to satiation effects and should have the characteristic of long-term dependability over time (low variance over time). Furthermore, the reinforcing value of tokens is relatively independent of momentary deprivation states. Tokens can easily be presented contingent upon the appropriate performance and as they are able to be exchanged for a variety of attractive items of the subject's choosing, responsiveness is likely to remain at a high level.

There is considerable variation in the effectiveness of certain types of reinforcers used in studies employing token reinforcement systems. The fact that these preferences do vary is one of the prime reasons for token systems in which a variety of "back up" reinforcers can be provided. Watson, Lawson and Sanders (1965) found that edibles were preferred to manipulatable reinforcements as did Sidman (1966). Baumeister and Klowowski 1965; Giles and Wolf 1966, found that some retardates show little preference for sweets, and Watson, Lawson and Sanders (1965 b) found toys and dolls to be effective reinforcers. When manipulatable reinforcers are used the child is only permitted to play with the object for a short period.

Staats, Finley, Minke, Wolf and Brooks (1964) were one of the first groups to establish an extensive reinforcing system in which tokens were exchangeable for a wide variety of edibles and toys. A child selected a toy for which he would "work" before beginning a training session. These experiments demonstrated that a token reinforcement system could maintain the reading behaviour of a four year old child for lengthy periods of time. The experiment was particularly significant because it suggested that with a token system and a variety of exchange items one may no longer be dependent upon the power of a single back up reinforcer, the effectiveness of which is dependent upon the deprivation state of the child.

Burchard (1967) used a token reinforcement system to improve the classroom behaviour of retarded boys. In the first session tokens were delivered contingent upon the subject sitting in his assigned seat.

One token was paid for every fifteen minutes accumulated. The second period involved tokens being delivered for the quality and out-put of work. Burchard also combined a period when tokens were delivered on a non-contingent basis for the appropriate behaviour. Using an ABA design Burchard found contingent token reinforcement to be more effective than any other form of reinforcement used in the classroom situation (praise, attention). A similar finding was obtained by Mandelker, Brigham and Bushell (1970).

McKenzie, Clark, Wolf, Kothera and Benson (1968), applied a token reinforcement system to a group of ten retarded children in order to attempt to improve learning behaviour in the classroom, that is: attending behaviour. Reinforcers employed were generally those involving periods in which the child could leave the room and play by himself, social reinforcement and payment for weekly grades. Attending behaviour and the standard of reading and writing increased markedly over the period of the study.

Significant improvements in academic behaviour in children in special classes have been reported by Clark, Lachowicz and Wolf (1968); and Wolf Giles and Hall (1968). The latter investigators had a special remedial education programme instituted with 15 fifth and sixth grade children in an urban poverty area. The Stanford Achievement Test scores of the children in the token programme increased by 1.5 years as compared to a median gain of 0.8 years for a 15 subject control group.

Several investigators repeatedly reported significant decreases in disruptive behaviour associated with token programmes (Kuypers, Becker

and O'Leary 1968; Martin, Burkholder, Rosenthal, Tharpe and Thorne 1968).

An example of the application of token reinforcement to a large class of 17 emotionally disturbed children was that performed by O'Leary and Becker (1967). Ratings of behaviour were administered every 20 minutes contingent upon adaptive classroom behaviour and these were later cashed in for back up reinforcers. The introduction of the token programme resulted in a decrease in the average level of disruptive behaviour (talking, pushing, eating) from a session average of 76 per cent of the time to an average of 10 per cent during the two month token period.

Walker, Mattson and Buckley (1969) devised a treatment programme for six "hyperactive, disruptive and acting out" fourth, fifth and sixth graders. The six children increased their task oriented behaviour (paying attention, working steadily) from an average of 39 per cent in the baseline period in the regular class to 90 per cent in the token programme. There was also a significant generalization of appropriate behaviour to the normal class at the end of the study.

The studies cited above have noted a decrease in disruptions as a result of the reinforcement of appropriate behaviour and not as a result of any aversive stimulus programmed to reduce disruptive behaviour.

The studies reviewed here show that a token reinforcement programme will significantly increase desired behaviours in a variety of students. A detailed examination of the behaviour of individual children reveals that some children fail to change with the introduction of the token system; Zimmerman et al (op. cit). One should not conclude from this

that such children's behaviour could not be influenced by a token programme. An investigator can never control all the variables in an applied situation.

The literature does not allow a detailed analysis of the behaviour most or least influenced by token programmes because most investigators have tended to describe the target behaviour in broad terms; e.g. study behaviour, disruptive behaviour. Furthermore, the frequencies of the subclasses of these behaviours have not been adequately reported. Part of the reason may be that the investigator's have wished to save space in the description of their research.

(c) STUDIES COMPARING SOCIAL AND TOKEN REINFORCEMENT

There has been little research performed in respect to a comparison of the effectiveness of token and verbal reinforcement programmes on the development of appropriate classroom behaviour. A review of the literature indicates that token reinforcement systems are often implemented when other forms of reinforcement fail to increase the desired behaviour. However, in most cases the results are far from conclusive.

Staats, Staats, Schultz and Wolf (1962) presented to school children, programmed material designed to teach them to read words individually and then to put them into short sentences. When the children were praised for correct responses but were offered no extrinsic rewards they worked at the reading tasks for 15-20 minutes and then became bored. After the subjects indicated they no longer wanted to remain in the experimental situation, tangible rewards consisting of candy, trinkets and tokens that could be exchanged for attractive toys were introduced. Under the influence of conditioned reinforcers,

made contingent upon reading behaviour, the children's limited "attention span" suddenly expanded and they not only worked enthusiastically at the reading task for 45 minutes, but also participated actively in additional sessions.

The marked changes in positive responsiveness noted in this study partly indicate the superiority of a token reinforcement system but also illustrate how low persistence on academic tasks resulting from inadequate incentives is often erroneously attributed to the basic deficits of the child in the form of short attention span or low frustration threshold. This view is also illustrated by Levin and Simmons (1962) in a study with hyperaggressive boys.

Birnbrauer, Bijou, Wolf and Kidder (1965) used both token reinforcement and verbal praise as reinforcers with a group of eight educably retarded boys. The work was performed in a classroom situation with the objective of improving: instruction-following, perseverance and concentration. A token reinforcement system had to be instituted when it was found that the pupils would not work steadily for only social approval and knowledge of results. It appeared that correct and incorrect answers were the same to the subjects. Some performances improved rapidly after the introduction of the token system.

Zimmerman et al (op. cit), directly studied the effectiveness of verbal reinforcement and token reinforcement with seven severely retarded subjects with instruction-following as the dependent variable. The investigators found that the token reinforcement contingency generated and maintained a higher rate of instruction-following than that produced under verbal reinforcement (praise).

Punishment Contingencies:

(a) VERBAL REPRIMAND

In spite of the fact that various forms of verbal reprimands are the most common forms of aversive stimuli administered in classroom situations, there is a paucity of studies that have specifically examined the effect of verbal reprimand in the reduction of disruptive behaviour. Many of the studies using this form of behaviour control are complicated by the fact that they are often directly combined with a reinforcement programme. This procedure makes it difficult to assess the effect of the punishment stimulus as such.

Risley (1968) found that repetitive head twisting was eliminated by a procedure of shouting at and shaking of the child. The repetitive head rolling behaviours were virtually eliminated within ten sessions of response contingent shouting "stop that" and vigorous shaking. Withdrawal of attention, isolation for ten minute time-out periods contingent upon climbing behaviour and reinforcement of incompatible behaviours all proved to be non influential.

McAlister, Stachowiak, Baer and Conderman (1969) studied the effects of verbal praise and verbal reprimand in 25 secondary school children. Verbal reprimands such as, "Phil shut up!" were used for inappropriate turning behaviour and for inappropriate talking by the children. Praise was administered to the whole class for being quiet. Talking and turning behaviour decreased from an average daily percentage of inappropriate behaviour in the baseline of 25.33 per cent to 5.34 per cent by the end of the study. A control class showed no significant

changes until the procedure was applied to them.

The design of the study did not make it possible to isolate the separate effects of the teachers statements of praise and disapproval on the children's behaviour. Although it appeared as if the statements of praise and disapproval operated as reinforcers and punishers, respectively, the possibility that had praise been delivered as instructions independent of the occurrence of inappropriate behaviour may have gained the same result cannot be discounted. Although, investigators such as O'Leary and Becker (1968), have indicated that reprimands given in a very low voice may be effective in young children their primary interest was centred on the effects verbal reprimands have on other subjects in the class to whom they are not directed, i.e. the possible rise in disruptive responses of the other children not receiving the contingent stimulus. It should also be noted that other investigators (Lovaas, Freitag, Kinder, Rubenstein, Schaefer and Simmons 1964; Thomas Becker and Armstrong 1968), indicate that disapproving adult behaviours do not have a unitary effect on children's behaviour and in some cases may even be reinforcing.

Studies using verbal reprimand have produced results which tend to indicate that verbal reprimands not only produce different responses amongst individual subjects but there is also some confusion as to the effectiveness of this form of behaviour contingency generally.

Lovaas et al (op. cit), found that with autistic children negative reinforcing properties could readily be conditioned to the verbal stimulus "no" through association with aversive stimulation. As the

verbal stimulus was associated with another aversive stimulus the effectiveness of the word "no" could not be assessed from the point of view of its properties as a punishment stimulus.

The only study that the present author could locate which specifically examined the effects of verbal reprimand in reducing inappropriate behaviour was that carried out by Benton (1967). Benton used verbal reprimands with normal children on a choice discrimination task. While groups of children were verbally reprimanded for either approaching or handling tabooed toys in a two choice discrimination task, their matched partners simply observed the punished performances. In a subsequent test for transgression it was found that the verbal reprimands did tend to suppress the target behaviour but also that the observers showed the same amount of response suppression as did the performers whose motor responding was reprimanded.

A review of the literature indicates that the evidence in respect to verbal punishment is variable. There is no clear consensus of opinion that shows verbal reprimands operate as a punishing stimulus. Furthermore, there has been little evidence to indicate at which level of amplitude the stimulus is most effective.

(b) TIME-OUT

The term "time-out" is defined by Ferster and Skinner (1957, p.34) as "any period of time during which the organism is prevented from emitting the behaviour under observation". This can be arranged by removing the subject from the reinforcing situation; by removing the opportunity to respond; or by introducing a stimulus that has been

previously correlated with non reinforcement.

A time-out from positive reinforcement has been used successfully as a deceleration procedure with the mentally retarded (Hamilton, Stephens and Allen 1967), with school children (Risley and Wolf 1959; Wolf, Risley, Johnston, Harris and Allen, 1967), with aggression in children (Sloane, Johnston and Bijou 1968), and with delinquents (Burchard and Tyler 1965).

Although Herrnstein (1955) experimentally demonstrated the aversive qualities of time-out and many laboratory research projects have concentrated on the procedure (Ferster and Appel 1961; Holz, Azrin and Ayllon 1963; Zimmerman and Baydan 1963), the means by which time out acts as a punishing stimulus is not clear.

Despite Vehave's (1966) contention that a time-out procedure is simply a period in which positive reinforcement is not available, Leitenberg (1965) indicates that there is no single set of operations which adequately define time-out from positive reinforcement. Time-out may be effective due to the removal of the possibility of positive reinforcement for disruptive behaviour i.e. the positive reinforcer itself may be removed for a specific time, or to the suppressing effects of the presentation of conditioned aversive stimuli, i.e. being placed in isolation. Furthermore, the effect of positive reinforcement received at the end of the time-out period has not been adequately assessed. The separate effects of these have not been adequately investigated. The issue becomes even more complicated when one considers Striefel's (1967) finding that time-out or a period in isolation, is not universally

aversive and may in fact be positively reinforcing in some cases. It would seem that the effect of time-out is partly dependent upon the stimulus being more aversive than the environment from which the subject has been removed.

When exclusion or isolation is employed as the negative outcome of disruptive behaviour, as is usually the case, each transgression results in a brief social withdrawal that is carried out immediately in a firm but non hostile manner. Since social attention may be reinforcing and increase the deviant behaviour, the experimenter minimizes social contact as much as is possible while the aversive stimulus is being applied. If the target behaviour is emitted during the time-out phase the period in isolation is often extended until the behaviour ceases.

The findings of research (Leitenberg 1965; Azrin and Holz 1966), show that the consequences of time-out may produce durable reductions in disruptive responses if an alternative mode of behaviour, which is positively reinforced, is available to the subject (Holz, Azrin and Ayllon 1963), or if the contingencies maintaining the behaviour have been removed (Baer, 1961; Nigro 1966).

The literature indicates that time-out has been successfully applied in institutional settings. Wolf, Risley and Mees (1964) successfully dealt with temper tantrums in an autistic boy using a time-out procedure which involved placing the boy in his bedroom for a minimum period of ten minutes contingent upon refusal to eat and destroying spectacles.

Hamilton, Stephens and Allen (1967) used a similar procedure by confining severely retarded patients to a time-out area for from 30

minutes to two hours after each incidence of aggressive or disruptive behaviour. The time-out procedure led to a rapid reduction in these classes of behaviour.

Barton, Guess, Garcia and Baer (1970) reduced undesirable meal-time behaviours in retardates by contingent time-out procedures applied successively to one undesirable behaviour after another, using a multiple baseline design. Undesirable behaviours were defined as stealing, using fingers inappropriately, messy use of utensils and "pigging". Time-out was applied to these behaviours in the above order, and in each case led to a marked and useful reduction in the incidence of these behaviours throughout the group. As these undesirable behaviours were reduced more appropriate mealtime behaviours increased. Time-out has also been successfully applied to the meal-time behaviours of retardates by Whitney and Barnard (1966), Giles and Wolf (1966) and Edwards and Lilly (1966).

In the above studies which used a time-out technique, with the exception of the Barton et al (1970) study, alternative behaviours were not only present but were positively reinforced in a systematic manner. While this may be the most effective procedure for developing adaptive as well as reducing disruptive behaviour the assessment of time-out as a punishing stimulus, often tends to be confused as a result of interaction effects.

Recent research performed by Bostow and Bailey (1969) described the use of brief time-out in conjunction with reinforcement for acceptable behaviour. Employing a technique which involved using the subject as

his own control and a two minute isolation period, the severe disruptions of two retarded patients were markedly reduced over the period of a few weeks. The investigators suggested that very brief periods of time-out may be effective in reducing certain classes of disruptive behaviour.

Helping Behaviour:

One of the aspects of the retardates behaviour repertoire is their lack of social responses. There have been examples of some normal, isolated children's behaviour being enhanced through differential reinforcement procedures (O'Connor 1969; Azrin and Lindsley (1956), but the modification of this type of behaviour in retardates has largely been ignored.

That operant conditioning procedures can be used to develop or modify the social responsiveness of retarded children has been suggested by a large number of researchers (Ellis 1963-1964; Baer, Peterson and Sherman 1967).

Whitman, Mercurio and Caponigri (1970) used praise and sweets as reinforcers to shape the social behaviour of two severely retarded children in a day school setting. The reinforcement was applied to sharing behaviour and co-operation. Generalization of co-operation was facilitated by the introduction of two other subjects into the learning situation. Both subjects spent considerably more time interacting during the reinforcement period. When reinforcement was discontinued co-operative responses dropped but remained above the baseline level. Furthermore, co-operation between the children tended to generalize to their interactions with other subjects who were not included in the study.

Zimmerman et al (op. cit) observed a general increase in social activity over the course of their study of the effectiveness of social and token reinforcement. The authors noted the emergence of helping behaviours such as: subjects leading other subjects to the table, helping them obtain objects which enabled them to receive reinforcement.

No specific reinforcement contingency was applied to this behaviour and as it occurred only during the token reinforcement sessions the authors concluded that this behaviour may have been controlled, in part, by the presence or absence of the props and cues associated with the token reinforcement procedure. The authors further suggest that the development of helping behaviour may be a result of the class being addressed as a whole and the fact that all children had an equal opportunity to obtain tokens.

Furthermore, Azrin and Lindsley (1956) have concluded that operant conditioning techniques can be used to develop co-operation between children without the use of specific instructions directed towards co-operative behaviour. The investigators also state that the co-operative responses will increase with contingent reinforcement.

CHAPTER III SUBJECTS AND PROCEDURE

The Subjects:

Six severely retarded subjects (four boys and two girls), were selected from a population of 28 retarded children enrolled in a school for the Intellectually retarded in Wellington (see Table A, Appendix I). The six children were selected on the basis that they were the most severely retarded of the total population, displayed severe attentional behaviour deficits, refused to follow instructions and displayed the most disruptive behaviour. The sample was selected in consultation with the Headmaster and his staff using the criteria that the staff considered the sample the most difficult to train and that they would benefit most from the programme.

A list of the subjects, diagnoses etc. are included in Table A: Appendix I.

Description of the physical environment:

The study was conducted in a 25 by 15 foot room which was normally used as a conventional classroom. Three tables were placed together across the front of the room in order to be able to seat all six subjects in a straight row, facing the front of the room. There was a small desk placed at the front of the room and to the left which was used by the experimenter for the placement of reinforcements used during the token reinforcement sessions. The stimulus objects (pictures, numbers etc.) were displayed on the front wall. A small room next to the experimental classroom measuring five foot by four foot was used as an isolation room for the time-out contingency. This room obtained natural lighting through a small window, the glass of which was frosted to avoid

the child looking out to the area at the side of the school. There were no pieces of furniture or manipulatable objects in the room.

Pre Baseline Observations:

Two weeks were spent observing the behaviour of the selected sample in the experimental room with the normal teacher. At this stage the children were involved in their usual classroom activities. These two weeks enabled the experimenter to define his terminal responses. Observations of the defined behaviours were recorded in the third week in order to attempt to overcome the possibility that the children's behaviour may have been partly influenced by the mere presence of the experimenter and assistant although it is realized that this possibility could not be totally eliminated short of the observer being hidden. Both the experimenter and assistant separately and independently recorded instances of instruction-following and disruptive behaviour using a 30 second time sampling method in which sampling was continuous. Inter-rater reliability was assessed at 96 per cent.

The Instruction List

The instruction-following list was constructed in much the same way as that used by Zimmerman et al (op. cit). The selection of items was based on two major criteria:

- (a) Only those behaviours that could be objectively measured in the classroom situation were used;
- (b) Behaviours that were directly related to the goals of the institution were to be taught and developed.

Many of the items decided upon were to call for those behaviours that were already present in the children's repertoire but a considerable

number were included in order to attempt to develop new behaviours. The instruction list was constructed after consultation with the Headmaster and the staff and included items calling for self help skills, social skills, communications, eye-hand co-ordination and functional co-ordination skills. It was considered important to construct a list which could call for a broad spectrum of behaviours which would be useful to the child and were relevant to the type of behaviours called for in classroom situations. The difficulty of the instruction following items were based upon the amount and type of instruction following behaviour exhibited in the normal classroom situation and on the advice of the staff. Many of the instructions were intentionally made difficult in order to avoid any satiation effects. Because of the difficulty of the items selected, the staff's advice and the extremely limited behavioural repertoire of the children, it was decided to limit the number of items to 20 and to present the instruction list twice in the one session (30 minutes).

The list was then constructed and tested with another group of subjects for difficulty, continuity and the logical sequence of items. The list was found to be satisfactory with the group of subjects who displayed instruction-following behaviour that was superior to that of the experimental group. It was found that the behaviours called for by the items could be easily monitored. Equivalent choices of instructions were installed within 70 per cent of the items in order to further avoid satiation effects and to call for a wider range of instruction-following behaviour. For example: Item 16 -"point to the pictures of the cats",

could be substituted by "dogs or horses". These substitutions were randomly varied across readings of the list by pre-arrangement at the beginning of the week.

The instruction list is presented in Table B of Appendix I. The instructions were presented to the group as a whole, that is: a common set of treatments was applied to the group as a whole.

The Stimulus Objects:

The stimulus objects that required recognition from the children (numbers, geometric objects, pictures) are presented in Table B of Appendix I. These were all drawn and pasted on to heavy paper measuring two foot six inches square. The numbers were painted in colours which contrasted the most effectively with the white background of the paper. For example, numbers were painted black in order for easy recognition. The stimulus objects were arranged so that one number, picture etc. was not in close proximity to the preceding one. In this way the experimenter and assistant could readily observe whether the child had indicated the correct object called for. The possibility that the stimulus objects may not have been within the line of sight of the children was tested with six other subjects who were of approximately the same height as the sample used in the experimental situation. They were placed in each seat in turn at the same time of day that the study was to be performed i.e. 9.30 a.m. to 10 a.m. in order to ascertain correct height, distance and light reflection. All reported that the objects were visible from each seat.

Specific Experimental Procedures:

The children were exposed as a group to a series of experimental conditions designed to test the separate effects of token and verbal reinforcement on instruction-following behaviour and the separate effects of two punishment stimuli: time-out and verbal reprimand, on disruptive behaviour. The verbal reinforcement contingency is designated as Verbal R. and the token reinforcement contingency as Token R.

Reinforcement Programme:

In each of 18 Verbal R. and the 15 Token R. sessions the following standard operating procedures were employed:

- (a) The experimenter and assistant followed a copy of the 20 item list. Either the experimenter or the assistant acted as instructor and observer and the other as the observer and recorder. The reading of the list was varied between sessions. The experimenter/assistant read items from the instruction list one at a time and praised each subject that responded appropriately with the verbal response "very good . . . " Because of the unavailability of personnel the observer also praised the child contingent upon the correct response. The experimenter and assistant had two standard size clipboards on which the recording sheets were placed. The difficulty of holding both the instruction list and the recording sheet on the same board was overcome by the experimenter and the assistant committing the instruction sheet to memory. As the instruction list included only 20 items this task was found to be relatively simple. When the alternatives contained in some of the items were used a decision as to what would be included was made the

day before and written on the side of the recording sheet. Furthermore, in order to facilitate ease of recording and delivery of reinforcers the experimenter and the assistant were each assigned three children's behaviour to monitor. The children selected were varied randomly over each session. In each session the two groups of three subjects were seated together. The instructor stood a little to the right or left of the centre of the table and observed those subjects nearest to him and the observer stood directly in front of the remaining three subjects. Care was taken by the instructor to make certain all subjects could clearly hear the instruction.

- (b) The instruction list was presented to the group as a whole. Each item was repeated once in order to allow all subjects the possibility of responding.
- (c) The pacing of the instructions and the repetitions were based on the behaviour of the subjects. Every child was reinforced immediately they had emitted a correct response. No child was reinforced twice for a correct response to the item. As soon as the instructor failed to observe a single child responding he proceeded to the next instruction, although a time limit of no more than five seconds was allowed after the first eligible child had responded correctly. In the case of items that involved drawing circles etc., the next instruction was not read until children who were obviously correctly responding to the item were reinforced.

As soon as a correct response had been made it was noted on the record

sheet held by either the instructor or the observer. In the case of instruction-following, the number (item) to which the child responded correctly was noted. If the child responded correctly to both the original reading and again to the repeated item then only the first correct response was recorded.

Inter-rater reliability over the programme was 94.6 per cent.

Reinforcement Programme:

The design is based on that of Zimmerman et al (op. cit), with extensions and some modifications.

Verbal R. and Token R.:

BASELINE: The class was presented the instruction list with the absence of any reinforcement. The defined instruction-following and disruptive behaviours were recorded independently by the experimenter and assistant.

VERBAL R.1: The class was exposed to the list. Verbal reinforcement: "Very good . . ." was administered contingent upon correct instruction-following behaviour. The contingency was applied over five sessions, i.e. five days.

VERBAL R.2: As for Verbal R.1: four days.

TOKEN TRAINING: (a) Tokens: these were plastic, rectangular milk tokens from an area outside of Wellington. These were selected because of their characteristic shape, light weight and the fact that they could not be replicated.

DAY 1: On the emission of the correct response the token was presented to the child together with the words, "that's a token". The

token was then taken back by the experimenter/assistant and the child was presented with a portion of a sweet. Jelly Beans cut into thirds were the basic sweet used and these were chosen because of their ready digestibility, and were thus swallowed by the time the next instruction was presented. The experimenter also provided pieces of marshmallow and soft jubes as alternatives for children who rejected the jelly beans. In fact it was found that subjects 1 and 3 preferred marshmallows and jubes, respectively. The sweets were cut into small pieces to avoid satiation.

The second reading of the list on day one was basically the same as that in reading one with the exception that the children were taught to hand the token over to the experimenter before the reinforcer was delivered. This was done by means of successive approximation with each child. By the end of the session (43 minutes) all the subjects had learned to give their tokens to the experimenter in order to receive the reinforcer. The words, "give the tokens to me" were used during this period.

DAY 2: A repeat of second reading on day one.

DAY 3: The containers were placed in front of the children. These consisted of 6, 8 ounce glasses made of clear glass. They were drawn from the school environment and were used because the children could not only watch the token being dropped into the container but could also see how many they had earned. The first five items of the instruction list were reinforced for each token earned. In each case the token was removed from the glass following the issue of the reinforcer. For items 6-9 the children were reinforced only after the ninth item. However, at

this stage a child was reinforced even if only one token had been earned in this period. For items 10-20 the child was reinforced in the same way as above after every five items. In the second reading of the list reinforcement was delivered after each ten items read. The session took 38 minutes.

DAY 4: On the first reading of the list the child was brought up to the table in the front of the room on which was placed the token box. This procedure was carried out after each ten items on the instruction list had been read. The child brought his tokens up and presented them to the experimenter before selecting a reinforcer. At this stage the selection of reinforcers was that of the three sweets mentioned previously.

During the second reading of the list the tokens were delivered to the containers contingent upon the appropriate response and were "cashed in" at the end of the session for edible reinforcers. At this stage reinforcers were graduated i.e. a child who earned 15 tokens was permitted to select more sweets than a child who had earned only five.

DAY 5: The children were not permitted to obtain reinforcement until the end of the session, i.e. two readings of the instruction list, or 30 minutes. The other reinforcers that were used throughout the Token R. sessions. Selection, time of use etc. was graduated according to the number of tokens earned by the child. Table D, Appendix 1.

SELECTION OF REINFORCERS: The variety, type and percentage time of use are included in Table C, Appendix 1.

The reinforcers were selected according to the following criteria:

(a) The staff were questioned as to what articles available in the school

- environment were the most desired by each child;
- (b) Parents were consulted as to preferences of their children;
 - (c) In terms of the experimental evidence as mentioned in Chapter Two (page 17).
 - (d) From the point of view of expense. As this study did not have the benefit of outside funds and the fact that schools of this type are notoriously short of finance, objects that existed in the school environment were generally used as reinforcers. The staff were asked not to allow the children to play with the selected reinforcers other than in the experimental setting.

VERBAL R.3: As for Verbal R.1 and 2: five days. This period was instituted before the Token R. sessions in order to remove a carry over effect of experimenters attention which was at a high level during the Token Training week.

TOKEN R.1: Tokens were delivered to the containers contingent upon the appropriate response being emitted by the child. No praise or attention were given during any of the token reinforcement sessions in order to accurately measure the effectiveness of the two conditions. There was a problem that had arisen during the Token Training period; that of the physical difficulty of the experimenter and assistant delivering tokens, holding the clipboard and scoring responses at the same time. This problem was overcome by the manufacture of a small sack which was attached to the belt. Thus, it was a relatively simple matter to take a token out of the sack and check off responses at the same time. This week of Token R. operated in the same manner as that of the final day of Token Training.

TOKEN R.2: As for Token R.1: five days.

VERBAL R.4: Four days. This condition was reintroduced in order to evaluate whether the verbal reinforcement condition would continue to maintain instruction-following behaviour at the same level as the Token R. condition. Procedure of administration was the same as that used in the other Verbal R. sessions.

TOKEN R.3: As for Token R.1 and 2. In order to note any rises, falls from that level achieved by the Token R.2 and Verbal R.4 conditions.

REVERSAL: As for Baseline.

Punishment Conditions:

The two punishment conditions (verbal and time-out) were to be compared for their effectiveness in reducing three classes of disruptive behaviour:

- (a) getting out of seat - i.e. any occasion when the child actually left the seat. Rising and then sitting down was not included.
- (b) interference with another's person: shaking, punching, biting, pulling clothes.
- (c) interference with another's work gear: taking crayons, ripping and taking another's paper.

The three behaviours were selected on the basis that they occurred at a relatively high level and were considered the most likely to disrupt instruction-following behaviour.

BALANCING OF CONDITIONS: The conditions were arranged so that each subject spent two consecutive weeks under each condition. Three children were exposed to the time-out condition first and three to the verbal reprimand condition. In this way results would not be subject

to misinterpretation, i.e. if all subjects had commenced on a time-out condition then any corresponding drop in the verbal reprimand condition could be interpreted as resulting from the effects of time-out rather than from verbal reprimand itself. A reversal design was used between the conditions in order for the punished response to recover its original unpunished level. A minimum of one week was allowed for this to occur. Because there was only one time-out room available there was an effort to pair a high responder with a low responder in order to attempt to avoid the problem of children emitting disruptive responses at the same time. If this had occurred the child would have been placed in an empty classroom next to the experimental room, and while this room was not as suitable as the time-out room the child would have been isolated. All chairs, rugs and assorted items were removed from this prior to beginning the programme.

No more than two children were on either of the conditions at the one time. The balancing of children and conditions is contained in Table E, Appendix I.

VERBAL REPRIMAND: When the defined disruptive response was emitted the child would be immediately reprimanded by either the experimenter or the assistant. The verbal reprimand consisted of the words: "stop doing that . . . (name)". These stimuli were delivered at a level of amplitude much higher than that normally present in normal conversation in an effort to ensure the stimulus was heard and to minimize the possibility that it was reinforcing to the child.

TIME-OUT: As soon as the child emitted the disruptive response the experimenter or assistant stated the word "no" in a loud voice, lifted

the chair away from the child, helped the child up by the arm and stated the following, "time-out room, come with me". There was to be as little further physical contact as possible in order to remove the possibility of reinforcing the child. The possibility that the child may have strongly objected to being placed in the time-out room was considered and in these cases it was decided to firmly grasp the child by the hand and lead him to the room. The child was placed in the time-out room, the door was closed and the experimenter or assistant stood outside. The time in isolation was decided as 60 seconds which was measured by stop watch. As the defined behaviours (out of seat, interference with another person and interference with another child's work tools), could not be emitted in the time-out room a change over delay was not considered necessary except in cases where the child had a major tantrum (bashing on the walls and door, screaming loudly). In these cases the time-out period would have been extended until the behaviour ceased.

Because both the experimenter and the assistant had committed the instruction sheet to memory there was no difficulty for the remaining individual to record all six children's responses, administer verbal reprimands and read instructions to the class for the period in which time-out was being applied.

Helping Behaviour:

Any response that could be defined as that of helping another child, was positively reinforced with verbal praise.

Three classes of behaviour were defined: helping others with work tools, (bringing crayons up to the front), helping others gain reinforcement (helping other children to point at stimulus objects), and helping others bring their chairs up to the table.

CHAPTER IV RESULTS

The three general effects put forward in Chapter I are examined in the current chapter as follows:

- SECTION I Comparison of social and token reinforcement in control of instruction-following behaviour.
- SECTION II Comparison of social (verbal reprimand) and time-out (T.O.) in the control of disruptive behaviour.
- SECTION III Use of social reinforcement (praise) to control helping others.

SECTION I: Comparison of Social (verbal) and Token reinforcement in control of instruction-following.

For all subjects Token conditions produced higher rates of instruction-following than Verbal conditions so far, although it is apparent that Verbal would have produced higher rates given time. The V.R.4 condition interpolated between T.R.2 and T.R.3 conditions consistently yielded lower rates than either of the two Token conditions. This is perhaps because Verbal is less effective than Token reinforcement.

The day to day data for this comparison is presented in Table F: Appendix 2. Figures one through six present the number of items responded to correctly, per session, and has been plotted as a function of the successive Verbal and Token conditions.

Figure one presents the data obtained with subject one. This child responded to a maximum of five instructions in the first Verbal R. week with a range of one to five. The Token Training sessions produced a range of four to six. There was a rapid rise in correct responding

during the Verbal R. condition which followed Token Training to a maximum of 31 in the final day. This period was marked by a sudden increase in responding from seven on day three to 24 on day four.

The introduction of the first Token condition was illustrated by a further steady rise in responding with a range of 30 to 37. The second Token condition was marked by some fluctuation with a range of 24 to 30 correct responses. The introduction of the final Verbal R. condition saw a decrease in responding from 20 on the first day to 16 on the fourth. When the final Token condition was introduced there was a marked increase in responding from 35 on the first day to 40 on both the fourth and fifth days. The beneficial effect of the Token system seemed to be established for this subject.

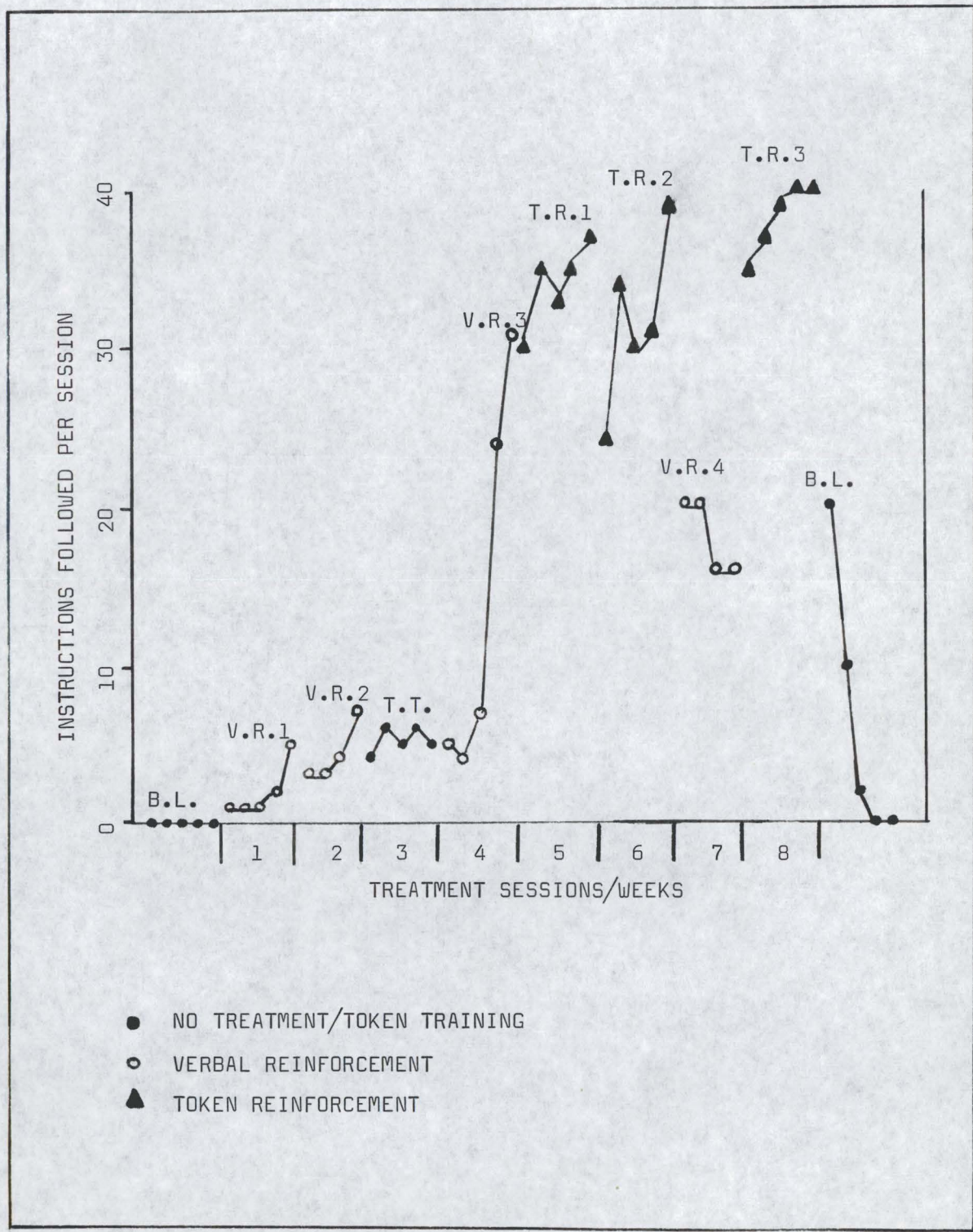
A similar pattern occurred for the other five children although there were different rates and levels of correct responding between each child. Furthermore, the differential rate of correct responding between the Token and Verbal conditions was not as marked as it was for subject one. In all of the other five children the highest number of correct responses occurred in the final Token condition.

As the six children responded correctly at such a low level during the initial baseline period, the highest being subject six with a maximum rate of nine and a range of four to nine, it is misleading to compare the effects of the Verbal and Token conditions over the whole programme. The initial weeks involving the Verbal condition seemed to develop the responses from the low level exhibited during the baseline period and consequently, when the Token condition was introduced responding was already at a reasonably high level. However, it does seem valid to compare

the differences in response rates between Token R.2, Verbal R.4 and Token R.3. During these periods responding was at a high level and the differences under the two conditions can be reasonably assessed.

FIGURE 1 Comparison of Social (Verbal) and Token reinforcement in control of instruction-following.

SUBJECT 1



- NO TREATMENT/TOKEN TRAINING
- VERBAL REINFORCEMENT
- ▲ TOKEN REINFORCEMENT

FIGURE 2 Comparison of Social (Verbal) and Token reinforcement in control of instruction-following.

SUBJECT 2

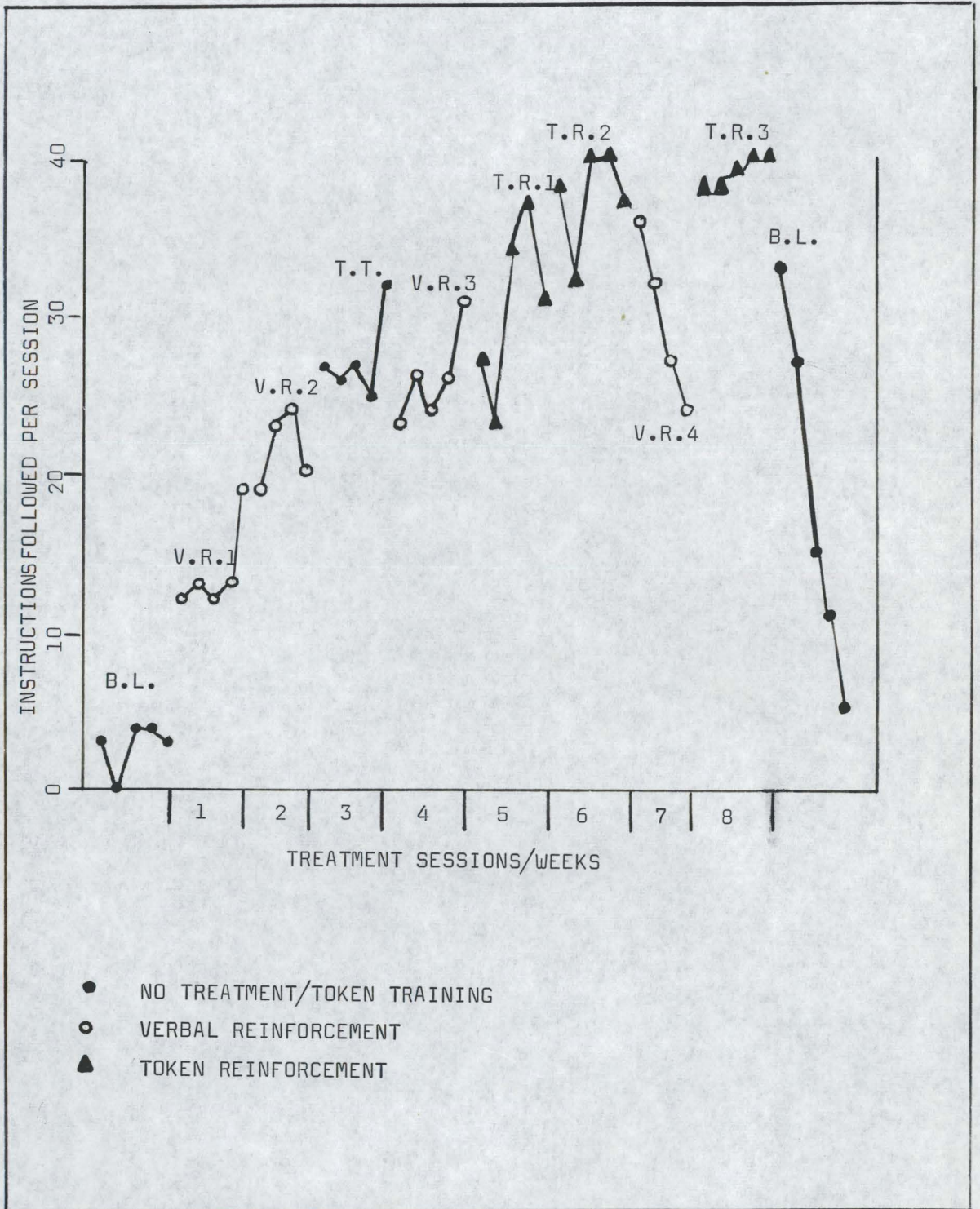


FIGURE 3 Comparison of Social (Verbal) and Token reinforcement in control of instruction-following.

SUBJECT 3

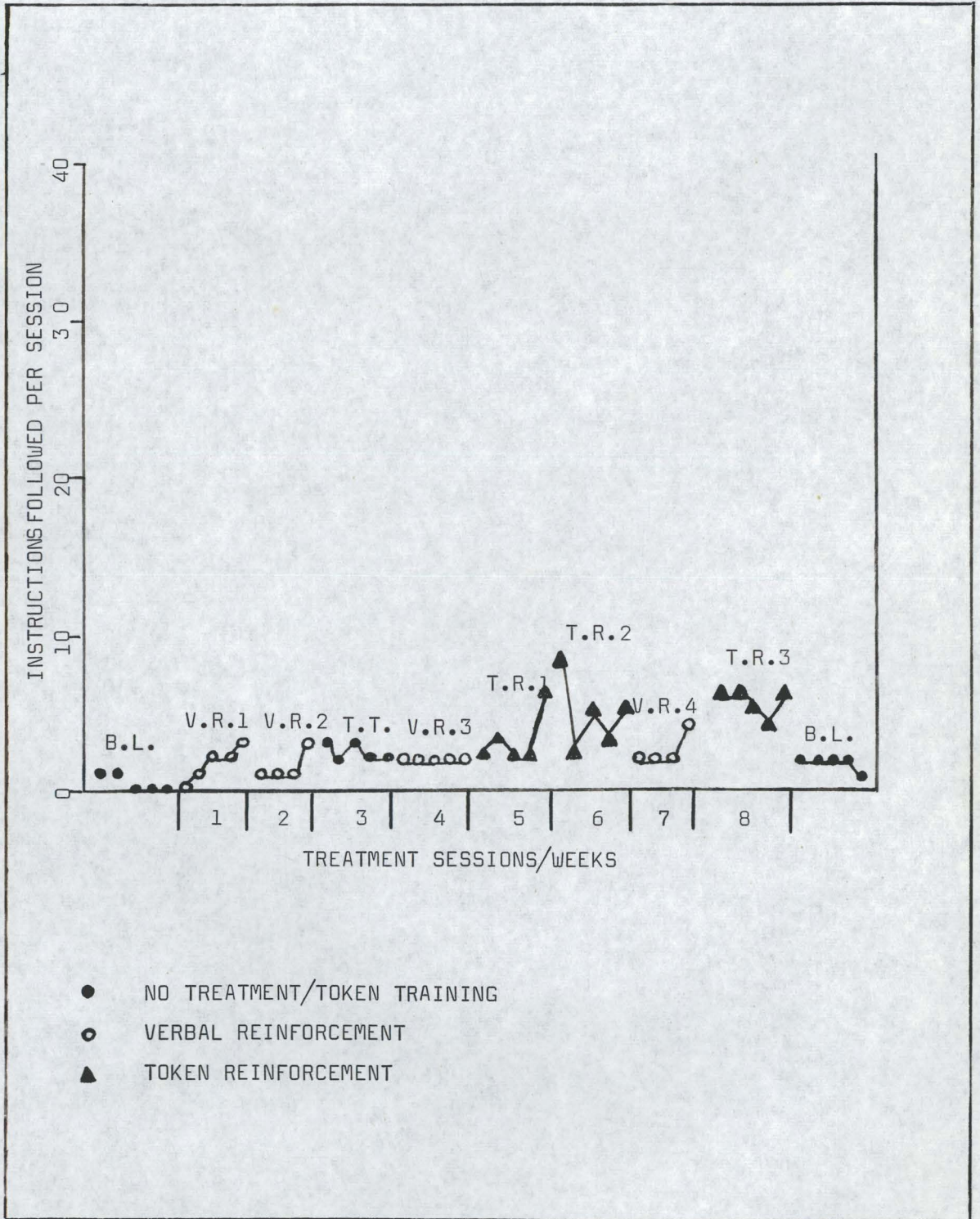


FIGURE 4 Comparison of Social (Verbal) and Token reinforcement in control of instruction-following.

SUBJECT 4

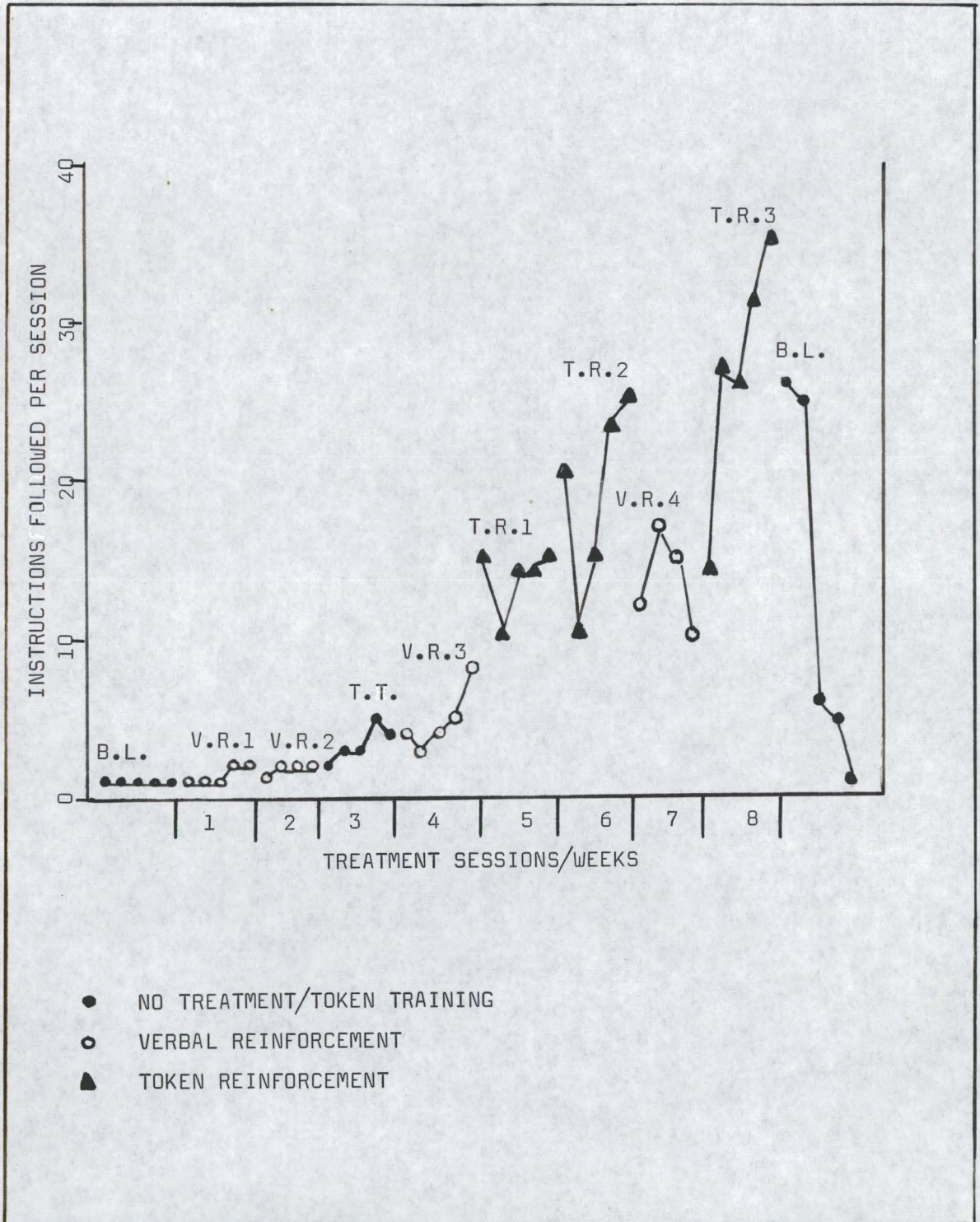


FIGURE 5 Comparison of Social (Verbal) and Token reinforcement in control of instruction-following.

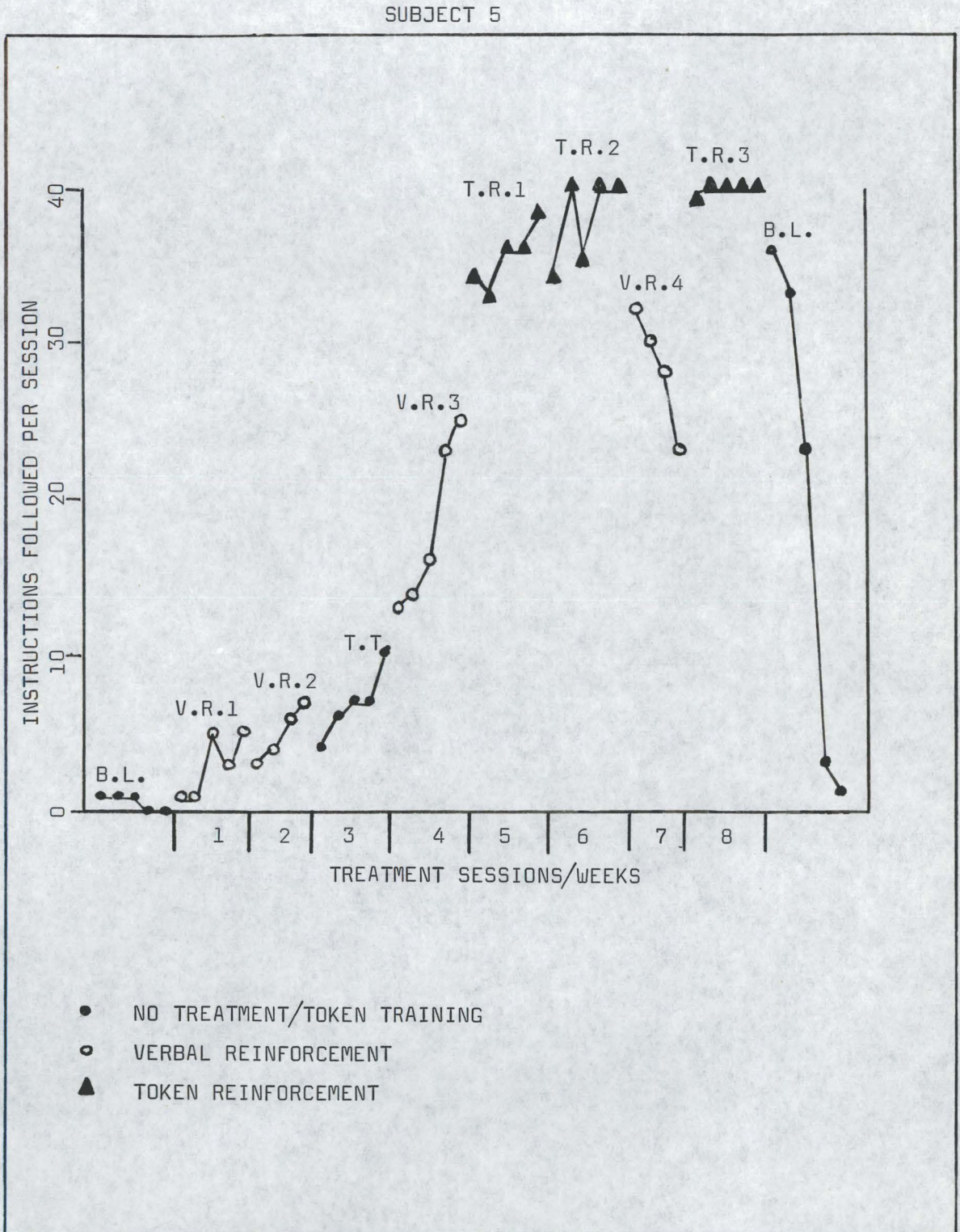
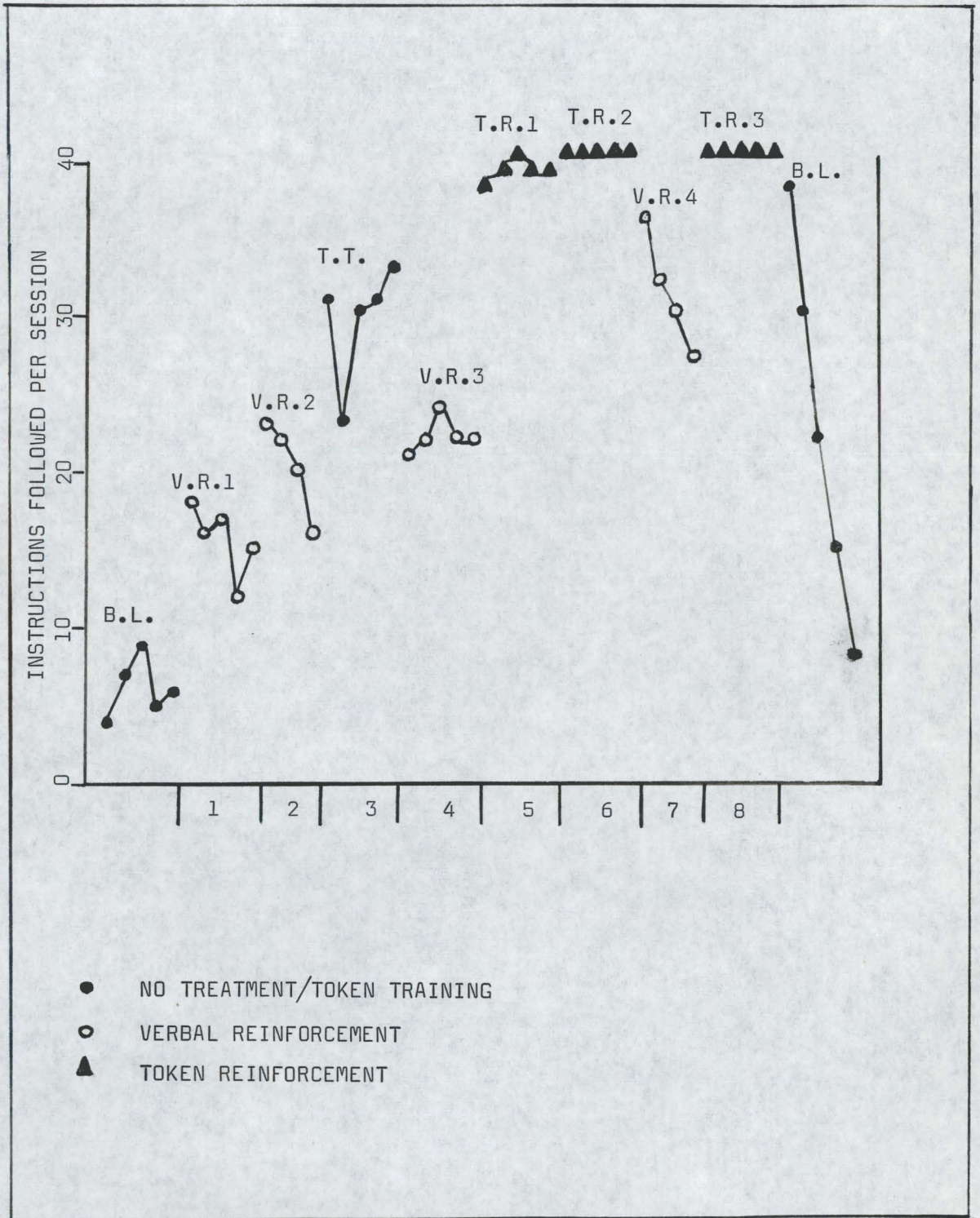


FIGURE 6 Comparison of Social (Verbal) and Token reinforcement in control of instruction-following.

SUBJECT 6



SECTION II: Comparison of Social (verbal reprimand) and time-out (T.O.) in the control of disruptive behaviour.

For all six subjects time-out reduced and maintained lower frequencies of disruptive responding for the three designated behaviours (out of seat, interference with others, interference with other's gear), than did verbal reprimand. Both conditions differed from the no punishment condition.

The day to day data for this comparison is presented in Table G: Appendix 2. Figures seven through 12 present the total number of disruptions emitted by subjects one to six, per session. These are plotted as a function of the time-out, verbal reprimand and no punishment conditions.

Figure seven presents the data obtained with subject one. This subject emitted one disruptive response in each of the first five time-out sessions as compared with the maximum number of 66 on the fourth day of the baseline period (range: 35 to 66). The second period in which the time-out condition was employed saw one disruptive response being emitted in the first two sessions with a reduction to no disruptions in the final two sessions. When the time-out condition was removed and replaced with a no punishment condition disruptive responses increased to a maximum of 23 in any one session (range: nine to 23).

The first five days of the verbal reprimand condition indicated a slight reduction with a maximum of 16 disruptions in any one session and with a range of 12 to 16. A similar rate was obtained for the last five sessions in which the condition was employed.

Removal of the verbal reprimand condition and an introduction of the

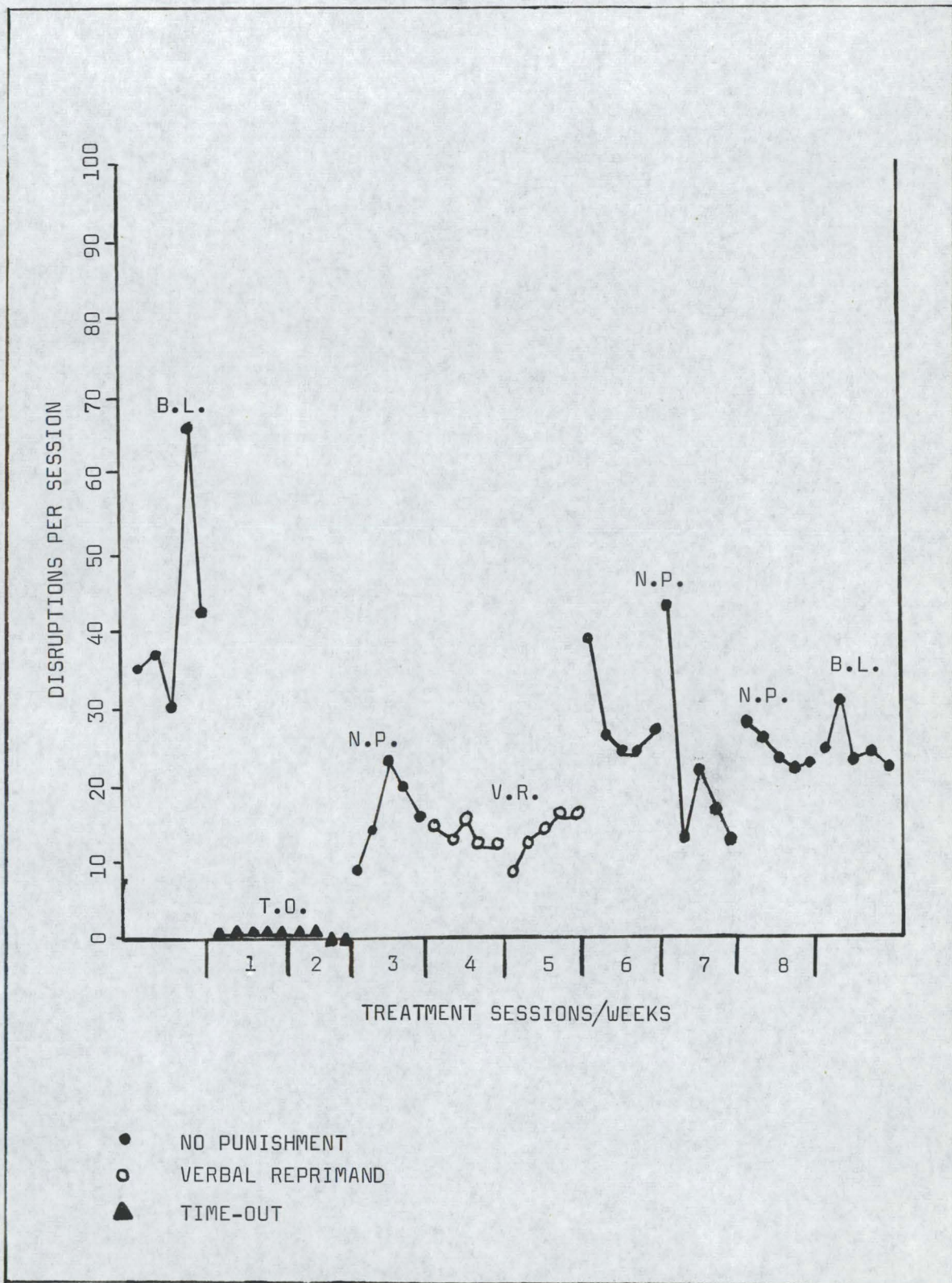
no punishment condition again saw an increase in disruptive responding with a maximum of 43 in any one session and a range of 13 to 43. The reductive effects of time-out were established for this subject with time-out significantly more effective than verbal reprimand.

A similar pattern was exhibited by the remaining five subjects irrespective of which condition was presented first. In the time-out condition the maximum number of isolation periods in any one session was two. This occurred only once, with subject three, and was in the first time-out session. In each subject the time-out condition produced a significantly lower rate of disruptive responding than did the verbal reprimand condition.

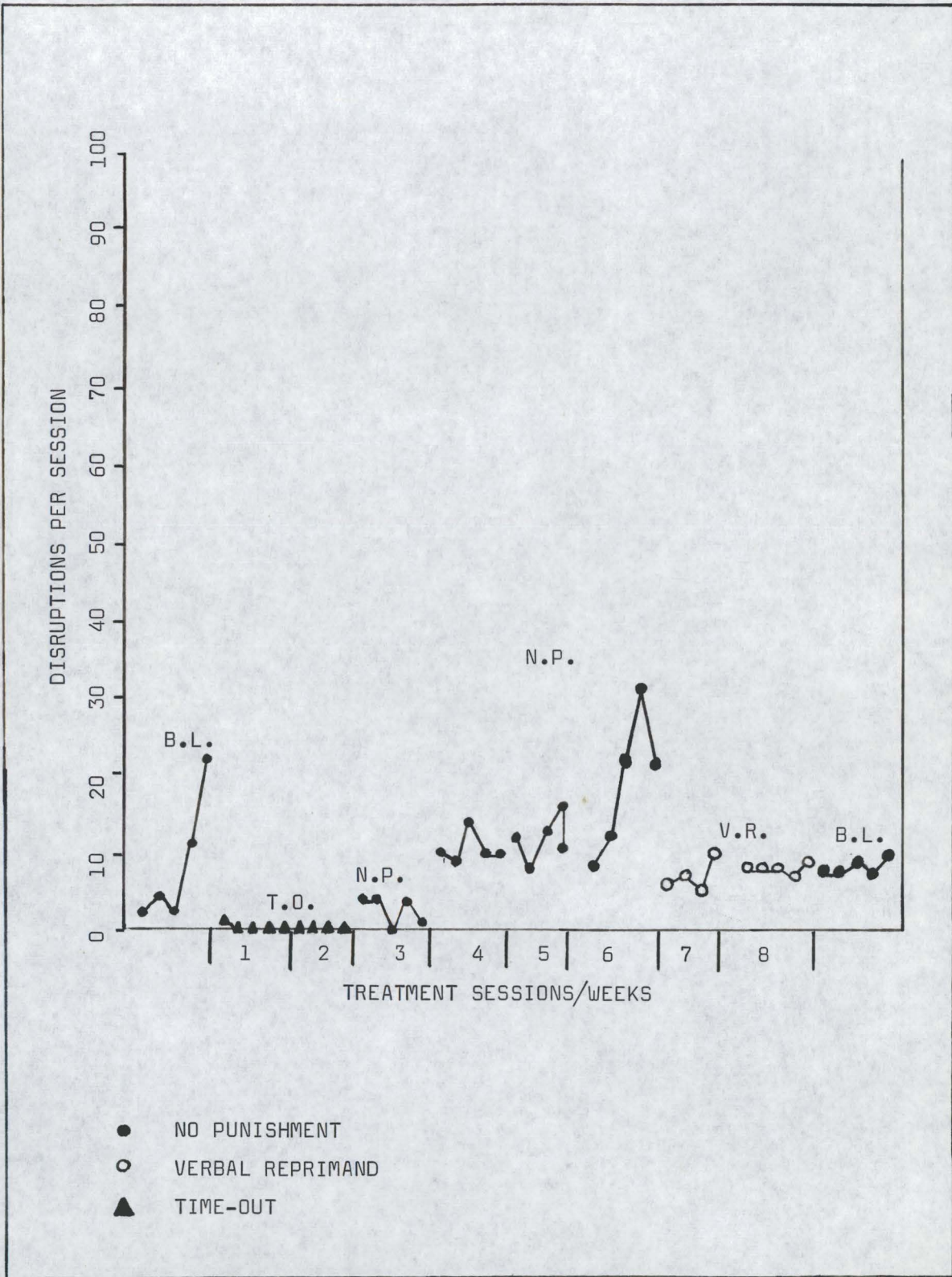
The effects of verbal reprimand tended to vary between subjects in the extent to which it reduced disruptive behaviour. Subjects three and five illustrated lower rates of disruptive behaviour under this condition than under any of the no punishment conditions. Subject two responded less in the verbal reprimand condition than in any no punishment condition with the exception of those following time-out. A similar pattern was observed in subjects four and six. The results do not allow any conclusions as to verbal reprimand acting as punishment stimulus.

FIGURE 7 Comparison of Social (verbal reprimand) and time-out (T.O.) in the control of disruptive behaviour.

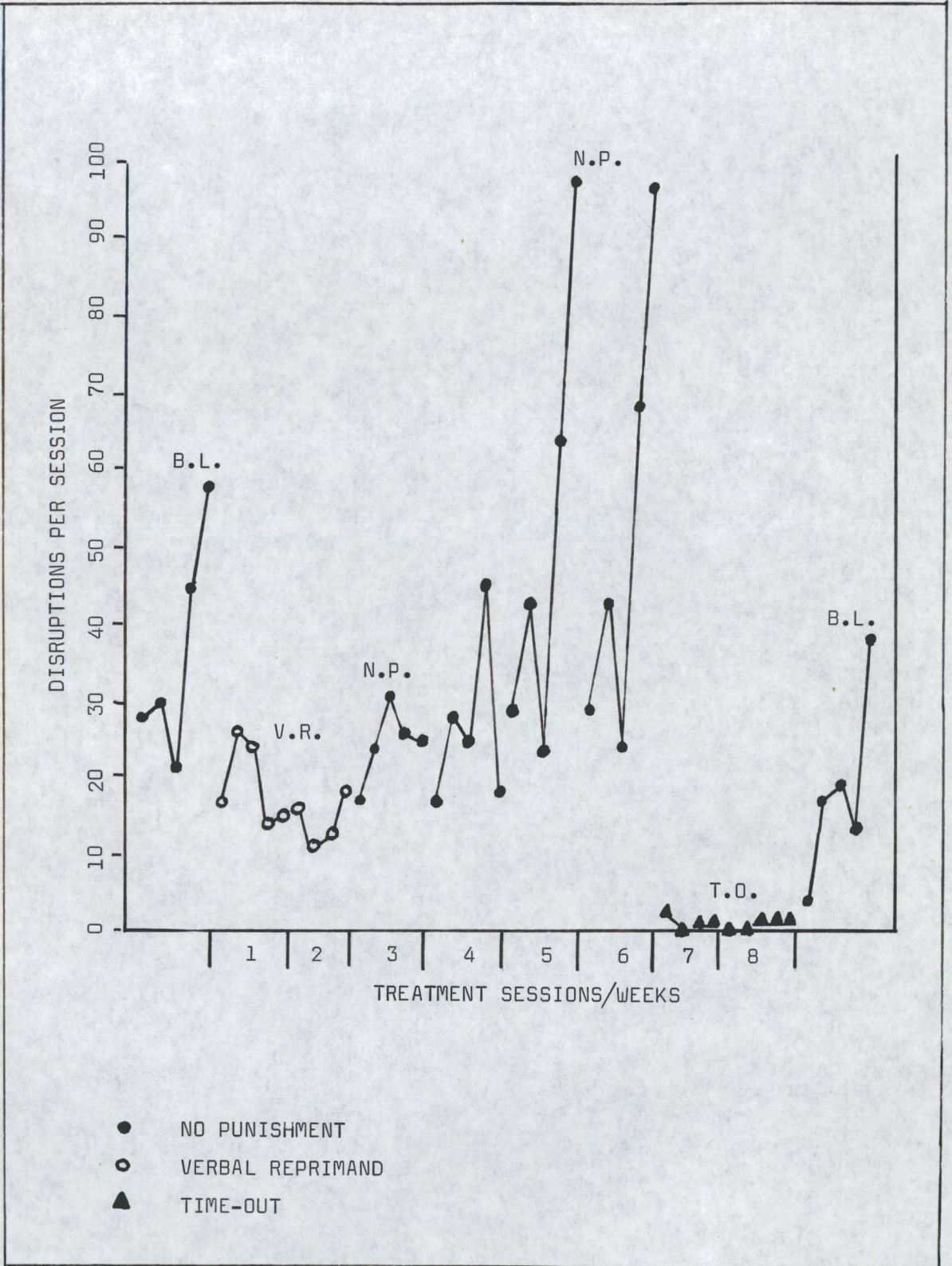
SUBJECT 1



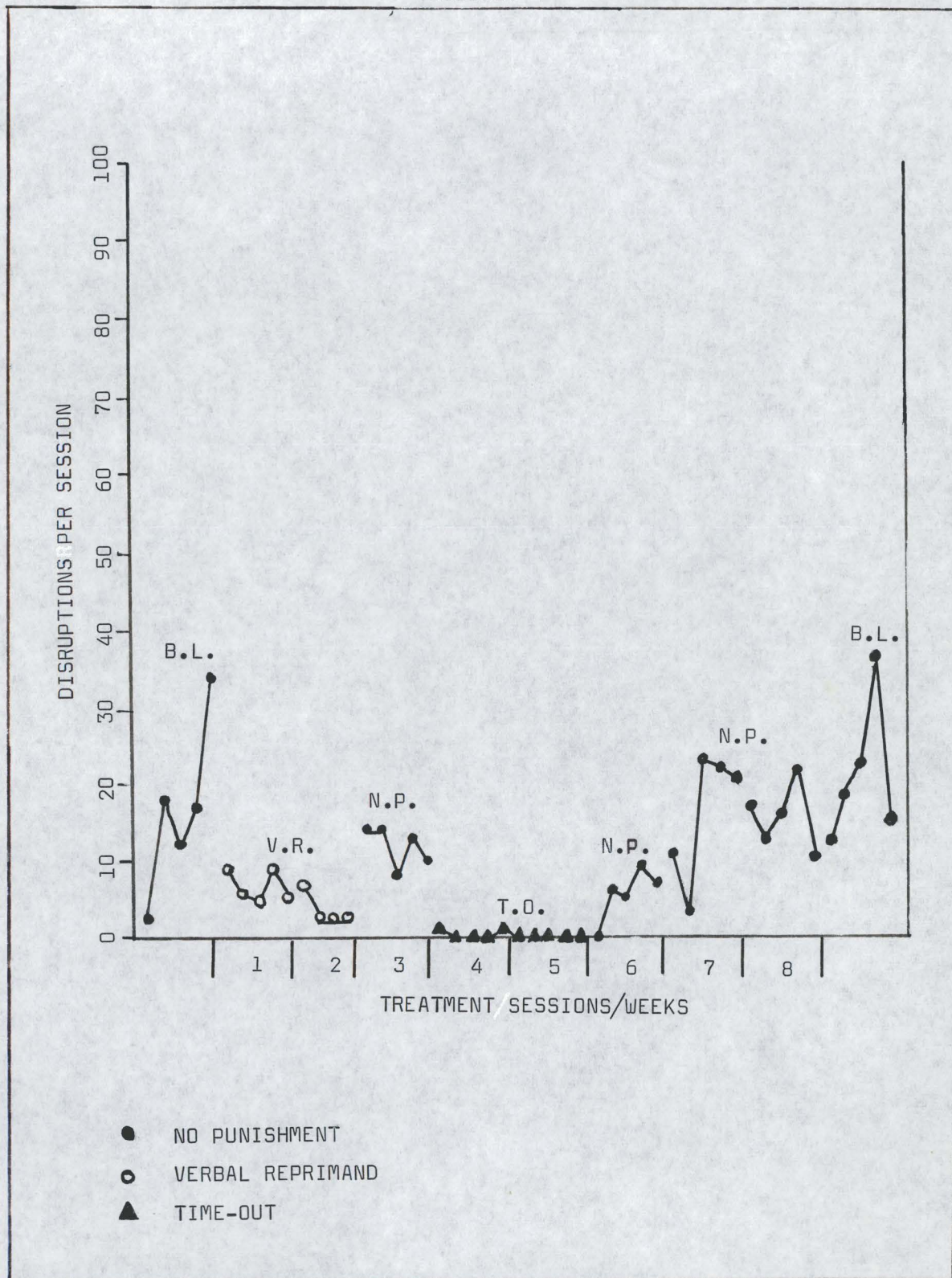
SUBJECT 2



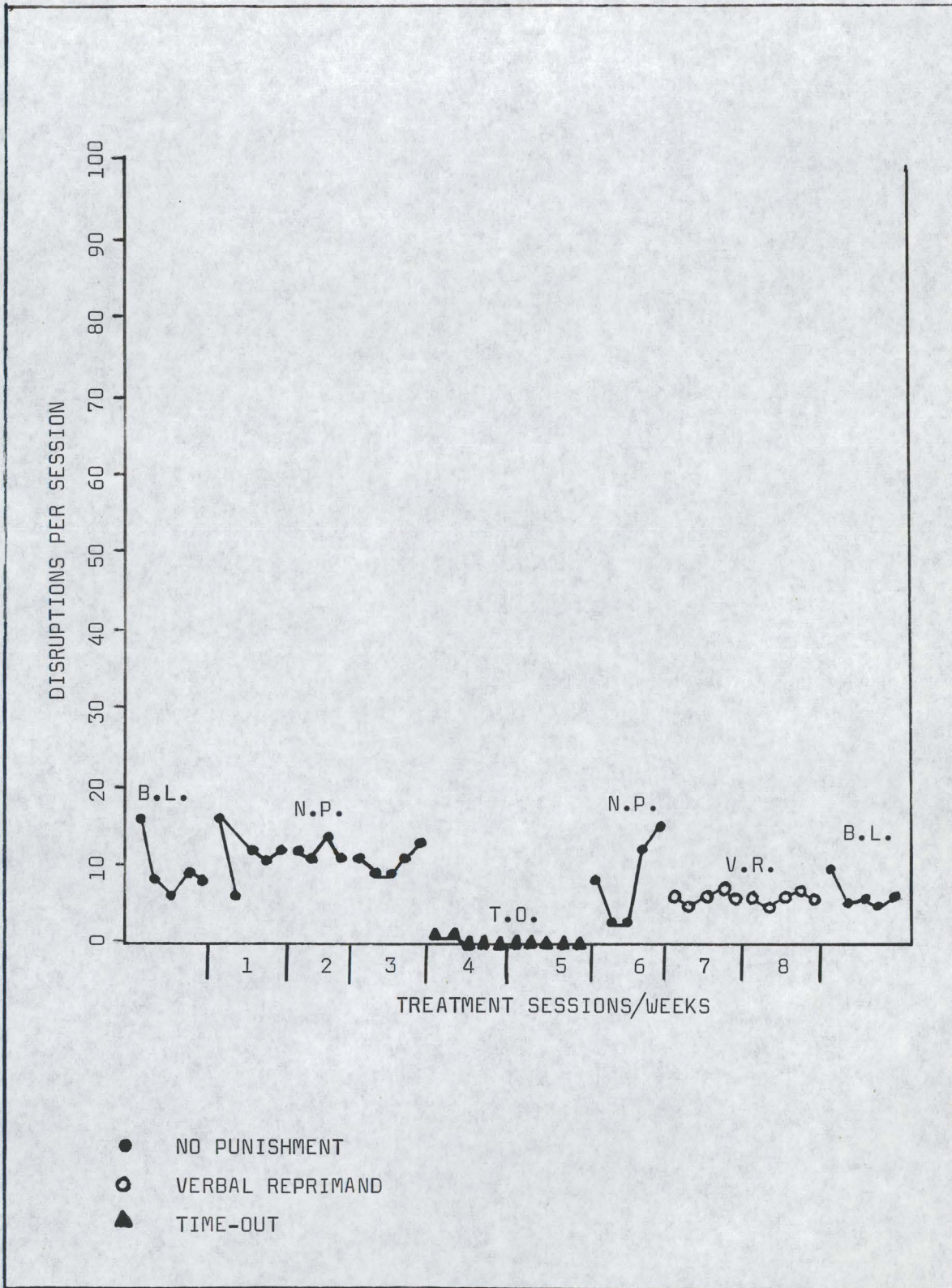
SUBJECT 3



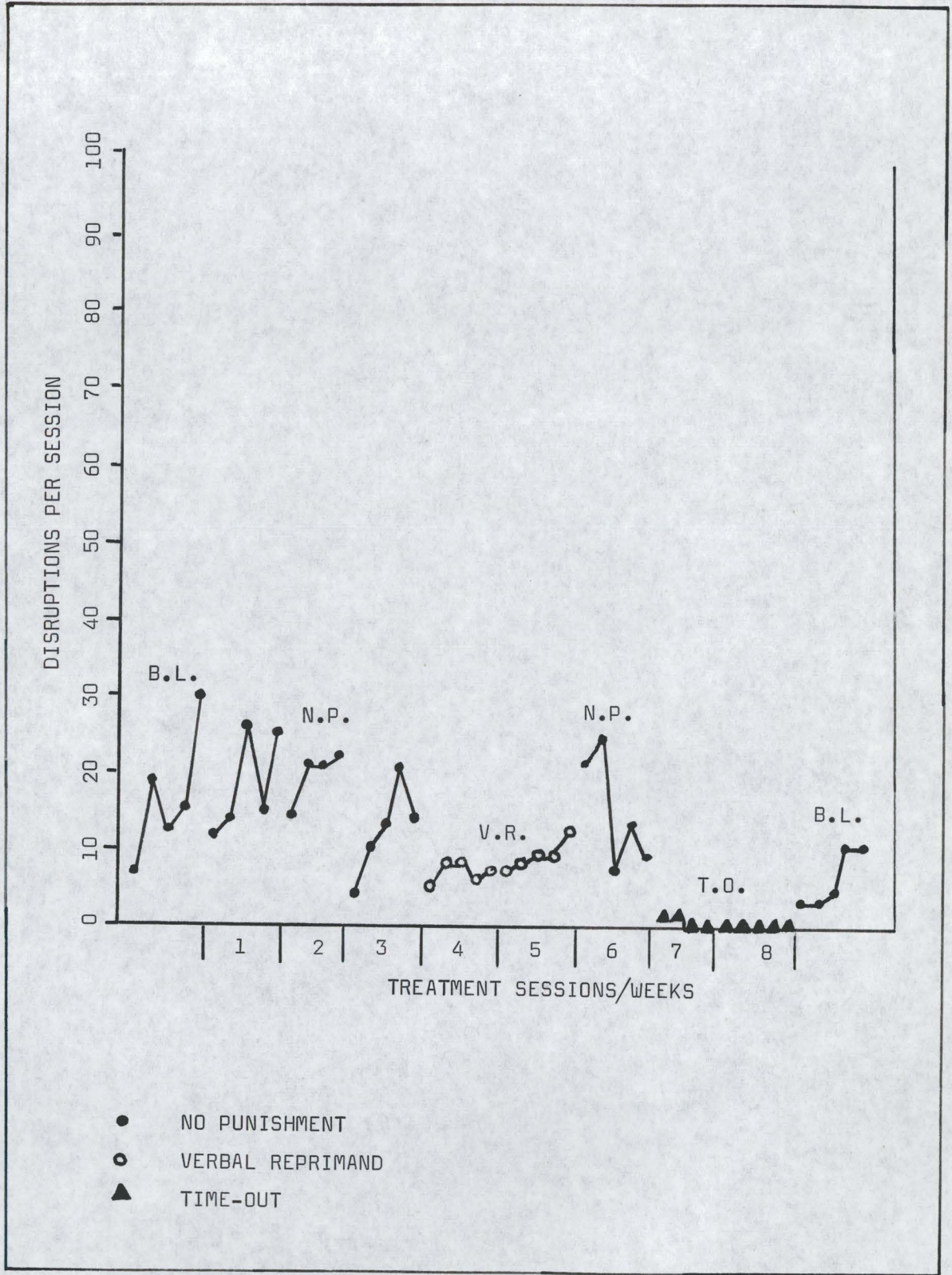
SUBJECT 4



SUBJECT 5



SUBJECT 6



- NO PUNISHMENT
- VERBAL REPRIMAND
- ▲ TIME-OUT

SECTION III: Use of social reinforcement (praise)
to control helping others.

For only one subject (subject two), did the introduction of social reinforcement (praise), have any noticeable effect on the incidence of helping behaviour defined as: helping others with their work tools, helping others get reinforcement, helping others to bring up chairs. As shown in figure thirteen this subject steadily increased in the number of helping responses emitted from a maximum of four in the baseline to a maximum of 15 in any one session.

As shown in figures 14 and 15, subjects five and six displayed slight increases, but not enough to make any valid conclusions as to the effect of verbal reinforcement as a means of developing this sort of behaviour in retarded children treated in a group setting.

The day to day data for subjects two, five and six are presented in Table H; Appendix 2. Subjects one, three and four failed to emit any helping responses during the course of the programme.

FIGURE 13 Use of social reinforcement (praise) to control helping others.

SUBJECT 2

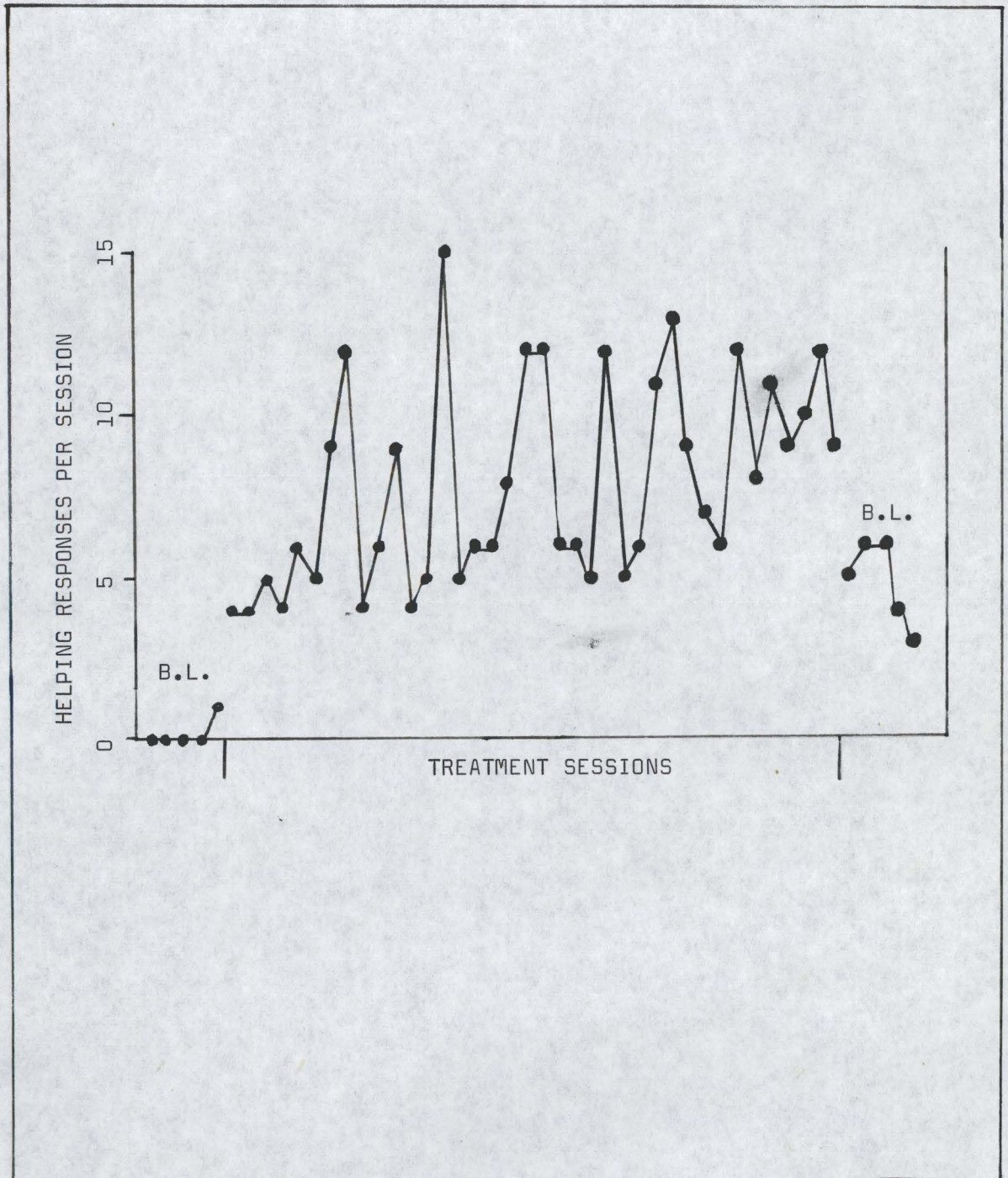


FIGURE 14 Use of social reinforcement (praise) to control out helping others, of disruptive behaviour.

SUBJECT 5

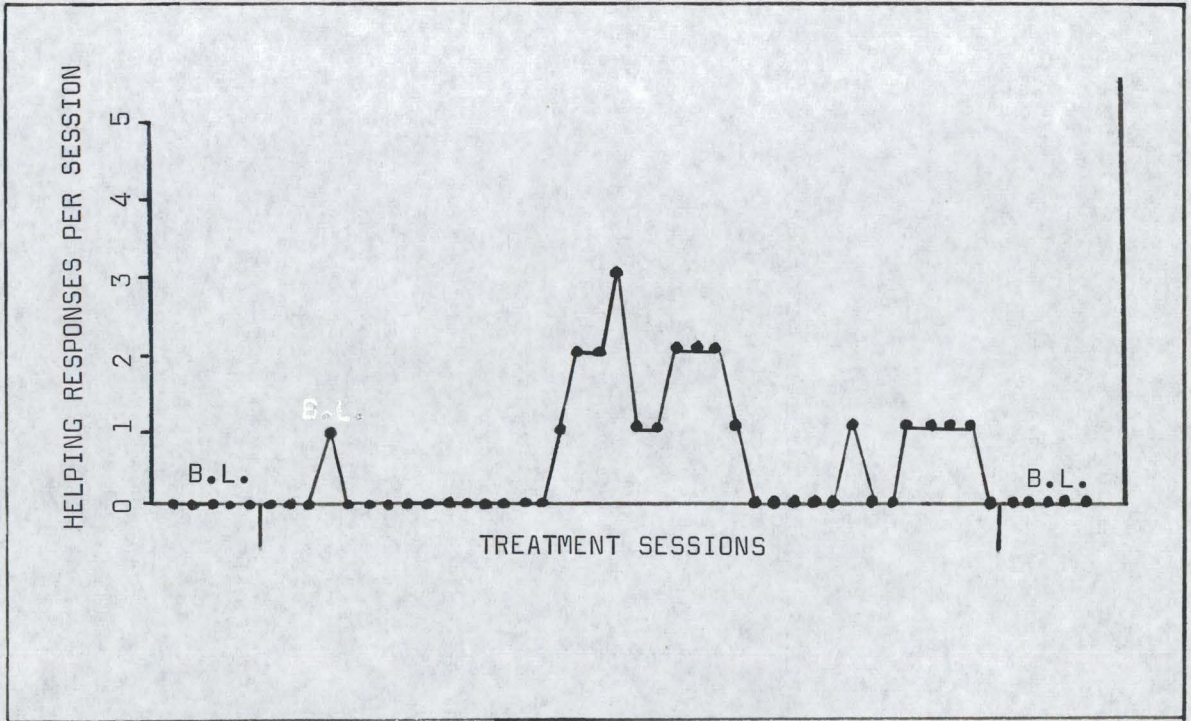
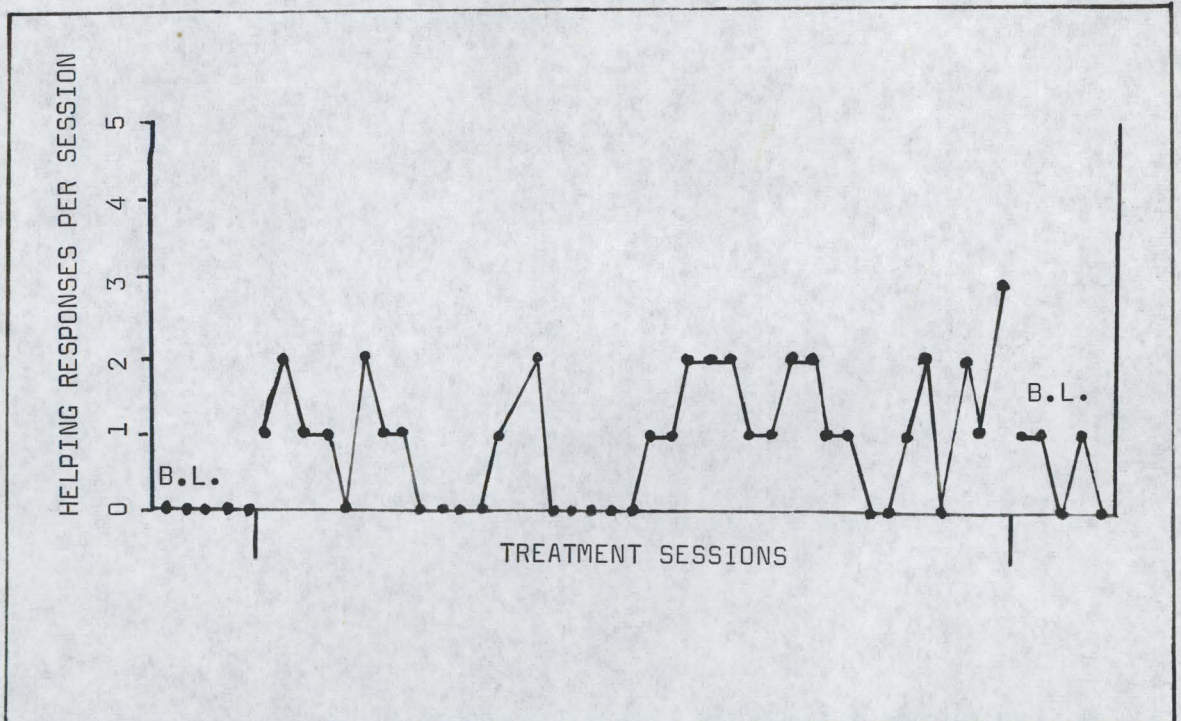


FIGURE 15 Use of social reinforcement (praise) to control helping others.

SUBJECT 6



CHAPTER V: GENERAL DISCUSSION

Comparison of the effectiveness of Verbal and Token Reinforcement in their effectiveness in increasing instruction-following behaviour.

The results obtained in this study were similar to those produced in the Zimmerman et al (op. cit, 1969) investigation. In all cases the token reinforcement conditions produced a higher rate of correct responding than did the verbal reinforcement conditions. This trend was illustrated by all subjects and was especially evident in the comparison between the final verbal and token conditions. There was a drop in the rate of correct responding after the introduction of the final verbal condition and when the final token reinforcement condition was introduced responding rose to the highest level obtained in the programme. These results tend to agree with those found by Zimmerman et al (op. cit, 1969), and Girardeau and Spradlin (1965) and Bijou (1965) in their applications of the operant method to groups of subjects.

The rapid rate of increased responding illustrated by all subjects, with the exception of subject three, indicates the value of programmes which systematically apply reinforcement which is both appropriate and has a high enough incentive value for the child. The experimenters observations of classrooms in which retarded children are taught, indicates that although verbal praise is utilized as a reinforcer it is delivered on a non contingent basis and in an inconsistent manner. The increases in instruction-following, in this study, were obtained in spite of the fact that all of the children had been diagnosed as incapable of following instructions; both by the staff and visiting "specialists". The four

subjects that illustrated the fastest rise in instruction-following behaviour were variously described as, "extremely distractable, displays little attention", "hyperactive and not able to pay attention", "not able to pay attention or fit into any type of classroom". Furthermore, subject six, who indicated the fastest rate of correct responding and who, consistently, followed all 40 instructions, was described as: "hyperactive, highly distractable . . . shows little comprehension of verbal instructions . . . is impossible to teach, and is unable to distinguish meaningful from irrelevant material".

Of interest is the fact that the difference in response rates during the verbal and token reinforcement conditions was obtained with the use of objects that existed in the school environment, with the exception of sweets, which were chosen noticeably less than was expected in view of the findings of other studies that indicate that edible substances have been found to be the most effective single class of reinforcers. Given that an object in the school environment is reinforcing for the child, and that a state of deprivation exists, then the use of these objects may help to reduce the financial expense of token programmes.

An interesting, and unexpected, side effect of the programme was the rise in verbal communications between the children themselves, and between the children and the experimenter. Subject 4, who had never previously spoken in his period at the school (2 years), responded to instructions requiring a verbal reply. Subject 1, who had never issued a verbal statement other than in Greek replied to the instructions in English. Over the course of the programme this subject communicated freely with the experimenter in English. This could perhaps be a result

of the imitative procedure, which as Baer (1966) pointed out, tends to increase the child's vocalizations to the instruction, "do what I do". It was interesting to note that speech tended to increase in all subjects without any further shaping by the experimenter.

It would have been useful to increase the number of items in the instruction list and to vary the types and ranges of behaviours called for. However, as this design did not allow for the introduction of added variables it was not possible to do so. Furthermore, observations of the children's behaviour prior to the study and the advice of the staff did not lead the experimenter to suspect that there would be such a rapid rise in correct responding nor that it would increase to the level illustrated in most subjects. In a continuing application of these techniques in the classroom there is no reason why the instruction list cannot be lengthened and applied to more complex forms of instruction-following behaviour.

In all cases the children were continuously reinforced contingent upon the correct response. This tended to rapidly build up responding to a high level. However, when the second baseline was applied at the end of the programme a rapid extinction effect was noticed. In a continuing programme it may be more beneficial to shift to an intermittent schedule of reinforcement which tends to maintain responding at a high level and is more resistant to extinction than responding produced under continuous reinforcement. If intermittent reinforcement had been used in this programme the rates of Verbal may not have fared so badly compared with Token. Verbal stimuli may well satiate quickly compared with non-verbal ones.

Informal observation by the experimenter and reports from the school staff, indicated that the children involved in the experimental programme, mixed more freely with the rest of the school population than they had previous to the beginning of the study. Subjects one and five, who had never previously sat with the other children and had occupied seats well away from the body of the class, sat with the rest of the school during no non-experimental periods. It was also interesting to note that these two subjects made the initial response to sit with the other children without any coaxing from the staff. It would seem that the act of sitting with other children during the programme and the receipt of reinforcement for associated behaviours tended to generalize to the normal school setting.

There were no examples of absenteeism during the period the programme was in operation. This is in contrast to the six months before the instigation of the study where absenteeism was at a relatively high level, with at least one of the six subjects being absent once a week, or more.

Although the study indicated that token reinforcement generated higher levels of instruction-following behaviour than did verbal reinforcement, there was sufficient evidence to show that verbal reinforcement is effective in increasing this type of behaviour. When the classroom is under the control of one teacher verbal reinforcement has the advantage that it is easier to deliver, and requires less knowledge of the principles of behaviour control from the teacher. Verbal reinforcement is seen as a worthwhile alternative when it is impossible to institute a token reinforcement programme. This is particularly so when one considers the number of stimulus elements that must be defined

and isolated before such a programme is instituted. It must be noted, that in order to be effective, the teacher must deliver reinforcement immediately following the correct response.

Pre study investigation carried out by the experimenter in the ordinary classroom in which the teacher issued instructions, indicated that instruction-following behaviour was at a level similar to that obtained in the baseline. As the type of instructions issued to the children were often different from those used in the study it is difficult to directly compare rates with those obtained in the course of the study. Of the instructions administered by the teacher, they were followed at a very low rate. Using a 30 second time sampling technique, the number of instructions followed by each child averaged no more than 1 per 30 minute session. The same time sampling technique was applied to the sample in the normal classroom two weeks after the experimental programme to study the lasting effects of the study on instruction-following behaviour. The results indicated that there was little increase in responding over that observed in the pre study period. This was in spite of the fact that the teacher, who had observed two of the experimental sessions, was administering many of the instructions used in the study. The lack of instruction-following behaviour could be directly attributed to non existence of reinforcement administered during this period.

The results of the study provide further evidence of the effectiveness of operant procedures as applied to groups of children as a whole rather than treatment programmes directed at individual subjects in a group situation. The method is seen as a worthwhile alternative to individual treatments.

Comparison of time-out and verbal reprimand in their effectiveness in reducing disruptive behaviour.

The results of the study indicate that time-out reduced disruptive behaviour at a faster rate than did verbal reprimand. The superiority of time-out was marked for each subject and this occurred irrespective of the order in which the condition was applied.

As severely retarded children tend to emit disruptive responses at a high rate it has often been seen as useful to employ a technique which will reduce these responses rapidly and maintain them at a low level of occurrence. The present study indicated that very brief periods of isolation are effective when applied to the defined behaviours (out of seat, interference with others, interference with other's gear). In the present study the period of isolation employed was that of sixty seconds. This short period in the isolation room is important because it allows the child more time to respond appropriately. In the present study disruptive responses were rapidly reduced to a near zero level upon the application of the time-out condition and maintained this level during the period in which the time-out condition was in operation.

Not only was time-out more effective than verbal reprimand but also quite dramatic in its effect on responding. There were never more than two disruptive responses made in any session in which time-out was the punishment.

Because only one or two time-outs could not normally be expected to reduce the number of responses present at so rapid a rate, one may conclude that the children had been punished for similar behaviour on previous occasions. The children learned to discriminate what would

be punished very quickly which might suggest some sort of one trial learning. The experimenter, however, tends to prefer the explanation that the procedure was so effective because of conditioning that has occurred in the past. It is as if time-out in some way "sensitized" a whole series of previously acquired inhibitions against certain classes of responding. One aspect of this low rate of responding was that it reflected the fact that time-out reduced both the responses actually punished and also those other disruptive responses studied by the experimenter. For example, if the child received a time-out for being out of seat then the responses of interference also failed to occur after this punishment.

The results may further suggest that the disruptive responses are not currently under the control of any of the contingencies exercised by the teacher.

Because the children were concurrently proceeding with the instruction-following task there is no question of an overall suppression of responding. For this reason it does not seem reasonable to argue that time-out merely caused a traumatic inhibition of all responding. The same rationale can also be applied to the effects of verbal reprimand.

Although the reductive effects of time-out and verbal reprimand were considerably different, and the fact that this effect occurred irrespective of when either condition was applied during the treatment programme, the verbal reprimand condition, in some cases, reduced disruptive responding below that of the no punishment level. In a single teacher classroom verbal reprimand is somewhat easier to apply

than time-out which would require leaving the room for a period and would thus reduce the opportunity for non offending subjects to respond appropriately to classroom instructions. However, continually punishing the child in a loud voice may not only be tedious for the teacher but may be subject to habituation effects. Although the present study cannot do other than show that verbal reprimand delivered in a loud voice contingent upon the disruptive response, slightly reduced some behaviour that was inappropriate, and cannot analyze the effects of these types of stimuli as punishments, some conclusions can be drawn. Verbal reprimand was relatively effective with this sample and indications are that this form of behaviour control does not act as a positive reinforcer and therefore, increase disruptive responding.

One important finding was that neither of the punishment conditions appeared to interact with the instruction-following behaviour. Rises in instruction-following occurred irrespective of the punishment condition being applied at the same time. One would have expected the removal of the disruptive responses to facilitate learning. In this case an adaptive, alternative response, was being positively reinforced. In no subject was there a noticeable change in correct responding after the introduction of the punishment condition and in fact, those that were currently under a punishment condition when the final verbal reinforcement was introduced illustrated the same characteristic drop in responding as did the other subjects. Furthermore, the removal of the punishment condition did not accompany a drop in instruction-following behaviour. These results would seem to have practical implications for the teaching of mentally retarded subjects, as disruptive

responding may not have the important bearing on instruction-following behaviour as is normally assumed. In this study neither social nor token reinforcement systems led to a drop in disruptive responding. It seemed as if the subjects became able to discriminate between responses that would be reinforced and those that would either be punished or not punished.

Because of the limited number of personnel involved in the study (two), it was not possible to study either the latency between the beginning of the session and the time when the disruptive response was emitted or, the rate of disruptive responding within the session. Informal observation led the experimenter to believe that the disruptive response occurred early in the session in the first few days of the punishment condition and then did not occur until late in the session near the end of the period in which the punishing stimuli were being applied. This effect seemed most marked in the time-out procedure.

It would have been interesting to formally record the amount of generalization to other disruptive responses that occurred under the two conditions. Again lack of staff made this impossible. Casual observation throughout the punishment conditions indicated that there was an overall decrease in responding and that this was more marked during the time-out period than during that of verbal reprimand. It is suggested that this question could be examined in future research.

Time-out seemed to have more lasting effects than did verbal reprimand. In many cases the no punishment period immediately following time-out was marked by a slow recovery of disruptive responses. This

effect was not noticeable after the verbal reprimand condition when disruptive responses recovered at a relatively rapid rate. More research would seem warranted into this aspect.

None of the undesirable side effects mentioned in studies involving electric shock were noted. There were no examples of either temper tantrums or situations which were marked by an absence of any responding. This finding was confirmed by the staff.

The results of the study enable one to observe the effects of time-out as a punishing stimulus. Interaction effects were not present and future studies may find it of advantage to examine the effects of time-out as a punishing stimuli, as such, rather than in any combination with a competing adaptive response. Although the results of the study tend to indicate that time-out does act as a punishing stimulus the design did not enable one to unequivocally state that this was the case. Furthermore, one could never be certain whether it was the removal from any form of positive reinforcement that was the aversive stimulus or whether the period in the isolation room was the crucial variable. There is a need for this question to be examined in detail, i.e. what types of isolation rooms, periods in isolation room, means of removing child from class etc. The same rationale would apply to verbal reprimand: at what levels of voice, directed to subject or not, etc.

The application of time-out in particular, showed that severe behaviour problems can be significantly reduced by providing consistent and immediate consequences for them.

The demonstration that brief and non painful, easily administered consequences, can prove effective in reducing disruptive behaviours may

prove a worthwhile alternative to the use of electric shock, although this has proved to be consistently effective (Lovaas, Schaeffer and Simmons, 1965). The experimenter quickly learned that the use of electric shock in institutions, such as that used in the study, would not be permitted. Time-out seems effective enough for this purpose and may be more acceptable because of its short duration and its non injurious effects.

The effectiveness of social reinforcement
in increasing helping behaviour.

No general conclusions can be gained from the results other than to say that one subject's helping behaviour increased significantly over the programme. In this case the introduction of social reinforcement led to an increment in responding. Two other subjects increased their helping behaviour slightly and the remaining three showed no helping behaviour throughout the course of the programme. The increase by subject two does indicate that this means of reinforcement may have some effect upon certain types of children - mongols, in this case. There was no significant difference in the rate of responding under verbal reinforcement and token reinforcement conditions. As the remaining three subjects did not emit any helping responses it may be useful to develop this form of response to a reasonably high level before the effects of any type of reinforcement can be adequately studied. It may well be that each child will require a specific reinforcer which has incentive value for that child. The shaping of this type of behaviour may have to be performed with a pair of children and then extended to a wider situation including larger numbers of subjects.

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APPENDIX ONETABLE A: Ages, sex, intelligence quotients and diagnoses
of subjects used in the study

<u>SUBJECT</u>	<u>AGE</u>	<u>SEX</u>	<u>I.Q.</u>	<u>DIAGNOSIS</u>
1	10	Female	Not known	Unstable, severely retarded.
2	10	Female	30	Mongolism
3	10	Male	28	P.K.U.
4	9.7	Male	35	Brain damaged, cerebral palsy.
5	10	Male	30	Hyperactive
6	9.5	Male	32	Hyperactive

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Bond*

TABLE B: Instruction Following List as presented to group as a whole. Statements made by instructor underlined.

- (1) Pick up your chairs and bring them up to the table. Reinforce and check only if brought right up to the table.
- (2) Sit down at the table in your own chair. Reinforce and check only if children seated in the chair they brought up to the table.
- (3) Now do what I do. (Hand up, clap hands, tap back of hand on table.)
- (4) Sit down at the table and point to your (nose, eyes, mouth).
- (5) Walk over and touch the (window, door), Reinforce only if door or window actually touched.
- (6) Come back to the table and sit in your own seat. Reinforce and check only if seated in their own seats.
- (7) There are coloured pieces of paper on the wall. Point to the (green, red, yellow) paper on the wall.
- (8) Place paper in front of subjects, together with a selection of three different crayons. Pick out a (red, green, yellow) crayon.
- (9) Draw what I draw. (circle, square, triangle)
- (10) Point to the picture of the (circle, square, triangle) on the wall.
- (11) Give your crayon to the child next to you. Reinforce and check only if crayon is actually given to the child.
- (12) Sit down at the table and do what I do. Hold up (1, 2, 3, 4, 5) fingers.
- (13) Draw what I draw. (1, 2, 3, 4, 5)
- (14) There are pictures of numbers on the wall. Point to the picture of the number. (1, 2, 3, 4, 5)
- (15) Sit down at the table and hold up (1, 2, 3, 4, 5) fingers.
- (16) There are pictures of animals on the wall. Point to the picture of the (cats, dogs, horses).
- (17) Draw what I draw. (A, B, C, D)

TABLE B: (Continued)

- (18) Say what I say (A, B, C, D).
- (19) Stand up behind your chairs. Reinforce and check only if standing behind their own chairs.
- (20) Bring your papers and crayons up to me. Reinforce and check only if both papers and crayons brought up.
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TABLE C: List of Reinforcers used in token conditions, subject chosen for and per cent of time chosen by each subject.

REINFORCER	SUBJECT CHOSEN FOR	PER CENT CHOSEN	
Butterflys on Cards (board)	1	Sub. 1	26.6
Picture Cards; cars, planes, animals, scenes	5,6	Sub. 6	73.3
		Sub. 5	26.6
		Sub. 4	6.6
Balls (rubber)	3	Sub. 3	100.0
		Sub. 6	13.3
Bead Threading	2	Sub. 2	13.3
Dolls	2	Sub. 2	20.0
Maracas	1,2	Sub. 2	53.3
		Sub. 1	6.6
Sweets; Jelly Beans, marsh- mallows, jubes	All subs.	Sub. 2	6.6
		Sub. 4	6.6
		Sub. 5	40.0
Toys: plastic planes, cars, boats	4,6	Sub. 4	80.0
		Sub. 5	30.0
		Sub. 1	6.6
Triangle	1	Sub. 1	60.0

TABLE D: Number of tokens needed for graduated use of reinforcers

REINFORCER	NUMBER OR TIME	NUMBER OF TOKENS	
Butterflys	2 small (take home)	40	
	1 large " "	30-40	
	1 small " "	15-30	
	1 small (admire and return after 60secs)	10-15	
	1 small as above 30 secs	0-10	
Cards	3 small (take home)	40	
	1 large, 1 small (take home)	30-40	
	1 large (take home)	25-30	
	1 small (take home)	15-25	
	1 small (admire 60 secs)	10-15	
	1 small (as above 30 secs)	0-10	
Balls	5 minutes	40	
	3 "	30-40	
	1.5 "	15-30	
	30 seconds (small)	10-15	
	15 " "	0-10	
Dolls	4 minutes (large in pram)	40	
	2 minutes " " "	30-40	
	1 minute (small)	15-30	
	30 seconds "	10-15	
Triangle	as for dolls	as above	
Maracas	" " "	"	
Bead Threading	" " "	"	
Toys	2 large (take home)	40	
	1 " " "	30-40	
	1 small " "	15-30	
	1 small (admire, 30 secs)	10-15	
	1 small " 15 secs)	0-10	
Sweets	Jelly Beans: 10 halves	40	
	6 "	30-40	
	4 "	15-30	
	2 "	10-15	
	1 "	0-10	
	Smokers	as above	as above
	Marshmallows	" "	" "
	Jubes	" "	" "

TABLE E: Arrangement of subjects under punishment conditions
over course of programme.

WEEK SUBJECT	2	3	4	5	6	7	8	9
1	TO	TO	NP	VR	VR	NP	NP	NP
2	TO	TO	NP	NP	NP	NP	VR	VR
3	VR	VR	NP	NP	NP	NP	TO	TO
4	VR	VR	NP	TO	TO	NP	NP	NP
5	NP	NP	NP	TO	TO	NP	VR	VR
6	NP	NP	NP	VR	VR	NP	TO	TO

TABLE F: Number of instructions correctly followed by each subject, per session, under all conditions.

SUBJECT 1

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
0	1	3	4	5	30	24	20	35	20
0	1	3	6	4	35	34	20	37	10
0	1	4	5	7	33	30	16	39	2
0	2	7	6	24	35	31	16	40	0
0	5		5	31	37	39		40	0

SUBJECT 2

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
3	12	19	27	23	27	38	36	38	33
0	13	23	26	26	23	32	32	38	27
4	12	24	27	24	34	40	27	39	15
4	13	20	25	26	37	40	24	40	11
3	19		32	31	31	37		40	5

SUBJECT 3

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
1	0	1	3	2	2	8	2	6	2
1	1	1	2	2	3	2	2	6	2
0	2	1	3	2	2	5	2	5	2
0	2	3	2	2	2	3	4	4	2
0	3		2	2	6	5		6	1

TABLE F: (Continued)

SUBJECT 4

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
1	1	1	2	4	15	20	12	14	16
1	1	2	3	3	10	10	17	27	15
1	1	2	3	4	14	16	15	26	6
1	2	2	5	5	14	23	10	31	5
1	2		4	8	15	25		35	1

SUBJECT 5

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
1	1	3	4	13	34	34	32	39	36
1	1	4	6	14	33	40	30	40	33
1	5	6	7	16	36	35	28	40	23
0	3	7	7	23	36	40	23	40	3
0	5		10	25	38	40		40	1

SUBJECT 6

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
4	18	23	31	31	38	40	36	40	38
7	16	22	23	32	39	40	32	40	30
9	17	20	30	34	40	40	30	40	22
5	12	16	31	33	39	40	27	40	15
6	15		33	33	39	40		40	8

TABLE G: Number of disruptive responses emitted by each subject, per session, under all conditions.

SUBJECT 1

<u>Baseline</u>	<u>T.O.</u>	<u>T.O.</u>	<u>NP</u>	<u>V.R.</u>	<u>V.R.</u>	<u>NP</u>	<u>NP</u>	<u>NP</u>	<u>Baseline</u>
35	1	1	9	15	9	39	43	28	24
37	1	1	14	13	12	26	13	26	31
30	1	0	23	16	14	24	22	23	23
66	1	0	20	12	16	24	17	22	24
42	1		16	12	16	27	13	23	22

SUBJECT 2

<u>Baseline</u>	<u>T.O.</u>	<u>T.O.</u>	<u>NP</u>	<u>NP</u>	<u>NP</u>	<u>NP</u>	<u>V.R.</u>	<u>V.R.</u>	<u>Baseline</u>
2	1	0	4	10	12	8	6	8	8
4	0	0	4	9	8	12	7	8	8
2	0	0	0	14	13	22	5	8	9
11	0	0	4	10	16	31	10	7	8
22	0		1	10	12	21		9	10

SUBJECT 3

<u>Baseline</u>	<u>V.R.</u>	<u>V.R.</u>	<u>NP</u>	<u>NP</u>	<u>NP</u>	<u>NP</u>	<u>T.O.</u>	<u>T.O.</u>	<u>Baseline</u>
28	17	16	17	17	29	29	2	0	4
30	26	11	24	28	43	43	0	1	17
21	24	13	31	25	24	24	1	1	19
45	14	18	26	45	64	68	1	1	13
58	15		25	18	98	97	0		38

TABLE G: (Continued)

SUBJECT 4

<u>Baseline</u>	<u>V.R.</u>	<u>V.R.</u>	<u>N.P.</u>	<u>T.O.</u>	<u>T.O.</u>	<u>N.P.</u>	<u>N.P.</u>	<u>N.P.</u>	<u>Baseline</u>
2	9	7	14	1	0	0	11	17	12
18	6	3	14	0	0	6	3	13	18
12	5	3	8	0	0	5	23	16	22
17	9	3	13	0	0	9	22	21	36
34	5		10	1	0	7	21	10	15

SUBJECT 5

<u>Baseline</u>	<u>N.P.</u>	<u>N.P.</u>	<u>N.P.</u>	<u>T.O.</u>	<u>T.O.</u>	<u>N.P.</u>	<u>V.R.</u>	<u>V.R.</u>	<u>Baseline</u>
16	16	12	11	1	0	8	6	6	10
8	6	11	9	1	0	3	5	5	5
6	12	14	9	0	0	3	6	6	6
9	11	11	11	0	0	12	7	7	5
8	12		13	0	0	15	6	6	6

SUBJECT 6

<u>Baseline</u>	<u>N.P.</u>	<u>N.P.</u>	<u>N.P.</u>	<u>V.R.</u>	<u>V.R.</u>	<u>N.P.</u>	<u>T.O.</u>	<u>T.O.</u>	<u>Baseline</u>
7	12	14	4	5	7	21	1	0	3
19	14	21	10	8	8	24	1	0	3
13	26	21	13	8	9	7	0	0	4
16	15	22	20	6	9	13	0	0	10
30	25		14	7	12	9		0	10

TABLE H: Incidence of helping behaviour for each subject,
per session, over all conditions

SUBJECT 2

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
0	4	5	6	5	12	5	7	11	5
0	4	9	9	6	6	6	6	9	6
0	5	12	4	6	6	11	12	10	6
0	4	4	5	8	5	13	8	12	4
1	6		15	12	12	9		9	3 ³

SUBJECT 5

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
0	0	0	0	0	1	1	0	1	0
0	0	0	0	1	1	0	1	1	0
0	0	0	0	2	2	0	0	1	0
0	1	0	0	2	2	0	0	1	0
0	0		0	3	2	0		0	0

SUBJECT 6

<u>Baseline</u>	<u>VR1</u>	<u>VR2</u>	<u>TT</u>	<u>VR3</u>	<u>TR1</u>	<u>TR2</u>	<u>VR4</u>	<u>TR3</u>	<u>Baseline</u>
0	1	2	0	0	1	1	1	2	1
0	2	1	0	0	1	1	0	0	1
0	1	1	0	0	2	2	0	2	0
0	1	0	1	0	2	2	1	1	1
0	0		2	0	2	1		3	0