

NATURALISTIC TREATMENT OF AN AUTISTIC CHILD¹

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The present research experimentally evaluated a "naturalistic" treatment program for an autistic child administered by the parents over a 2-yr period. Operant reinforcement techniques previously developed and tested in laboratory settings were initially assessed in a clinic and eventually in the family's home. Experimental manipulations were performed in both settings on rituals, crying and whining, compliance, non-verbal imitation, and verbal imitation. The results clearly indicated that parents can effectively treat autistic behaviors provided that they receive adequate training and supervision in operant reinforcement therapy, and provided that sufficiently potent reinforcers are available to maintain behavior.

Operant reinforcement methods applied in laboratory settings have been remarkably effective in modifying a wide variety of "autistic" behaviors. For example, self-destructive behaviors (Tate and Baroff, 1966; Simmons and Lovaas, 1969; Lovaas, Freitag, Gold, and Kassorla, 1965); tantrums (Lovaas, Schaeffer, and Simmons, 1965), avoidance and non-attentive behaviors (Schell, Stark, and Giddon, 1967; McConnell, 1967; Simmons and Lovaas, 1969; Lovaas, Schaeffer, and Simmons, 1965), rituals and stereotyped behaviors (Lovaas, *et al.*, 1965) and self-stimulatory behaviors (Lovaas, Litrownik, and Mann, 1971) have been successfully treated in laboratory settings. Reinforcement therapy has also been employed in laboratory settings to produce appropriate social, imitative, and language skills (*e.g.*, Lovaas, *et al.*, 1965; Lovaas, Freitag, and Whalen, 1967; Lovaas, Freitag, Kinder, Rubenstein, Schaeffer, and Simmons, 1966; Simmons and Lovaas, 1969; Metz, 1965; Schell, Stark, and Giddon, 1965; Nelson and Evans, 1968; Hingtgen and Churchill, 1971; Hingtgen, Coulter, and Churchill, 1967; Hingtgen, Sanders, and DeMyer, 1965; Hingtgen and Trost, 1966).

Although the research cited above is im-

pressive, applications are limited by one or more of the following conditions: (1) focus has been on behaviors produced in contrived settings; (2) unnatural stimuli such as shock, buzzers, lights, and specially built apparatus not readily utilized in non-laboratory settings, or consummatory stimuli tied to biological cycles (*e.g.*, food and liquids) have been employed to manipulate autistic behaviors; (3) treatment has been administered by a limited number of highly trained professional personnel, and (4) accurate records of autistic behavior outside of the laboratory setting have not been kept.

Unfortunately, those few studies that have examined reinforcement techniques in non-laboratory settings have not provided experimental evidence documenting the success of their treatment programs (*e.g.*, Brown, Pace, and Becker, 1969; Hewett, 1965; Wetzell, Baker, Roney, and Martin, 1966; Wolf, Risley, and Mees, 1964). Although Risley and Wolf (1966) did provide data that suggest that parents can be trained effectively to modify some autistic behaviors, their conclusions are based on information obtained in a laboratory setting. Only Risley (1968) reported experimental evidence that indicates that parents can successfully apply reinforcement methods to autistic behaviors in natural settings. He trained the mother of a 6-yr-old autistic girl to suppress dangerous

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climbing behaviors, opening the refrigerator, pulling clothes off of closet hangers, and throwing pots and pans out of the kitchen cupboards. The mother also attempted to teach her child non-verbal imitative skills, but the program was terminated before Risley (1968) could adequately evaluate this phase of the research.

Although limited in scope, Risley's (1968) results suggested that parents of autistic children can be trained to administer reinforcement therapy in a home setting. If parents could in fact be trained to modify a wide variety of autistic behaviors, a "home based" treatment approach would have several distinct advantages over a laboratory (or clinic) approach: (1) cost to parents would be appreciably reduced because the parents, not professionals, would administer the treatment package; (2) treatment conducted in the home would have to rely on reinforcers indigenous to that setting and consequently, (3) concern for generalization from the laboratory (or clinic) to the home would not be necessary. This last advantage cannot be taken lightly because others have either suggested (*e.g.*, Breger, 1965) or demonstrated (*e.g.*, Risley, 1968) that successful treatment in a laboratory setting is no guarantee that treatment will transfer to the child's natural environment.

Thus, the primary objective of the present research was to assess the therapeutic impact of a "naturalistic" treatment program administered by the parents and designed to modify a wide variety of autistic behaviors. Because laboratory evidence (cited above) had consistently indicated that several months were required to administer such a program, another objective of this research was to assess the impact of the treatment over an extended time period.

METHOD

Subject and Settings

Joey was referred by his parents to the Psychological Clinic, University of Tennessee, at the age of four. During the preceding 2-yr period he had been seen by a number of professionals

and was variously diagnosed as mentally retarded, schizophrenic, brain damaged, aphasic, and autistic. The parents reported that they were usually advised to place the boy in an institution.

When first seen by the second author, Joey exhibited a number of deviant behaviors and behavioral deficits characteristically associated with childhood autism. Language skills were absent; the parents reported that the boy had never spoken words. Social skills were also absent, eye contact was very poor and close physical contact with other people, including the parents, usually elicited struggling, whining, and sometimes intense tantrum behavior. Most of Joey's behavior could have been classified as ritualistic, self-stimulatory, or self-destructive. He was often observed playing with one toy, "sighting" on his fingers as one might sight on a gun barrel, or pouring sand, dirt, or sometimes a liquid on his head. Arm biting was also a problem and occasionally he would bang his head against a wall or a chair. Screaming and a loud, high-pitched sound, something like a factory whistle, occurred quite often. However, the parents were most concerned about attacks directed toward a younger, 2-yr-old sister. Although the attacks had just begun to occur at the time of his referral and were more vocal than physical, the parents expressed the fear that Joey would seriously harm his sister.

Because of the need for immediate intervention, efforts to obtain baseline estimates of the boy's behavior were not instituted. Instead, the second author described to the parents a treatment program based on some of the laboratory research cited earlier and expressed an interest in training them to administer the program in their own home. They were informed of the experimental nature of the research and also told that their home would eventually become a laboratory base for conducting the research. That is, the parents were told that they would be trained to administer essentially the same therapeutic techniques that had been successfully administered by professional per-

sonnel in laboratory settings. They were also told that several sessions would be required to teach them these skills and because of this, they would be asked to make 10 hourly visits to the clinic for the first two months. After two months, visits would be scheduled on a weekly basis whenever possible. It was also explained to them that both their behavior and their child's behavior would be monitored closely by observers and that it would be necessary at times to discontinue treatment briefly for the purpose of evaluation.

Behavior Classification, Observers, and Reliability

Records of Joey's behavior were obtained through a behavior checklist similar to that described by Hawkins, Peterson, Schweid, and Bijou (1966). The method required an observer to make coded checks for the occurrence of a behavior class within successive 10-sec intervals over a 30-min observation period; any occurrence of a class, regardless of its duration, was scored as a single unit. Thus, no more than 180 units could be scored for a behavior class during an observation period.

Four observers were used in the research. Each observer was sophisticated in the use of operant principles and natural science methods of observation. Only one observer was aware of the experimental nature of the research. This observer collected approximately one third of the data. Reliability checks were made at periodic intervals on 33% of the data.

Several of the initial clinic visits were used to adapt the boy and his parents to the observer's presence and to obtain written records of parent-child interactions. During these sessions, the parents and the child were observed in a playroom that contained several toys, a sand box, a chalk board, punching bag, and a small table with chairs. The parents were told to play with the boy and periodically request that he do something for them. Occasionally, these requests were intended to elicit imitative responses. For example, one of the parents would

take a peg board and mallet, demonstrate its use to Joey, then give the toy to him and say: "Here. Now you try it. Do it like mommy".

After the fifth session, the written records were analyzed in the following way: Joey's behavior was grouped into classes on the basis of physical or functional similarities among the separate responses. For example, screaming, crying, and whining were considered members of the same response class because of their similar physical characteristics. Compliant responses, although physically dissimilar, were considered together because of their relationship to common stimulus events, namely, parental commands. Similarly, imitative responses were also considered members of the same response class because of their relationship to parent model cues. Thus, five separate child response categories were identified and defined as follows: *Rituals*—"sighting" on fingers, flapping hands, twirling objects or unusual gestures. *Crying and Whining*—crying, whining, screaming, and destructive behavior such as face slapping, biting, or hitting that sometimes occurred along with crying and whining. *Compliance*—following a parental command within the interval the command was delivered or within the interval immediately following the command. *Non-Verbal Imitation*—imitation of parental non-verbal behavior in the interval the parental cue was delivered or in the interval immediately following the presentation of the non-verbal cue. *Verbal Imitation*—the same scoring criteria were applied to this category that were applied to the non-verbal imitative category.

General Procedure

Treatment: Phase I. The parents were first instructed to use procedures intended to reduce the frequency of rituals, crying, and disruptive behaviors and increase the frequency of imitative behaviors. A timeout procedure was used to punish inappropriate behaviors. Whenever these behaviors occurred in the home setting, the parents were asked to remove the child immediately to his room and leave him there for

at least 10 min. If a tantrum occurred while he was in his room, he was not released until the tantrum had subsided for 2 or 3 min. Timeout was used to punish inappropriate behaviors for two reasons: first, earlier research (*e.g.*, Wolf, Risley, and Mees, 1964) indicated it might successfully suppress the frequency of these behaviors. Second, Wahler (1969) demonstrated that the timeout procedure is sometimes associated with increases in parental reinforcement value. Therefore, there was reason to believe that reductions in inappropriate behaviors might be associated with an increase in the reinforcement value of the parents. Consequently, the parents were also instructed to attend to compliant behavior as often as possible.

To teach Joey how to produce verbal responses, an imitative training procedure² was implemented, similar to those described by Lovaas *et al.*, (1967), Nelson and Evans (1968), and Risley and Wolf (1967). Because Joey had no verbal imitative repertoire to speak of, it was necessary first to teach him to imitate simple non-verbal tasks. A number of researchers (cited above) have found that the acquisition of verbal imitative skills is facilitated when a child is first taught to imitate non-verbal behaviors. Usually,

²The imitation training procedures were directed to the establishment of non-verbal imitative skills. Non-verbal behaviors (see Footnote 3) were selected that were known to be within the boy's behavioral repertoire. After instructing Joey to "Watch me. Do this," the mother (or father) would present the cue, then give the materials to the boy and say "Ok. Now you do it." During the first several sessions, any gross approximation to the parents behavior was reinforced with social approval. Gradually, the parents were instructed to withhold approval until better approximations were produced. This "shaping" procedure was consistently used for all new model stimuli throughout the study. If no behavior occurred after a cue presentation, the parents were instructed to take the boy physically through the imitation and then reinforce. Gradually, the prompts were faded until Joey produced the response on his own. To test for the effect of non-verbal training on the acquisition of verbal imitative skills, verbal cues were alternated with non-verbal cues. Non-verbal trials were discontinued after Session 45 because they no longer appeared to facilitate the acquisition of verbal imitation (see Figure 1).

several non-verbal behaviors can be identified and presented to the child by an adult model. If the child does not imitate the model, prompting, shaping, and fading procedures (see Risley and Wolf, 1967) may be used to elicit, shape, and maintain the behavior. Once the child has learned reliably to imitate several non-verbal tasks, he is usually ready to begin verbal imitation training. Thus, the purpose of using non-verbal imitation training in the present research was to facilitate the acquisition of verbal imitation skills.

Assessments of Phase I began after the habituation and behavior classification sessions. Assessments were made only in the clinic during 30-min observation periods, although the parents did implement the same training program in the home on the days they did not visit the clinic. In order to obtain continuous records of Joey's behavior, timeout was not administered during the recording sessions. Instead, the parents were asked to begin presenting non-verbal and verbal imitative cues to the boy at regular intervals and attempt to control inappropriate behavior by delivering firm commands. Each session proceeded in the following manner: the parents, an observer(s), and Joey entered the laboratory room described above; all of the materials remained in the room. Joey was seated by his parents at a small table and one of the parents (usually the mother) sat opposite the boy and began to administer the imitative cues.³ Non-verbal and

³Both non-verbal and verbal cues were selected on the basis of familiarity and probability that the boy could produce the behavior. Thus, the non-verbal cues consisted of lifting a cup to the mouth, using a fork and plate to eat "imaginative food", pounding a peg board, and stirring a spoon in a cup. The verbal cues (also presented visually on cards) initially consisted of sounds associated with the letters a, e, i, o, u, b, p, t, k, d, and s. By Session 20, it was apparent that Joey could imitate all of these sounds fairly well. Therefore, very short one or two syllable words such as cat, dog, eat, me, top, baby, *etc.*, were introduced to the boy. All of the words used were selected essentially on the basis of length, difficulty, and their association to common objects or events found in the

verbal cues were alternated so that the same per cent of verbal and non-verbal cues were presented each session. Initially, any response was reinforced with social approval and the boy was allowed about 1 min to play in the room after each trial. If no response was observed (on non-verbal trials only), the parents were instructed to prompt the response and slowly fade the prompt until Joey produced the response without help from the parents. Gradually, the number of trials preceding play were increased until a trials:play ratio of 3:1 was attained. Access to play was discontinued after Session 54. As later data will show, the per cent of rituals and crying and whining observed across all sessions of the Phase I treatment period gradually declined. This change was accompanied by increases in the per cent of compliance, non-verbal imitation, and verbal imitation. Thus, a reversal procedure was briefly implemented to test for cause-effect relationships. During this period, the parents were instructed to discontinue timeout and social reinforcement for compliant behaviors. Once causality was demonstrated, the parents were asked to reinstate the treatment procedures.

Treatment: Phase II. The treatment procedures used during Phase I were only partially

boy's home. Thus, the words food, water, bathroom, outside, door, car, *etc.* were frequently presented because it was intended that the parents begin eliciting these words "naturally" as soon as the boy had learned to produce them. By Session 81, Joey had learned to imitate virtually any word presented to him. Therefore, the sentences "I want the _____," "This is a _____," and "Let's go to (the) _____" were introduced. Each word was presented separately at first, but reinforcement was not delivered until the boy had produced the last word of the sentence and pointed to the object, until the parent handed him the object requested, or until the parent had given him a picture of the place he was to go. Gradually, the parent faded the verbal prompts until the procedure went as follows: the parent, holding up an object (or picture of a place) would say "Joey, what is this? (What do you want: Where do you want to go?)". Joey, after producing the correct response, would then write the response on paper, repeating verbally each word as he wrote it. After 1 min of "free-time" to write, a new stimulus was then presented.

successful in increasing the per cent of compliant and imitative behavior and decreasing rituals and crying and whining. The variability in the boy's performance from one session to the next suggested that parental attention, although reinforcing, was not a potent enough reinforcer to produce behavioral stability. Consequently, a search of the boy's home environment was undertaken in an effort to identify a reinforcer powerful enough to maintain the treatment program. From home observations and the parents' reports, it was learned that Joey spent a great deal of time watching television; commercials, soap operas, and cartoons were viewed with equal interest. Thus, the treatment program was modified so that imitation of parental cues was reinforced by a token that Joey could immediately insert in a slot and earn 15 sec of television viewing. At the end of this phase, the family and research team temporarily discontinued observations and terminated the clinic visits to allow for a well-earned vacation break. Although on vacation, the parents continued to use the timeout and differential attention procedures. Because the parents had become quite skilled in the administration of treatment, plans were formulated for implementing observation and training sessions in the family's home.

Treatment: Phase III. It did not take long to determine that television was not going to produce response stability. Crying and whining, compliance, and verbal imitation per cents continued to fluctuate markedly from session to session. Thus, after briefly implementing a second reversal period, the parents once again instituted imitation training and continued to punish inappropriate behaviors with timeout. However, appropriate imitative behaviors were now reinforced by short writing periods. In addition to watching television, it was learned that Joey spent a considerable amount of time drawing pictures and copying letters, words, and even sentences. Thus, the training procedure was changed so that a correct verbal imitation was followed by a brief period when Joey was given paper and pencil and asked to copy a

written representation of the word (or sentence) he had just verbalized.

Joey was very skilled with paper and pencil, usually reproducing the written cue in a few seconds. It soon became apparent that less than 10% of the training sessions were actually spent writing; more than 90% of the time Joey was required to produce imitative behaviors. It is not surprising, therefore, that his performance continued to fluctuate across sessions. To deal with this problem, the parents were instructed (Session 79) to increase the "free-writing" periods to a full 1 min. After Joey had reproduced the written stimulus, he was free to write or draw whatever he wished. A brief reversal of the final procedure was put into effect toward the end of the phase.

RESULTS

Reliability

Inter-observer agreement per cents were computed separately for each response class by adding the total number of interval agreements to the total number of interval disagreements and dividing the sum into total interval agreements.

The mean agreement per cents for each response class were as follows: Rituals, 0.87 (range: 0.78-1.00); Crying and Whining, 0.80 (range: 0.71-0.94); Compliance, 0.81 (range: 0.76-1.00); Non-Verbal Imitation, 0.96 (range: 0.82-1.00); Verbal Imitation, 0.87 (range: 0.69-1.00). No differences were observed between per cents based on clinic sessions and per cents based on home sessions.

Treatment

Figure 1 presents changes in the per cent of rituals, crying and whining, compliance, verbal imitation, and non-verbal imitation over a 2-yr treatment period. One is immediately impressed by the marked variability in Joey's behavior. However, in spite of the variability, the per cents of ritualistic behavior and non-verbal imitation eventually stabilized. That is to say, by Session 46, non-verbal imitation clearly stabilized near 100%; by Session 64, the per cent of ritualistic behavior decreased to zero. Thus, data for both categories terminated at these points.

Although rituals and non-verbal imitation eventually stabilized at acceptable treatment levels, crying and whining, compliance and

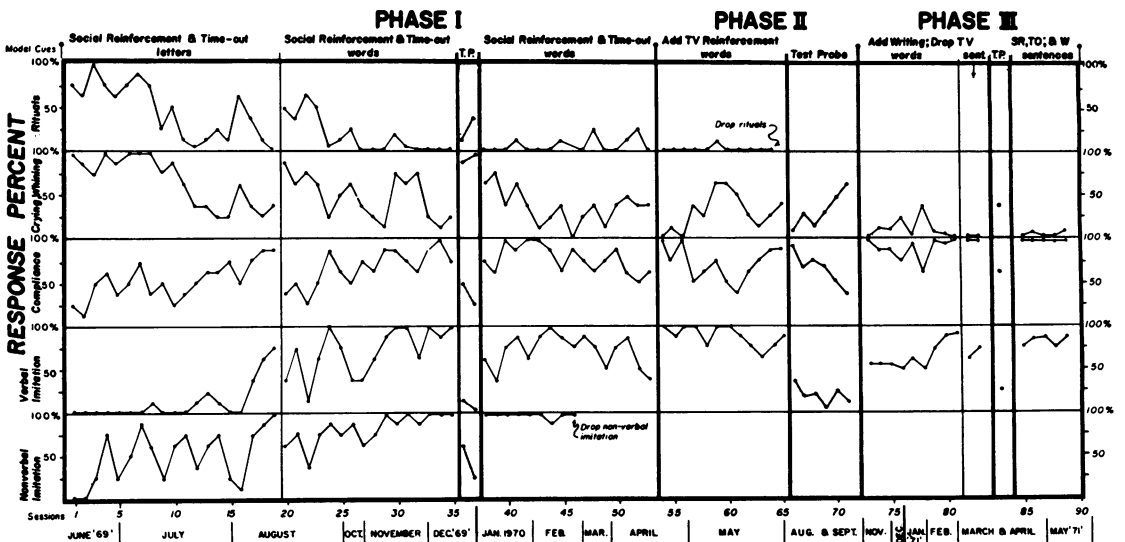


Fig. 1. Per cent of Rituals, Crying and Whining, Compliance, Non-Verbal Imitation and Verbal Imitation recorded during 30-min treatment sessions conducted initially in a clinic (Sessions 1 to 65) and later in the home (Sessions 66 to 90). Reinforcement contingencies are temporarily discontinued during the Test Probe sessions. Changes in verbal model cues are also indicated; i.e., letters to words (Session 20) and words to sentences (Session 82).

verbal imitation per cents varied considerably until Session 79. It will be recalled that the parents instituted a full 1-min period of "free-writing" reinforcement during this session. Thereafter, Figure 1 depicts sharp increases in the per cents of verbal imitation and compliance, as well as concomitant decrease in the per cent of crying and whining. These per cents were stable over the remaining treatment sessions.

The data in Figure 1 clearly suggest that the variability in Joey's performance was predominantly a function of weak reinforcers. Most of the boy's crying and whining was due to the fact that he did not want to "work" very hard for parental approval or 15-sec of television viewing. Crying and whining and compliance per cents decreased and increased accordingly only when a powerful reinforcer was made contingent on verbal imitation (Session 79). Ritualistic behavior did not appear to be associated with (produced by) the treatment procedure. Thus, rituals were eventually suppressed. Non-verbal imitative behaviors are not incompatible with crying and whining. Joey could easily imitate non-verbal cues and still cry or whine, as he often did. However, verbal imitation is incompatible with crying and whining. Thus, it is not surprising to see such a close correspondence between an increase in verbal imitation on the one hand and a decrease in crying and whining on the other, especially when 1-min free-writing periods were introduced at Session 79.

Figure 1 provides additional sources of information. First, the acquisition of verbal imitative skills appeared only after the acquisition of non-verbal imitation. Therefore, the data suggest that verbal imitative learning is facilitated when the autistic child can reliably produce non-verbal imitative behaviors. Second, shifts in presentation of the model cues (*e.g.*, letters to words and words to sentences) produced only mild and very brief performance decrements, indicating that cue changes should be made when a subject can imitate approximately 75 to 80% of the model's behavior. Finally, Figure 1 presents evidence indicating that changes in the boy's behavior

were produced by the treatment operations. When the parents were instructed to discontinue treatment (see the Test Probes), per cents for all five response categories reversed direction.

DISCUSSION

One objective of the present research was to evaluate experimentally the effectiveness of a parent-administered treatment program for an autistic child. The results clearly suggest that parents can be trained successfully to treat a wide variety of autistic behaviors. The results also indicate that techniques essentially developed in laboratory settings do not present setting limitations; *i.e.*, the present treatment techniques, though similar to those used by laboratory researchers, were easily learned and effectively applied by parents in a clinical setting and at home. Thus, in some cases it may not be necessary to institutionalize the autistic child or depend entirely upon professional personnel to administer the treatment. Once a parent has learned the basic principles of operant reinforcement therapy, and has had an opportunity to receive supervision in the administration of operant techniques, he can begin to assume full responsibility for administering the treatment package in the home setting. The professional can then direct his attention to the design of the treatment package, making changes and advising the parents as new problems arise. Such a "home based" program would considerably reduce treatment costs incurred by the family and appreciably diminish concern for the generalization of treatment from the laboratory (or clinic) to the child's natural environment.

Although a "naturalistic" treatment approach has several distinct advantages, its success depends upon the ability of professionals and parents to satisfy the following conditions: first, the parents must be willing to make a prolonged commitment to the program. They must spend a considerable amount of time familiarizing themselves with operant reinforcement principles and subject themselves to several training

sessions before attempting to "go it on their own". Most important, the parents must fully comprehend the *extent* of their commitment. Many months of continuous therapy may be required to attain treatment results. Second, the present research indicates quite clearly that a naturalistic approach will work only when potent reinforcers are accessible to the parents. Fortunately, a home based treatment program can utilize most reinforcers employed in laboratory settings; also, reinforcers indigenous to the natural setting may be identified that otherwise might have gone unnoticed had treatment been conducted solely in a laboratory or clinic setting.

Thus, the implications of the present research are clear. Naturalistic treatment of the autistic child is one therapeutic alternative to therapy conducted in a laboratory or clinic setting. Conceivably, teachers as well as parents might be trained to treat autistic behaviors. Certainly, the extension of the treatment locus to include both the school and the home offers exciting research possibilities.

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