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# COMPLIANCE TRAINING AND BEHAVIORAL COVARIATION IN THE TREATMENT OF MULTIPLE BEHAVIOR PROBLEMS

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The present study investigated the use of a compliance-training procedure and its effect on untreated deviant child behaviors. Three children, each generally noncompliant to adult requests and with several additional problems, such as crying, aggression, and self-injurious behavior, were trained in the compliance procedure under a multiple-baseline design across therapists. Compliance was defined as the correct response to prespecified requests. Other classes of deviant child behavior were measured continuously throughout the study but not directly reinforced. The results of the study showed that (a) increases in compliance to requests were directly related to the contingencies employed; (b) decreases in untreated deviant behaviors occurred when compliance increased, even though no direct contingencies had been placed on these behaviors; and (c) the relationship between untreated deviant behaviors and compliance appeared to be maintained by a different set of events in each of the three children. The results are discussed in terms of behavioral covariation and generalization.

DESCRIPTORS: compliance, covariation, aggression, crying, self-injurious behavior

Over the past 15 years, the literature of applied behavior analysis has clearly documented that a variety of deviant child behaviors such as disruptive behavior (Bostow & Bailey, 1969; Twardosz & Sajwaj, 1972) and self-injurious behavior (Bucher & Lovaas, 1968; Carr, 1977; Corte, Wolf, & Locke, 1971) can be modified through behavioral interventions such as extinction, time-out from positive reinforcement, reinforcement of incompatible behavior, overcorrection, and punishment. These interventions are characterized by the provision of specific consequences for the occurrence of deviant behavior. Even when alternative or incompatible response techniques and DRO (Myers, 1975) are used, reinforcement is still delivered in relation to the targeted response (although, in this case, contingent on its nonoccurrence).

Although these procedures are often effective, at least in providing an initial reduction in behavior, their use has several drawbacks. First, most are designed to modify only one response at a time. Second, the application of direct consequence to deviant behaviors may increase the probability of undesired side effects (Risley, 1968). Third, these procedures do not teach any specific alternative response. Fourth, concern in recent years over the ethical use of restrictive procedures has prompted the search for alternatives to traditional aversive techniques (Carr, Newsom, & Binkoff, 1976; Russo, Carr, & Lovaas, 1980; Russo & Cataldo, 1977).

Traditionally, behavioral treatment has been

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conducted on a sequential model. That is, the behaviors of a given individual are ranked hierarchically according to several discriminators such as severity, danger to a person and his environment, and importance in the modification of later behaviors. Although such a reductionistic approach to the modification of behavior has allowed for the empirical evaluation of treatment effects, by definition it has made therapy a time-consuming process. The multiple-baseline design is itself a perfect example of this strategy. Although empirical evaluation strategies are central to applied behavior analysis, they may have shaped behaviorism into a conceptual model of sequential treatment.

One promising approach to behavior change has been the recent literature on response covariation (e.g., Wahler, 1975). Study of the covariation among responses within the repertoire of the child or, alternately, the simultaneous measurement of numerous behaviors while only one is modified, has demonstrated changes in untreated behaviors such as bed-wetting (Nordquist, 1971) and stuttering (Wahler, Sperling, Thomas, Teeter, & Luper, 1970). Other investigations have shown that while changes in nontarget behaviors were correlated with the introduction of treatment on the target response, some behaviors changed in a nonbeneficial direction (e.g., Buell, Stoddard, Harris, & Baer, 1968; Sajwaj, Twardosz, & Burke, 1972; Twardosz & Sajwaj, 1972).

The investigation of behavioral covariation is based on the premise that behaviors may be similar in terms of their functional controlling variables. Topographically dissimilar behaviors may consistently occur in close temporal proximity and result in consequences such that they will begin to be functionally related. In such circumstances, as this functional relationship continues to develop, a group of behaviors may be observed to covary directly and/or inversely, even though the environment acts directly on as few as one member behavior (Sajwaj et al., 1972). The identification of these functionally related behaviors may proceed on intuition and common sense, or result from careful observation of behavioral covariation when one single member behavior is systematically manipulated.

The present analogue study documents changes in children's aberrant behaviors (mild self-injury, aggression, and inappropriate crying) when contingencies are implemented to increase compliance with adult requests. Noncompliance has been identified as an important childhood problem, especially with children referred to child management clinics (Forehand & King, 1977; Forehand, King, Peed, & Yoder, 1975; Johnson, Wahl, Martin, & Johansson, 1973; Taplin & Reid, 1977). Studies have shown that reinforcement of compliance with parental rewards and attention (Peed, Roberts, & Forehand, 1977), teachers' contingent praise (Goetz, Holmberg, & LeBlanc, 1975; Shutte & Hopkins, 1970) and access to preferred activities (Baer, Rowbury, & Baer, 1973) results in increased compliance with the same requests in the future. In addition, in such a reinforcement paradigm, generalized compliance often occurs, in that reinforcement of specific requests has been shown to result in increases in nonreinforced requests (e.g., Bucher, 1973; Doleys, Wells, Hobbs, Roberts, & Cartelli, 1976).

Accordingly, the present study attempts to demonstrate the reduction of aberrant child behavior in a quasi-laboratory environment (a pediatric treatment setting) by the use of procedures that do not provide direct contingencies on the aberrant behavior(s), but rather on compliance with adult requests. Such a procedure, if successful, offers the advantage of reinforcing an important positive behavior and may avoid the disadvantages often cited in providing direct contingencies (e.g., punishment, extinction) to reduce undesired, aberrant childhood behavior.

## METHOD

### *Participants*

Three children were selected on the basis of the following criteria: (a) each had been identified by both the parents, and at least one inde-

pendent agency, as being noncompliant with adult requests, hyperactive, or uncontrollable; and (b) in addition to noncompliance, each child exhibited at least two negative behaviors such as aggression, tantrums, or self-injurious behavior. Prior to inclusion in this study, evaluation of each child indicated that receptive language abilities were sufficient to allow the children to respond to simple commands and that the children had a history of not responding to the commands used in the particular investigation. Additionally, by history and observation, negative behaviors in the home were of sufficient frequency and intensity to have justified their independent treatment.

Tom, a 3-yr 7-mo-old, was referred for treatment because of severe behavior problems at home including tantrums, aggression such as kicking and biting, and self-injurious behavior in the form of head banging and hand biting. Additionally, his parents reported that he almost always failed to follow requests and exhibited frequent perseverative behavior, such as playing with a string. The results of psychological testing using the Bayley Scales of Infant Development indicated this child's abilities were at the level of a 2-yr-old.

Bill, a 3-yr 6-mo-old, was referred for treatment of general noncompliance and multiple behavior problems such as tantrums lasting 1-2 h, aggression toward adults including kicking and scratching, and self-injurious head banging. Psychological testing on the Bayley Scales of Infant Development indicated abilities up to the 18-mo level.

Patty, a 5-yr 7-mo-old, was referred for evaluation of noncompliance, persistent hairpulling and tantrums, and thumbsucking. Psychological testing indicated an I.Q. of 60 on the Stanford Binet. She showed good language abilities, periodically following several step commands. Additional behavior problems included refusal to go to bed and refusal to eat certain foods.

*Setting*

All sessions for each child were conducted in a 2.4 m × 2.4 m treatment room with a single chair. For Patty, a block, a doll, and a truck were also present during each session. Observers were seated in an adjoining observation room and recorded data through a one-way mirror.

*Design and Measurement*

Each child's performance on compliance training was assessed by a multiple-baseline design across therapists. At least two kinds of negative behavior were measured simultaneously with compliance across all conditions for each child. Behaviors were identified for recording based on parental report and observations of parent-child interaction. For Tom and Bill, in addition to compliance, crying, self-injurious behavior, and aggression were measured across two therapists; for Patty, compliance, hairpulling, and thumbsucking were monitored across three therapists.

Compliance was defined as an appropriate response within 5 sec of a command. Tom and Bill received three standard commands ("Come here," "Sit down," and "Stand up") randomly ordered and delivered five times each in a 10-min session. A correct response to the command "Come here" required that the child move to the therapist within 5 sec such that the therapist could physically touch the child. An appropriate response to "Sit down" involved the child moving to the chair and sitting such that the child's feet were on the floor and the child was facing forward. A correct response to "Stand up" required the child to leave the chair and maintain vertical position within 5 sec of the request. Patty received five standard commands randomly ordered and each was given three times within the 10-min session. In addition to the three commands given to Bill and Tom, Patty was also asked to "Go there," requiring her to move to the corner of the room to which the therapist pointed, and "Give me (a block, a doll, or a truck)," requiring her to hand to the therapist one of those familiar objects.

Compliance for each session was measured

as a percentage of the prespecified commands to which each child responded correctly. Commands were given every 30-45 sec, a particular command being given only when the child was not already in that situation. For example, a child who was already standing was not asked to "Stand up." Timing of commands was based on this 30-45 sec window rather than on the behavior of the child; that is, commands were given irrespective of whether the child was quiet or engaged in deviant behavior.

For Tom and Bill, negative behaviors were defined as follows:

Crying: Defined as open-mouth vocalizations of at least 3 sec in duration and audible to observers behind the one-way mirror. These behaviors ranged from sobbing to screaming.

Self-injurious behavior: Any event in which the child banged his head with his fist or against an object. This class of behavior was defined by abrupt movements, rather than the touching of one part of the child's body with another.

Aggression: Any event in which the child hit, bit, or kicked the therapist, or attempted to do so.

For Patty, two negative behaviors were defined:

Hairpulling: Grasping her hair with closed fist.

Thumbsucking: Any instance of placing her thumb in her mouth or against her lips for 3 sec or more.

Over the course of the experiment, no direct contingencies were placed on negative behaviors. Negative behaviors were scored on a 10-sec continuous interval recording system simultaneously with the measurement of compliance. For crying, thumbsucking, and hairpulling, the presence or absence of the event during the 10-sec interval was noted; for self-injurious behavior and aggression, the number of events occurring during each interval was recorded. Each of the negative behaviors could occur simultaneously with or in close proximity to compliance, and were not physically incompatible with each other or with compliance. Reinforcers provided for compliance during treatment were not contingent on the absence of negative behaviors.

Four therapists participated in the study. All therapists were staff members or students at the Kennedy Institute with a minimum of several months experience recording behavior. Once assigned to a particular child, each therapist worked with that child daily throughout the experiment. For Bill, therapists 1 and 2; for Tom, therapists 1 and 3; and for Patty, therapists 1, 3, and 4 were assigned. Each therapist who worked with a particular child conducted at least one session per day five days per week. The order of sessions by particular therapists for each child was changed daily. For example, for Tom, therapist 1 provided the first session on a particular day, whereas on other days, therapist 2 conducted the first session. Seven observers were used during the study. In addition to therapists 2, 3, and 4 who served as observers for children with whom they did not do therapy, four other similarly trained observers participated.

*Reilabiltiy*

Reliability checks were obtained for all dependent measures across all therapists, experimental conditions, and children. Reliability was assessed by comparing the records of independent observers for each behavior measured during a particular session. To assist in obtaining unbiased and independent recordings, different observer pairs were used with the same child.

Point-by-point reliability was determined for compliance. This was calculated by dividing the number of agreements on compliance and noncompliance by the number of requests for compliance by the therapist. The quotient was multiplied by 100. The number of requests for compliance was predetermined before each session.

Interobserver agreement for untreated corollary behaviors was assessed by either of two different methods depending on whether an interval or frequency data collection system was used. Reliability of corollary behaviors measured by interval recording was calculated

on the basis of occurrence only. That is, the numerator was the number of occasions when both observers agreed on the occurrence of the behavior, and the denominator was the number of agreements plus disagreements on occurrence. Reliability of corollary behaviors recorded by frequency methods was based on agreements on the exact number of occurrences for each 10-sec interval. Specifically, interobserver agreement was calculated by dividing the number of 10-sec intervals in which both observers agreed on the frequency of the behavior by the number of intervals per session (agreements plus disagreements), multiplied by 100. Reliability was calculated separately for each behavior.

A total of 206 independent reliability checks on individual behaviors occurred during 57 sessions of the experiment. At least two checks occurred in each experimental condition for each therapist with each child. Mean reliability for compliance was 99% (range: 76 to 100%) across all conditions. Mean reliability for corollary behaviors was 89%; mean reliability for crying was 94% (range: 64 to 100%), for self-injurious behavior, 86% (range: 68 to 100%), and for aggression, 89% (range: 67 to 100%). With Patty, a mean reliability of 99% (range: 95 to 100%) for thumbsucking, and 97% (range: 88 to 100%) for hairpulling was obtained.

*Procedure*

For each of the three children, a basic experimental comparison was made of two conditions: baseline and reinforcement of compliance. The specifics of these conditions varied across subjects due to performance differences. Each child's data, however, represent a controlled experiment.

*Baseline.* For each child, the initial baseline condition was similar. During each 10-min session, each of the three standard requests for Tom and Bill was presented five times, whereas each of Patty's five standard requests was presented three times. At least 30 sec elapsed between requests. The therapist stated the child's name and then the request with an appropriate accompanying gesture (e.g., "Come here" with arms outstretched). The therapist would then wait 5 sec. Whether or not the child complied with the request, the therapist provided no consequences, either verbal or physical. Therapist-child interaction was limited to request presentations. During instances of aggression, the therapist moved away from the child. The next request was presented based on the normal time schedule.

The sequence of experimental conditions was determined for each child based on this initial condition. For Bill, a "nagging" condition was imposed. This differed from baseline only in that rather than presenting a particular request only once, the therapist repeated the same request two to four times additionally on a given trial, with a 3-sec interval between requests. As in the initial baseline, no further interaction between child and therapist was provided.

*Reinforcement of compliance.* After comclusion of the initial baseline condition for Tom and Patty, and the nagging condition for Bill, reinforcement of compliance was begun. Procedures during this condition were identical to baseline except that compliance to the standard requests within 5 sec immediately produced a small piece of food (candy, cereal, raisins), physical contact, and verbal praise (e.g., a hug and "Good boy" or "Good girl").

For Bill, the reinforcement-of-compliance condition was followed by a brief reinstatement of the nagging condition, followed by a second reinforcement-of-compliance condition. This condition was identical to the first reinforcement procedure except that if the child failed to respond to a request within 5 sec, each therapist manually prompted the child with the correct response (e.g., physically placed the child in the chair). Prompted trials produced only the feedback, "That's right," and unprompted correct trials continued to produce edibles, praise, and contact. Prompted trials were not scored as appropriate compliance. Bill received either full-

prompt or no-prompt trials. As compliance increased, fewer prompts were given until none was necessary.

For Patty, the initial reinforcement of compliance was immediately followed by a second reinforcement-of-compliance condition, identical to the first except that correct trials produced different events. Whereas correct trials in the initial reinforcement condition produced food and praise, a token system was used in this second condition. Contingent on a response, the child received a penny. After the completion of two consecutive sessions, Patty was allowed to take her pennies to a nearby store if she had complied correctly to 26 of the 30 requests. The pennies were not exchangeable until this criterion was met, and all pennies saved could be spent.

## RESULTS

Figure 1 shows the effects on Tom's behavior of compliance training and the levels of the three untreated corollary behaviors across therapists. During the initial baseline for therapist 1, Tom complied with 33% of requests. With the introduction of reinforcement of compliance in session 8, this compliance immediately rose, showing a mean of 91% during this condition. A return to baseline in session 17 showed a decreased level of compliance and a general downward trend, with a mean of 57%. Reintroduction of reinforcement of compliance produced a flat, high level of compliance with a mean of 95%.

Levels of three corollary behaviors—crying, self-injurious behavior, and aggression—measured simultaneously with compliance for therapist 1, are presented directly below compliance data in Figure 1. As can be seen, during baseline, crying remained steady at 100%, while mean rates of 102 aggressive responses and 5.7 self-injurious responses per session occurred. During reinforcement of compliance, a sharp decrease in crying was seen, with three of the last four sessions in this condition showing no crying. Self-injurious behavior and aggression showed minimal change. With the reintroduction of baseline, all three corollary behaviors immediately increased, with aggression rising above initial baseline levels. Reintroduction of reinforcement of compliance produced immediate decreases for all three behaviors to near zero levels.

Baseline with therapist 2 began in session 18. During the nine sessions of this condition, a mean compliance of 57% was obtained. After reinforcement of compliance began in session 28, a rapid increase of compliance to a mean of 84% occurred.

Data on the corollary behaviors measured during treatment by therapist 2 are presented below compliance. During baseline, crying was highly variable with a mean of 58%. Self-injurious behavior and aggression were also recorded, showing means of 4.4 responses and 7.8 responses per session, respectively. With the introduction of reinforcement of compliance in session 28, all these behaviors were reduced to near zero levels.

Figure 2 presents the results for Bill of compliance training and the levels of his untreated corollary behaviors across two therapists. During baseline, Bill's compliance remained low, with means of 2% for both therapists 1 and 2. Introduction of the nagging condition in session 11 showed no increase in compliance. For therapist 1, the brief introduction of reinforcement of compliance showed an increase from previous conditions, to a mean of 14%. A brief reversal to nagging in sessions 21 and 22 produced a return to baseline levels, with a mean compliance of 4%. However, for both therapists 1 and 2, introduction of reinforcement of Bill's compliance for an extended period produced increases to mean compliance of 78% and 86%.

Data on Bill's three untreated corollary behaviors are presented directly below compliance in Figure 2. During the initial baseline, decreases occurred in the rates of all three behaviors with both therapists. With the introduction of nagging in session 11, however, there were

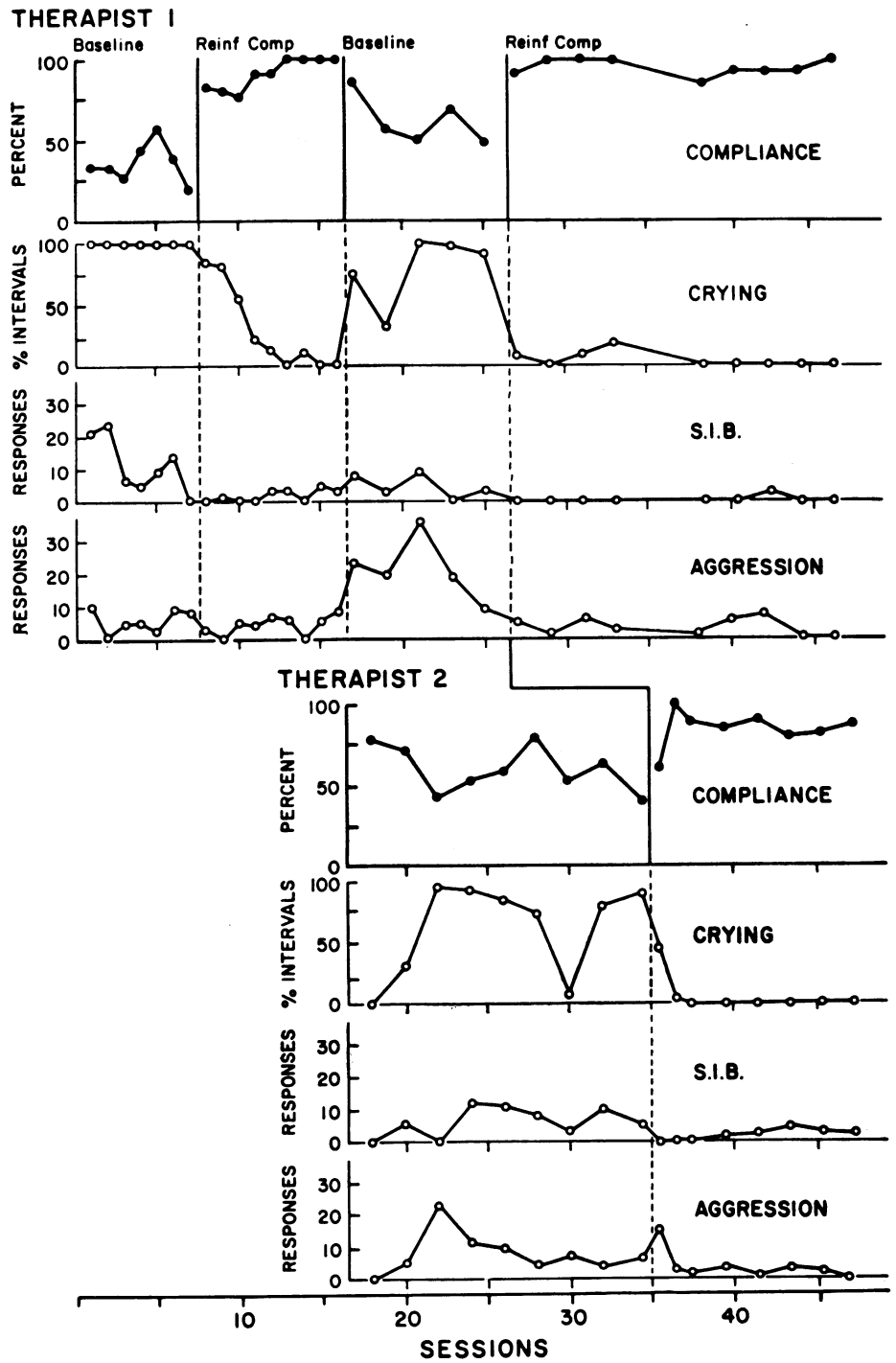


Fig. 1. Percentage of compliance and the three untreated corollary behaviors, crying, self-injurious behavior, and aggression, for Tom across experimental conditions and therapists.

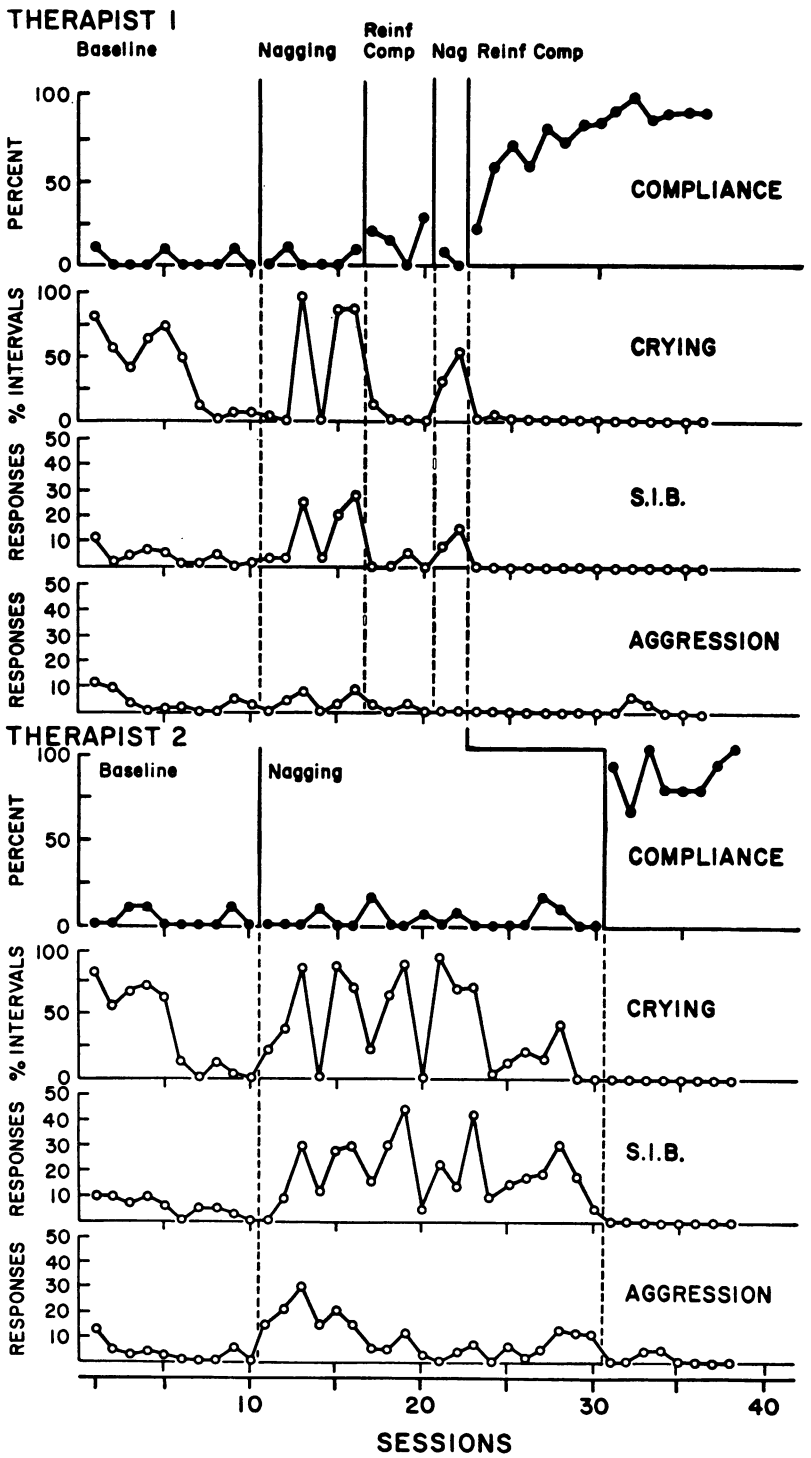


Fig. 2. Percentage of compliance and the three untreated corollary behaviors, crying, self-injurious behavior, and aggression, for Bill across experimental conditions and therapists.

clear increases in all behaviors, with the possible exception of aggression in the presence of therapist 1. With the onset of reinforcement of compliance by therapist 1 in session 17, all corollary behaviors returned to baseline levels; reintroduction of nagging in sessions 21 and 22 showed recovery of previous nagging levels for crying and self-injurious behavior. For both therapists 1 and 2, reinforcement of compliance was followed by near zero levels, with little variability for all corollary behaviors.

Figure 3 shows Patty's percentage of compliance and percentage of occurrence of the two untreated corollary behaviors across the three therapists for all conditions. For compliance, baseline data showed means of 18%, 10%, and 13% for the three therapists, respectively. The reinforcement-of-compliance I condition, introduced in session 5 for therapist 1, session 12 for therapist 2, and session 16 for therapist 3, produced immediate increases to greater than 80% compliance. With each therapist, however, compliance began to decline over the course of this condition, reaching a low of zero for therapist 1 in session 17, 34% for therapist 2 in session 19, and 27% for therapist 3 in session 20. With the introduction of reinforcement-of-compliance II (adding pennies for correct responses) in sessions 18, 23, and 25, compliance rose to mean rates of 87%, 98%, and 96%.

Patty's untreated corollary behaviors of thumbsucking and hairpulling covaried similarly across all three therapists. Means of 84%, 52%, and 58% for thumbsucking, and 35%, 45%, and 41% for hairpulling, were recorded for the three therapists during baseline. During the initial sessions of the reinforcement-of-compliance I condition, general decreases in corollary responses occurred concurrently with increased compliance. As seen in Figure 3, during this condition, changes in compliance were mirrored by inverse changes in the emission of untreated corollary behaviors. With the introduction of the pennies in the reinforcement-of-compliance II condition across therapists in sessions 18, 23, and 25, immediate decreases to near zero levels were recorded in corollary behaviors. Increases in thumbsucking to 42% and hairpulling to 25% in session 23 were the only exceptions to this trend.

## DISCUSSION

The results indicate that (a) increases in compliance were directly related to the reinforcement condition, and (b) some decreases in corollary behaviors occurred when compliance increased even though no direct contingencies were placed on corollary behaviors. Although the first of these two conclusions has been demonstrated in previous studies, the second is important in that a decrease in aberrant behavior from the use of positive procedures to increase other appropriate behaviors like compliance could have important conceptual and clinical implications for child behavior therapy.

Because of the lack of other research on this second finding and the preliminary nature of the present study, conclusions about the relevance of compliance training per se as the critical variable in the observed behavioral covariation are not yet warranted and would go beyond the available data. In the case of Tom, crying was related to the control of compliance; however, such a relationship to compliance is not clear with regard to self-injurious behavior with therapist 1 because this behavior had decreased to near zero during the initial baseline. Subsequently, all aberrant behaviors increased when compliance procedures were discontinued during the reversal condition (albeit self-injurious behavior to a much lesser extent) and then decreased again as soon as compliance was again reinforced. All three of Bill's aberrant behaviors decreased to near zero for both therapists during the first baseline, but increased again during the nagging condition. Although his aberrant behavior during most reinforcement-of-compliance sessions was zero, the study design does not permit conclusions to be made about how this condition was functionally different from baseline. The relationship between Patty's compli-

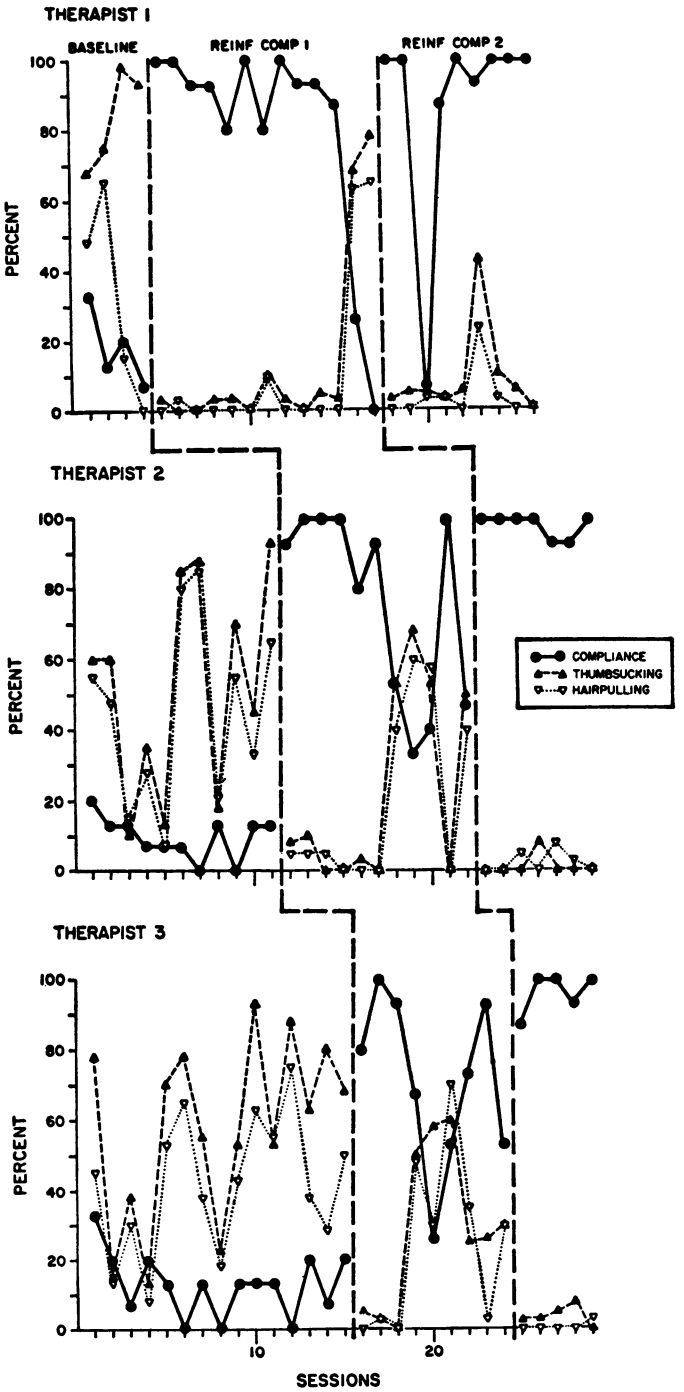


Fig. 3. Percentage of occurrence of Patty's compliance and the two untreated corollary behaviors, thumbsucking and hairpulling, across therapists and experimental conditions.

ance and her two aberrant behaviors, thumbsucking and hair pulling, was much clearer than with the previous subjects.

The lack of consistently high levels of aberrant behavior during the extended baselines suggests that the results may not necessarily be due to a reciprocal relationship to compliance per se. In fact, other explanations are compelling. For example, the change in aberrant behavior may be related to the aversiveness of the control conditions. These children's responses to aversive situations may be to cry, be aggressive, and engage in self-injurious behavior. This could explain the decrease during baseline of Tom's self-injurious behavior and Bill's crying. That is, as the baseline proceeded, it became more familiar, less strange to the child, and thus, less aversive. This could also explain the rate of Tom's aggression during the reversal (i.e., aggression to the first therapist during the reversal was considerably higher than during the initial baseline) because this reversal condition included the withdrawal of the previous reinforcement contingency. Perhaps the best evidence to support an aversive-condition hypothesis are Bill's data during the nagging condition.

A second explanation for the observed changes in aberrant behavior, very much related to an aversive-condition hypothesis, is that reinforcement rate controlled the amount of aberrant behavior. These children's responses to conditions in which reinforcing events occur with some considerable frequency may be to reduce their aberrant behaviors. An obvious design to test this hypothesis and control for reinforcement rate would use an uncorrelated schedule of reinforcement. Future studies should consider the use of a noncontingent reinforcement control condition to test whether the results observed in the present investigation were due to reinforcement rate or some other explanation.

As indicated in the introduction, we are most favorably disposed toward an explanation that attributes these results to aspects associated with the increase in compliance. A plausible reason for this is that compliance and these aberrant behaviors form an inverse response class. Such a response class could develop because parents are most likely to reinforce compliance with their requests when compliance occurs in the absence of any aberrant behavior. Conversely, since these children were referred for a treatment program because of their aberrant behavior and noncompliance, aberrant behavior was very likely to have occurred when compliance did not. Although the present study observed rather than analyzed covariation, whether compliance and aberrant behavior function as an inverse response class could be demonstrated experimentally by first applying contingencies to one behavior and noting changes in other behaviors, and then discontinuing this condition and applying contingencies to another behavior and noting changes. An inverse response class may be said to exist if a reinforcement contingency for compliance is applied and compliance increases and aberrant behaviors decrease. Subsequently, after a brief reversal, a punishment or DRO contingency for an aberrant behavior if applied to one aberrant behavior should demonstrate that other aberrant behaviors decrease and compliance increases. This may be a reasonable study because the present research showed that compliance increased and aberrant behaviors decreased when a reinforcement contingency was applied to compliance, whereas Risley (1968) reported that aberrant behaviors decreased and compliance increased when a punishment contingency was applied to one aberrant behavior of an autistic child.

Although not clearly evident, the results of the present study suggest that, through parental response to aberrant behavior, these children could have learned that these behaviors can function as operants in different ways (e.g., as an escape or avoidance response, or to obtain parental attention). Although such a consideration also goes beyond the data, speculation about the results may be helpful in formulating future studies. For example, Tom's aberrant behavior could, in part, have been used as a re-

sponse to obtain adult attention that set the occasion for additional reinforcers to occur. If this were the case, his aberrant behaviors would have been on extinction during baseline. Therefore, during baseline, the decrease in self-injurious behavior, perhaps the behavior with the highest response cost to Tom, could have been expected. Further, during the reversal, the increase in the behavior most likely to attract others' attention, aggression towards others, also is consistent with an attention-obtaining hypothesis. Bill's behavior, on the other hand, may have functioned as an attempt to gain attention during baseline and as an escape response during the nagging condition. In a recent study, Carr et al. (1976) remind us that topographically similar responses may be controlled by different antecedent and consequent events, thereby serving different functions, both within and across individuals. The present investigation may provide examples supporting this contention.

Another consideration relates to whether generalized compliance occurred under the conditions of the study and to what extent this affected corollary behaviors. Other research using procedures similar to those in this study has demonstrated generalized compliance (Doleys et al., 1976; Striefel, Wetherby, & Karlan, 1978). An alternative design for the present study would be to select a larger group of requests and reinforce compliance to some while only noting this effect on compliance to the others. In such a circumstance, the changes in corollary behaviors might be explained in terms of generalized compliance. In these children's past histories, parents may have instructed and reinforced them to stop crying, to stop aggression, and to stop self-injurious behavior. Thus, these behaviors might be decreased because compliance generalized from the reinforced requests to the cessation of certain aberrant behaviors. This, of course, presupposes a response class of compliance to both "do" requests and "don't" requests—and suggests a study yet to be conducted.

Investigations that study and then apply considerations based on covariation of behavior could have considerable impact on improving child behavior management techniques. Although the use of prescriptive procedures based on response topography may modify targeted responses, procedures based on observed response covariation may be more parsimonious treatment strategies—especially in cases that result in beneficial changes in multiple behaviors for which no explicit contingency has been programmed. Therefore, the programming of multiple changes may require considering both evaluation of topography and response covariation. Wahler (1975) has demonstrated that clusters of behaviors within the individual tend to covary predictably across time. Further, an understanding of functional relations among behaviors in a covarying response class may be a step toward developing an empirical technology of generalization (Stokes & Baer, 1977) and may be essential to developing new strategies for multiple behavior change.

The treatment approach suggested in the present study may also be helpful in regard to ethical issues. Indirect treatments for behaviors such as self-injury, demonstrated by other authors (Carr et al., 1976; Myers, 1975), minimize the ethical concerns and potential dangers inherent in direct intervention. Through the training of a targeted positive skill, reductions in deviant behaviors may occur without resort to restrictive contingencies on those behaviors. Such reductions would most likely occur gradually, without the rapid increase in emission of the behaviors that might be expected with direct intervention during initial treatment sessions (Carr, 1977; Myers, 1975).

With increasing emphasis on community-based intervention, the need for new models of treatment that are ethical, safe, and cost effective becomes paramount (Cataldo & Russo, 1979; Russo & Cataldo, 1977). Strategies for the simultaneous beneficial modification of multiple behaviors could be an important step in the development of community-based care. In this regard, the study of response covariation as a

methodology for designing innovations in the treatment of children with deviant behavior appears promising in (a) teaching children a positive response which may be inversely related to deviant behavior; (b) allowing indirect, efficient modification of deviant responses; and (c) providing an alternative to certain direct interventions about which ethical questions have been raised. Empirical evaluations of the development of generalized compliance, functional covariation among responses, and parameters that govern the generality of behavior to new settings and persons are suggested by the present study as complementary areas of inquiry.

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