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# *AN EXPERIMENTAL ANALYSIS OF SOCIAL INTERACTION BETWEEN A BEHAVIORALLY DISORDERED PRESCHOOL CHILD AND HER CLASSROOM PEERS*[1]

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The social interaction between a behaviorally disordered preschool child and her classroom peers was measured under two conditions of contingent adult attention: (1) verbal praise and physical contact directed to the target subject's peers for appropriate interaction with the target subject, and (2) verbal praise and physical contact directed specifically to the target subject for engaging in appropriate interaction with peers. Continuous measures of interactive behavior were made during baseline, intervention, and return to baseline conditions. Results indicated that application of experimental contingencies to peers (Condition 1) rapidly increased appropriate social behaviors by the peers and also by the target subject. When experimental contingencies were applied to the target subject (Condition 2), a similar increase in appropriate social behaviors was noted for both the target subject and the peers. Additionally, during Conditions 1 and 2 the recipient(s) of contingent adult attention initiated more appropriate social contacts than did the interacting partner(s).

One often-observed characteristic of the behaviorally disordered preschool child is the absence of a well-developed repertoire of social responses. Typically, these children exhibit a wide range of socially isolate behavior, including lack of functional speech (Risley and Wolf, 1967), opposition to social requests (Wahler, 1967), and physical withdrawal from parents and peers (Hutt and Ounsted, 1966). Considering that many critical skills are learned in the context of social interaction, acquisition of appropriate social behaviors is essential to successful behavioral development (Whitman, Mercurio, and Caponigri, 1970). If behaviorally disordered children are to function adequately in preschool environments, it is imperative that early intervention be initiated to alter their isolate behavior patterns.

Some optimism for ameliorating this characteristic is warranted, in that a growing amount of evidence has demonstrated that contingent adult attention may be employed to increase appropriate social behaviors of isolate children (*e.g.,* Buell, Stoddard, Harris, and Baer, 1968; Hart, Reynolds, Baer, Brawley, and Harris, 1968; Harris, Wolf, and Baer, 1964; Milby, 1970).

These studies utilized time-sampling or interval check methodologies in which "social" responses were measured as the singular behaviors of individual children. In contrast, the present study employed an observational strategy that could assess continuous sequences of social interaction in terms of initiator-responder units, and thus provide a more precise analysis of the effects of operant reinforcement procedures on interactive behavior.

In the present study, social interaction between a behaviorally disordered preschool child and her classroom peers was measured under two conditions of contingent adult attention: (1) verbal praise and physical contact directed to the target subject's peers for appropriate interaction with the target subject, and (2) verbal praise and physical contact directed specifically to the target subject for engaging in appropriate interaction with peers.

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## METHOD

### *Setting*

The investigation was conducted in the Language Classroom unit of the Regional Intervention Program, an early intervention center operated by the Tennessee State Department of Mental Health, Nashville, Tennessee. Language Classroom sessions, each 2.5 hr, were conducted five mornings per week. Scheduled activities included a group opening exercise, a group language exercise, a snack time, a supervised free-play period, a group art time, and a group closing exercise. In addition, individual language-training sessions were held during the free-play period. Classroom staff consisted of a master teacher, three assisting teachers, and two graduate-level university students, only one of whom worked in the classroom on a given day.

The study took place during the free-play period in which the children were allowed to engage in a variety of self-selected activities. The children were not required to remain in a certain sector of the room for any specified length of time, nor were they required to request permission to change activities. Two adults were usually involved with the individual language-training sessions while the other three adults moved about the room, often joining a group of children for a brief time. Informal observations throughout the investigation indicated that the membership of the various small groups in the classroom tended to change quite frequently within free-play periods and across calendar days.

### *Subjects*

The target subject, Martha, was a 3-yr, eight-month-old girl, admitted to the Regional Intervention Program 3.5 months before the study. At the point of admission, her parents reported that her language development had been very slow, that she was hyperactive, did not interact appropriately with siblings or peers, usually played alone, rarely obeyed commands, was not toilet trained, and did not seem to recognize danger. The subject was selected on the basis of reports from program personnel indicating that she was the most isolate child in the Language Classroom. Martha's peers were characterized by a variety of disorders, ranging from mild language delay with no other marked behavioral deficits to severe language delay with extremely high rates of disruptive, oppositional behaviors. During the initial baseline period, the peer group consisted of 14 boys and three girls, ranging in age from 3 yr to 4 yr, four months. Three additional boys and one girl entered the class during the course of the study. Mean daily attendance of peers during the study was 14.2.

### *Target Behaviors*

Social interaction between Martha and her peers was described with respect to two general classes of target behaviors: motor-gestural and vocal-verbal. The extremely low rate and relative stability across conditions of vocal-verbal behavior recorded in the present study suggested that this behavior class be removed from direct consideration. The general behavior classes were further described with respect to two sets of topographical features: positive and negative; initiated and responded. The low rate and relative stability of negative behaviors suggested that they also be removed from consideration.

The operational definition for the general target behavior class reported was:

> *Motor-Gestural:* all movements emitted that cause a child's head, arms, or feet to come into direct contact with the body of another child; that involve waving or extending arms directly toward another child; or that involve placing of hands directly upon a material, toy, or other movable apparatus that is being touched or manipulated by another child.

The operational definitions of the topographical features reported were:

> *Positive:* touch with hand or hands; hugs; holding hands; kiss; wave; all cooperative

responses involved with sharing a toy or materials.

*Initiated:* all discrete motor-gestural behaviors that are emitted at least 3 sec before or after another child's motor-gestural behavior.

*Responded:* all discrete motor-gestural behaviors that are emitted within 3 sec following another child's motor-gestural behavior.

One category of adult behavior was also recorded:

*Adult Attention:* verbal praise and physical contact (*e.g.,* pat on back, rub head) directed to either Martha or her peers contingent upon positive initiated or responded child behaviors.

*Observation Procedures*

Target behaviors involving interaction between Martha and her peers were recorded for eight consecutive minutes during the 25-min free-play period. Other interactions occurring in the classroom that did not involve Martha were not recorded. Recording began approximately 5 min after the signal for free-play was given by the master teacher. Entries of target subject-peer interactions were made by trained observers using coded symbols and a prepared record sheet, illustrated in Figure 1. Each 1-min period on the record sheet was divided into six 10-sec blocks to facilitate the analysis of data and the computation of interrater reliability. Behaviors were recorded in continuous fashion. Each target behavior observed was entered as having been emitted by either the subject (S) or by any one of the peers (P), as belonging to one of the two general classes, motor-gestural or vocal-verbal, as being either positive (+) or negative (—) in type, and as having been initiating or responding in nature, noted by the placement of the + or — sign either before or after the symbol for the identified emitter of the behavior. On those occasions in which Martha interacted with more than one peer in rapid succession, the symbol (P) was entered for each discrete target behavior emitted by an individual peer. Contingent adult attention events were entered by placing the symbol (t) just above the appropriate target behavior immediately preceding delivery of the event. For example, in Figure 1, the entries in the third interval block describe a positive motor-gestural behavior initiated by a peer that receives contingent adult attention, and a positive motor-gestural responding behavior by the subject; followed by another positive motor-gestural initiated behavior by a peer and a positive vocal-verbal responding behavior by the subject. A horizontal dash was entered in the event that an initiated behavior received no response (Figure 1, fourth interval block), or if no behaviors were emitted during

| Minute One | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| MOTOR-GESTURAL | P+ +S | -P | P+ t P+ +S | P- - | - | S+ +P |
| VOCAL-VERBAL | +S | S- | +S | | | |

Fig. 1. Example of 1-min segment from coding sheet.

an interval (Figure 1, fifth interval block). A prerecorded audio cassette tape was used to indicate the onset and conclusion of each 10-sec interval, enabling the observers to devote complete attention to activity in the classroom.

A pool of three trained observers was employed during the study. On reliability assessment days, two observers were seated at a three-station desk, each station partitioned from the other. Two-way interrater reliability was calculated by dividing the total number of target behaviors and corresponding topographical descriptors recorded in agreement plus those recorded in disagreement. Agreement was reached only when both observers marked the same behaver (S or P), the same topographical symbols (+ or −), in the same position (before or after behaver symbol), in the same general class (motor-gestural or vocal-verbal), all within the same 10-sec interval block.

### *Experimental Procedures*

The basic design of the study was a reversal procedure (Baer, Wolf, and Risley, 1968). The following steps were included:

*Baseline I.* No special instructions were given to any of the adults (teachers and graduate students) in the classroom.

*Intervention I.* The two graduate-level students, both trained in the application of behavior modification principles, were told that they were to serve as experimental agents in a study to investigate the effects of contingent adult attention on the social behavior of the subject. After three training sessions devoted to a review of operational definitions of target behaviors, the agents were instructed to direct highly specific verbal praise and physical contact to any and all peers who emitted either initiating or responding positive behaviors of the two general classes toward Martha. The agents were told that they should attempt to deliver contingent attention whenever they observed an appropriate target behavior being emitted by a peer. Only one of the agents was present in the classroom and responsible for implementing the intervention strategy in a given session.

*Baseline II.* The agents were instructed to move about the room as they normally would, interacting with Martha and her peers when it was appropriate to do so, but to withhold attention in the presence of the target behaviors.

*Intervention II.* The agents were instructed to deliver specific contingent attention to Martha whenever she was observed emitting a positive initiating or responding target behavior.

*Baseline III.* The procedures in effect during the Baseline II condition were re-instated.

## RESULTS

### *Reliability*

Eight reliability checks were conducted across experimental conditions. Table 1 presents the range and mean percentage of observer agreement for all target behaviors reported.

### *Total Positive Motor-Gestural Behaviors*

Total (*i.e.,* initiated and responded) positive motor-gestural behaviors emitted by the target subject and the peers with whom she interacted are plotted in Figure 2. The rate of positive motor-gestural behavior was extremely low for both Martha and her peers during the eight-day Baseline I period. A steady and rapid increase in behavior rates for both Martha and her peers accompanied implementation of contingent adult attention procedures directed to the peers. Mean

Table 1

Range and mean percentage of observer agreement for reported target behaviors.

| *Target Behaviors* | *Range* (%) | *Mean Percentage* |
|---|---|---|
| Positive motor-gestural by subject: | | |
| initiated | 79–100 | 97 |
| responded | 80–100 | 94 |
| Positive motor-gestural by peers: | | |
| initiated | 73–100 | 84 |
| responded | 75–100 | 92 |
| Adult attention | 89–100 | 96 |

daily frequencies of 21.4 for peers and 21.4 for the target subject were produced during the nine-day Intervention I condition. Removal of contingent adult attention procedures during Baseline II was followed by an immediate decrease in positive motor-gestural behavior for both subject and peers, approaching the levels observed during Baseline I. Implementation of contingent adult attention procedures directed specifically to Martha was accompanied by an abrupt increase in behavior rates for both her and her peers. Mean daily frequencies of 30.6 for the target subject and 30.6 for her peers were produced during the eight-day Intervention II condition. Removal of contingent adult attention procedures during Baseline III was again followed by an immediate decrease in the number of positive motor-gestural behaviors emitted by the subject and by her peers.

*Initiated Positive Motor-Gestural Behaviors*

Initiated positive motor-gestural behaviors emitted by the target subject and by her peers are plotted in Figure 3. The initiated positive motor-gestural behavior rates for Martha and for her peers were extremely low during the Baseline I period, and returned to similar levels during Baseline II and Baseline III conditions. Introduction of contingent adult attention procedures during the two intervention conditions was followed by increases in both subject and peer rates of initiated behavior. However, differential effects were observed within each condition and across the two conditions. During Intervention I, in which contingent attention was directed to peers, the mean daily frequency of initiated positive motor-gestural behaviors emitted by the peers was 13.2. The subject's

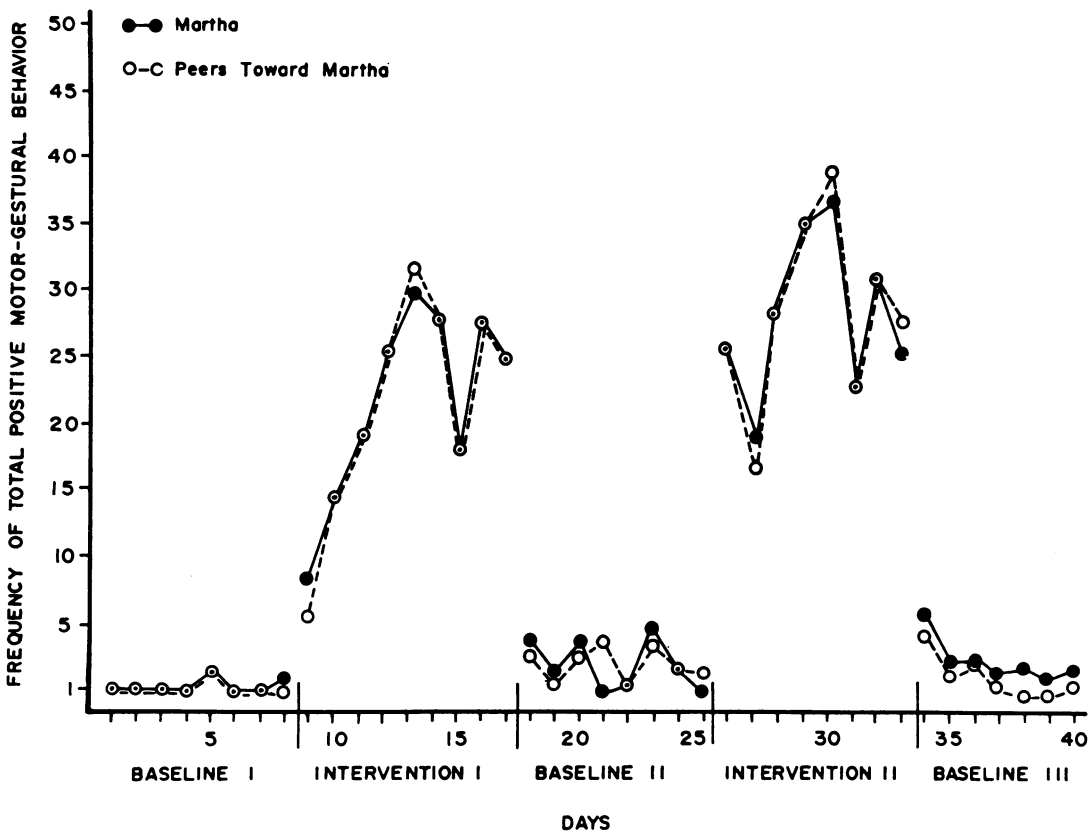


Fig. 2. Daily frequency of total positive motor-gestural behavior (initiated and responded) for Martha and peers across Baseline I, Intervention I (contingent adult attention to peers), Baseline II, Intervention II (contingent adult attention to Martha), and Baseline III conditions.

mean daily rate was 9.7. During Intervention II, in which contingent attention was directed to the subject, her mean daily rate of initiated behaviors was 25.6; the peers' daily rate was 5.6.

*Contingent Adult Attention*

No adult attention events occurred during Baseline I, Baseline II, or Baseline III conditions. Additionally, no instances were observed in which adult attention was inappropriately directed to a child who was not at that time under reinforcement conditions. The mean daily frequency of contingent adult attention events during Intervention I was 16.3 and 15.3 during Intervention II. Table 1 reports the number of initiated and responding positive motor-gestural behaviors emitted by peers during Intervention I and by the subject during Intervention II, the percentage of initiated and the percentage of responding positive motor-gestural behaviors receiving contingent adult attention during each intervention condition, and the percentage of total (*i.e.*, initiated and responding) positive motor-gestural behaviors receiving contingent adult attention in each intervention condition.

Table 2

Percentage of positive motor-gestural behavior receiving contingent adult attention during intervention conditions.

| | *Intervention I Peer Behaviors* | *Intervention II Subject Behaviors* |
|---|---|---|
| Number initiated | 123 | 205 |
| Number responding | 73 | 40 |
| Percentage initiated receiving attention | 67% | 43% |
| Percentage responding receiving attention | 89% | 82.5% |
| Percentage total receiving attention | 75% | 49.7% |

## DISCUSSION

The present results clearly demonstrate the reinforcement control of contingent adult attention in systematically manipulating rates of

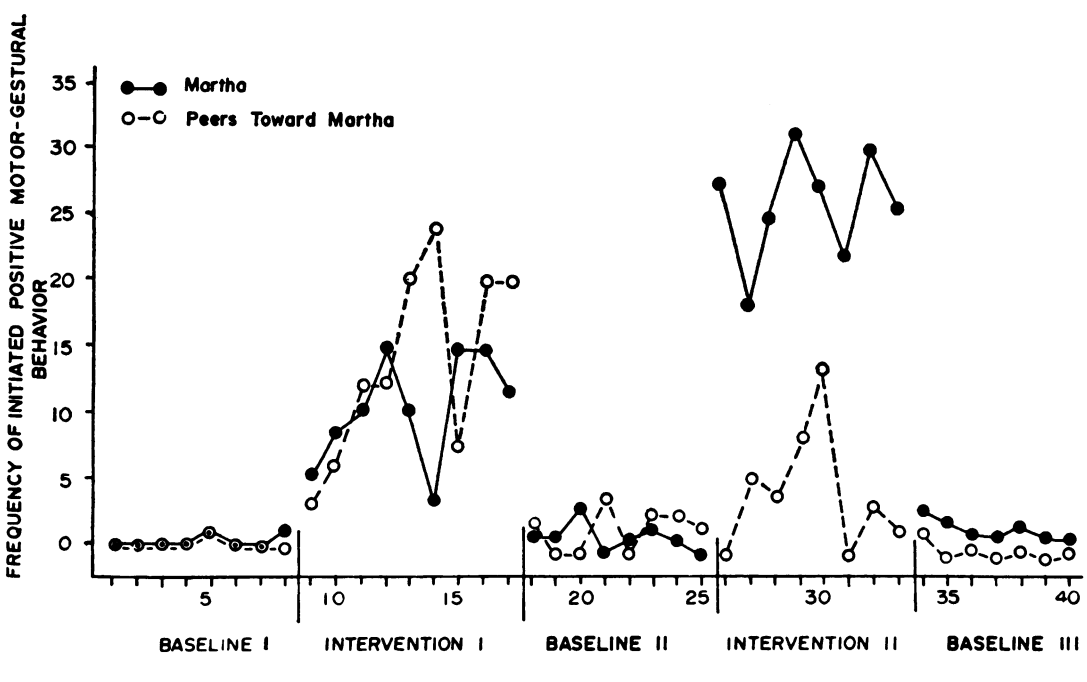


Fig. 3. Daily frequency of initiated positive motor-gestural behavior for Martha and peers across Baseline I, Intervention I (contingent adult attention to peers), Baseline II, Intervention II (contingent adult attention to Martha), and Baseline III conditions.

positive interaction between a behaviorally disordered preschool child and her peers.

By using an observational system that provided a continuous measure of social interaction between the target subject and her peers, the present study reveals that changes in the rate of total positive motor-gestural behaviors emitted by the recipient(s) of contingent adult attention were accompanied by comparable changes in the behavior of the interacting partner(s) (see Figure 2). It is possible that these parallel changes in positive motor-gestural behavior may have resulted from some "spillover" of social reinforcement (Broden, Bruce, Mitchell, Carter, and Hall, 1970). While social praise and physical contact was specifically directed to either Martha (Intervention II) or her peers (Intervention I), the experimental agent was also in close physical proximity to the interacting partner(s). Thus, adult proximity, as well as nonverbal events such as smiles, may have inadvertantly effected the partner's response rate.

A further analysis of the total positive motor-gestural behaviors across both reinforcement conditions indicates that contingent attention to the target subject produced consistently higher rates of positive behavior than did attention to peers. At least two factors, operating singly or in combination, may have accounted for this differential effect. First, during Intervention I, in which attention was dispersed among several peers, it is reasonable to assume that individual peers were reinforced less frequently for positive behaviors than was the target subject during Intervention II. Future research efforts, in which the behavior of specific peers is monitored, would provide valuable information regarding the effects of differential schedules of reinforcement. Second, the order of presentation of intervention procedures may have been critical. Informal observations during Baseline II conditions indicated that Martha's "isolate" behavior was topographically quite different from her "isolate" behavior during Baseline I. During the first baseline condition, Martha would typically spend the majority of the free-play period in a corner of the room, sitting idly, or playing repetitiously with a toy. However, though she seldom interacted with children during Baseline II, she now remained physically close to other children, and on numerous occasions she was observed to circle a group of children playing together, and to exchange smiles. These observations indicate the need for replication efforts in which the effects of ordered experimental conditions are systematically studied.

The above two factors, again acting singly or in combination, may also have accounted for the contrast between the peers' rate of initiated behaviors during Intervention I, and the subject's rate of initiated behaviors during Intervention II (see Figure 3). Although in each condition, the recipient of contingent adult attention emitted more positive initiated behaviors than did the interacting partner, this effect was especially pronounced during Intervention II.

These findings and observations, which further reveal the complexity and variability of children's social responses, underscore the need for more complete and precise behavioral measures in operant research on social interaction.

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