

*ATTENTION TRAINING: THE USE OF OVERCORRECTION
AVOIDANCE TO INCREASE THE EYE CONTACT
OF AUTISTIC AND RETARDED CHILDREN*

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A crucial first step in teaching and training the retarded and autistic is to develop and maintain eye contact with the therapist. Functional movement training (an overcorrection procedure) plus edibles and praise were compared with edibles and praise alone as a method of developing eye contact in three such children. In both conditions, the child was given food and praise when eye contact occurred within 5 sec of the therapist's verbal prompt: "Look at me." Functional movement training avoidance plus edibles and praise produced about 90% attention for the three children, while edibles and praise alone were less effective (eye contact never exceeded 55%). Functional movement training avoidance combined with edibles and praise appears to be an effective method of teaching eye contact and possibly other forms of instruction-following to behaviorally disordered children who are not always responsive to positive consequences.

DESCRIPTORS: overcorrection, functional movement training, eye contact, avoidance conditioning, prompt, aversive stimulation, retardates, children

One of the first steps in developing instructional control with retarded and autistic children is to establish eye contact or visual attending behavior (Kozloff, 1973; Lovaas, *in press*; Rislely and Wolf, 1967). For example, Harris (1975) named attending to the teacher as the first prerequisite for teaching speech. Usually during eye-contact training, the child is given food and praise for either looking at the therapist on command or for spontaneous eye contact. When a verbal prompt is used, food is often held close to the therapist's face near the eyes. For individuals with specific deficits such as deafness and blindness, facial orientation is perhaps even more important. The deaf must look

at the therapist in order to receive manual instructions, and the facial orientation of a blind person toward the speaker provides at least some indication of listening behavior. These approaches have been very successful in establishing eye contact in children (Brooks, Morrow, and Gray, 1968; Kozloff, 1973; Lovaas, Berberich, Perloff, and Schaeffer, 1966; McConnell, 1967; Martin, England, Kaprowy, Kilgour, and Pilek, 1968). Once eye contact has been established, more advanced programs can then be implemented, such as training in nonverbal and verbal imitation and perhaps functional language (Harris, 1975).

Some retarded and autistic children in almost every treatment or training setting, however, are at times unresponsive to food, praise, or other potential reinforcers despite the therapist's exhaustive search for an effective reinforcer. Because consistently effective reinforcers cannot be found, these children often do not progress in their training programs. The problem is especially crucial when the children do not attend visually, since other training programs must be postponed until that rudimentary behavior has been learned.

¹Special thanks are due B. Ballard, C. Bridges, R. Brown, C. Flake, A. Renzaglia, and F. Simmerman for their assistance as therapists and observers. James Brahlek, Chief of Psychology, Rosewood Center provided valuable administrative support. The author wishes to thank Don F. Hake for reading an earlier version of the paper. Portions of this research were conducted at Anna State Hospital, Anna, Illinois and Rosewood Center, Owings Mills, Maryland. Reprints may be obtained from R. M. Foxx, Psychology Department, University of Maryland Baltimore County, 5401 Wilkens Avenue, Baltimore, Maryland 21228.

The purpose of the present study was to teach eye contact to one autistic child and two severely retarded children who only occasionally responded to a variety of edible and social rewards. The approach was to combine edibles and praise for eye contact with an aversive procedure (avoidance training) for not attending. Although the use of an aversive procedure to facilitate the learning of appropriate behaviors justifiably has not been used widely, its use was thought to be appropriate in the present instance. Current ethical standards (May, Risley, Twardosz, Friedman, Bijou, and Wexler, 1975) dictate that aversive procedures be used only when positive consequences have not proved effective, as was the case with the three children in the present study. In an earlier study, Lovaas, Schaeffer, and Simmons (1965) used discriminated avoidance procedures with schizophrenic children when positive consequences alone proved ineffective in establishing social behaviors. In the present study, the aversive procedure chosen was functional movement training (Foxx and Azrin, 1973), a positive practice form of overcorrection that was used to punish self-stimulatory behavior of autistic and retarded children. The specific form of functional movement training chosen was the same procedure that had been used to punish the head weaving of a retarded girl and consisted of requiring the child to move her head in one of three positions: up, down, or straight, under a teacher's manual guidance and instruction. The child was required to maintain each position 15 sec, after which another instruction was given. A functional movement training procedure that involved the head was selected because appropriate eye contact requires that the child's head be oriented toward the therapist.

The use of functional movement training when a child fails to respond to the verbal prompt "Look at me" should serve ultimately to produce eye contact as a discriminated avoidance response whenever the verbal prompt is presented. In the present study, the avoidance response, eye contact, would be followed by

food and praise as well as the postponement of the functional movement training.

METHOD

Subjects

Three children enrolled in a day-care intensive learning program served as subjects. Mike, an 8-yr-old autistic boy, displayed several classic autistic behaviors, such as avoiding eye contact, specific yet erratic taste preferences, and withdrawal from social contact. His self-stimulatory clapping had been treated by overcorrection in an earlier study (Foxx and Azrin, 1973). However, previous eye-contact training sessions with Mike had not been particularly successful.

Wilma was an 8-yr-old severely retarded girl whose Vineland Social Quotient was 28. Her self-stimulatory hand mouthing had been treated by overcorrection in an earlier study (Foxx and Azrin, 1973). However, her major problem was general noncompliant behavior to any verbal instruction. Some days Wilma would visually attend at very high levels for edibles and praise, while on other days her eye-contact levels were very low. Wilma's erratic eye contact was a concern to her teachers, because they were never quite sure whether or not she had learned to attend. Criterion levels of attending performance were useless because Wilma rarely maintained any level for more than a few days. Although she was not the most disruptive child in the program, she was considered by her teachers to be the most bothersome.

Doug, a 6-yr-old severely retarded boy, was a new student in the program and had never received eye-contact or any other training before the study. Preliminary work with him indicated that although he was sometimes responsive to edibles and praise, he responded very slowly, if at all, to any type of verbal prompt.

Setting

Individual eye-contact training sessions were conducted in a 4 by 4 m soundproof room con-

an edible and praise for 2 sec of eye contact, and in the fourth condition, Therapist A gave 5 min of functional movement training for inattention and an edible and praise for 2 sec of eye contact within the 5-sec avoidance interval. Two seconds of eye contact was chosen as the target response because Wilma had had a long history of eye-contact training and had responded under a 2-sec contingency on some occasions at better than a chance level. The experimental design used for Wilma was a simultaneous-treatment design combined with a multiple baseline across therapists (the last two conditions).

Doug. During an initial baseline condition, both therapists provided an edible (a piece of sugar-coated cereal or bite-sized candy) and praise for each glance. Over the remaining three conditions, the criterion level of eye contact was increased to 2 sec. Beginning with the second condition, Therapist A gave 2 min of functional movement training for inattention (no response within 5 sec of the verbal prompt) and an edible and praise for the criterion level of eye contact; Therapist B gave only an edible and praise following each instance of the criterion level of eye contact. The experimental design used for Doug was a combination of the changing criterion design and a simultaneous-treatment design.

Procedure

Baseline. During a session, the therapist and child were seated at a table facing each other about 45 cm apart. The therapist would take an edible, place it near her eye, say the child's name, and give the verbal prompt "Look at me." If the child made eye contact within 5 sec, he or she was given an edible and praised. If there was no response within 5 sec, the therapist returned the food to a bowl located on her right. After some 10 sec, the therapist lifted the edible near her eyes and gave the verbal prompt again. A total of 20 verbal prompts were given per session, which lasted about 5 min each. Edibles and praise were given only for a criterion level of eye

contact that occurred within the 5-sec avoidance interval. All other instances of eye contact were ignored.

Functional movement training avoidance. During functional movement training avoidance conditions, the therapist gave the child functional movement training if he or she did not respond to the verbal prompt within 5 sec. At the end of the 5-sec trial, the therapist said "_____ (the child's name), you didn't look at me" in a stern voice and then began functional movement training. Functional movement training was identical to that used by Foxx and Azrin (1973) to treat self-stimulatory head weaving where the child was required to move his head in one of three directions—up, down, or straight and a verbal instruction was given for each position, (e.g., "head up"). The child had 1 sec in which to respond to the instruction, after which the therapist began guiding his head manually in the desired direction. The therapist stood behind the child, who remained seated throughout the functional movement training period. If the child began the desired movement at any time during the guidance, the guidance was eliminated and the therapist merely shadowed the child's head with her hands. However, she re-applied the guidance whenever the desired movement ceased. The child was required to sustain each posture for 15 sec. The order of the instructions was random so that the child would attend to the verbal instruction, rather than learning a particular sequence. Approximately 20 sec after the functional movement training period had ended, a new eye-contact trial was begun.

Recording and reliability. Whenever the child responded to the verbal prompt within 5 sec for the appropriate duration (either a glance, 1 sec, or 2 sec), a correct response was recorded by the therapist. Eye contact was defined as the child orienting his or her head toward the therapist so that the eyes looked directly at the therapist's face for the prescribed period of time. If the child did not respond within 5 sec, or for less than the required duration, an incorrect re-

response was recorded. At the end of each 20-trial session, the child's correct responses were multiplied by five to yield a per cent-of-eye-contact score. The child's per cent of eye contact for the day (five, 20 trial sessions) was computed by calculating the mean per cent eye contact for the five sessions.

Reliability was assessed during at least one session for each therapist per condition by an independent observer who sat outside the room and observed the session through the one-way mirror that provided a head-on view of the child. The observer was cued that a trial was to begin when the therapist lifted the edible toward her eye. The observer watched the child's eyes and counted to herself the 5-sec duration (*i.e.*, she counted 001, 002. . .) and duration of the eye contact. A modified version of the session recording sheet was used during reliability checks. In that version, each trial was numbered from one to 20 so that individual trial comparisons could be made. Reliability was calculated by dividing the number of trials in which the two observers agreed (that attending had occurred) by the number of agreements plus disagreements (where one observer recorded eye contact and the other did not), times 100. Thus, only occurrence data was used in calculating reliability.

On 10 checks with Mike, agreement between the observer and Therapist A averaged 92.8% and ranged from 75 to 100%; it averaged 91.5%, range 71 to 100%, for the observer and Therapist B. During six reliability checks with Wilma, the interobserver agreement averaged 88.8% between the observer and Therapist A (range 70 to 100%) and averaged 93% (range 75 to 100%) between the observer and Therapist B. With Doug, on six reliability checks, the interobserver reliability between the observer and Therapist A averaged 93% (range 75 to 100%) and averaged 88.2% (range 71 to 100%) for the agreement between the observer and Therapist B.

The independence of the observers could be questioned in the present study, since the re-

liability observer, who had been instructed to make her judgements independent of the therapists' behavior, could still have been influenced by the therapist (the primary observer) giving edibles and praise to a child whenever she judged a response to be correct. One could ask whether the reliability observer was agreeing that the child had made eye contact or that the therapist had delivered an edible and praise. To answer this question satisfactorily, eye-contact training sessions were conducted with a retarded child and observers who had not participated in the original study. Two independent recorders observed eye-contact training sessions in which a therapist conducted the following conditions: (1) a baseline, during which the therapist gave the verbal prompt and waited 5 sec but did not follow eye contact (the correct response) with any consequences; (2) a noncontingent reward condition, during which the therapist delivered an edible and praise sometime during the 5-sec interval independent of the child's eye contact and, (3) a reward condition, in which the therapist followed all correct responses (eye contact) with an edible and praise. Nine 20-trial sessions were conducted for each condition for a total of 27 sessions. In the first 15 sessions (five of each condition), the correct response was a glance, in the next six sessions (two of each condition), the correct response was 1 sec of eye contact, and in the final six sessions (two of each condition), the correct response was 2 sec of eye contact. The sequence of conditions for each level of a correct response was random, so that only the therapist was aware of which condition was in effect. The therapist's verbal prompt signalled the beginning of a trial and the 5-sec interval. The therapist counted the interval silently, as did one of the observers who signalled to the other when to begin and end an observation. All other facets of the original study were preserved: the definition of eye contact, the observers viewing the session outside the session room through a one-way mirror (they sat 1.8 m apart), and the use of occurrence

data only in calculating reliability. Occurrence data were used because the child's per cent of eye contact was low; the overall mean eye contact across the three conditions and criterion levels was 45%. The mean interobserver agreement between the therapist and Observer I in the three conditions was baseline: 94.3%, noncontingent reward: 91.9%, and reward: 88.8%. The overall mean was 91.7% agreement, with a range of 71 to 100%. The mean interobserver agreement between the therapist and Observer II in the three conditions was baseline: 92.8%, noncontingent reward: 91.3%, and reward: 90.9%. The overall mean was 91.7% with a range of 66 to 100%. The mean interobserver agreement between the two observers in the three conditions was baseline: 97.8%, noncontingent reward: 91.1%, and reward: 89.1%. The overall mean was 92.7% with a range of 71 to 100%. The high reliabil-

ity scores obtained in this experiment were comparable to those obtained in the original study. This replication of the original reliability scores (especially in the baseline and noncontingent reward conditions) indicated that in this study, the judgement of the reliability observer probably was not dependent on the therapist's behavior, but rather on the child's eye contact.

RESULTS

Figure 1 shows that Mike visually attended (glanced) during about 20 and 26% of Therapists' A and B trials during baseline. His eye contact with the therapists was quite low, even though each correct response was followed by food and praise. When Therapist A began following each nonresponse with 2 min of functional movement training, Mike's per cent of eye contact increased to an average of

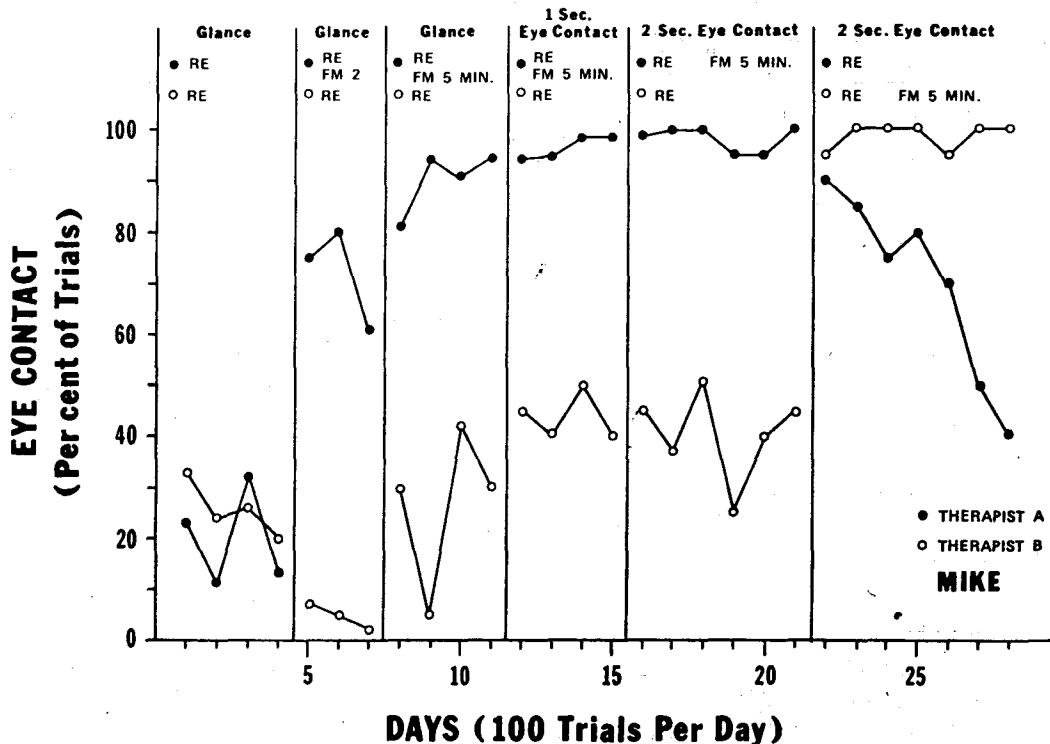


Fig. 1. The effect of edibles, social-praise rewards (RE), and functional movement training procedures (FM) on the eye contact of an autistic boy. The ordinate shows the percentage of trials in which the criterion level of eye contact occurred within 5 sec of a therapist's verbal prompt. The duration of eye contact required for edible and praise rewards and the procedures conducted by each therapist are listed at the top of each condition. The closed and open circles represent Therapists A and B respectively.

72%, although his performance was beginning to wane during the final 100 trials of the condition. With Therapist B, where no functional movement training followed nonattending, Mike's visual attending behavior deteriorated to an average of about 5%. When the duration of functional movement training was increased to 5 min, Mike responded to Therapist A's verbal prompts on 90.5% of the trials and to Therapist B on 26.7% of the trials. When the required duration of eye contact was increased to 1 sec, Mike visually attended on almost 97% of the trials in the Therapist A condition and on about 44% of the Therapist B trials. When the duration of eye contact was increased to 2 sec, Mike attended on 98% of the Therapist A trials and 40% of the Therapist B trials. When the therapists reversed their roles, Mike's eye contact decreased in the presence of Therapist A over time to an average

of 40%, but increased rapidly in the presence of Therapist B to an average of 98.6%.

Figure 2 shows that Wilma's eye contact ranged from 2% to 90% during baseline (when both therapists gave an edible and praise for 2 sec of eye contact), which corresponded to her erratic behavior in other training situations. Wilma's eye contact averaged 34% for Therapist A and 32% for Therapist B. When 2 min of functional movement training was given by Therapist B for nonresponding, Wilma responded to the prompt on almost 50% of the trials, while her eye contact to Therapist A decreased to zero and averaged 7%. When the duration of functional movement training was increased to 5 min by Therapist B, Wilma's eye contact increased to an average of 89%. She continued to respond erratically to Therapist A's prompts (range 0 to 45%, mean 8%). When Therapist A also

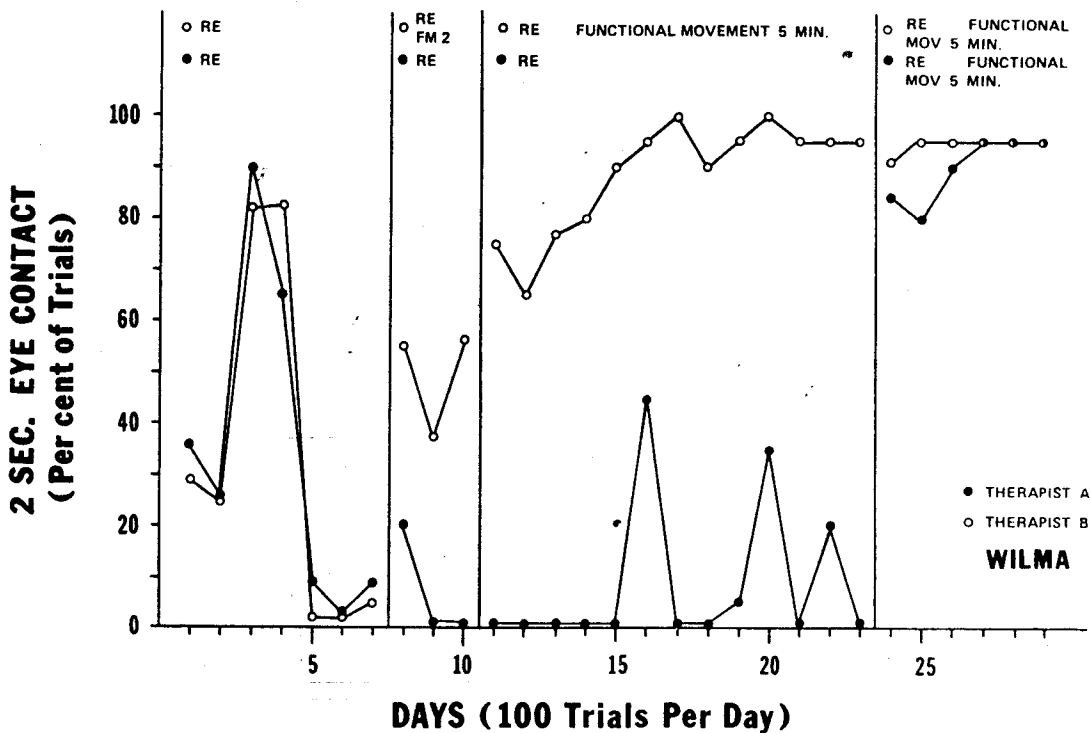


Fig. 2. The effect of edibles, social-praise rewards (RE), and functional movement training procedures (FM) on the eye contact of a severely retarded girl. The ordinate shows percentage of trials in which 2 sec of eye contact occurred within 5 sec of a therapist's verbal prompt. The procedures conducted by each therapist are listed at the top of each condition. The closed and open circles represent Therapists A and B respectively.

began following nonattending with the 5 min of functional movement training, Wilma's eye contact increased to an average of 90%, while she averaged 94% on the Therapist B trials.

Figure 3 shows that during baseline, Doug visually attended on 44.5% to 51% of the trials for Therapists A and B respectively. When Therapist A began following no responses to the verbal prompt with 2 min of functional movement training, Doug visually attended (a glance) on 86% of the trials and visually attended to Therapist B on 53% of the trials. During the 1- and 2-sec required periods of eye-contact conditions, Doug visually attended on 90.6% and 89% of the trials in response to Therapist A's verbal prompts. In the Therapist B sessions of the two conditions, Doug's per cent of eye contact averaged 40.7 and 32.5% respectively.

A noticeable change in the children's behavior occurred over the course of the study in the sessions in which the functional movement training avoidance was used. During baseline for both therapists, throughout the edible and praise-alone conditions, and the initial phases of functional movement training avoidance, the children had displayed a variety of behaviors generally regarded as incompatible with attending to a therapist (*i.e.*, squirming in their chairs, looking about the room, fidgeting, tapping the table, staring at the table or their hands, bouncing in their chairs, or pushing the table). After several sessions of functional movement training avoidance these behaviors ceased. The children sat in their seats very quietly and observed the therapist. As a result, the eye-contact training sessions were completed within 5 to 10 min, whereas they

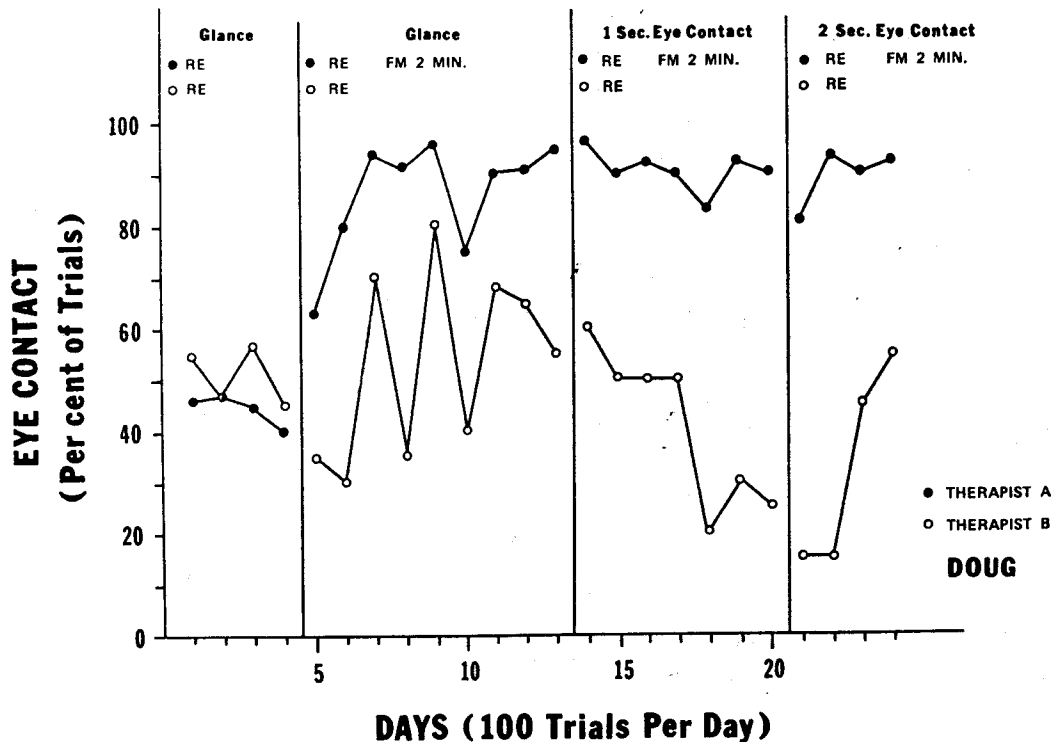


Fig. 3. The effect of edibles, social-praise rewards (RE), and functional movement training procedures (FM) on the eye contact of a severely retarded boy. The ordinate shows the percentage of trials in which the criterion level of eye contact occurred within 5 sec of a therapist's verbal prompt. The duration of eye contact required for edible and praise rewards and the procedure conducted by each therapist are listed at the top of each condition. The closed and open circles represent Therapists A and B respectively.

had taken as long as 50 min during some of the earlier sessions. However, the children continued to display nonattentive behaviors throughout the edible and praise-only conditions.

Mike and Wilma ultimately learned to move their heads in the instructed direction, instead of having their heads physically guided. However, Doug never moved his head when instructed to do so, and thus received physical guidance throughout the study. All three children displayed some emotional and escape behaviors, such as brief periods of crying and attempts to slide out of the chair, at some point during the initial functional movement training sessions, as was reported also in an earlier use of functional movement training (Foxy and Azrin, 1973). After a few sessions, however, the children ceased exhibiting either emotional or escape behavior.

Generalization Training

Generalization training of eye contact began as soon as the formal study ended. A minimum of 20 eye-contact trials were conducted per child per day in the day-care program. Approximately every 10 to 15 min, one of the therapists or another staff person would approach one of the children and deliver the verbal prompt. The same criterion level of eye contact (2 sec), positive consequences for a correct response, avoidance interval (5 sec), and duration of functional movement training were used that had been in effect during the final experimental condition for each child. All three children reached the criterion level for eye contact, 90% on a daily trial, within a week. After the first week, the edibles and praise were given intermittently and then faded out over time. Functional movement training continued to be used on those infrequent occasions when the child did not attend to the prompt.

DISCUSSION

The functional movement training avoidance procedure appears to be an effective method for

increasing the eye contact of children who are noncompliant and sometimes unresponsive to edibles and social praise. All three children increased their eye contact to near 90% or above during the avoidance training conditions. The autistic child, Mike, displayed the highest levels of eye contact and responded to the functional movement training avoidance contingency more rapidly than the two retarded children.

In the present study, an edible and praise were available for correct eye-contact responses across all sessions. This followed one of the basic rules of using aversive contingencies: always try to provide reinforcement for an alternative behavior (Herman and Azrin, 1964). Thus, the intended purpose of the functional movement training avoidance was twofold: (1) to establish eye contact as a conditioned avoidance response, and (2) to establish correct responding as an attractive alternative, so that ultimately positive consequences might gain more control over the correct response. In the present study, a correct response was followed not only by positive consequences but also postponed the aversive consequence.

It had been hoped that as a child's per cent of correct responses increased, control of behavior would switch from the aversive contingency to the positive consequences. Unfortunately, the data indicate that the positive consequences alone were never very effective in controlling eye contact, since there was no generalization across therapists.

The duration of functional movement training that was required before high levels of eye contact were achieved differed among the children. While 2 min of functional movement training was sufficient to increase Doug's eye contact to around 90%, Mike and Wilma were relatively unaffected by that intervention. Only when the duration of functional movement training was increased to 5 min did Mike and Wilma respond over 90% of the time to the therapist's prompts, illustrating clearly the necessity of having treatment programs individualized.

The various experimental designs permitted the assessment of: (1) generalization, (2) the role of the individual therapist, (3) changes in responses as they were shaped toward the terminal response (2 sec), and (4) the relative effectiveness of the interventions. Each therapist served as a clear signal to the children of which condition was in effect. There was no generalization across therapists because high levels of eye contact occurred only during the avoidance conditions. Reversing the therapists' roles in Mike's case demonstrated that the effectiveness of functional movement training avoidance was not a function of any characteristics of a particular therapist, but rather of the procedure itself. Similarly, in the condition in which both therapists gave Wilma functional movement training, she responded with high levels of eye contact to both therapists. Over the course of the study, Mike and Doug's eye-contact responses matched the criterion required to avoid the functional movement training.

This study reported how a practical and socially acceptable avoidance conditioning procedure can be used to increase compliance with requests for eye contact. As mentioned earlier, eye contact is a rudimentary form of instruction following, which is widely regarded as crucial to learning. There appears to be no reason why the present procedure could not be used to increase other forms of instruction following. Our preliminary work using a modified version of the functional movement training avoidance procedure for noncompliance during discrimination and matching-to-sample training tasks indicates that it may very well increase instruction following in those activities. We intend to continue investigating the effectiveness of overcorrection avoidance procedures in increasing instruction following across a variety of tasks.

The functional movement training avoidance procedure should be viewed as a last resort which is applicable only when positive procedures have not proved effective, as was true

for the three children in this study. In the present study, the use of functional movement training avoidance alone may have produced high levels of eye contact. However, the singular use of that procedure may have raised some serious ethical questions about the use of aversive consequences alone in teaching appropriate behaviors. An analogous situation would appear to be the use of aversive consequences to decrease inappropriate behaviors. In those instances, the therapist must demonstrate that less intrusive or restrictive procedures have been tried and found ineffective or only partially effective before more restrictive or intrusive (aversive) procedures are used. However, the fact that the therapist has shown that less intrusive procedures such as reinforcement programs have not been effective does not allow him to dispense with their use. Rather, current ethical considerations dictate that the more intrusive procedures (*e.g.*, punishment procedures such as overcorrection or timeout) can be instituted only in situations where the density of reinforcement is high and positive consequences are available for appropriate behaviors. If positive consequences were not available, serious ethical questions would be raised and the use of the aversive consequence alone would not be permitted. Such questions do not arise in the present study because positive consequences were always available for correct responses. Thus, a less restrictive but ineffective procedure was kept in force even when a more restrictive procedure was required. We can only hope that for some children, the less restrictive procedure will eventually acquire enough control over the behavior to allow the more restrictive procedure to be discontinued.

Fortunately, most retarded and autistic children will visually attend for positive consequences alone. For those individuals who will not, however, the functional movement training avoidance procedure appears to be a reasonable procedure to combine with positive consequences.

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Received 14 April 1976.

(Final acceptance 14 January 1977.)