A Comparison of Functional Equivalence Training and Timeout Procedures in the Reduction of Disruptive Behavior

Steven D. Goodman
A COMPARISON OF FUNCTIONAL EQUIVALENCE TRAINING AND TIMEOUT PROCEDURES IN THE REDUCTION OF DISRUPTIVE BEHAVIOR

by

Steven D. Goodman

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Steven D. Goodman, M.A.
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The use of nonaversive or aversive procedures continues to be debated regarding treatment of behavior problems of persons with developmental disabilities. This study compared the efficacy of a punishment and a nonaversive procedure in the reduction of problem behavior. The nonaversive technique involved the teaching of alternative, functionally equivalent, responses. Timeout was employed as the punishment procedure. The functional equivalence training included a functional analysis to identify the motivating conditions for the disruptive behavior of three boys with severe mental retardation. Treatment conditions were evaluated on rate of disruption, effects on learning trials, and time engaged in training. Results indicate functional equivalence training reduced disruptive behavior for all subjects; however, for two of the three subjects, timeout was more effective in the reduction of disruptive behavior. When provided a choice, two subjects demonstrated a preference for a communication condition in which a functional equivalent response was reinforced, relative to the alternatives of timeout or baseline condition.
ACKNOWLEDGMENTS

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My deepest gratitude, thanks, and appreciation are extended to my wife Sheila; my daughter, Stacy; and to my parents, for their love, support, sacrifice, and encouragement that brought this study to completion.

Steven D. Goodman
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Goodman, Steven Dewayne, M.A.
Western Michigan University, 1991
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INTRODUCTION

A considerable amount of research has been devoted to developing techniques for managing disruptive classroom behavior. A variety of interventions have been created that employ punishment techniques to reduce problem behavior (Harris & Ersner-Hershfield, 1978; Schroeder, Mulick, & Schroeder, 1979). Among the more common techniques is timeout from reinforcement which has been used by more than half of special education teachers responding to a survey (Maheady, Duncan, and Sainato, 1980). Timeout procedures have proven effective with a variety of behaviors (Harris, 1985; Schroeder et al., 1979) including disruptive behavior of special education students.

Statement of the Problem

In spite of the proven efficacy of punishment techniques, there are a number of ethical considerations (e.g., negative side effects) that limit their application in some settings (Martin, 1975). These ethical considerations, in combination with procedural restrictions on restrictive and intrusive behavioral interventions (Guess, Helmstetter, Turnbull, & Knowlton, 1987), have
created a need for the development and evaluation of nonaversive procedures for the reduction of undesirable behavior (Carr, Robinson, Taylor, & Carlson, 1990).

One nonaversive procedure for reducing problem behavior involves the training of alternative, functionally equivalent, responses. Functional equivalence training is based on the theory that problem behavior of the severely impaired serves a particular function (e.g., to escape demands, to attract attention) and that it persists because these individuals have a limited repertoire of more acceptable behavior to achieve the same or similar function. Under these conditions, the training of acceptable behaviors that achieve the same effect as the problem behaviors should allow the person to fulfill his/her "needs" with more appropriate behavior, thus supplanting the problem behavior (Dunlap, Johnson, & Robbins, 1990). Functional equivalence training has been applied to a range of problem behaviors including aggression and destruction (Carr & Durand, 1985), stereotypic behavior (Durand & Carr, 1987), and self-injurious behavior (Bird, Dores, Moniz, & Robinson, 1989). During functional equivalence training, alternative behavior is reinforced. This is similar to other reinforcement procedures for decreasing problem behavior including: differential reinforcement of other behavior...
(DRO), differential reinforcement of appropriate behavior (DRA), and differential reinforcement of incompatible behavior (DRI). However, the response to be reinforced during functional equivalence training must be functionally equivalent to the problem behavior identified for reduction.

Choosing an alternative response to be trained, and analyzing contingencies involves the use of a functional analysis to identify the reinforcement contingencies that are presumably maintaining the problem behavior (Evans & Meyer, 1985). Several methods for conducting functional analyses have been identified (Lennox & Miltenberger, 1989). It has been suggested that once the function of the problem behavior is identified, it can be replaced by teaching an appropriate response that serves the same function as the problem behavior (Donnellan, Mirenda, Mesaros, & Fassbender, 1984; LaVigna, 1987; LaVigna & Donnellan, 1986). Interventions matched to the function of the problem behavior have been shown to improve efficacy when compared to interventions that are not matched to the function of the problem behavior (Repp, Felce, & Barton, 1988).
Previous Investigations

Several researchers have experimentally evaluated functional equivalence training. Carr, Newsom, and Binkoff (1980) reduced the aggressive behavior of a mentally retarded boy by reinforcing an alternative response. In this study, the boy's aggressive behavior appeared to function as an escape response. An alternative behavior (e.g., tapping finger on hand) was then reinforced by allowing the subject to escape a task. The authors claim that aggression was reduced when the subject could escape a task by tapping. However, this experiment does not rule out the possibility that the subject's aggression may have been reduced by extinction when aggressive behavior was ignored during the reinforcement of finger tapping.

The concept of functional equivalence training to decrease problem behavior was extended by Carr and Durand (1985). Their focus was on functional communication training, i.e., teaching an appropriate verbal response which serves the same function as the disruptive behavior. In their study, behavior problems were reduced as the subjects began using newly acquired communication skills. The authors made the point that the success of their strategy is based upon the equal function of the misbehavior and the verbal response taught. Using a
similar strategy, Bird et al. (1989) reduced aggressive and self-injurious behaviors of two mentally retarded men. After identifying the variables that maintained each subject's targeted behaviors, they taught functionally equivalent communicative responses (i.e., signing "break" to terminate demands) and noted significant reductions in aggressive and self-injurious behaviors of both subjects.

The concept of functional equivalence training was further analyzed by Wacker et al. (1990), who employed a component analysis to evaluate the necessity of an intervention component for inappropriate behavior during functional equivalence training. The authors identified the motivating variables for the problem behaviors (e.g., hand biting, body rocking, destruction) of three subjects with severe handicaps. The subjects were then trained to solicit reinforcement by signing or pressing a microswitch. A component analysis then compared the experimental conditions of functional equivalence training to a treatment package including functional equivalence training and a consequence procedure (i.e., graduated guidance or timeout) for the problem behavior. The results of this experiment suggest that it may be necessary, when treating problem behavior with functional equivalence training, to include, at least initially, a consequence for the problem behavior.
Purpose of Study

In spite of evidence suggesting the efficacy of functional equivalence training, there is no comparative study on which to base treatment decisions. There is also no evidence to suggest that consumers of interventions for problem behavior would prefer functional equivalence training to a timeout procedure. The primary purpose of this study was to extend existing literature by evaluating the relative efficacy of a common punishment procedure (e.g., timeout) and functional equivalence training. Efficacy measurements include time engaged in training, rate of disruptive behavior, and correct responding on learning trials. This study also investigated consumer preference for the experimental treatments of timeout and functional equivalence training.
METHOD

Subjects

The participants were three students who were labeled Severely Mentally Impaired (i.e., IQ < 35). The subjects were independently mobile and had previous exposure to a timeout procedure for the behaviors targeted in this study; however, success was limited. Approval was obtained from the Human Subjects Institutional Review Board at Western Michigan University, Kalamazoo after subject selection. Informed consent was obtained from each subject’s legal guardian before the implementation of this study.

Harold was a six-year-old male diagnosed with fetal alcohol syndrome. Harold used sign language to identify approximately eighty objects. He would also request items or activities from staff. On a Nonspeech Test (Huer, 1988), Harold had a language equivalency of 20-23 months. Harold’s target behaviors were tantrums and physical aggression; behaviors which persisted even in timeout.

Richard was a fourteen-year-old male, characterized by “hyperactivity” and “high distractibility.” His communication skills involved signing approximately 20 words, usually as a request for an object or activity. On a Nonspeech Test, Richard had a language equivalency of 22-
28 months. Richard engaged in the disruptive behaviors of screaming and aggression.

Bruce was a fifteen-year-old male who signed approximately 5 words to request an object or activity. On a Nonspeech Test, Bruce had a language equivalency of 11-15 months. Bruce's disruptive behavior involved aggression.

Setting

This study was implemented in a day school program for the mentally impaired. The sessions were held in the classroom where all three subjects were students. The class included a total of 6 students, one teacher (the experimenter) and two teacher aides. Also in the classroom were tables, chairs, and school materials. An observer was in the classroom to provide interobserver agreement measures and program integrity information.

Response Definitions and Measurement

Dependent Variable

The target behavior for Harold was aggression and tantrum. Aggression was defined as striking another person with hand, arm or object; kicking; biting; scratching; or pinching. A tantrum was defined as crying and screaming with flailing of arms or legs, rocking body, or dropping to
floor. A tantrum was considered to end with the absence of the defining behaviors for 3 or more seconds.

Richard’s target behavior was screaming, defined as loud vocalizations separated by taking a breath; and aggression, defined as striking another person with hand or butting head against others.

For Bruce, the target behavior was aggression, defined as striking another person with hand or object, pulling hair, or kicking others.

**Recording and Reliability**

Observations were conducted in the classroom during regular programmed educational tasks (e.g., pointing to objects identified by the instructor). The experimenter used a wrist counter to record each episode of disruptive behavior. An episode of disruptive behavior was defined as time during which a subject engaged in one of the target behaviors. A tantrum episode was separated by at least 3 seconds of the absence of the defining behaviors. Subjects were observed continuously during the recording period which usually lasted 20 minutes. A timer was used to signal the end of the recording period. A rate measure was calculated by dividing the frequency of disruptive behavior by the duration (in minutes) of the session. Time required for administering the timeout procedure was subtracted from
the session duration for computing the rate of target behavior (i.e., for each timeout, 2 minutes were subtracted from the session duration). The session was not lengthened to compensate for the timeout procedure.

Disruptive behavior was scored separately during educational tasks (i.e., following directions to identify objects) or freetime (i.e., 2 minutes of no demands) for each experimental condition. This information was then used to compute a percentage of disruptive behavior that occurred during Educational Tasks versus Freetime activity. The definitions for Educational Tasks and Freetime are provided later in this paper.

Time Engaged in Training was recorded across conditions. During the timeout condition, Time Engaged in Training included total session time minus timeout duration and freetime. Time Engaged in Training during baseline or communication conditions included total session duration minus freetime.

During the educational task, learning trials were recorded as Correct, Incorrect, or No Response. A correct trial was scored when the subject responded correctly to a question within 3 seconds. An incorrect trial included signs or gestures (including asking for an object or freetime) not related to the training question. No Response was recorded when the subject did not respond
within 3 seconds following a question. Beginning on day 21, the occurrence of the communication skills for each subject that were trained as part of the functional communication intervention was recorded.

Interobserver agreement measures were taken by an independent observer who recorded the occurrence of disruptive behavior on a data sheet. A frequency ratio method (Kazdin, 1982) was used to calculate the interobserver agreement of disruptive behavior. The interobserver agreement percentage was computed by dividing the smaller count by the larger count and multiplying by 100. Interobserver agreement checks were conducted during 31 out of 234 total sessions throughout the experiment. The mean interobserver agreement percentages for disruptive behavior were: for Bruce 92% (range 80% to 100%), for Harold 94% (range 77% to 100%) and for Richard 93% (range 80% to 100%).
PROCEDURE

Functional Analysis Disruptive Behavior

The Motivation Assessment Scale (MAS) developed by Durand and Crimmins (1988) was completed to identify the variable(s) that maintained each subject's disruptive behavior. The MAS contains questions relating to the antecedent and consequence of problem behavior. Each question is rated on a 7 point scale ranging from "never" to "always." A score is then calculated by summing the points that correspond to questions for each of the four motivating variables. The four variables identified by the 16 question scale include sensory feedback, escape, social attention, and tangible reinforcement. The MAS was completed by the experimenter on two separate occasions for each subject: prior to developing the communication training and half-way through the experiment (see Figure 1). The results of the MAS suggested that the disruptive behavior of Bruce and Harold was maintained by escape and attention. Richard's disruptive behavior also was maintained by escape and attention. Before comparing the efficacy of functional equivalence training and timeout, training was provided to assure that the requisite communicative response was in each subject's repertoire.
Figure 1. Results of Motivation Assessment Scale

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Functional Equivalence Training

Subjects were trained using a time delay prompting procedure (Bird et al., 1989; Halle, Baer, & Spradlin, 1981). During functional equivalence training, disruptive behavior was ignored. Functional equivalence training began with the trainer modeling a response (e.g., signing book) and immediately prompting the subject to make the same response by physically manipulating the subject’s hand to form the sign. The subject then received the item or action requested by the sign. Gradually, a delay was increased prior to the onset of the prompt. Functional equivalence training was continued until the subject independently and spontaneously emitted the trained signs on three occasions while in the natural classroom setting.

Selected communication responses were based on the results of the MAS. All three subjects received a high rating in the motivating condition of “Escape.” The sign “time” (i.e., breaktime) was trained to provide a communication response that was functionally equivalent to their target behaviors. Bruce and Farold received high scores for motivation by tangible consequences. They were trained to sign “book” as an alternative for tangible consequence maintained behavior because both students spent a large amount of their freetime looking at magazines. The
The sign "come" was trained as a social attention alternative for attracting the social attention that Richard's disruptive behavior typically garnered.

**General Procedures**

During each session, subjects engaged in educational activities that are common for severely impaired individuals. These activities included following directions to touch clothing items (shirt, shoes, socks) and hygiene items (toothbrush, comb, soap). Each subject received a token and praise (i.e., "good working") for a correct response. The token could be traded, during the session, for 2 minutes access to an object or activity (e.g., freetime). The subject was not required to participate during freetime and no directions were presented to him during the freetime period of 2 minutes. The subject remained in his seat when receiving an object. The subject could go to the activity area (within the classroom) when trading a token for an activity. Separate pictures to cue the experimental conditions (e.g., timeout, alternative communication, and baseline) were posted during each of the experimental phases.
Baseline Condition

During this phase, controlling variables that were in effect in the classroom were identified and continued. Disruptive behavior was ignored. Communication was ignored except when a subject requested to purchase an item with tokens. The picture cue (i.e., drawing of student working) for the baseline condition was shown to the subject at the beginning of each baseline condition. The subject was then told "It is time to work."

Timeout Condition

The timeout condition continued most of the procedures from Baseline condition but implemented a relatively standard timeout procedure (Foxx, 1982; Gast & Nelson, 1977) for each subject's target behaviors. When a subject engaged in disruptive behavior the experimenter said "No _____ (description of behavior)" and escorted the subject to a partitioned corner of the classroom. The subject remained for 2 minutes and was ignored during this timeout period. At the end of the timeout the subject was directed to return to the group. The subject was told "If you're disruptive you will go to timeout." A picture cue for the timeout condition (i.e., drawing of student with flailing arms) was shown to the subject at the beginning of each
Functionally Equivalent Communication Condition

During this communication condition an object or activity was provided for 2 minutes when requested by a subject and disruptive behavior was ignored. A timer was set to signal the end of the 2 minute period. Tokens were not required to “buy” activities or items, however, subjects received tokens and praise for every correct response. The tokens were traded for activities or items requested by subject, even though a subject could request and receive an item or activity without tokens. If the subject requested freetime (e.g., break), then at the end of a 2 minute period the subject was told “time to come back.” If the subject had requested an object (i.e., toy, book) the item was given to the subject while he sat in his chair. At the end of the 2 minute period, the subject returned the item. A picture (i.e., drawing of student talking) to cue the communication condition was posted. The subjects were told “You need to tell me what you want.”

Subject Choice

During this phase of the experiment the subject selected one of the three experimental conditions for a session. The picture cards that correspond to each
condition were placed in front of the subject who was asked "Which one do you want?" The subject would then touch a picture card. The procedure for the selected picture card would be implemented as described previously for the conditions of baseline, timeout, and functionally equivalent communication.

**Integrity of Independent Variable**

An independent observer recorded correct implementation of treatment procedures (Peterson, Homer, & Wonderlich, 1982). After each incident of disruptive behavior was recorded, the observer then recorded the experimenter's response. With respect to disruptive behavior, correct implementation involved ignoring disruptive behavior during the conditions of baseline and functionally equivalent communication, and placing the subject in timeout after disruptive behavior during the condition of timeout. Correct implementation involved ignoring requests (except when trading in tokens) during the conditions of timeout and baseline. During the condition of functionally equivalent communication, correct implementation involved the experimenter responding to the subject's requests by providing the requested item or activity, including non-trained signs.
Observers recorded the reaction to disruptive and communication responses as correct or incorrect depending on the criteria for each experimental condition. Program integrity was then assessed by dividing the number of correct interventions by the number of correct plus incorrect interventions and multiplying by 100. Integrity checks were recorded during 19 sessions throughout the experiment. The mean integrity score for the timeout condition was 99% (range 89% to 100%). For the functionally equivalent communication condition it was 93% (range 67% to 100%). The mean score for baseline was 100%.

Communication responses were recorded for each subject after session 21. The communication responses that were observed on at least five occasions were: for Bruce, time, book and eat; for Harold come, time, book, swing and toy; and for Richard time, book, swing and eat. This included signs that were trained and also those not included in training.

Experimental Design

The three experimental conditions, timeout, functionally equivalent communication, and baseline were presented in an alternating treatments design (Barlow & Hersen, 1984) in which a two experimental conditions were presented daily, one in the morning and one in the
afternoon. The experimental conditions were randomized and counterbalanced across morning and afternoon sessions. Each subject averaged 2 experimental conditions per day.
RESULTS

A rate measure of disruptive behavior for each subject is presented in Figure 2. The timeout condition produced the lowest rates of disruptive behavior for Harold (M = .10) and Richard (M = .23) while the baseline condition produced the highest rates for Harold (M = .48) and Richard (M = 2.01). Functionally equivalent communication training produced intermediate rates (Harold M = .27) and Richard (M = 1.45). The functionally equivalent communication training produced the lowest rate of disruption for Bruce (M = .13). The timeout condition produced a higher disruptive behavior rate for Bruce (M = .68) than his baseline condition (M = .33).

The effects of each condition on academic performance are presented in Table 1. There was little difference in responding across each condition with the exception of Bruce who had higher Incorrect Responses and lower No Responses during the functionally equivalent communication condition. This occurred because Bruce often asked for freetime during the functionally equivalent communication condition. This was recorded as an incorrect response when requests for freetime followed a learning trial (i.e., command to touch object).
Figure 2. Responses per Minute of Disruptive Behavior.
### Table 1

#### Mean Percentages of Academic Performance on Learning Trials

<table>
<thead>
<tr>
<th>Subject</th>
<th>Response</th>
<th>Timeout</th>
<th>Communication</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruce</td>
<td>Correct</td>
<td>16%</td>
<td>13%</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>Incorrect</td>
<td>48%</td>
<td>72%</td>
<td>47%</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>36%</td>
<td>15%</td>
<td>36%</td>
</tr>
<tr>
<td>Harold</td>
<td>Correct</td>
<td>42%</td>
<td>38%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>Incorrect</td>
<td>35%</td>
<td>46%</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>23%</td>
<td>16%</td>
<td>21%</td>
</tr>
<tr>
<td>Richard</td>
<td>Correct</td>
<td>45%</td>
<td>44%</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td>Incorrect</td>
<td>51%</td>
<td>54%</td>
<td>54%</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>4%</td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>
Table 2
Percent of Disruptive Behavior During Educational Task and Freetime

<table>
<thead>
<tr>
<th>Subject</th>
<th>Activity</th>
<th>Timeout</th>
<th>Communication</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bruce</td>
<td>Educational Task</td>
<td>96%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Freetime</td>
<td>4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Harold</td>
<td>Educational Task</td>
<td>100%</td>
<td>83%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Freetime</td>
<td>0%</td>
<td>17%</td>
<td>0%</td>
</tr>
<tr>
<td>Richard</td>
<td>Educational Task</td>
<td>100%</td>
<td>59%</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>Freetime</td>
<td>0%</td>
<td>41%</td>
<td>14%</td>
</tr>
</tbody>
</table>
Relatively low rates of disruptive behavior occurred during freetime compared with educational activities (see Table 2). However, during the functionally equivalent communication condition Richard’s disruptive behavior was fairly equal in distribution between educational task (59% occurrence) and freetime (41% occurrence) conditions. The highest percentage of Time Engaged in Training took place during baseline for Bruce (M = 84%), Harold (M = 86%) and Richard (M = 82%). Even though the duration of time in timeout was subtracted from the session length, timeout resulted in the lowest percentage of training time for Bruce (M = 43%) and Richard (M = 53%). The functionally equivalent communication condition produced the lowest percentage of training time for Harold (M = 53%).

When given a choice between the three conditions, Bruce did not differentiate between the conditions, selecting 4 timeout sessions, 5 functionally equivalent communication sessions, and 5 baseline sessions. Harold chose the functionally equivalent communication conditions for 13 out of the 14 opportunities while choosing 1 timeout session. Richard chose the functionally equivalent communication condition on 7 occasions, baseline on 5 occasions, and the timeout on 2 occasions.
DISCUSSION

The purpose of this study was to compare the efficacy of functional equivalence training with a timeout procedure. Teaching a communicative alternative response was effective in reducing disruptive behavior for each subject, relative to a baseline condition, supporting previous research on functional equivalence training.

When the relative efficacy of functional equivalence training and timeout are compared, results are mixed. The timeout procedure increased Bruce's disruptive behavior relative to the baseline condition. The timeout procedure produced lower rates of disruptive behavior relative to the conditions of baseline and functionally equivalent communication for both Harold and Richard.

The inconsistent results across subjects may be attributed to several variables. It would appear that Bruce's disruptive behavior was motivated by escape (as identified by the MAS) thus it is not surprising that a timeout procedure would increase his behavior if it allowed him to escape the demands placed on him during the educational tasks (Solnick, Rincover & Peterson, 1977). Harold's disruptive behavior was also motivated by escape; however, timeout was effective in the reduction his
tantrums and aggression. It may be possible that the MAS was not adequate for identifying controlling variables for each subject; a more detailed functional analysis employing controlled conditions may be necessary (Iwata, Vollmer, & Zarcone, 1990). It should be noted, however, that the MAS provided enough information to develop functionally equivalent communication responses that appeared to be effective relative to baseline levels of disruptive behavior for both Harold and Richard. The task difficulty may have played a role in the different results. Harold emitted over twice as many correct responses as Bruce. It is possible that the educational tasks were more aversive to Bruce, so his escape responses (i.e., aggression, signing "time") were more probable when reinforced during the timeout or functionally equivalent communication conditions.

Speculation about the inconsistent results across subjects could be extended by considering the issue of punishment. It was demonstrated that timeout was a punisher for Harold and Richard. Lower rates of disruptive behavior, relative to experimental baseline conditions, were produced when timeout immediately followed the targeted response for these subjects. Timeout produced different effects for Bruce, increasing his rate disruptive behavior relative to baseline conditions, thus
demonstrating that timeout was not a punisher for him. It would be interesting to see the results had the timeout procedure been replaced with a punishment procedure where effectiveness was experimentally confirmed.

It is noteworthy that the two subjects who displayed the lowest rate of disruptive behavior under timeout (thus verifying its efficacy as a punisher) also showed the lowest preference of this condition during the Choice phase of the experiment. The functionally equivalent communication condition was a factor in the maintenance of this disruptive behavior. Other two subjects, Richard's MAS results were different than those of the other two subjects. Richard's MAS indicated that attention to the conditions of baseline and timeout produced intermediate rates of disruptive behavior relative to those produced by both subjects. Treatment produced the same outcome for the experiment. The functionally equivalent condition was the preferred (i.e., chosen) condition of the experiment. The condition during the Choice phase verifying its effectiveness as a punisher (thus showing the lowest rate of disruptive behavior under timeout) was experimentally confirmed.

It is noteworthy that the two subjects who displayed demonstrating that timeout was not a punisher for him. It
problem may be solved by gradually requiring more time engaged on-task before reinforcement is provided for the communication responses. However, it is unclear whether this would decrease the efficacy of functional equivalence training in managing disruptive behavior. Steege, Wacker, Berg, Cigrand, and Cooper (1989) addressed a similar issue by gradually increasing the number of responses before providing reinforcement.

The results of the present study indicate that subjects engaged in training for approximately 50-60% of the total session duration during the conditions of timeout and functionally equivalent communication. But the time needed to implement a timeout procedure further subtracts from training time. This suggests that more time available for training is a benefit of functional equivalence training as compared with timeout.

Previous research has suggested that functional equivalence training can be an effective intervention for individuals with severe handicaps. But functional equivalence training did not eliminate the disruptive behavior for subjects in the present study. To increase the efficacy of functional equivalence training, it may necessary to add an experimentally confirmed punisher as a consequence for problem behavior. This supports the findings of Wacker et al. (1990), who suggest that a
procedure such as timeout may be necessary at least initially for some individuals. Those authors argue that a suppression procedure may be needed to reduce disruptive behavior with a long history while providing functional equivalence training. A combination of functional equivalence training and consequences for problem behavior should be evaluated on an individual basis. It would seem logical that once a functionally equivalent response is learned and reinforced in the natural environment, it would then continue as part of an individual’s behavioral repertoire provided that the new behavior is at least as efficient as other responses serving the same function. Further research should examine the issue of maintenance with functional equivalence training to confirm this logic.
Appendix A

Form Letter for Obtaining Informed Consent from Subject’s Guardian
Informed Consent Form

This letter is written to ask for your permission to allow [name] to participate in a research study. We are comparing the procedures of time-out and alternative communication training on disruptive behavior. Disruptive behavior is demonstrated when a student is aggressive, screaming, or out of seat. The treatment procedures will include: Communication training (teaching the words "Come" and "Time") and Time-out (removing the student from the class for 2 minutes when he or she is disruptive). This study will take place at the Ottawa Area Center.

A questionnaire will be completed by your child's teacher. This questionnaire will assist in the identification of events maintaining disruptive behavior.

Your child will then learn to communicate the words "Time", "Come", or words for favorite items. This will take place until your son or daughter uses the words correctly 10 times in a row.

Three procedures will be alternated after the communication training is completed. There will be one session in the morning and one in the afternoon. Each session will last approximately 20 minutes. The first procedure involves your son's or daughter's current classroom routines. During the second procedure, the student will be encouraged to use communication in the place of disruptive behavior. The third procedure involves time-out. When the student is disruptive, his or her teacher will say "No, you need to go to time-out" and the student will be escorted to a specific area of the classroom. This area will be behind a partition. This study will take approximately 15 weeks to complete.

The benefits of this study include a possible reduction of your son's or daughter's disruptive behavior. It is also possible that communication skills will be increased. The risks to your child of participating in this research project are small. It is possible that your son or daughter may become upset during the time-out procedure. Your child's teacher will closely monitor your child's behavior during these procedures.

During this project, your child will be video taped for the purpose of collecting data on his or her disruptive behavior. The video tape will be viewed only by persons directly involved with this study. All video tapes of your child will be completely erased after the project is completed.
Any information obtained in this study will be confidential to the experimenter. By signing this informed consent document, you give permission for the data to be used in scientific presentations and publications; all identifying information will be removed.

Participation is voluntary; your decision will not in any way prejudice or effect the educational program of your child. Participation can be discontinued at any time without effecting your child's educational program. It is strongly recommended that the commitment will be for the entire study.

If you have questions concerning this project, please contact:

Dr. R. Wayne Fuqua
Department of Psychology
Western Michigan University
Kalamazoo, Michigan 49008

Steve Goodman
Ottawa Area Center
10160 96th. Avenue
Zeeland, Michigan 49464

To whom it may concern, I hereby give my permission for _________ to participate in the research project described above entitled A Comparison of Communication Training and Time out procedures in the Reduction of Disruptive Behavior.

I have read the attached description of the project and understand it as described. I realize that I may withdraw my permission at any time without effecting my child's educational program.

Sincerely,

Guardian Date

Witness Date
Appendix B

Approval Letters From the Human Subjects
Institutional Review Board
Date: March 21, 1990
To: Steve Goodman
From: Mary Anne Bunda, Chair

This letter will serve as confirmation that the change in your research protocol, "A Comparison Training and Timeout Procedures in the Reduction of Disruptive Behavior", has been approved by the HSIRB.

The Board notes that your initial approval will last until May, 1990. If you need an extension, please let us know.

The Board wishes you success in the pursuit of your research goals.

xc: W. Fuqua, Psychology

HSIRB Project Number 89-05-06
Approval Termination May, 1990
Date: June 11, 1990
To: Steve Goodman
From: Mary Anne Bunda, Chair

This letter will serve as confirmation that Human Subjects Approval Review of your research protocol, "A Comparison of Communication Training and Timeout Procedures in the Reduction of Disruptive Behavior", has been approved as full by the HSIRB. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the approval application.

You must seek reapproval for any change in this design. You must also seek reapproval if the project extends beyond the termination date.

The Board wishes you success in the pursuit of your research goals.

xc: W. Fuqua, Psychology

HSIRB Project Number 90-06-05

Approval Termination June 11, 1991
BIBLIOGRAPHY


