

*THE USE OF CONTINGENT-INTERRUPTED MUSIC IN THE
TREATMENT OF DISRUPTIVE BUS-RIDING BEHAVIOR*

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The present study evaluated the efficacy of using contingent-interrupted music in treating the disruptive bus-riding behavior of an 8-year-old profoundly retarded female. Music was played during each bus ride as long as the subject was sitting appropriately, and interrupted contingent upon each response defined as disruptive bus riding, during an ABCDCDCDA design. A significant reduction in disruptive bus riding occurred with each introduction of contingent-interrupted music. The treatment procedure described in this report was easy to administer, produced rapid treatment gains, and showed virtually no regression during an 8-week follow-up period.

DESCRIPTORS: bus riding, disruptive behavior, stimulus control, contingent-interrupted music, retarded girl

In recent years there have been many studies demonstrating the efficacy of using music as a reinforcing stimulus. A review of the literature indicates that the use of music, as a means of increasing a desirable response, has been effective in areas such as self-help skills (Harrison, Lecrone, Temerlin, & Trousdale, 1966), activity level (Rieber, 1965), academic behaviors (Madsen & Forsythe, 1973), imitative behaviors (Metzler, 1974), and behavior problems (Greene, Hoats, & Hornick, 1970).

Although there have been many studies concerned with the systematic use of music as a reinforcer to increase appropriate behavior, fewer studies have investigated the effectiveness of contingent-interrupted music to reduce undesirable behaviors. The contingent interruption of

music has been an effective procedure for decreasing problem behaviors such as multiple tics (Barrett, 1968), inappropriate verbal and non-verbal behavior (Hanser, 1974), and disruptive classroom behaviors (Wilson, 1976).

Ritschl, Mongrella, and Presbie (1972) tested a "group control procedure," response-contingent withdrawal of music, as a method for decreasing out-of-seat bus-riding behavior of mildly retarded children. In this study, the authors played continuous rock and roll music as long as the children were sitting quietly. The music was contingently interrupted for 5 sec immediately following each instance of out of seat by any child in the group. Results indicated that the group time-out procedure was effective in significantly reducing instances of out-of-seat behavior.

Although disruptive bus riding is a frequently reported problem (Allen, Turner, & Everett, 1970; McKenzie, 1971; Tanzman, 1971), little attention has been focused on this troublesome area. Problems often created by disruptive bus riding include: the inability of the bus driver to concentrate fully on driving the vehicle, thereby increasing the potential for traffic accidents; potential bodily injury to the children on board;

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and potential for imitating a child's disruptive behavior.

When the subject population consists of children with at least a moderate degree of receptive and expressive language skills, it seems possible to successfully implement *group* contingencies for the purpose of modifying the problem behavior of a few individuals or the group as a whole. However, when the subject population does not possess this important characteristic, the benefits inherent in a group procedure (e.g., peer pressure, direct instructions, modeling of appropriate behavior) may not always be fully realized.

As was mentioned above, previous studies using contingent-interrupted music for decreasing undesirable behavior have been effective primarily with children from either a normal population or a population considered to be a low to moderate range of retardation. Many of these studies also implemented *group* contingencies as the primary treatment strategy. The efficacy of using contingent-interrupted music, in the absence of group contingencies, when treating behavior problems in the profoundly retarded, has yet to be empirically demonstrated.

Therefore, the following study was designed to evaluate the effectiveness of response-contingent withdrawal of music for the purpose of reducing the disruptive bus-riding behavior of a profoundly retarded child.

METHOD

Subject

The subject was an 8-yr-old profoundly retarded, nonambulatory, Caucasian female who was residing at home with both of her natural parents at the time of this study. A recent medical examination described the girl as evidencing microcephaly, alternating esotropia, and wondering lateral mystagmus. She showed virtually no expressive language skills, and often responded poorly to commands. Her mental age score, as assessed on the Bayley Scale, fell between 5-6 months. Throughout the duration of

this study, the client attended a Developmental Center for Handicapped Minors.

The client's parents reported that the presenting problem, disruptive bus riding, had been occurring for nearly 5 yr. The parents also reported that disruptive behavior was frequently seen in the family car, although to a much lesser extent than in the school bus. Disruptive behavior was operationally defined as any occurrence of the client screaming, kicking the seat in front of her, crying, banging her head against the seat rest, and falling onto the floor of the bus.

Behavioral Analysis

A behavioral analysis of the problem situation revealed consistent and reliable antecedents and maintaining conditions associated with disruptive bus riding. The therapist (senior author) rode the school bus with the client in order to observe these conditions directly. Direct observations indicated that nearly every instance of disruptive behavior was consistently preceded by the slowing down, stopping, or turning of the school bus. Rarely would the client engage in disruptive behavior while the bus was cruising at a constant speed or when she would get ready for school, board the bus, or choose her seat on the bus.

In addition to predictable antecedent conditions, consistent consequences for this behavior were also evident. Immediately following each instance of disruptive behavior, the driver and/or aides would attempt to distract the subject by "talking her down," singing to her, or holding her. Other previously attempted control methods included giving the client toys to play with and verbal reprimands such as "No, sit quietly." None of these procedures was effective in eliminating this behavior.

Isolation of Variables

Initially it was hypothesized that the client's disruptive behavior might be some type of sensory evoked seizure. Although the client's medical history was void of any seizure activity, it was thought that either the *motion* caused by

turning, accelerating, and decelerating, or the loud differential *sound intensity* emitted from the engine (via frequent gear changing) could be responsible for eliciting a specific type of seizure disorder. Tape recordings of the sounds of the engine and gear shifting were played to the client while she was seated in the motionless bus and attempts were made to recreate the turning movements experienced during the ride. Neither produced disruptive behavior.

Experimental Conditions

The dependent measure was the percentage of time disruptive behavior was emitted during each bus ride, from the client's home to her school. The ride was exactly 15 min and she rode the bus in the morning and afternoon; therefore, each 30-min block corresponded to one day.

The target behavior had a discrete onset and offset that was easy to identify. As a result, duration recording was used as the data collection procedure. Observers were equipped with a stopwatch for the purpose of recording the percentage of disruptive behavior displayed during a complete ABCDCDCDA design (Hersen & Barlow, 1976).

Baseline (A). During baseline measures (Days 1-4) the driver and aides were instructed to behave in their usual manner toward the client, which invariably consisted of physical contact, distraction techniques, and verbal reprimands. At no time was music played during this condition.

Extinction (B). Due to the possibility that attention may have been responsible for maintaining the problem behavior, everyone on the bus was instructed to ignore the child when she was emitting disruptive behaviors. This condition was in effect for three days.

Continuous Music I (C). During this condition (Days 8-10) a portable cassette recorder (Realistic, Model #CTR-25) was used to play back prerecorded music. Music was chosen as the positive stimulus because parental reports indi-

cated that music appeared to have a "soothing" effect on their child.

The prerecorded cassettes contained musical selections that the client appeared to enjoy. These selections included rock and roll music as well as classical music. The selections played each day were randomly chosen in order to avoid satiation effects. Throughout this condition music was played continuously for 15 min regardless of whether or not disruptive behavior was being displayed. The client listened to the music through headphones directly connected to the player-recorder. The headphones helped not only to block out distracting auditory stimuli created during the ride, but also to ensure that she was attending to the music.

Interrupted Music I (D). This condition (Days 11-14) consisted of withdrawing the positive stimulus (music) contingent upon each occurrence of disruptive behavior. As long as the client was sitting quietly, she was allowed to listen to the music. Contingent upon the first sign of disruptive behavior, the music was immediately withdrawn by removing the headphones. The headphones were returned after she had been sitting quietly for 5 sec.

Continuous Music II (C). In order to better evaluate the efficacy of response-contingent withdrawal and representation of music, noncontingent, continuous music was played (Days 15-17).

Interrupted Music II (D). Days 18-21 were conducted as in the first interrupted music condition.

Continuous Music III (C). Another return to this treatment contingency (Days 22-24) was again introduced in order to demonstrate the effects of the treatment procedure.

Interrupted Music III (D). A final evaluation of this condition (Days 25-28) was implemented as a further test of the effects of interrupted music.

Fading. During this condition (Days 25-26) the variety of discriminative stimuli (e.g., therapist, tape player, headphones, music) was systematically eliminated from the experimental setting. First the headphones were removed so

that the music was heard directly from the recorder. Next, the volume and duration of music was gradually faded. Finally, the therapist gradually faded his presence from the client. This was done by sitting further and further away from the client during each session. The therapist was no longer riding the bus on Day 26. At this time the driver was instructed to play the bus radio intermittently when the client was sitting quietly.

Follow-up (A). Follow-up data were collected on one randomly selected day each week, for eight consecutive weeks, following termination of treatment procedures. Data were collected in a manner similar to previous conditions.

Reliability

Interobserver reliability was assessed by having the therapist and another individual, who was naive concerning the design of this study, both independently record the percentage of disruptive behavior during each bus ride. Reliability checks were conducted during all experi-

mental phases except during Continuous Music III, due to the absence of a second observer at that time. Reliability was calculated by dividing the smaller percentage score by the larger score. Interobserver agreement ranged from .94 to 1.00, with a mean of .96.

RESULTS

The percentage of disruptive behavior, plotted over days (30-min periods), is shown in Figure 1. During the baseline condition the mean percentage of disruptive behavior was 93.5%. During the extinction condition, mean disruptive behavior was 99%. During Continuous Music I, mean disruptive behavior decreased slightly to 96%.

After only one day of interrupted music, the treatment contingency was effective in decreasing the problem behavior to 45%. The remaining days in this condition decreased disruptive behavior to a mean of 42%, a 54% decrease from the previous control condition. In Continuous Music

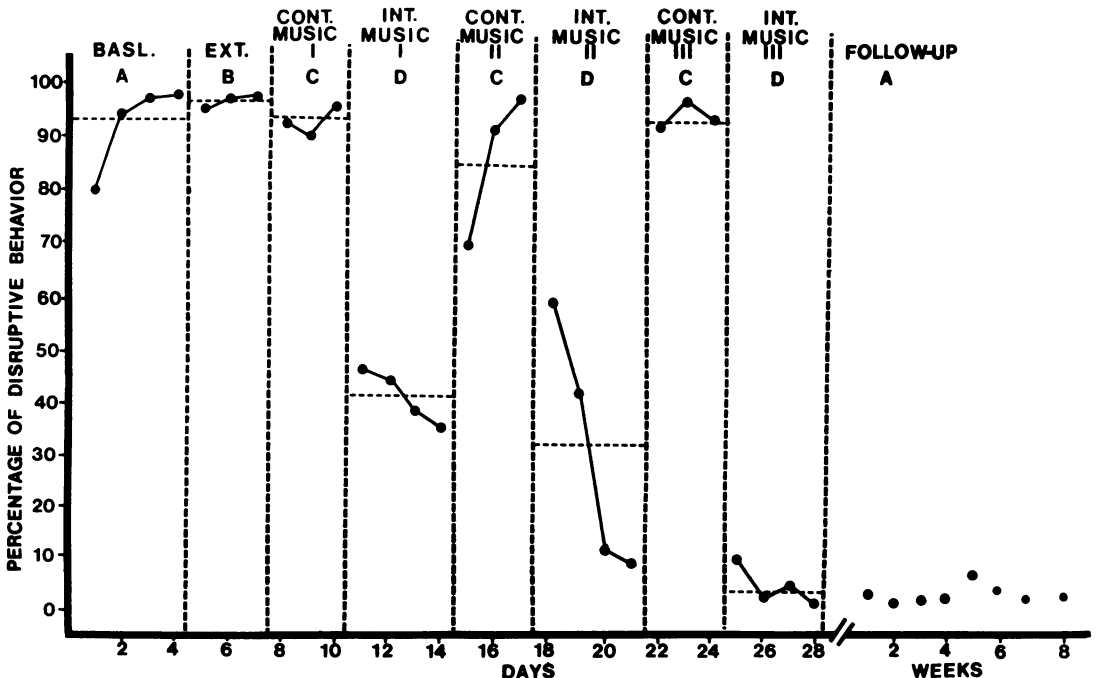


Fig. 1. Percentage of time spent in disruptive bus-riding behavior during all experimental conditions. Each datum point corresponds to a 2-session (30-min) block.

II, disruptive behavior increased to a mean of 86%. During the Interrupted Music II condition, disruptive behavior was once again reduced, resulting in a mean of 32%. When continuous music was once again implemented disruptive bus riding increased to a mean of 91%.

During the final treatment period, contingent-interrupted music was responsible for decreasing the target behavior to 8.5%, the lowest percentage throughout the duration of this intervention. Beginning with Day 25, discriminative stimuli were gradually faded from the experimental setting. After the first session of Day 26, all stimuli associated with the treatment procedure had been removed. Follow-up observations began one week following termination of treatment, and continued for eight consecutive weeks. As can be seen from Figure 1, treatment gains had been maintained.

DISCUSSION

The results of the present study demonstrated the efficacy of contingent-interrupted music in reducing the disruptive bus-riding behavior of a profoundly retarded child. These results were obtained after only 28 days of intervention. After 8 days of implementing treatment contingencies, disruptive behavior was decreased to 4%, a 91% decrease from baseline measures.

The results of this report are also consistent with the Ritschl et al. (1972) study which tested a "group time-out" procedure for decreasing out-of-seat behavior of mildly retarded children while riding a school bus. However, in the present study, equally effective results were obtained with a profoundly retarded individual without the added benefits of implementing a group contingency. Although the results of the present study are comparable to the Ritschl et al. study, it should be pointed out that in this report the interrupted music conditions involved two contingencies. One was removal of music contingent on disruptive behavior and the other was re-presentation of the music contingent on nondisruptive behavior. Either or both of these

contingencies may have been responsible for the changes observed.

As was previously mentioned, duration measures were used as the method for calculating reliability. This procedure may have led to spuriously high reliability figures because there was no guarantee that the two observers were actually recording the same behavior at the same time. The comparison of observers' records could have been better calculated on a moment-by-moment basis or by using a correlational statistic. However, the dramatic differences between treatment and nontreatment phases in the study suggest that this was not a serious problem.

Regarding generalization of treatment effects to other movable environments, i.e., the family car, it should be noted that parental self-report data suggested that improved bus-riding behavior had generalized to some degree with respect to the child's behavior while riding in the family car. However, it should be stressed that these data are purely of a subjective nature and therefore cannot be empirically justified.

Although the possibility of neurological impairment was never fully ruled out as a possible cause for this problem behavior, results indicated that this behavior could be successfully modified by implementing operant conditioning procedures, regardless of the etiology.

The treatment procedure described in this report was easy to administer, produced rapid treatment gains, and showed virtually no regression during follow-up. This efficient and cost-effective treatment should prove useful to others who are faced with similar management problems in a school bus setting or other moving environments.

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