

## Promoting Recreation Skills in Severely Retarded Children

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### RESUMEN

*Muy diferentes puntos de vista han subrayado la importancia de la educación física y las actividades recreativas para los niños retardados. En concordancia, se examinaron los procedimientos de modificación de conducta en un campo de veraneo para niños retardados, como medio para aumentar la participación de los mismos en actividades recreativas, y demostrar que miembros supervisados del personal pueden servir como experimentadores en situaciones de este tipo al tiempo que modifican conductas que les preocupan. Se realizaron cuatro estudios en donde el personal del campamento actuaron como experimentadores primarios; los sujetos de estos estudios variaron desde sujetos individuales hasta grupos enteros de clase. En el primer estudio se examinó la conducta de realizar tareas en el salón de clases en dos niños que mostraban altas tasas de distracción (vgr., gritar, lanzar materiales, correr, etc.). Se aplicó secuencialmente un procedimiento de reforzamiento simbólico a tres diferentes salones de actividades en un diseño de línea base múltiple. Se dispusieron contingencias similares para una clase entera de niños en un segundo estudio. Los aumentos substanciales en la participación en clase para todos los niños se relacionó funcionalmente a la introducción de las contingencias experimentales.*

*En un tercer estudio se evaluaron los efectos del reforzamiento social de los adultos en el juego apropiado con pelotas de baloncesto y patines en un niño con síndrome de Down, empleando un diseño de reversión. Las observaciones efectuadas durante el juego libre mostraron aumentos en un 75% en el juego apropiado durante los periodos de reforzamiento social por adultos. En el cuarto estudio se empleó la extinción utilizando un diseño de línea base múltiple para reducir el contacto físico perturbador de una niña con impedimentos físicos. Los registros efectuados sobre el número de contactos físicos perturbadores dirigidos a dos miembros del personal mostraron que durante las fases de extinción, la conducta perturbada virtualmente se eliminó. En conjunto, estos cuatro estudios demostraron que:*

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1. *Los campamentos pueden ser situaciones de enseñanza significativas para niños impedidos.*
2. *Se puede aumentar la participación de los niños en actividades físicas saludables, empleando procedimientos de modificación de conducta.*
3. *El personal del campamento, con un adiestramiento y supervisión apropiados puede aplicar técnicas de modificación de conducta y demostrar proyectos sin perturbar la rutina normal y como resultado disponer de más tiempo para supervisar las actividades de los niños, y*
4. *Se necesita arreglar las condiciones para asegurar la participación de los niños si se van a obtener beneficios de las actividades físicas y de recreación.*

#### ABSTRACT

The importance of physical education and recreation activities for retarded children has been stressed from many quarters. Accordingly, in a summer day camp for retarded children, behavior modification procedures were examined as a means to increase children's participation in recreational activities and to demonstrate that supervised staff members can serve as experimenters in camp setting as they modify behaviors that are of concern. Four studies were conducted in which camp personnel acted as primary experimenters; the subjects of these studies ranged from single subjects to entire classroom groups. In the first study, on-task classroom behavior was examined for two boys who displayed high rates of distractible behavior (e.g., shouting, throwing materials, running, etc.). A token reinforcement procedure was sequentially applied to three different activity classrooms in a multiple-baseline design. Similar contingencies were arranged for an entire class of children in a second study. Substantial increases in the classroom participation of all children were functionally related to the introduction of the experimental contingencies. In a third study, the effects of adult social reinforcement on the appropriate play with basketballs and roller skates of a young Down's Syndrome boy were assessed using a reversal design. Observations made during free play showed increases of 75% in appropriate play during periods of adult social reinforcement. In the fourth study, extinction was employed using a multiple baseline design to reduce disruptive physical contact of a physically handicapped girl. Records kept on the daily number of disruptive physical contacts directed toward two staff members showed that during extinction phases, disruptive behavior was nearly eliminated. Taken together, these four studies demonstrated that (1) day camps can be significant teaching settings for young handicapped children, (2) children's participation in healthy, physical activities can be increased by employing behavior modification procedures, (3) indigenous camp personnel with proper training and supervision can carry out behavior modification techniques and demonstrate projects without disrupting the normal camp routine and as a result have more time to supervise children's activities, and (4) conditions need to be arranged to insure children's participation if benefits are to accrue from recreation and physical education activities.

The application of behavior principles has been used to increase the appropriate behavior and decrease the inappropriate behavior of retarded children in such settings as special education classrooms (Grimm & Bijou, 1973) and large institutions (Browning & Stover, 1971). Despite its demonstrated effectiveness, this treatment approach has been largely ne-

glected by practitioner of physical education and recreation (McKenzie & Rushall, 1973).

Three recently published studies have applied behavior principles in recreation settings. Rickard and Dinoff (1965) reported a case study where a shaping procedure was used to encourage active participation of a 13-year-old boy in camping activities. Pierce and Risley (1974) demonstrated how two problems of urban recreation programs—recruiting members and reducing disruptive behavior within the program—could be handled by contingently adjusting the amount of time the recreation activities were available. In a second study, Pierce and Risley (1974) showed that the job performance of Neighborhood Youth Corps workers serving as aids in an urban recreation program could be improved by making earnings contingent upon specific performance objectives.

The purpose of this investigation was to determine the effects of the application of behavior analysis techniques in a day camp setting for retarded children. Four studies were carried out by the camp staff. Two studies examined the effectiveness of token reinforcement to promote desired behaviors in camp activities. In these studies positive consequences were arranged to follow children's participation. A third study examined adult praise as a positive technique to increase a child's play behavior during free play activities. Positive, encouraging comments and attention from a supervising adult were used as reinforcers for ballplaying or roller skating in this study. A fourth study examined procedures to reduce disruptive behavior; they involved formally or systematically ignoring disruptive behavior and occasionally redirecting the child into appropriate activities.

Each study was integrated into the normal camp operation. The camp utilized the classroom and gymnasium facilities of an elementary school, while swimming activities were held in a neighborhood pool. The camp was attended by 60 mentally and physically retarded children, 32 boys and 28 girls, between 5 and 15 years of age. The camp staff consisted of a director, three teachers, a full-time nurse, and between 30 to 50 high school students who volunteered on a daily basis. The camp was operated for six weeks during the summer from 9:00 a.m. to 1:00 p.m., Monday through Friday. During the first 30 min. of the morning, indoor free play was scheduled. The remainder of the morning consisted of three, 45-min. classes (music, sports-and-games, and arts-and-crafts), a 30-min. snack time, and a 45-min. swimming lesson.

### **Experiment 1: Increasing Participation in Camp Activities**

The behavior of two children who rarely participated in camp activities and often disrupted other children was modified during scheduled activities by allowing them to earn small toys, gum, and candy. During camp classes, tokens (poker chips) were contingently dispensed for activity

participation and were redeemable for these prizes at the end of each class.

### *Subjects*

Two boys, Kevin and Jimmy, participated in this study. Kevin was a 12-year-old, Down's Syndrome child who exhibited a number of deviant behaviors that were incompatible with successful, task-oriented participation in camp activities. His deviant behaviors during the music, games, and art classes included running around the room, making loud noises, disrupting other children's activities and destroying their craft products, running out of the classroom or play area, refusing to participate in camp activities, and destroying materials provided to him during class.

Jimmy was 11 years old and was diagnosed as brain damaged. During music, he wandered around the room, stared "into space" and out the window, and rarely participated in camp activities.

### *Procedure*

Data were recorded every day during the three scheduled classes by a high school student who volunteered to serve as observer. Each observation session was always 45 min. long. Every minute, the observer recorded the occurrence or non-occurrence of task behavior by placing a "+" (on-task) or "-" (off-task) in boxes on a prepared data sheet. On-task behavior was scored when the child participated in the assigned activity (i.e., cutting, pasting, drawing, etc.) for the entire interval; off-task behavior was scored when behavior unrelated or incompatible with scheduled activities (including yelling, crying, hitting, running away, or disrupting other children) occurred.

Periodically, reliability checks were taken to determine the accuracy of the data recorded. Twelve reliability checks were performed by having two observers make simultaneous but independent records. A percentage agreement score was computed by dividing the number of agreements by the number of intervals observed, and multiplying by 100. Reliability averaged 99% (range 87% to 100%).

### *Experimental Phases and Results*

*Baseline.* Records were kept of the percentage of time Kevin and Jimmy were on-task during their classes. For Kevin, no contingencies were in effect for being on-task in music during the first six days of the experiment in games during the first ten days, and in art through the first thirteen days. For Jimmy, there was no contingencies for the first six days in games, ten days in music, and eighteen days in art.

Kevin's average percent time on-task was 1.3%, 22.0%, and 55% in music, games, and art, respectively; the corresponding figures for Jimmy were 0.8%, 2.3%, and 76.5%.

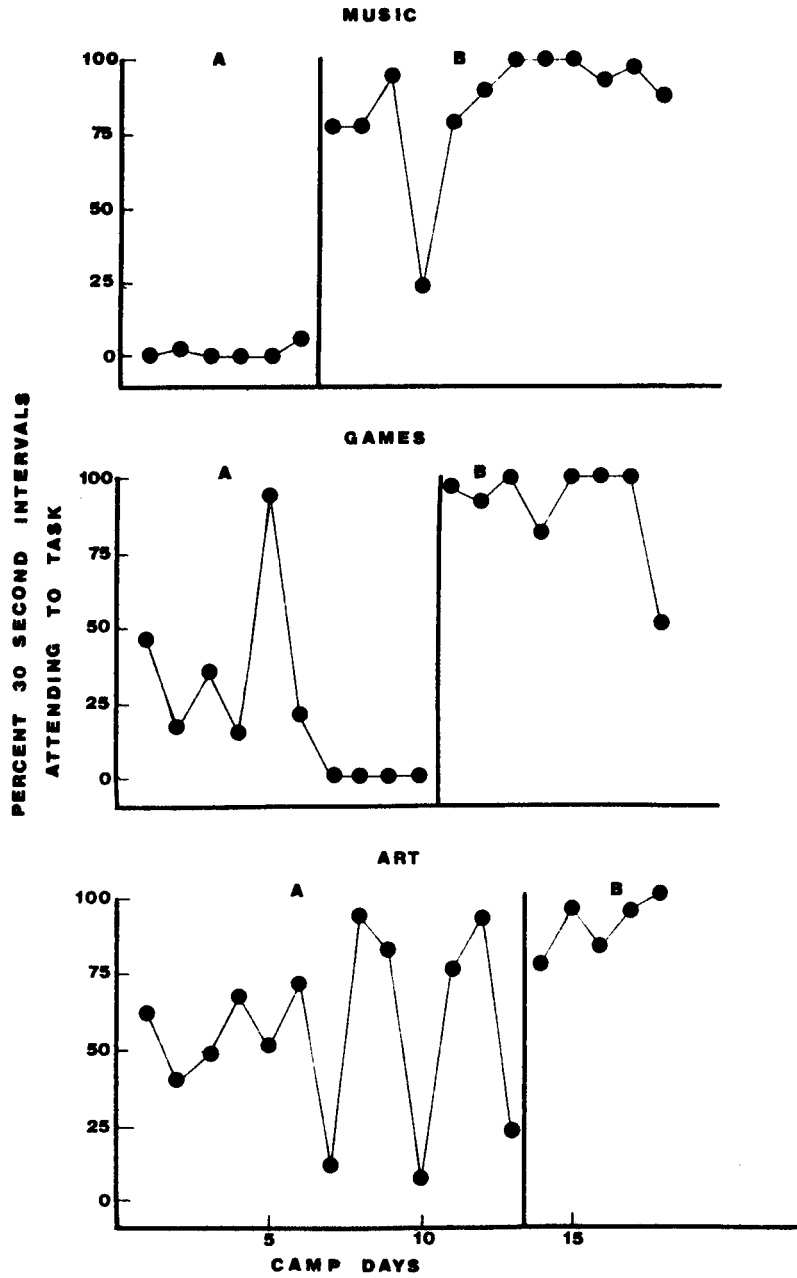


Figure 1. Kevin's percent on-task behavior in the music, art, and games classes during baseline (A) and reinforcement (B) conditions.

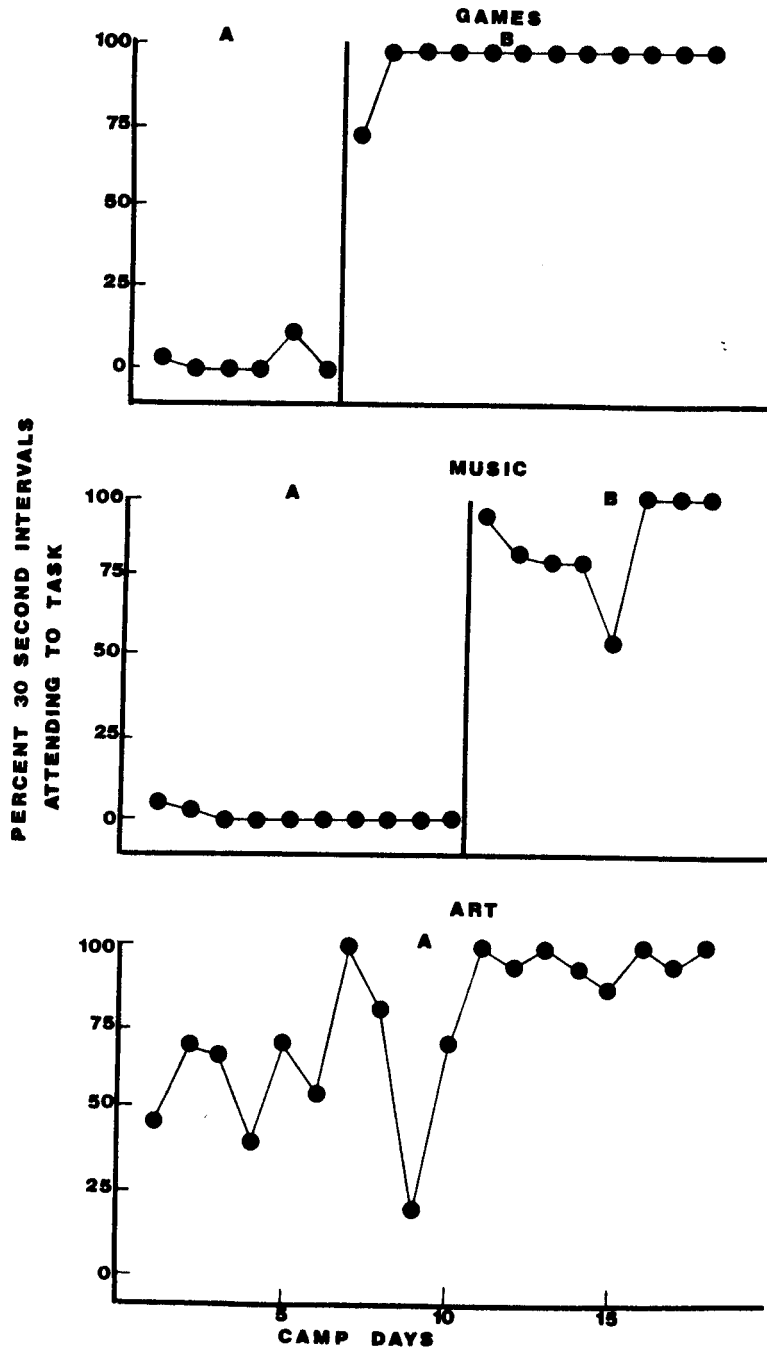


Figure 2. Jimmy's percent on-task behavior in the music, art, and games classes during baseline (A) and reinforcement (B) conditions.

*Token reinforcement.* On day 7, Kevin was told that he could earn tokens by participating in music. The tokens were dispensed immediately after each interval scored as on-task. Nothing was said about the other classes. As seen in Figure 1, under these conditions, Kevin's on-task behavior in music increased dramatically, while on-task behavior was essentially unchanged in games and art.

On day 11, Kevin was told he could earn tokens for participating during both music and games; nothing was said about art. Figure 1 shows that under these conditions Kevin's on-task behavior in music remained high while on-task behavior in games increased substantially. On-task behavior in art remained essentially at the same level.

On day 14, Kevin was told he could earn tokens in all three classes. Under these conditions, on-task behavior was high for all three activities.

Jimmy received a similar sequence of conditions. Tokens could be earned starting on day 7 in games and on day 11 in music; tokens were not used in art as his behavior in this class was not disruptive. Figure 2 shows that there was improvement in baseline performance whenever the reinforcement procedures were implemented.

### *Summary*

Disruptive behavior was reduced and participation was increased for Kevin and Jimmy by introducing positive contingencies for constructive, on-task behavior. The effectiveness of contingent tokens was clearly demonstrated in music and games. One possible interpretation for the improving trend in art is that generalization across situations occurred (Kazdin, 1975). It might also be possible that over time the teacher better programmed the art activities to meet the child's needs or that the activities themselves varied in their reinforcing function. Future studies might check these possibilities. Future studies might also investigate procedures for gradually fading out the contrived token reinforcer system and for maintaining the improved behavior under conditions natural to the setting, i.e., praise and attention.

### **Experiment II: Increasing Use of Two Free-Play Activities**

The previous study incorporated contrived consequences to motivate participation in camp activities. In this study, the presentation of a naturally occurring consequent, adult attention, was rearranged. Rather than attending to the child when he was in isolation, and adult now attended to and praised the use of two free-play materials.

### *Subject*

The subject of this study was Don, a 6-year-old boy, Down's Syndrome boy who rarely interacted with other children or with the available play

equipment during the 30-minute free-play period. Casual observation indicated he rarely played with a basketball or roller skates, two very popular free-play activities for the other children.

### *Procedure*

A high school student collected data on the amount of time Don spent playing ball or roller skating during the 30 minute free-play period. Every minute on the minute the observer located Don and noted whether he was playing basketball (defined as bouncing, rolling, catching, throwing, or shooting a basketball), roller skating (defined as forward or backward movement via the wheels), or in isolation (defined as sitting idly, not interacting with the basketball or roller skates). Reliability was assessed on seven occasions by the formula given in Experiment 1 and averaged 93% (range 83% to 100%).

### *Experimental Phases and Results*

*Baseline.* (A) During baseline, data were collected on the percentage of time Don spent playing ball or roller skating. No contingencies were in effect for either activity. Figure 3 presents the amount of time Don spent in each of the two activities plus the amount of isolation.

Don's mean baseline for percent time spent playing ball was 2.4%. His mean percent time spend roller staking was 39.4% and his mean percent time spent in insolation was 58.2%.

*Adult praise contingent on ball playing.* (B) On day 6, the staff member who supervised free play was asked to attend to and praise Don for playing ball. No changes were to be made for Don's roller skating or isolation. Figure 3 shows that adult attention and praise increased ball playing to a mean of 64.2%. Roller skating averaged 16.8% and isolation decreased to 19.2%.

*Return to baseline.* (A) On day 11 baseline conditions were instituted and no contingencies were programed for ball playing or roller skating. Figure 3 shows a drastic change from the previous reinforcement condition; Don spent all of free-play time in isolation.

*Adult praise contingent on roller skating.* (C) On day 12, the free-play supervisor was asked to attend to and praise Don when he roller skated. Figure 3 shows that during this condition, roller skating increased to a mean of 60.3%, ball playing decreased to a mean of 2.3%, and isolation averaged 37.3%.

*Adult praise contingent on both ball playing and roller skating.* (D) On day 16, the supervisor was asked to attend to and praise Don for both playing ball and roller skating. As shown in Figure 3, under these conditions, ball playing averaged 3.2%, roller skating averaged 50.6%, and isolation increased slightly to an average of 46.2%.



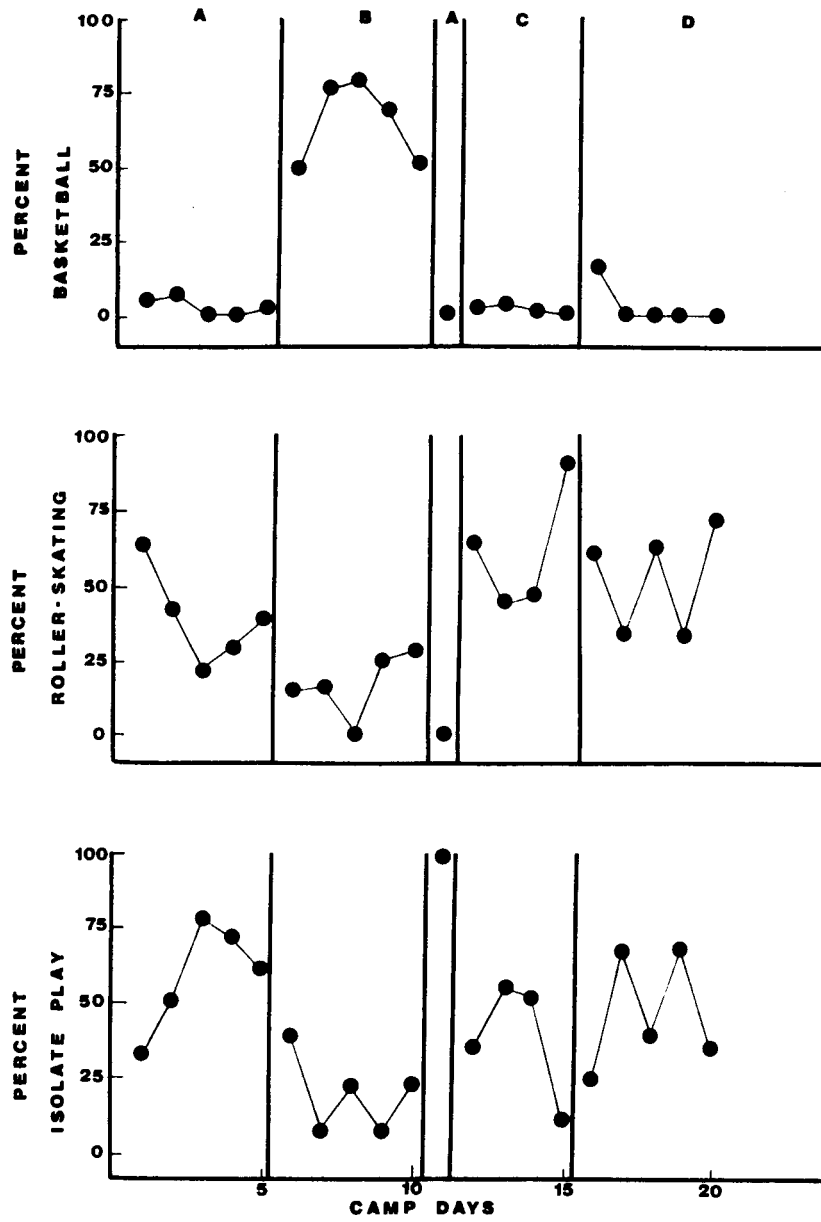


Figure 3. Don's percent time spent in isolation, ball playing or roller skating activities during baseline (A) and experimental phases (B, C, and D).

### *Summary*

The purpose of Experiment II was to determine whether isolation could be reduced by reinforcing an incompatible behavior. Thus, first one (basketball) then another (roller skating) activity was singled out for reinforcement in a reversal design. Don's behavior shifted dramatically under these conditions. When both activities were reinforced, however, his isolation behavior was not dramatically different than baseline. Roller skating did remain high, however, and the possibility exists that Don was not sufficiently exposed to the new contingency to produce change. That is, the procedure of alternating reinforcement of one activity with no reinforcement may have precluded change when reinforcement was available for either activity.

### **Experiment III: Reducing Disruptive Physical Contact**

This study was concerned with weakening a disruptive behavior through a simple extinction procedure.

### *Subject*

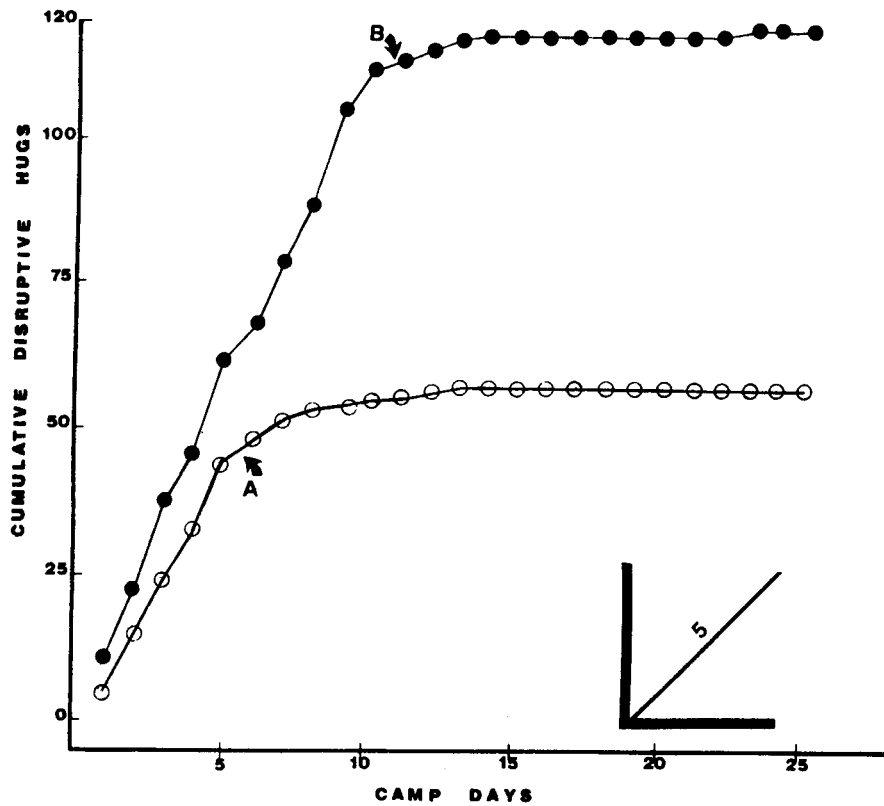
Tammy was a 13-year-old, cerebral-palsied girl. She frequently engaged in disruptive physical contact (holding, tugging and squeezing) with members of the camp staff for durations of more than 30 seconds. The excessive physical contact was reported aversive, sometimes painful, and often made it impossible for a staff member to supervise other children.

### *Procedure*

Each day data were collected by the camp director and the games teacher who counted the number of times Tammy wrapped her arms or legs around them. These counts were made on golf score counters carried by both staff members. Reliability was assessed on 12 occasions by having a second observer make an independent count. A percentage agreement was obtained by dividing the smaller count by the larger and multiplying by 100. Reliability averaged 88% (range 83% to 95%).

*Baseline.* The number of physical contacts was recorded and no experimental contingencies were in effect during the first 5 days of the experiment for the games teacher and the first 10 days for the camp director. In this condition, the two staff members sometimes patted her on the back and expressed verbal greetings ("How are you, Tammy?"), sometimes asked her not to hug them, and sometimes struggled to free themselves. As seen in figure 4, the rate of physical contact during baseline was 11.6 instances per day for the camp director and 8.8 instances per day for the games teacher.

*Extinction of disruptive physical contact.* On day 6 (A) the games



**Figure 4.** Tammy's cumulative number of contacts to the games teacher (open circle) and camp director (solid circle). Extinction procedures were applied at points A and B.

teacher began ignoring Tammy's physical contacts. He did not respond verbally or physically to hugs, but remained still and indifferent. The camp director was requested to respond similarly beginning on day 11 (B). As seen in figure 4, disruptive contact was dramatically reduced first to the teacher as he applied the contingency and next to the director as he instituted the same procedure. During extinction, there was an average of .55 and .94 instances per day respectively for the games teacher and the camp director.

### *Summary*

Hugging, holding or squeezing are normally considered acceptable and affectional responses. However, when such behaviors become painful or incapacitating, techniques are required to reduce the offensive behavior. Additionally, a desirable behavior or pattern of responding should be simultaneously developed. This was done informally in the present study by prompting Tammy to greet staff members with a robust "hello."

### **Experiment IV: Increasing Participation During Activities in A Group of Children**

Members of camp staff often find themselves confronted with several children in the same class who display problem behavior. These occasions require group techniques which can be applied by only one staff member. The present study describes such a technique.

#### *Subjects*

Six children, five boys and one girl, between the ages of 7 and 13 years (mean = 10.2) served in this study. These children were selected because they spent most of their class time engaging in disruptive behaviors.

#### *Procedure*

Data were collected on the amount of time these six children participated in scheduled art, music and games activities. The teacher in each class served as observer and experimenter and was provided with lists of time intervals, a 30-minute timer, and observational data sheets.

#### *Experimental Phases and Results*

*Baseline.* For the first 5 days in music, 9 days in art and 13 days in games, the teacher in each class set the timer according to the specified intervals listed on the time interval sheets. The time intervals were scheduled such that on the average of every 5 minutes the timer rang. When the timer sounded, the teacher recorded the behavior of each target child by placing a "+" (on-task) or "-" (off-task) after each child's name on a prepared data sheet. On 4 occasions in each class an independent observer made a similar record. Reliability between the teacher and observer averaged 87% (range 79% to 95%). During this condition, on-task behavior for these children averaged 22.5% in music, 21.2% in art and 19.1% in games. Figure 5 presents these data.

*Reinforcement.* On day 6, the children were told that during music class they could play a game (cf., Sloane and Allen, 1971) to help them have more fun in music. The children were told that a bell would ring frequently during the class and that each time they were participating in class when the bell rang, they would earn a token. The tokens (poker chips) could be exchanged at the end of class for trinkets, candy, and gum. The game continued throughout the study and was later introduced in the art and the games classes on days 10 and 14, respectively.

As shown in figure 5, the token economy produced immediate and dramatic changes in the amount of time the six children participated in class activities. In every case the group data represent that of individual children.

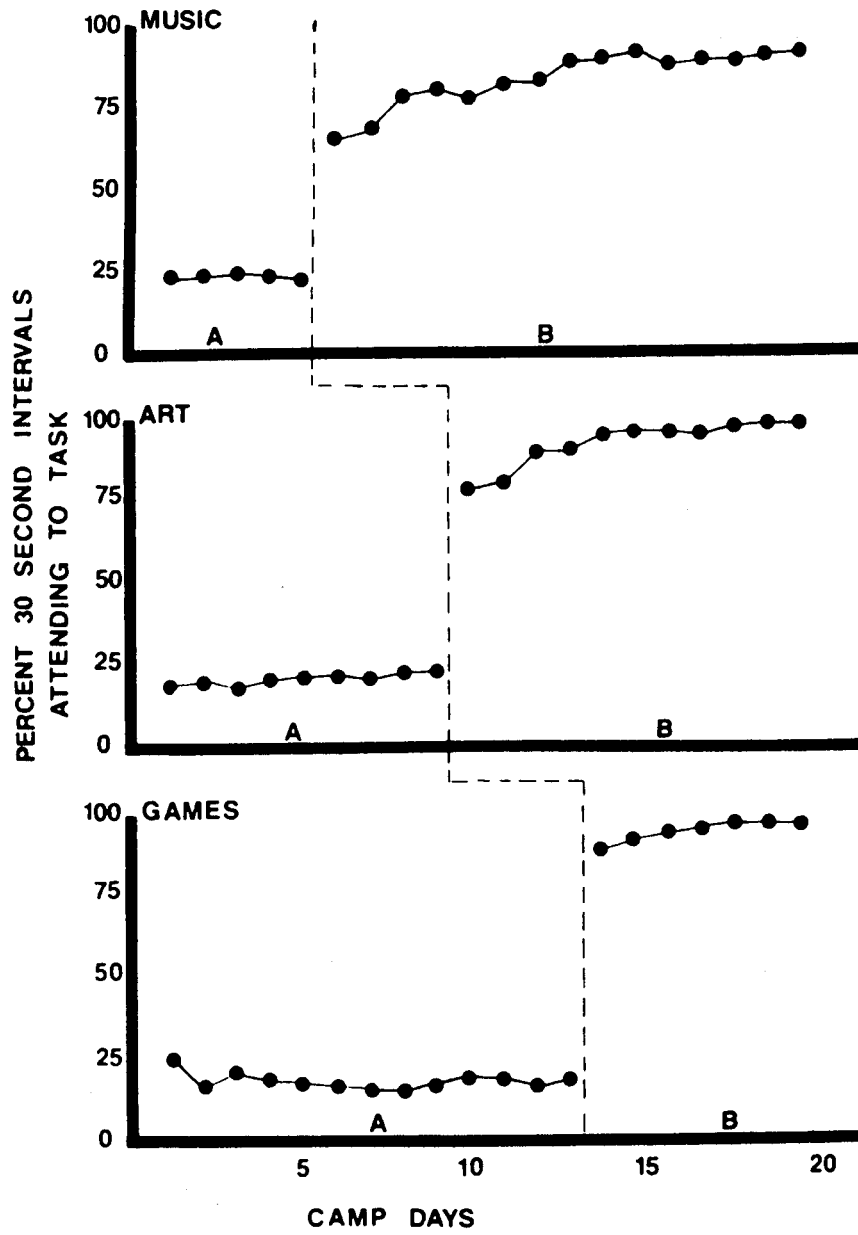


Figure 5. Mean percent of 6 childrens' on-task behavior in the music, art, and games classes during baseline (A) and reinforcement (B) condition.

When the game was introduced in music, participation increased to a mean of 83.3%. Participation in the other two classes remained essentially unchanged. Time on-task in art increased to 92.7% when the game was introduced, while participation in music remained high and baseline performance continued in the games class. Finally, when the contingency was introduced in the games class, participation was high in all three classes, averaging 83.3%, 92.7% and 94.9% in music, art, and games, respectively.

### General Discussion

Behavior principles were systematically applied by members of a summer day camp staff to the problem behaviors of 10 severely retarded children in order to increase their use of the available camp materials and participation in scheduled activities, thereby maximizing their chances of profiting from the recreation program. The techniques described in these studies are noteworthy in that they represent an educational technology that is capable of enhancing individual participation in recreation; such participation has been suggested to promote social interaction, leadership and citizenship (Carlson, Deppe and MacLean, 1963).

These studies are also notable in two other respects. First, the problem behaviors were modified in the camp setting that utilized personnel indigenous to that setting. Training consisted mainly of simple explanations of the principles of positive reinforcement and extinction and demonstration how to keep observational records. Some additional assistance was required in training staff members to analyze the problem situations so that the target behaviors could be clearly defined and objectively and reliably scored.

Second, the total financial cost of these therapeutic interventions was less than \$ 15. This money was used to purchase the backup reinforcers, e.g., candy, gum, and trinkets. The 30-minute timers, tokens, and golf counters were easily obtained from the homes of staff personnel.

In summary, these studies indicate that behavior analysis techniques can have powerful, beneficial effects and that they deserve serious consideration by physical education instructors and recreation program directors.

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