

## TEACHING LEISURE SKILLS TO SEVERELY HANDICAPPED ADULTS: AN AGE-APPROPRIATE DARTS GAME

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### **Abstract:**

This study demonstrates the acquisition and generalization of dart skills by three severely multihandicapped adults. The program took place in a community adult development center. By identifying the motor responses required to play darts, a 7-step task analysis was generated to facilitate instruction. Systematic training procedures using applied behavior analysis were implemented. A combination multiple baseline across subjects and changing criterion design was used. The results indicated that not only could this supposedly difficult skill be acquired by severely multihandicapped individuals, but that they could also generalize to other appropriate environments. Acquisition of this skill could help optimize their use of free time for leisure pursuits in a variety of settings.

**DESCRIPTORS:** leisure skills, recreational activities, generalization, acquisition, multihandicapped adults

### **Article:**

Leisure skill training is important to the habilitation and community integration of severely and profoundly mentally retarded adults. Most severely retarded individuals have ample free time and do not usually use their leisure in constructive ways (Wehman & Schleien, 1981). Typically, inappropriate social behaviors are exhibited such as handflapping, body rocking, self-abuse, and bizarre verbalizations. These behaviors may lead to institutionalization or reduce the likelihood of reintegration into the community (Wehman & Schleien, 1980).

There have been relatively few studies that evaluated the acquisition of chronologically age-appropriate leisure skills in severely and profoundly mentally retarded adults. Wehman and his associates (1978) taught table game and physical fitness skills to severely retarded adolescents and adults. Johnson and Bailey (1977) and Schleien, Kiernan, and Wehman (1981) developed appropriate leisure skills in moderately retarded adults residing in community living facilities. Matson and Marchetti (Note 1) recently taught mentally retarded adults to use a stereo independently. However, the focus of the majority of leisure skill research with severely retarded persons, has been with children (Wehman, 1978, 1979).

One leisure skill that does not require complex motor or cognitive behaviors and is frequently engaged in by nonretarded adults is throwing darts. Dart throwing provides an excellent opportunity for community participation in local bars and lounges, community clubhouses and private residences. Therefore, the present study was designed to evaluate the effect of behavioral training procedures on dart throwing in three severely multihandicapped adults.

### **METHOD**

#### ***Setting and Participants***

Three multihandicapped individuals who attend a community adult development center served as participants. The center offers self-help, social/communication, and vocational skill training to 12 severely and profoundly handicapped persons between 21 and 63 yr of age. The clients attend the center from 9:00 a.m. to 3:00 p.m. Monday through Friday. The darts skill leisure training program was initiated in the

recreation room within the complex. The three participants, each with varying degrees of physical and intellectual deficits, are described below.

**Participant 1.** Herman was a 63-yr-old male. He had cerebral palsy—athetoid type and an unsteady, uncoordinated gait with poor dynamic and static balance. He had difficulty in the visual tracking of moving objects. Arm/leg extension and flexion were additionally poor. Herman had an IQ of 27 on the Stanford-Binet, placing him in the severely retarded range. His AAMD Adaptive Behavior Scale scores were also at the severe level. Herman's communication skills reflected the ability to follow multiple step directions, although he was minimally verbal. He was presently receiving vocational training through much of the day. Herman's leisure skill repertoire consisted of smoking approximately three packs of cigarettes daily and watching television in the evening hours.

**Participant 2.** Roselyn was a 32-yr-old female. She had cerebral palsy—spastic type with severely contracted muscles in her right arm giving her no fine and minimal gross motor movements. Coordination in her left arm was somewhat better with a modified pincer grasp. Due to a dislocated right hip, Roselyn was un-able to stand unsupported and required a walker for locomotion. Additionally, her arm/leg extension and flexion were limited on her right side. She had an IQ of 35 on the Stanford-Binet, placing her in the severely retarded range. Her social functioning on the AAMD Adaptive Behavior Scale was high relative to her other areas of functioning. Roselyn spoke in short phrases but not in sentences. During her free time, Roselyn enjoyed attending professional hockey games and the movie theatre, but these community facilities were accessible only when her parents or relatives were willing to accompany and transport her. Although she enjoyed spectator recreational activity, Roselyn had not been taught specific leisure skills.

**Participant 3.** Robert was a 23-yr-old male. He had Down's Syndrome and was labeled profoundly retarded. Robert received a Stanford-Binet IQ score of 8 and was categorized as non-trainable. Center staff reported that Robert had yet to maintain or generalize any behavior that he had acquired within 2 yr of attendance at the agency. His behavioral functioning was de-scribed as "autistic," since he frequently exhibited perseverative, self-stimulatory motor movements and other stereotypic behavior (e.g., body rocking, placing hands in front of face, staring aimlessly). His speech consisted exclusively of delayed echolalia and spontaneous verbal behavior was nonexistent. Robert was visually impaired requiring special eyeglass lenses; he was also diabetic and required daily doses of insulin and restricted diet. He was often noncompliant, requiring continuous physical prompting to complete most tasks. Robert was occasionally physically aggressive and had hit his peers in the past. He did not engage in any leisure related activity.

### **Program Objective**

The objective of the dart skills leisure pro-gram was for each participant to throw three darts and to strike the dart board successfully on each toss from the standard 8 ft. distance. Criteria for mastery consisted of 100% completion of the 7-step task analysis for two consecutive sessions.

An additional objective of the program was to generalize dart throwing performance to three other environments (i.e., community dart bar, staff's apartment, another training facility) and across time (i.e., 4-mo follow-up). The goal of the generalization probes was to demonstrate criterion level performance in several environments using only a verbal prompt.

### **Rationale for Skill Selection**

There were four reasons for selection of the dart game skills. These included: (a) age appropriateness—standard dart games are considered by the community to be chronologically age appropriate; (b) competing behaviors—recreation staff strongly desired to eliminate play with a dart set using velcro balls among one of the adults by instruction and substituting a more appropriate and acceptable behavior; (c) social validity—it was noted through an initial survey that 25% of the bars in the local community contain a minimum of one dart board (apparently a popular pastime in the Richmond, Virginia area); and (d) therapeutic—since two of the

participants are physically handicapped (i.e., cerebral palsy), dart tossing provides functional illustrations of visual tracking and number recognition skills.

### **Procedure**

Instruction was provided for each participant 15 min daily. Sessions were held at different times throughout each day in order for the participant to generalize the skills easily to any time of day (Stokes & Baer, 1977). Additionally, this training routine allowed the clients to use this recreational activity during their break time from development center vocational training.

A 7-step task analysis was used for instruction. Content validity was established through observations of competitors in a tournament throwing darts in a community dart bar by a therapeutic recreation specialist. Besides the basic motor skills required to grasp, aim, and toss a dart (e.g., pincer grasp, arm flexion/extension, controlled hand release), 100% accuracy in striking the dart board was required for mastery of the skill. The rationale for this seemingly stringent minimal criterion level was twofold. First of all, most dart players usually strike the dart board on three out of three chances, and secondly, safety factors had to be considered. Training for accuracy helped eliminate or reduce dangerously stray dart throws that could injure others in the immediate environment.

A performance objective, verbal cue, and task analysis were used for instruction. The performance objective read: Given a dart board at standard height and three darts, the participants will strike the dart board from the standard 8 ft. distance, 100% of the time. The original verbal cue given to each participant was "(Herman, Roselyn, Robert), throw the darts at the board." The seven steps of the task analysis in the correct sequence were (a) stand/sit 8' from dart board, (b) grasp first dart in dominant hand (tip of dart facing board) using pincer grasp, (c) bend elbow until forearm is perpendicular to ground, (d) thrust forearm and hand in forward motion toward board, releasing dart when arm is extended, (e) first dart strikes dart board, (f) throw second dart, striking dart board, and (g) throw third dart, striking dart board.

### **Baseline**

Initially a nonreinforced baseline was conducted to determine preinstruction competency levels. The baseline level for each participant was derived by giving the verbal cue (i.e., "Her-man, Roselyn, Robert, throw the darts at the board."), and recording the steps of the task analysis performed correctly and without assistance. Herman, Roselyn, and Robert, within the multiple-baseline design, were assessed on 5, 11, and 14 sessions, respectively. One baseline trial per session was conducted for each participant.

### **Instruction**

Each instructional session consisted of five training trials followed by a nonreinforced probe in which no prompting was provided. The general verbal cue was given and the number of steps performed independently recorded. Instruction began on the next step of the task analysis which had not been performed correctly or without assistance during two consecutive sessions.

An instructional cue hierarchy (Horner & Keilitz, 1975) was used to teach the dart skills.

This entailed initially administering the verbal cue for the step being trained (e.g., step (b)— "Herman, grasp the dart.") and socially reinforcing the participant for appropriate behavior. If the verbal prompt did not lead to the desired response, the second stage of the teaching hierarchy was implemented. This included giving the verbal cue and concurrently modeling the correct behavior. The client was then verbally prompted to try again (e.g., "Herman, now you try."). If the targeted behavior was then exhibited, the player was socially reinforced. Finally, if the participant again failed to perform, the instructor physically prompted the individual through the appropriate action, while once again giving the verbal cue. Praise was provided continuously following this hierarchical step. Reinforcement consisted of social praise, pats on back, and extra attention.

Training continued for each participant until he or she was capable of performing all seven steps of the task analysis during two consecutive sessions. Generalization probes, in the absence of prompts and reinforcement, were performed in three other environments for all participants. Locations for these probes included a friend's apartment, neighborhood dart bar, and another training facility.

### **Interobserver Agreement**

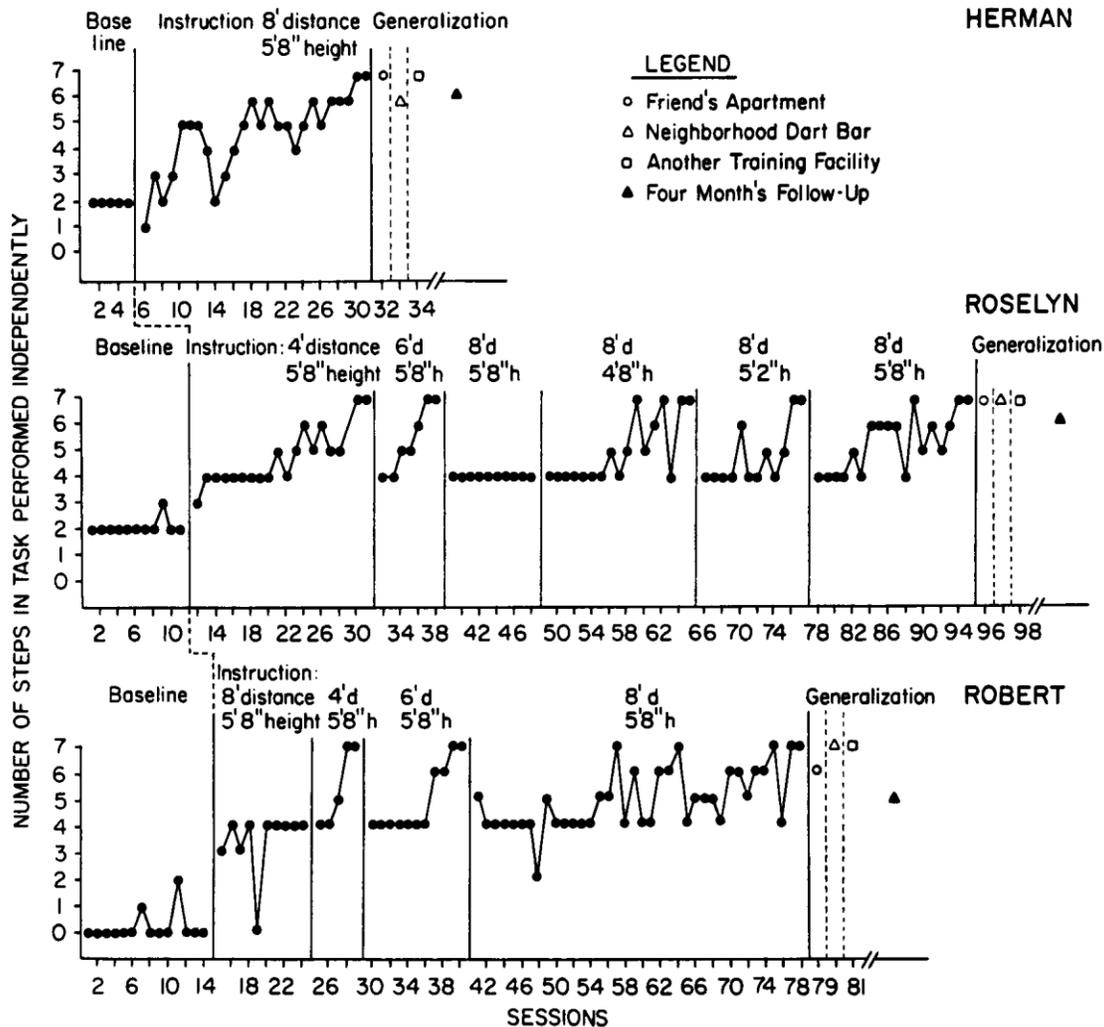
In order to determine reliability for the baseline, instruction, and generalization records, a reliability check was made by a second trained observer one session per week. During reliability checks, the instructor/original data recorder was unaware of the presence of the reliability check. Interobserver reliability averaged .98 across the three participants. Observer agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements. An agreement was recorded when a step of the task analysis (e.g., stand 8' from dart board) was scored by both instructor and observer in an identical manner. That is to say, if both scorers recorded a plus or minus for step (a), an agreement was scored. If the scorers were in disagreement, (i.e., one plus and one minus) concerning the participant's performance on a particular step, a disagreement was recorded. Each instructor was responsible for recording behaviors (i.e., number of steps in task performed independently) of the three participants. The second observer made recordings concurrently with the regular instructor on the same. Those participants and data were compared. The day of the week and instructor checked were selected on a random basis.

### **Experimental Design**

A combination multiple baseline across subjects and changing criterion design was used. The changing criterion design was only required with Roselyn and Robert. With this design, base-line data were collected across three individuals. After competency levels for each person had stabilized during a 1-wk period (five sessions), instruction began with Herman. At this time, base-line data collection continued on the other participants. The minimal criterion related to his performance required to implement instruction with Roselyn was 100% increase in task analytic steps performed independently above preinstruction competency levels on two consecutive days. The identical procedure was then followed for initiating instruction with Robert.

Within the multiple baseline, a changing-criterion design (Hartmann & Hall, 1976) was used for two of the participants, Roselyn and Robert. For example, Roselyn received instruction at one-half distance (4 ft.) from the target at the standard board height (5 ft., 8 in.). When this level of performance was obtained (i.e., 100% performance on two consecutive days), instruction continued at three-quarters distance (6 ft.) at standard board height. Once criterion was met, instruction commenced at standard distance (8 ft). But following 10 sessions without improvement and not striking the dart board, a modified board height (4 ft., 8 in.) was used. Master of this height resulted in the board being raised to 5 ft., 2 in. Standard height (5 ft., 8 in.), along with standard distance was ultimately required for performance to reach the mastery level.

Robert's instruction also required using a change in distance criterion. The changing levels of performance were one-half distance, three-quarters and standard distance. Board height remained at the normal 5 ft., 8 in. throughout instruction.



**Fig. 1. Number of steps in a darts skill performed independently by three participants.**

## RESULTS

Figure 1 presents the functional relationship between the instructional procedures and the increased number of steps in the dart throwing task analysis exhibited by each client. For Herman and Roselyn, stable baseline rates were obtained on step (b) of the task analysis (i.e., grasping dart using pincer grasp). Instruction then commenced for these individuals on step (c) (i.e., proper positioning of throwing arm). Robert demonstrated a fairly stable baseline of zero-step proficiency. On two occasions, however, Robert was able to stand behind the foul line. During one probe he exhibited the appropriate dart grasp. This was believed to be due to chance as the behavior returned to zero-rate in subsequent sessions. Therefore, instruction began on step (a) of the task analysis (i.e., stand 8 ft. from :lan board).

Figure 1 indicates that Herman mastered the darts skills relatively quickly within 26 instructional sessions. In contrast, Roselyn and Robert required a changing-criterion method of programming and needed a considerably larger number of sessions, 84 and 64 sessions, respectively.

Nonreinforced generalization probes were taken in three different environments outside the home agency. These locations included a friend's apartment, popular neighborhood dart board, and another training facility within the county. During probes in two of the three sites, 100% criterion was met, and in the third, Herman struck the dart board on two out of three attempts, which was an acceptable performance. Roselyn and Robert both displayed similar performance levels in the same three generalization environments. Additionally, a 4-mo follow-up probe was conducted with the three participants at the development center in order to test the maintenance of this leisure skill over time. No modeling or physical prompting was offered during this probe.

The participants were simply given the general verbal cue. Herman, Roselyn, and Robert successfully performed six, six, and five steps of the task analysis, respectively.

## **DISCUSSION**

The present study demonstrated and evaluated instructional procedures for teaching a chronologically age-appropriate leisure skill for severely and profoundly handicapped adults. As severely multihandicapped individuals continue to be deinstitutionalized into group homes and other community living facilities, the ability to use leisure time independently and constructively will take on increased importance.

There were three major components to the present leisure skills training program. First, an instructional cue hierarchy characterized by verbal cues, modeling and demonstration, and physical guidance was used (Horner & Keilitz, 1975). Second, social reinforcement and immediate feedback consequences were provided on a continuous schedule. Third, for two of the three clients a distance shaping strategy was used (Wehman, Renzaglia, Schutz, & Karan, Note 2). The design of this study did not allow for an evaluation of which of these three components was the most influential. However, it appears unlikely that criterion would have been reached with any of the participants without the necessary combination of training procedures.

All three participants performed well in three other settings during generalization probes and after a substantial period of time during follow-up probes. This demonstrated the efficacy of the training procedures and the intrinsically reinforcing nature of the dart skill itself. The ability to perform these skills exclusively in the home agency (e.g., adult development center) is not sufficient because the bulk of the participants' free time exists in a variety of other environments when their time is less structured. It was reported by staff that Herman and Roselyn had spontaneously tossed darts in the development center during break times on several occasions in the past 4 mo. Not only had these two individuals learned to throw darts, they had also learned an appropriate leisure skill that became part of their leisure repertoires. Robert had not continued to pursue the recently acquired skill over this extended period of time.

A final word is in order concerning the selection of dart throwing as the target leisure skill. The emphasis of this program was not only acquisition of a leisure skill but also demonstration of a chronological age-appropriate skill. Dart throwing would be considered by many professionals in special education to be "too dangerous" with suggestions for velcro or rubber tip darts. Yet, for full integration into community facilities, severely retarded persons must not only receive effective training but must also be allowed the dignity of risk (Perske, 1972).

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