INFORMATION TO USERS

This manuscript has been reproduced from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6" x 9" black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

UMI
University Microfilms International
A Bell & Howell Information Company
300 North Zeeb Road, Ann Arbor, MI 48106-1346 USA
313/761-4700  800/521-0600
An ecological inventory approach to independent use of a health club by adolescents who are moderately/severely mentally retarded

Owens, Patricia Kellogg, Ph.D.

The Ohio State University, 1991

Copyright ©1991 by Owens, Patricia Kellogg. All rights reserved.
AN ECOLOGICAL INVENTORY APPROACH TO INDEPENDENT USE OF A HEALTH CLUB BY ADOLESCENTS WHO ARE MODERATELY/SEVERELY MENTALLY RETARDED

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Patricia K. Owens, B.S., M.A.

* * * * *

The Ohio State University 1991

Dissertation Committee:

Dr. Paul Jansma, Chairperson
Dr. Donald Cavin
Dr. Henry Leland

Approved by:

Paul Jansma
School of Health, Physical Education, and Recreation
With Love and Appreciation
to Doug
ACKNOWLEDGEMENTS

Dr. Paul Jansma, adviser and committee chair, is to be commended for his thoroughness and professionalism throughout this dissertation process. His diligence has allowed me to view this document with great pride. I also credit Dr. Donald Cavin and Dr. Henry Leland at The Nisonger Center for their contributions as committee members. In addition, Dr. Daryl Siedentop, Dr. John Cooper, Dr. Tim Heron and Dr. William Heward were all excellent panel members for research design and methodology.

Shirley M. Wall, Director of Special Education, Upper Arlington City Schools, provided the inspiration for this research investigation. Kay Pudelski, manager of Sawmill Athletic Club, and her excellent staff, made this project a successful reality for the many students who achieved independence while joining the mainstream of society. The parents, teachers, and trainers who have tirelessly assisted with both the pilot and the principal investigation deserve many thanks for their cooperation and dependability.

And most of all, to my children, Jason, Todd, and Jessica Owens, for their love, interest, and support.
VITA

October 14, 1946 ........ Born - Paterson, New Jersey

1968 ...................... B.S., University of Delaware, Newark, Delaware

1978 ...................... M.A., Ohio State University, Columbus, Ohio

1978-84 .................... Adapted Physical Education Specialist, Livingston-Steuben-Wyoming B.O.C.E.S., Geneseo, New York

1984-86 .................... Graduate Teaching Assistant, Leadership Training Grant, The Nisonger Center, Ohio State University

1986-Present ................ Adapted Physical Education Specialist, Upper Arlington City Schools, Upper Arlington, Ohio

PUBLICATIONS


FIELDS OF STUDY

Major Field: Health, Physical Education and Recreation
Studies in: Psychology-Dr. Henry Leland, Dr. Donald Cavin; Elementary Physical Education-Dr. Neil Earls.
TABLE OF CONTENTS

DEDICATION .......................................... ii
ACKNOWLEDGEMENTS ...................................... iii
VITA ................................................... iv
LIST OF TABLES .................................... vii
LIST OF FIGURES ................................... viii

CHAPTER

I. INTRODUCTION ................................. 1

   Purpose of the Study ......................... 9
   Research Questions ............................ 11
   Asssumptions of the Study .................... 12
   Limitations of the Study ...................... 12
   Major Definitions ............................. 13

II. LITERATURE REVIEW .......................... 16

   Lobbying, Litigation, Literature, and Law  . 17
   Normalization, Least Restrictive Environment,
      Mainstreaming, and Deinstitutionalization . 24
   The Functional Skills Curriculum Model ..... 34
   Mental Retardation ............................ 50
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Interrater Reliability across Subenvironments</td>
</tr>
<tr>
<td>4.2</td>
<td>Scores Indicating Rater Agreement/Procedures</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURES</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Physical Education Service Delivery Options</td>
<td>28</td>
</tr>
<tr>
<td>4.1 - 4.6 Acquisition and Maintenance of Independent Behavior Across Four Health Club Subenvironments by an Adolescent who is Moderately/Severely Mentally Retarded.</td>
<td></td>
</tr>
<tr>
<td>4.1 Subject 1</td>
<td>94</td>
</tr>
<tr>
<td>4.2 Subject 2</td>
<td>96</td>
</tr>
<tr>
<td>4.3 Subject 3</td>
<td>98</td>
</tr>
<tr>
<td>4.4 Subject 4</td>
<td>100</td>
</tr>
<tr>
<td>4.5 Subject 5</td>
<td>101</td>
</tr>
<tr>
<td>4.6 Subject 6</td>
<td>103</td>
</tr>
<tr>
<td>4.7 Average Performance Scores of Six Adolescents Who are Moderately/Severely Mentally Retarded Exhibiting Independent Health Club Use</td>
<td>105</td>
</tr>
<tr>
<td>4.8 Generalization Scores</td>
<td>110</td>
</tr>
<tr>
<td>4.9 - 4.14 Adaptive Behavior Scores</td>
<td></td>
</tr>
<tr>
<td>4.9 Subject 1</td>
<td>116</td>
</tr>
<tr>
<td>4.10 Subject 2</td>
<td>117</td>
</tr>
<tr>
<td>4.11 Subject 3</td>
<td>118</td>
</tr>
<tr>
<td>4.12 Subject 4</td>
<td>119</td>
</tr>
<tr>
<td>4.13 Subject 5</td>
<td>120</td>
</tr>
<tr>
<td>4.14 Subject 6</td>
<td>121</td>
</tr>
<tr>
<td>D.15 Club Plan</td>
<td>164</td>
</tr>
<tr>
<td>D.16 Bicycle Photo</td>
<td>165</td>
</tr>
<tr>
<td>D.17 Rowing Machine Photo</td>
<td>166</td>
</tr>
</tbody>
</table>
Chapter I

Introduction

It is critical to realize the importance of the natural environment or setting when examining the human organism. The natural environment is paramount to the ongoing cognitive, social, physical, and emotional development of all human beings. Many studies have addressed the issue of environment and its infinite facets as they affect every realm of human development. This study will explore independent functioning of individuals who are moderately to severely mentally retarded as they access recreation and leisure facilities in a natural environment, which in this study is the integrated adult environment of a health club.

Developmental theorists such as Piaget, Werner, and Bruner, believe that development involves a complicated interaction between an active organism progressing toward its mature state, and an ever-changing environment. These developmental theorists' views on the balance between organism and environment differ, but their overall
orientation is the same: human development occurs because there is an interaction between an organism and its environment (Zigler & Hodapp, 1986).

An opposing view is that held by behavioral psychologists (Watson, 1924; Skinner, 1953; Baer, Wolf, & Risley, 1968), who tend to downplay the active nature of the organism, and instead focus on the organism's reactions to environmental contingencies. If this interactionist view of human development is accepted (Haywood, 1968), then "the nature of experiential opportunities available to all individuals becomes significant, since it is assumed that development results from interaction between the organism and environmental events" (p. 22). Environment is thought to play the most critical part in early infant development when it can actually determine the dimensions of human potential. Fueled by the events of the twentieth century, environmental impact may have increasing effect on human development at every age. For the individual who is mentally retarded, the potential for the environment to exert an influence on individual development is viewed differently. This is true since the individual who is mentally retarded may not be able to receive and interpret cues from the environment in the same way as a person possessing normal intelligence processes environmental
input. The role of the environment for this type of individual thus becomes a challenge to direct care givers. Since the potential for environmental input is minimized by the very nature of mental retardation, the means necessary to enhance experiential opportunities for persons who are mentally retarded need to receive systematic attention.

The effect of the environment on mental development has been studied in this century, at first focusing on infants who were cognitively slow, reared in an orphanage, and later placed in an institution (Skeels & Dye, 1939). When placed in a more normalized and nurturing environment, with attention and stimulation from adolescent girls, the infants showed radical gains in cognition and overall development. Later studies have shown that environmental effects on measurable gains in intelligence may range from 20-30 I.Q. points (Baroff, 1986). Other studies have examined groups classified as retarded as compared to normal children when reared in institutional vs. home environments (Carr, 1970; Centerwall & Centerwall, 1960; Kaufman, 1967; Kirk, 1958). "Generally the at-home children have been shown to have the advantage in mental development, especially in language, and to exhibit fewer stereotyped, self-stimulating behaviors" (Robinson & Robinson, 1976,
As chronological age advances from early childhood to adolescence and adulthood, the impact of environment on intelligence may lessen.

In the 1980's, research emphasizing the importance of natural environments and subenvironments on the potential functioning of persons who are mentally retarded began to receive increased attention. This particular research also emphasized the ecological inventory approach within a functional skills curriculum (Certo, Schleien, & Hunter, 1983; Brown, Branston, Baumgart, Vincent, Falvey, & Schroeder, 1980). Another functional curriculum entitled "Project A.M.E.S." (Actualization of Mainstream Experience Skills) focused on the importance of a functional curriculum across life domains (Maurer, 1983). In addition, Nishioka (1983) developed "The Teaching Research Curriculum for Mildly and Moderately Handicapped Adolescents and Adults", which provided instruction in those skills facilitating success in the student's present and future natural environments.

Such environmental emphasis created the need for a closer investigation of the institutions which house individuals with mental retardation. Questions such as the following were posited: Were we providing this population with environments and subenvironments that would maximize their future functional capabilities?
Conversely, were we forcing them to exist under stifling conditions that actually caused them to functionally deteriorate? The struggle to address these and many other related questions contributed to the deinstitutionalization trends of the recent past.

Parents and educators began to demand swift reform. This was catalyzed by a widely disseminated policy statement in a 1982 report of the President’s Panel on Mental Retardation which advocated and emphasized community treatment of persons who are mentally retarded. Later, emphasis on the normalization of those individuals having mental retardation, and ensuing litigation, resulted in the movement of an increasing number of these persons from institutions into the community. This thrust is associated with the transformation of former "custodial warehouses" into real intervention facilities for persons who had to remain (Maloney & Ward, 1979).

Nirje (1969) states that "This entire approach to the management of the retarded is based on the 'normalization principle'; this underlies demands for standards, facilities, and programs for the retarded as expressed by the Scandinavian parent movement" (p. 19). The normalization principle was "the philosophical backbone of both the deinstitutionalization and mainstreaming movements" (Zigler & Hodapp, 1986, p. 39). This principle
is based on the idea "that each person has the right to experience a style of life that is normal within their own culture" (Zigler & Hodapp, 1986, p. 40). And with the publication of the book by Wolfensberger (1972), the principle of normalization shifted from the individual to the services provided to that individual. The concept of "normalization of services to individuals who are retarded" has meant getting them into schools, homes, and other facilities that are as much like those used by the nonretarded population as possible.

These concepts, united with the federally-mandated placement of persons who are retarded in "the least restrictive environment" (Public Law 94-142), supported the concept of mainstreaming in schools as we know it today. Several authors (Dunn, 1968; Zigler & Hodapp, 1986) have collaborated to produce the following related generalizations regarding the benefits to the individual who is handicapped and integrated into the "least restrictive environment". First of all, for the individual who is functioning within any normalized social environment, equal or better educational attainment may be the result. Secondly, those who are handicapped may show an increase in their social skills through contact with non-handicapped peers. Thirdly, the reduction of stigmatization from other children, teachers, and from
non-handicapped family members may possibly evolve. Lastly, instruction will be less costly, but equally individualized.

As the impact of these contributing factors is focused on the individual who is mentally retarded, the researcher is faced with many opportunities to study environmental effects upon individual behavior and learning in normalized environments. In such empirical efforts, emphasis should be placed where previously it was neglected - on the use of community facilities and resources to facilitate successful normalization of the individual through opportunities for social, psychological, and physical growth.

In this regard, the provision of physical/motor and recreational activities in the community for individuals who are mentally retarded should be provided as part of the total education and training of the individual (Ball, Chasey, Hawkins & Verhoven, 1976; Wehman, 1976; Putnam, Werder, & Schleien, 1985). Acquiring psychomotor skills and improving physical fitness could increase the mobility of trained individuals within the community. Relatedly, this could improve their chance of obtaining a job, fostering independence, and regularly participating in leisure and recreational activities in community programs (Collard & Charboneau-Klein, 1979; Dixon, 1980; Reynolds,
Researchers have explored and accepted the need for a more active lifestyle for individuals who are moderately/severely mentally retarded (Wehman, 1978), but more specific strategies to increase the activity levels of these individuals are yet to be explored. In a changing criterion research design study (Caouette and Reid, 1991), three forms of auditory stimulation were used as reinforcers for adults who were severely handicapped participating in cardiovascular workouts. Further research of this nature is required to enhance the development of functional skills in the recreation/leisure domain.

Many individuals who are moderately or severely handicapped are much closer to "normal" in their motor and physical characteristics (Jansma, 1984) and recreation and leisure needs (Mathews, 1979) than in any other aspect. This lends credence to making recreation and leisure programming a priority for them as well. Further, the greater the degree of disability, the more critical physical and motor skill training becomes (Jansma, 1984). Such related programming in the community would help to compensate for the common lack of community-level involvement in the physical, motor, and recreational areas for those labeled "mentally retarded".
Purpose of the Study

Persons who are either moderately or severely mentally retarded have long been systematically excluded from actively participating in normalized recreation/leisure activities in integrated community settings. If successful placement of those individuals in the community is to be realized, it is important that functional and age-appropriate skills be systematically taught to them in the community, and these skills should be based on the performance characteristics of non-handicapped peers.

A systematic and community-based approach to training persons who are mentally retarded should also facilitate the provision of varied opportunities and promote functional independence. This, in turn, would greatly improve the quality of life for persons who are mentally retarded. Of particular importance to the study, this approach should enhance active participation in normalized recreation/leisure skills in integrated community settings.

Specifically, in this research investigation, an ecological inventory approach was employed to train subjects in the steps necessary for functional independence in specific physical skills. Six adolescents
(male and female) who are moderately to severely mentally retarded were trained at a recreation and fitness club in an attempt to show a clinically or socially significant improvement in functional independence while appropriately utilizing the facility.

A changing criterion single subject research design which incorporated verbal, modeling, and physical prompt instructional procedures placed each subject at an individualized level in the established inventories, and demanded a greater degree of skill independence with each visit to the Club. The Adaptive Behavior Scale (A.B.S.) was used as an indicator of environmental functioning, as well as the situationally designed ecological inventory itself, which will be administered prior to training, at the termination of training, and at a two week and a two month interval following the culmination of the consecutive training sessions. One month after training has occurred, a generalization check occurred at a sister facility similar, but not identical to, the Club. The ecological inventory based recreational skills and adaptive behavior skills data were the focus of this study.
Research Questions

The following research questions are addressed in this investigation:

1. Will the training method used in this study be effective in facilitating overall positive change in the subjects' functional independence as they access a public recreation facility?

2. Will the level of functional independence be shown to change positively for all subjects in each of three pinpointed recreational activities of exercising (the bicycling and rowing machines), jogging (the 10-minute walk/run), and swimming?

3. Will the training, or any components of the training, effect changes in adaptive behavior as reflected in Adaptive Behavior Scale scores?

4. Will any training effects be maintained two weeks and two months after the formal training terminates?

5. Will the effects of training generalize to any other situations, or to other persons such as family, community residence staff, and volunteers? In other words, will the changes in independent behaviors and adaptive behavior, if any, be obvious to others in the environment?
Assumptions of the Study

1. Approximately ten two-hour training sessions would be sufficient in this study to affect functional independence in the pinpointed recreational activities at the designated health club.
2. The training in this study occurred in a natural environment since the facility was open to the public at the times of training during normal days.
3. Each one of the steps in the 68-step ecological inventory was equal in value.
4. The prompting levels were weighted linearly with each one of the levels having an equivalent point value.

Limitations of the Study

1. The primary study was limited to six adolescents who were moderately to severely mentally retarded, ranging in age from 15-21.
2. This study was limited to training in four subenvironments within one health club facility. The subenvironments included the entrance area down to the locker rooms, the weight room and an exercise area, the indoor jogging track, and the 25-meter indoor swimming pool.
3. This study was limited to verbal, modeling, and physical prompt instructional techniques using a changing criterion single subject research design for each subject.

4. No subjects were trained in groups.

5. This study was limited to individuals who already had the ability to swim independently in deep water; this was a prerequisite skill for subject selection.

Major Definitions

Adaptive Behavior - refers to functioning in such broad areas as personal independence, socialization, language development, number and time concepts, and physical development. This term is used most often in conjunction with mental retardation, since deficits in mental operations affect adaptive behaviors (Sherrill, 1986).

A.A.M.D. Adaptive Behavior Scale (A.B.S.) - this instrument (Nihira, Foster, Shellhass, & Leland, 1975) published by the American Association on Mental Deficiency reflects levels of functional independence across multiple domains (independent functioning, physical development, economic activity, language development, numbers and time, domestic activity, vocational activity, self-direction,
responsibility, and socialization). These scores indicate an individual's strengths and weaknesses across domains. The instrument also measures maladaptive behaviors (e.g., violent and destructive behaviors, unacceptable vocal habits.) A copy of this Scale, and the profiling graphs, can be found in Appendix G.

Changing Criterion Design - this single subject research design is a variation of the multiple baseline design, and may be appropriate for teachers and other applied researchers who wish to evaluate instructional programs that require gradual, stepwise changes in target behavior performance (Tawney & Gast, 1984). This design requires that baseline data be taken on a single target behavior. A treatment program is then implemented in each of a series of treatment phases. Each phase is associated with a step-wise change in criterion rate for the target behavior; in this way, each phase of the design provides baseline for the following phase. When the rate of the target behavior changes with each stepwise change in the criterion, therapeutic change is replicated and experimental control is demonstrated (Cooper, Heron, & Heward, 1987).
Ecological Inventory - a procedure for identifying needed skills. It involves observing nonhandicapped people to determine what they do in a specified environment, and what skills are required of them to perform targeted activities. Skills that occur in many environments can be given priority for testing and teaching (Whitney & Streifel, 1980).

Functional Skills Curriculum - in a functional skills curriculum, a critical element is that the skills or behaviors to be taught represent meaningful, useful, and appropriate aspects of an individual's current or probable future environment. Further, the characteristics of each individual's environment and subenvironments must be determined to identify those skills that will be most functional for each individual person; the older the individual, the more natural non-school environments become (Wehman, Schleien, & Kiernan, 1981).

Mental Retardation - defined by the American Association on Mental Deficiency as:

"Significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior, and manifested during the developmental period, birth - age 22" (Grossman, 1983, p. 11).
Chapter II

Literature Review

A currently emphasized and popular educational model for use with the individual who is moderately or severely handicapped is the functional skills curriculum model (Arnoczky, 1980; Bender, Valetutti, & Bender, 1985; Wehman, 1985; Brown, et al., 1980; White, 1980; Freagon, 1982; and Jansma, 1984). A central component of the model is recreation skills for application in the community (Wehman, Schleien, & Kiernan, 1980).

This curriculum model emerged, in part, as a response to the enactment of legislation and its emphasis on such concepts as normalisation, least restrictive environment, mainstreaming, and deinstitutionalization. The passage of such legislation, in turn, has been influenced by lobby groups, litigation, and the literature.

This chapter focuses on all of these interrelated variables and culminates with an introduction to this dissertation's research focus. Chapter Two specifically is divided into four sections: Lobbying, Litigation, Literature, and Law; Normalization, Least Restrictive
Environment, Mainstreaming, and Deinstitutionalization; the Functional Skills Curriculum Model; and Mental Retardation.

Lobbying, Litigation, Literature, and Law

Lobbying, litigation, literature, and law are the four components behind the force which prompted recent decades to be named, "the decades of civil rights for the handicapped". Each one of the concepts is related to the others, and none should be examined in isolation. The combined effect of lobbying efforts, cases litigated in court at all levels, and literature and publications, help to catalyze legislation. In turn, specific legislation has dramatically changed the lives of persons who are handicapped today.

As is the case in many disability areas, the problems associated with disability have been the tour de force for the formation of organizations and advocacy groups dedicated to improving the quality of life for those individuals who are handicapped. Repeatedly, the largest and most vocal groups have been the parents of the people who are handicapped. The incredible lobbying efforts of parent groups, such as the National Association of Retarded Citizens, caused actions to be initiated on
behalf of the rights of their children and family members with special needs. In 1971, this lobby group issued a policy statement whose pivotal concept was that:

"Public school education must be provided for all mentally retarded persons, including the severely and profoundly retarded. There should be no dividing line that excludes children from public education services. If current educative technologies and facilities are inappropriate for the education of some retarded, then these existing regimes should be modified" (Jansma, 1984, p. 16). This statement, and others like it, were to guide the remarkable legal and legislative actions to follow (Jansma, 1984).

In the late 1970's, the Bureau of Education for the Handicapped (now the Office of Special Education Programs; part of the Office of Special Education and Rehabilitative Services within the U.S. Department of Education), established the cause of those labeled severely and profoundly handicapped as a national priority. More effective educational and environmental programming has been the result, including model demonstration centers, successful technologies, and training programs through state education agencies (S.E.A.'s). In 1972, a three-judge federal court in Pennsylvania mandated the following: "(1) that all retarded children in the state
were assured the right to a publicly supported education appropriate to their needs; (2) the state was required to locate all children who had been excluded from school; and (3) local school districts were called upon to evaluate all retarded children within their jurisdictions, and to re-evaluate all children in special classes every two years" (Jansma, 1984, p. 17). Similar court orders were passed in the district of Columbia (1971) and North Dakota (1974). Another 1974 order catalyzed by the Maryland Association for Retarded Citizens reiterated the right of a free education for all children who are retarded, and ruled that mental retardation does not justify home teaching instead of classroom instruction. These actions and others paved the way for a more democratic form of education across the land.

Literature which affected the education and rights of the handicapped first emerged as early as the 1800's, when Itard published a description of his work with Victor, the Wild Boy of Aveyron. The writings describe Itard's attempts to use sensory stimulation to increase the intellectual level of this child, who had grown up in a totally savage world. This body of knowledge was later expanded through the works of Seguin, who developed a physiological approach to the education of individuals with mental retardation. Seguin opened the first
successful school for the mentally retarded in France in 1837 (French & Jansma, 1982). From these teachings emerged the Montessori method of instruction; she believed that mental growth depends upon the interaction of the individual with the environment. Many of Maria Montessori’s basic educational principles are still in use today.

In addition to the writings of these early educators, many current published resources are being disseminated to expand upon the information available concerning special populations and their psychomotor needs. As examples, the *Adapted Physical Activity Quarterly*, *Palaestra*, and *Clinical Kinesiology* journal all include current information on physical education, recreation, and sport programs for the handicapped. Countless other journals and texts with material relevant to recreation and special populations are also available, and have provided the impetus for program development in psychomotor skills areas, as well as in normalized recreation environments.

Such environments, in which all Americans function, are directly impacted by the 5th and 14th Amendments to the United States Constitution. These relate to liberty, equal opportunity, and due process. Litigation based to a large extent on these amendments has played a significant role in the human rights movement for all people,
including those with handicapping conditions. As an example, the landmark case of Brown vs. Board of Education (1954) resulted in a person who is black having the right to an education in as normal a setting as possible. These cases set legal precedence for the passage of ensuing legislation, especially P.L. 94-142.

Wehman and Schleien (1981) discuss P.L. 94-142 and two other critical pieces of legislation that are particularly relevant to opportunities for those who are handicapped. First, P.L. 90-480 (The Architectural Barriers Act) mandates that facilities constructed after 1968 with federal monies be architecturally accessible to persons who are disabled. Second, the Rehabilitation Act of 1973 and its related legislation (especially P.L. 101-336, The Americans with Disabilities Act) address both environmental and programmatic availability of educational, social, and employment services for individuals of all ages with handicapping conditions. Third, P.L. 94-142 and its related legislation (especially P.L. 99-457 "The EHA Amendments of 1986" and P.L. 101-476 "The Individuals with Disabilities Education Act") have particularly far-reaching effects for providers and recipients of educational services for children and young adults who are disabled. Syzmanski (1988, p. 6) summarizes the four central purposes of P.L. 94-142 as
follows:
"1. To ensure that all handicapped children have available to them special education and related services designed to meet their unique needs (related services to include recreation).
2. To ensure that the rights of children who are handicapped and their parents or guardians are protected.
3. To assist states and localities in providing for the education of handicapped children.
4. To assess and ensure the effectiveness of efforts to educate handicapped children."

The basic component for achieving the goals of Public Law 94-142 is the mandate that a written statement of specific services be provided for each person. In education this is called an individualized educational program (P.L. 94-142); in rehabilitation (P.L. 93-112) it is called an individualized rehabilitation plan; in a non-school and a non-work context it is labelled an individualized habilitation plan (P.L. 93-112); and for infants, toddlers, and preschoolers, it is called an individualized family service plan (P.L. 99-457). An additional emphasis throughout all of this legislation is on placement in the "least restrictive environment", which will be discussed in the following section.
Public Law 99-457 further broadens opportunities for locating, assessing, and programming for infants, toddlers, and preschoolers having developmental delays or who are at risk. This law will expand the opportunities for early intervention and treatment for those individuals who are handicapped, as well as for increased education and training of professionals who teach young children.

Clearly, lobbying, litigation, literature, and legislation have all combined to focus attention upon the quality of life for persons who are handicapped. Each has in some way been an agent of change to guarantee that all the citizens in a democratic society, including all those who were handicapped, procure the rights granted to them under the 5th and 14th amendments of the United States Constitution. The impact of these forces has been realized by groups in special need all the way to the person who is handicapped, on an individual basis. These laws not only come as mandates from the federal government - they also have stimulated quality programming by accessing funds to pay for it. The decades since 1970 are, therefore, aptly named, "the decades of civil rights for the handicapped".
Normalization, Least Restrictive Environment, Mainstreaming, and Deinstitutionalization

"The normalization principle means making available to the mentally retarded, patterns and conditions of everyday life which are as close as possible to the norms and patterns of the mainstream of society" (Scheerenberger, 1976, p. 74). The normalization principle also implies "ensuring normative patterns and conditions of life" (Wehman and Schleien, 1981, p. 3). Wolfensberger (1972) refers to normalization as: "The utilization of means which are as culturally normative as possible, in order to establish or maintain personal behaviors or characteristics which are as culturally normative as possible" (p. 28). A natural, adult community environment has high value from the vantage point of both the normalizing aspects of the activities as well as the environment itself. There is no reason why the adolescent or adult who is handicapped cannot be highly successful in a normalized environment. This is the ultimate goal of programming for persons who are mentally retarded.

Successful normalization is, in part, determined by the level of adaptive behavior that the individual who is handicapped possesses, or is capable of attaining with
effective training and intervention. This is reflected in the American Association on Mental Deficiency definition of mental retardation with its focus on adaptive behavior deficits as an integral part of this particular disability area. Adaptive behavior is "the manner in which persons perform the tasks expected of their particular age group" (Coulter & Morrow, 1978, p. 3), or "the ability to adapt to environmental demand" (Heber, 1961, p. 5). Technology for training adaptive behavior is directly linked to the normalization theory because the citizen who is mentally retarded must acquire skills that will support "a minimum level of functional independence required for normalization to be successful" (Leland, 1973, p. 3).

Another important aspect of normalization frequently mentioned by researchers is the concept of chronological age-appropriateness. Many persons who are handicapped function at a developmental level below that of a same-aged peer. When programming for those who are handicapped, it is critical to examine the activity to ensure that the person who is handicapped is not asked to do an activity that may be appropriate for his or her limited capabilities, but which may be highly inappropriate when viewed in the public eye. All individuals have a right to their own personal human dignity; no individual wants to be seen performing an
activity that would seem foolish or immature to that person's same-aged peers. For the individual who is handicapped, it is frequently the responsibility of supervising teachers and related professionals to ensure age-appropriate programming. Preservice and inservice training should also focus on this very important principle of chronological age-appropriateness. The focus should always be to have the person who is handicapped appear as similar to "normal" as possible.

Relatedly, the individual who is handicapped must be educated in the "least restrictive environment" (L.R.E.) in which his or her needs can be met and through which normalization can be fostered. There have been many interpretations of L.R.E. In its simplest terms, it means that a student's placement should foster the maximum amount of independent functioning. This decision should be made on an individual basis, with regard to every possible environment from least to most restrictive, both within and outside of the instructional setting. When a student is intentionally placed solely in a "regular" situation, the student has been mainstreamed. This least restrictive type of normalized placement is becoming more and more common, and in line with the current national regular education initiative (R.E.I.) thrust.
One example of a hierarchy of least restrictive environments for physical education is diagrammed by Werder and Kalakian (1985), and refers to service delivery options for adapted physical education (A.P.E.). The pyramid of possible placements begins with the "least" restrictive environment, and proceeds to the "most" restrictive environment. From the service delivery options delineated within the inverted pyramid in Figure 2.1 (p. 28) one can see that the least restrictive environment for the student would be described in the first step from the top - the regular physical education class with assessment and monitoring. The bottom of the inverted pyramid describes the most restrictive environment - to be seen on a one-to-one basis by the adapted physical education specialist. The steps in between describe a progression from the least to most restrictive environment. These steps may also be used in a transitory, rather than stationary, progression, to enable the student to move into a situation where he or she is functioning more independently.
Figure 2.1 Physical Education Service Delivery Options (from Werder and Kalakian, 1985, p. 19)
Within this framework, least restrictive environment placements and mainstreaming in physical education can also emphasize, among other elements, peer teaching systems (Folio & Norman, 1981), buddy systems (Martino & Johnson, 1979; Rynders, 1980), or special instructional approaches such as games analysis intervention (Marlowe, 1980). It follows, then that the term "mainstreaming" refers to placement in the least restrictive environment up to and until a student is mainstreamed (if appropriate). Sherrill refers to the concept of L.R.E. within this context as "an educational placement philosophy based on the belief that a handicapped student should be educated in the least restrictive environment in which his or her needs can be met" (1986, p. 44). Werder and Kalakian also concur that "the term mainstreaming has been coined to describe education in the least restrictive environment" (1985, p. 10). Thus, for some students a more restrictive environment might be the best and final placement, while for other students the R.E.I. can be experienced (i.e., to be mainstreamed). In this regard, Sherrill (1986) states that in contemporary physical education, students with moderately or mildly handicapping conditions may be totally mainstreamed in physical education.
Mainstreaming can also refer to the extent to which an individual who is handicapped can be placed with his or her same age "normal" peers. The often-cited definition given by Kaufman, Gottlieb, and Kukic (1975) refers to mainstreaming, given this "same age" factor, in the following way:

"Mainstreaming refers to the temporal, instructional, and social integration of eligible exceptional children with normal peers. It is based on an ongoing individually determined educational needs assessment requiring clarification of responsibility for coordinated planning and programming by regular and special education administrative, instructional, and support personnel" (Kaufman et al., 1975, p. 4).

As an extension of these definitional statements, the following principle goals of mainstreaming are summarized by Dunn (1968) and Gottlieb (1981): Mainstreaming can bring about equal or better educational attainment and increase the social skills of children with handicaps through contact with nonhandicapped peers. It can also reduce the stigmatization that occurs from other children, teachers, and nonhandicapped family members. In connection with these goals, research has shown that the achievement levels of integrated "special class students" either remain the same, or are consistently higher for
such students who are mainstreamed (Corman and Gottlieb, 1978; Gottlieb, 1981; Keogh and Levitt, 1976). This viewpoint generally depends upon the following conditions: 
(1) that the class size is small enough that the students who are handicapped as well as those who are not receive proportionately equal amounts of teacher/staff time, and 
(2) that the classroom teacher has the background and training necessary to understand and program for those students who are handicapped. The intent of this is to protect the rights of all students relative to the provision of an appropriate education.

It is in the areas of recreation and the acquisition of motor skills that mainstreaming might be used effectively toward these same ends. We do know that persons who are more severely handicapped are closer to "normal" persons in their physical and motor capabilities than in any other aspect of their development (Jansma, 1984). On the other hand, large discrepancies that exist in areas such as cognition, and the many difficulties in communication and social-emotional interactions, may render other areas of mainstreaming intervention and training less effective than in the psychomotor domain. Psychomotor domain training is, therefore, recognized as a viable and effective avenue for individual development, especially for those individuals who are handicapped. It
enhances functional independence, normalization, and subsequent physical, psychological, social, and emotional growth.

A final related component is the issue of deinstitutionalization, an outgrowth of the more global normalization principle. Deinstitutionalization is a very highly publicized issue because it has been viewed as a massive campaign to empty residential care institutions which include school-aged persons. The reasons behind this movement are multiple and include: (1) the nature-nurture studies of the 1930's and 1940's depicted many institutions as warehouses of deprivation; (2) the emphasis on the environment in the development of intelligence during the 1950's and 1960's led to greater scrutiny; (3) a 1972 nationwide television broadcast (Rivera, 1972) increased the public's outrage as it focused on the inhuman conditions at a state institution; (4) the 1982 policy statement of the President's Panel on Mental Retardation advocated and emphasized community treatment; and (5) several court cases ordered the breakup of some of the larger institutions and also demanded that institutions document and demonstrate that their treatment programs were appropriate and effective. Wehman, Schleien, & Kiernan (1980) also discuss the trend of deinstitutionalization as an outgrowth of the concept of
least restrictive environment. Deinstitutionalization of adults steadily occurred through the 1970's and promised to increase as court decisions paved the way for such persons to return to the less restrictive community.

In Ohio, as in the nation, the growing concern for the rights of persons who are handicapped has fueled the movement to improve the quality of life for these individuals. Many changes in the philosophy of services now stress maximizing independence and self-sufficiency. It is now recognized that the acquisition of these life skills will not only improve quality of life, but will also allow for the integration of the individual into the community. They will allow the individual to truly function in society's "mainstream" and to realize other benefits of such societal integration.

In Ohio alone, the average number of persons who are mentally retarded and residing in state-operated institutions decreased from 10,017 in 1967 to 3,497 in 1983, a decrease of 65% (Leland, 1983). At the same time, Ohio has seen a rapid growth of community-based services. For example, enrollment in county boards of MR/DD programs increased from 9,675 in 1967 to 23,098 in 1982. Community residences for those individuals having mental retardation increased from 700 beds in 1971 to over 7,000 in 1983. Truly, the service system in Ohio is in a period of
transition as the state moves from an institution-based to a community-based service delivery model.

The program philosophies that govern this deinstitutionalization movement stress the independence and human dignity of the individual who is handicapped. Also stressed are that individual's presence and participation in community life, and his or her status as a valued community member. In addition, the individual's potential for normalization and normalizing growth and development are seen as crucial. If this individual is of school age, the LRE and mainstreaming factors are equally applicable and important.

The Functional Skills Curriculum Model

The functional skills curriculum emerged in the decade following the enactment of Public Law 94-142, The Education for All Handicapped Children Act. In contrast to the traditional developmental model of education for those who are handicapped, it is viewed as significantly "more appropriate" for individuals with handicaps (Brown, Branston, Hamre-Nietupski, Pumphian, Certo, & Gruenewald, 1979; Brown, et al. 1980; White, 1980). As an integral part of this model, a major effort has been made to address training in natural environments with the
knowledge that persons who are seriously handicapped (especially those who are retarded) will always have permanent limitations in their mental capacities. Some may never progress beyond a certain point in their acquisition of knowledge no matter how long they remain in educational institutions. In the psychomotor domain, some may never learn the mature form of a skill "due to sensory deficits, the presence of contractures, or the absence of limb function altogether" (Jansma, 1988, p. 428). In this regard, many service providers have come to examine and question the end results of all training for such an individual after graduation. Had they prepared the student with a repertoire of functional skills for survival in our society? Had the student been educated with some meaningful purpose in mind? Did the education actually prepare him or her to do something useful and appropriate after graduation? For the decades preceding the 1980's, the answer typically was a resounding "no".

A major concern when discussing the functional skills model in light of this post-graduation issue for the person who is mentally handicapped might be stated as follows: What are the critical skills necessary for functional independence in everyday environments? Also, what is the balance between an individual's specific skill competence and the related demands of that person's
present and future predicted school and nonschool environments? White (1980) acknowledged that the form of acceptable behavior and skill competence is unique to each individual; yet, all individuals have existing behaviors that can serve as a foundation for functional skills training.

Functional skills training differs from the developmental approach in many ways. The skills targeted in the functional approach are first identified by noting the end result, or critical effect, on natural environments. In this way, adult life tasks are listed in a "top to bottom", rather than the "bottom to top" developmental methodology. Also, each student's potential is analyzed for an ability to exert an influence on one or more natural environments. Training steps are then formulated, adapted as necessary, and taught (Jansma, 1988).

What a shift in educational programming this represents (Voeltz & Wuerch, 1981). Formerly, a child was placed in a school program based on his or her performance as compared to a certain "developmental age". This was typically determined by a genotypic, norm-referenced test, with failed skills becoming the future objectives for that student's educational program (the developmental approach). This approach was so limiting that often, when
a student who was seriously handicapped left school, the content of his or her program was at a preschool level. This repertoire had "little or no relevance to the ultimate demands of adult community living" (Voeltz, Wuerch, & Bockhaut, 1982, p. 93). These authors also state: "The concept of the criterion of ultimate functioning, and curricula designed to meet the needs of each person's predicted, adult, least restrictive environment, redefines the content of educational programming for severely handicapped children" (p. 94). This type of thinking gave birth to the functional approach in education.

Using the functional approach, the student's educational goals are selected by predicting adult levels of performance in projected school and non-school environments. This estimation of adult level performance is calculated in concert with the L.R.E. (Least Restrictive Environment) imperative. Then, if done comprehensively, the curricula is designed to prepare the person who is handicapped for functioning in four major environmental domains: (a) vocational, (b) home living, (c) community, and (d) recreation/leisure, based on the least restrictive adult community placement (Ford et al., 1984). Even the focus of the curriculum for an individual at an early age is on those prerequisite skills necessary
for maximum functioning in least restrictive, integrated settings. The traditional developmental skills, such as block-stacking, would be included only if the specific skill contributed to ultimate future functioning skills in a direct way.

Authors have discussed the logic of dividing an educational curriculum into such life spaces or domains as those indicated above (Brown, Falvey, Baumgart, Pumpian, Schroeder, & Gruenewald, 1980), but previous attempts to delineate critical skills have typically been confined to schools and classrooms. It is the philosophy of some recent training attempts that all the natural environments where skills need to be manifested should be the points of reference.

The functional skills curriculum model also follows the ecological inventory approach (Brown, et al., 1980; Certo, Schleien, & Hunter, 1983). The first step in the ecological inventory approach is to list environments and subenvironments that are generic in nature across the domains in which training will occur. Activities are then generated within each environment in light of typical participation of nonhandicapped persons which lead to the full participation and utilization of those environments. The generic listing of environments allows for better programming of critical skill acquisition, as well as
maintenance and generalization training that is systematic. It also allows the profiling system to be useful to other researchers, teachers or professionals because it is nonspecific in nature. The final step in the ecological inventory process is to determine what skills are necessary to allow for full participation in the various specific targeted activities to be trained. Each completed student profile would then contain the following: (1) assessment of current levels of functioning, (2) determined long and short-term training objectives, (3) delineated instructional environments, and (4) monitored/evaluated student progress.

The selection of functional alternatives for the teaching of functional skills also is a vital consideration and should be guided by the concepts of normalization and L.R.E. This would involve an accurate estimate of the possible limits of each individual's overall capacity; behaviors to be trained may then approach those of the "normal" peer group. Another related concept highlights the individual's similarities to the norm and downplays individual differences. In this regard, needed functional skills are taught traditionally or alternatively with appropriate adaptations from least to most visibly different. Individuals are then provided with the ability to function effectively in least
restrictive environments which include school, non-school, and post-school environments.

The principle of functionality (Arnockzy, 1980) further involves the teaching of alternative skills which individuals may use to operate efficiently in their environments. Transfer of these skills allows independent functioning in "normal" environments. That is, the skills should allow independence from others and from highly visible, adaptive materials. Thus, individuals should be trained using materials that are as close to what may be encountered in the actual natural environment as possible.

From this approach, we may combine principles to produce some guidelines for selecting skills and using alternatives to teach these skills. First of all, the alternative should substitute as completely as possible for the normal skill. This complete skill substitution should allow total independence for the individual. A functional alternative should be age-appropriate, and should make the individual as similar to "normal" as possible. Finally, a functional alternative should allow an individual to become independent in natural, domestic, school, and community environments.

The need for addressing functional living skills across multiple domains for individuals who are moderately to severely retarded has been specifically addressed in
the literature. Wehman, Renzaglia, and Bates in their book, *Functional Living Skills for Moderately and Severely Handicapped Individuals* (1985), acknowledge that greater attention is being given to the importance of teaching "those behaviors and activities that are basic to independence at home, at work, and in the community" (p. 15). The theme of the book is community-based instruction in the practical life skills that are critical to helping persons who are moderately and severely handicapped become independent. In their view, home living, social, recreational, vocational, academic, and travel skills play a role in the educational planning and program development of the population characterized as severely handicapped. Emphasis should be on the teaching of functional activities involving skills of immediate usefulness to students, using materials that are real rather than simulated (p. 15).

A model program developed at Northern Illinois University (Freagon, 1983) is called "The Individual Student Life Skill Profile System for Severely Handicapped Students". This project is a longitudinal evaluation tool that utilizes natural domestic, community, vocational, and recreation/leisure environments as major referent points. It is not developmentally based or sequenced, but rather is based upon the demands for independence and/or partial
participation in an individual's current and future natural environments. Activities and skills essential to independent adult functioning and current participation are delineated in a wide array of heterogeneous natural environments.

The Teaching Research Curriculum for Mildly and Moderately Handicapped Adolescents and Adults: Taxonomy and Assessment (Nishioki et al., 1983) is another assessment tool for evaluating functional skills needed in vocational and residential settings by adolescents and adults who are mildly and moderately handicapped. This taxonomy has four basic skill areas: social/sexual skills, independent living, leisure skills, and vocational skills in sheltered or competitive employment. A seven-step procedure is outlined for assessing and determining the type of functional academic curriculum appropriate for individual students.

Project A.M.E.S. (Actualization of Mainstream Experience Skills) authored by Steve Maurer (1981) describes efforts to teach functional vocational and community living skills to students who are moderately and severely handicapped. The components of this program are vocational, community mobility, domestic living, and recreation/leisure skills. The philosophical commitment is toward generalizing skills to the community, teaching
skills that are chronologically appropriate as well as functional, and allowing students full participation in the curriculum.

This dissertation is concerned with one major area of the functional curriculums reviewed above - the leisure domain. The rationale for intense training within this domain is justified due to the typically exorbitant amount of leisure time available to those with serious handicaps. In addition, effective leisure programs can contribute to physical and social well-being, enhance self-concept, reduce the occurrence of aggressive and stereotypic behaviors, increase an individual's repertoire of social and self-help skills, and enable other types of progress within an environment that is less restricting and more normal as viewed by peers and society. Recreation and leisure programming also should be a critical part of the overall programming plan for persons who are mentally retarded.

Leisure education, in the form of special recreation, has been defined by Nesbitt (1974, p. 311) as providing students "... with special competencies necessary to overcome, adapt, modify, or in other ways achieve the goal of normal recreational, leisure, and cultural pursuits and participation...". Professionals in special education are now beginning to realize that
recreation and leisure should be part of a "total" curriculum. Recreation outcomes complement educational outcomes and education which is relevant must view the entire lifespan needs of the individual. In this regard, Nesbitt (1974) states the following goals that education and recreation have in common: (1) to improve the individual's mental, physical, social, and emotional development; (2) to catalyze change through growth at all levels (local, state, and national) in order to provide increased services to those who are handicapped; (3) to prepare individuals to assume the responsibility of increasingly directing their own education and recreation; (4) to develop a "whole" curriculum for the "whole" individual; (5) to recognize that leisure plays a large part in meeting the life adjustment and lifespan needs of each individual; (6) to acknowledge the special significance in acquiring recreation knowledge and skills when examining the increased amount of time devoted to leisure (especially when a greater amount of leisure time is allotted as compared to academic and vocational activities for the individual who is handicapped); (7) to see that leisure education coincides with a current national movement to expand instructional programs in Arts Education for all students with a handicap (Geddes and Stein, 1975; State Team Report, 1974); (8) to coordinate
efforts in the team, or transdisciplinary, approach, which have proven to be more effective in achieving goals with the person who is handicapped; (9) to examine the employment issue, since persons who are handicapped have more leisure time due to more limited employment and since there should be increased emphasis on recreation to transform the experience of enforced leisure from 'killing time' into one where the individual can achieve his or her maximum potential; (10) to see that the individual who is more severely impaired receives very specific instruction and extensive opportunities over time to develop competencies in any area of learning; (11) to view leisure education as important in providing instruction and developing these very competencies that can bridge the gap between school and community; and (12) to promote the advocacy of special educators for leisure education, since they are in a very unique position of seeing the effect of leisure education as it impacts child development from birth through the early childhood years.

The leisure component of functional curriculums could even be the best possible way to address these goals toward the end of mainstreaming individuals who are handicapped into the community (Putnam, Werder, & Schleien, 1985). Also, recreation - leisure time training may be the best possible avenue for students with serious
handicaps meeting on "common ground" with the nonhandicapped. Add to this the contention that the area which seems to have been most neglected historically in such training has been the development of physical, motor, and recreational abilities as part of the total education and training of the individual with serious handicaps, particularly the post-school aged individual (Ball, Chasey, Hawkins, & Verhoven, 1976; Putnam, Werder, & Schleien, 1985; Wehman, 1986). The post-school factor has to be raised, because many adolescent and adult persons who are mentally retarded are no longer in school. Their motor, physical, and recreational needs are more difficult to meet because related programs are fewer or nonexistent.

What are the overall leisure education requirements of persons, young or old, who have been deinstitutionalized? Pomeroy (1974) identifies these requirements broadly as the development of social skills, personal independence, emotional maturity, and physical mobility. With the acquisition of these skills, sequential processes that move persons progressively to independent leisure functioning must be implemented (p. 3). Toward that end, several leisure education models have been used over time, beginning with some that are developmental in nature. The first of the models developed by Forness (1977) is designed to facilitate the
transition of students from special to regular classes. Based on four levels, this paradigm outlines the curriculum materials, modalities, settings, reinforcers, and consequences necessary to progress through hierarchical orders of classroom settings (p. 3). A second criterion-referenced continuum for involving persons who are disabled in public recreation settings has been validated for use by Burdette and Miller (1979). Based in a municipal recreation facility, the program is modelled on a skill continuum from the complete absence of sensory-motor or self-help skills, to the highest level of skill-specific activities. Suggestions to integrate students who are handicapped with students who are not can be utilized at each level of this program. Another conceptual approach stressing a continuum of recreation programs leading to normalized participation was designed by Hutchinson and Lord (1979). The settings in which recreation services occur are viewed as a progressive and sequential procedure. Individual assessment determines the appropriate type of recreation, and decisions are based upon each individual's socialization, functional levels across domains, behavioral concerns, and physical status. Individuals who are more severely impaired across domains receive recreation at the facility in which they reside. Those individuals are gradually integrated into
more complex recreation environments and settings. The ultimate goal of this progression is community integration for those individuals who have the prerequisite skills for such programming.

Stensrud, using his concept of advocacy (1978), outlines a strategy to involve individuals who are disabled in settings requiring increasing degrees of socialization. "Throughout this process, with the use of volunteer assistance, procedures are utilized beginning with the inclusion of nondisabled persons in segregated settings and progressing through the stage of '50-50' (disabled/nondisabled) integration that ends in fully involved client-directed participation", (Wehman & Schleien, 1981, p. 4).

The Ho’onanea Model for Leisure Education (Voeltz & Wuerch, 1981) delineates a training process that uses systematic instructional strategies to teach both leisure activity skills, and the skills needed to apply them across home, school, and community settings. Also writing on the topic of integrated community settings are Certo, Schleien, and Hunter (1983), who present a conceptual framework for leisure skill instruction for individuals who are severely disabled. This inventory teaches functional, age-appropriate leisure skills referenced against the performance characteristics of nondisabled
individuals which lead to participation in integrated community settings.

Day and Day (1977) designed a leisure skills instruction program developed for a two-month summer period for 30 children and adolescents labeled moderately-to-severely handicapped. The goal of the program was to provide the students with independent recreational skills that they could use without the benefit of adult supervision. A three-level curriculum was developed, with a task analysis approach used for each activity that was selected. A placement level of adaptive behavior was also used as a determinant for skills to be taught. This Project did demonstrate that functional leisure skills could be systematically taught to the student who is moderately retarded; also, these same skills could be generalized to the living environment.

All of these curricula have evolved because of the goal for individuals who are handicapped to be able to function in their natural community environments, utilizing appropriate facilities (e.g. recreation) as they would all public facilities — with their highest individual level of functional independence. This significant trend has emanated from many sources — the written word (including results of research); litigation; legislation; and advocacy on every level possible. The
utilization of such a multi-pronged approach in the special leisure education field within the context of functional curriculums will truly create a needed and viable approach to intervention with persons who are mentally retarded.

It is a focus of this dissertation to train targeted subjects who are mentally retarded to demonstrate functional independence while accessing community recreation. It was hoped that an empirically based framework could be established to advance the subjects in their education and training and to be a basis for future related projects yet to evolve.

**Mental Retardation**

The population of concern in this dissertation involves adolescent and adult individuals who are either moderately or severely mentally retarded. Mental retardation, as a condition, is a deviation from the standard of normal development (Uzgiris, 1968). However, if an interactionist point of view is accepted, the nature of experiential opportunities available to all individuals becomes significant since it is assumed that development results from interaction between the organism and environmental events, whatever the genetic base. In this
regard, the importance of the interaction of individuals who are mentally retarded with their natural, community, recreational environment cannot be overestimated. It would be undesirable to limit the experiential opportunities of individuals who are already limited cognitively. In fact, the potential for the environment to exert an influence on this type of individual should be maximized, especially because the ability of this type of individual to extract cues from the environment is limited already by the very nature of mental retardation.

There have been many attempts made to define the condition termed "mental retardation". The first one that was published and professionally acknowledged was catalyzed by the American Association on Mental Deficiency (Heber, 1959), and was similar to the definition which is broadly accepted today. The most current definition reads as follows: "Mental retardation refers to significantly subaverage general intellectual functioning resulting in or associated with impairments in adaptive behavior and manifested during the developmental period" (Grossman, 1983, p. 11). The terms used within the definition have important implications for persons working with individuals who are mentally retarded. Specifically, "mental retardation" means lowered cognitive ability. "Sub-average" indicates performance lower than normative
expectancies for society, specifically two or more standard deviations below the mean for a given age group on a standardized I.Q. test. "Adaptive behavior" refers to maturation, learning, and the ability to cope with the natural and social demands of the environment. A "deficit" exists when an individual cannot adjust responses to environmental demands. The "developmental period" includes birth to twenty-two years (Robinson & Robinson, 1976, p. 30).

The American Association on Mental Deficiency (A.A.M.D.) has also developed the means for classifying different types of mental retardation. The categories are: mild, moderate, severe, and profound. The Stanford-Binet Test of Intelligence uses the following classification system:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Intelligence Quotients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>68-52</td>
</tr>
<tr>
<td>Moderate</td>
<td>51-36</td>
</tr>
<tr>
<td>Severe</td>
<td>35-20</td>
</tr>
<tr>
<td>Profound</td>
<td>19 and below</td>
</tr>
</tbody>
</table>

The A.A.M.D. manual has descriptions indicating the level of functioning one might find for individuals who have been categorized at that level. Since the population of
concern in this dissertation is moderate/severe, only those two categories are discussed.

"The moderately retarded person has a Binet I.Q. of from 36 to 51, or a Wechsler I.Q. from 40 to 54, with an approximate mental age of from six years and one month to eight years and five months. Although much less dramatic than with the profoundly and severely retarded, these individuals often have some observable physical features which indicate abnormality. They frequently look as though something is wrong with them. Some of them do maintain full-time jobs, and many others have part-time or odd jobs. The chief focus of training is on self-care and other practical skills, and the majority become fairly proficient in such skills as dressing, toileting, eating, and grooming. As children, they may well have attended Trainable Mentally Retarded (T.M.R.) classes " (A.A.M.D., 1983, p. 29). This group obviously will function higher in all areas than the individual who is identified as severely mentally retarded.

The A.A.M.D. manual defines severely retarded persons as having "... a Binet I.Q. ranging from 20-35 or a Wechsler I.Q. from 25 to 39 (extrapolated), with a mental age roughly from three years and nine months to six years. Although neurological damage is common in this group, they are more apt to be ambulatory than the profoundly
retarded. Unlike profound retardation, special training can teach them to talk and care for simple personal needs. Academic training, however, is not effective" (p. 29). These descriptors of moderate and severe mental retardation may be helpful to the person not familiar with individuals who are mentally retarded; however, it should be kept in mind that each individual's development is unique, and that individuals who are mentally retarded should be evaluated always as individuals.

As stated by Zigler and Hodapp (1986), the field of mental retardation is still in its infancy. "From the initial efforts of Seguin and Howe in the 19th century to the classic studies of Bayley, Spitz, and the Iowa group in the 20th, all of the advances in mental retardation areas have occurred in the past 150 years, and most within the last 50" (p. 30). Up until this time, there had been little significant research in the field of mental retardation.

Early in this century, it was thought that nothing could be done to modify the adaptive level of the retarded; this was the view proposed by Fernald (1919), that was later dispelled when a follow-up study was done with the same patients who had been reluctantly released from an institution. This surprise discovery led to a shift in the focus of institutions from only custodial
care to actual rehabilitation. Other research followed (Foley, 1929; Matthews, 1922; Storrs, 1924) to refute the notion that all individuals who were mentally retarded were incapable of a satisfactory adjustment in the community. Later surveys (Abel & Kinder, 1942; Bigelow, 1921; Duncan, 1942; Kinder, Chase & Buck, 1941; Little & Johnson, 1932; Thomas, 1943) looked at the nature of the adjustment of adult individuals who were mentally retarded after their discharge from an institution. In a 1968 study by Heber and Dever, a considerable percentage of individuals with I.Q.'s over 50 achieved employment, and this employment was probably more related to attitude and personality factors than to intelligence. In the community, the individuals who were retarded were isolated from civic, recreational, and social activities, and were cited more frequently for minor legal infractions than the public at large. These findings summarize research attempts up to approximately 1970.

Studies since 1960 have been more sophisticated and have challenged previous conclusions. Windle (1962) studied four groups of residents who had spent time in the community, but who could not be discharged from the institution. The persons who returned to the institution and could not stay in the community did so because of inadequate interpersonal relationships,
inadequate interpersonal relationships, inadequate vocational performance, or antisocial behavior.

Edgerton (1967) also studied institutionalized persons who were able to stay in the community. These persons had been "successfully adjusted" to community integration after a long process of previous trial placements, and had returned to the institution for further rehabilitation as deemed necessary. The most salient characteristic of their adjustment was their dependence on benefactors to help them maintain (a) their self-percept; (b) their ability to cope with the world; and (c) their ability to pass for normal.

Goldstein (1964) reviewed studies that examined the occupational level of graduates of special education classes not in the institution. The conclusion he drew was that most students who are mildly retarded will make an adjustment to their community as adults. These persons are more affected than the norm by economic depression, and downward economic trends determine their future socio-economic status. Persons who are retarded tend to be on the lower end of the occupational scale, and are therefore more vulnerable to economic fluctuations.

Clearly, we are in an era now when all avenues of social and community integration should be utilized for the individual who is mentally retarded. In this regard,
Sheerenberger (1976) states that "the current emphasis on deinstitutionalization and institutional reform is based on a heightened sense of responsibility for the recognition of the rights of the handicapped" (p. 4).

Lastly, and in light of this dissertation's focus, the individual who is mentally retarded commonly has associated delays in physical fitness needed for appropriate recreation participation. In the area of physical fitness, numerous researchers (Brace, 1948; Brace, 1961; Francis & Rarick, 1959; Howe, 1959; Sengstock, 1966; Stein, 1965) have demonstrated that individuals who are mildly mentally retarded fall significantly below non-handicapped individuals in tests of physical fitness. Campbell (1978) found that persons who were moderately to severely retarded were significantly less fit than their mildly retarded peers. Londeree & Johnson (1974) found that individuals who were trainable mentally retarded (TMR) and educable mentally retarded (EMR) were significantly less fit than normal children. Brace (1961) used the American Association for Health, Physical Education, and Recreation Youth Fitness Test to determine that 80% of the students who were mentally retarded were below the median of the national score in fitness measures.
The importance of teaching psychomotor skills and fitness to individuals who are mentally retarded is well recognized for many reasons (CEC, AAHPER, 1966; Fait, 1971). Instruction in fitness skills should be implemented for all individuals who are mentally retarded since these individuals will most likely use physical rather than intellectual skills in vocational and recreational areas. Motor fitness is an essential part of habilitative programming (Luckey & Shapiro, 1974), and has great value in predicting success in vocational areas. Motor fitness is also critical to functional skill development. Activities of daily living (A.D.L.) all have prerequisite motor skill components as well. In addition, recreation and programs of motor development can greatly reduce the gap between the person who is retarded and the rest of society by providing activities in which the person who is retarded can successfully perform (Mathews, 1977). Further, these individuals have unique needs which are primarily physical and motor in nature (Jansma, 1984) and have a greater portion of their day available for leisure time use. In fact, the past two decades have witnessed a radical shift in programming needs for individuals who are more severely retarded from academic-vocational-physical/social to physical/social-vocational-academic (Jansma, 1984).
This section has presented various terms and meanings related to the concept of mental retardation and a synopsis dealing with the history of the treatment of those with mental retardation. It has also reviewed literature relevant to the total environment of the individual who is mentally retarded, and has hopefully substantiated the notion that effective programming is mandatory for further community integration of the individual who is mentally retarded. Further, it has reviewed studies that cite the psychomotor status of individuals who are retarded and the importance of motor fitness to the individual who is handicapped.

Training individuals who are mentally retarded to function independently as they access community recreation is valuable from many standpoints: community integration, motor fitness, effective use of leisure time, mainstreaming, socialization, adaptive behavior levels - the implications appear to be endless. In this regard, it is the purpose of this study to train six individuals who are moderately to severely mentally retarded to become functionally independent as they access a public recreation facility. The benefits of this training potentially would affect the subjects' future functioning in other related environments, enhance their self-esteem, promote their physical/motor fitness, expand their
leisure-time skills, set the occasion for normalized social interactions for them and concomitant language development, and also provide the members at the club (used as the research site) with a view of mental retardation which focuses on ability, not disability.
Chapter III

Procedures

The purpose of this study was to demonstrate whether or not functional independence could be positively affected through the systematic training of recreation/leisure skills at a private health club with adolescents who are moderately to severely mentally retarded. Information applicable to the conduct of this study is presented in the following sub-sections of Chapter Three: a) Research Site, b) Selection of Subjects, c) Ecological Inventory, d) Description of Equipment, e) Training of Raters, f) Research Design, g) Methodology, h) Reliability, i) Procedural Integrity, j) Content and Social Validation, k) Maintenance, l) Generalization, m) Data Analysis, and n) Adaptive Behavior.

Research Site

Sawmill Athletic Club (the Club) is a private health club located in Columbus, Ohio. Enrollment at the Club
was 3,500 people at the time of this study. The membership consisted of families as well as single men and women. This site was chosen because of its accessibility and its excellent facilities including a swimming pool, indoor and outdoor jogging track, racquetball courts, and weight room. In addition, the facility operated from 6 a.m. - midnight Monday through Friday, and 8 a.m. - midnight on weekends. These hours had appeal due to the wide variability of available times for lifetime leisure skills development. Written approval to conduct the study at the Club was obtained from the manager of the Club.

There were several different subenvironments which were involved in this research study. They included the jogging track, the weight and exercise rooms, and the 50-meter indoor swimming pool. All training occurred during regular hours when the Club was available for use by the general public.

**Selection of Subjects**

Six subjects who were students in a class located in Upper Arlington High School, Upper Arlington, Ohio, were selected for the pilot investigation. This investigation occurred from September through December, 1989, and provided valuable information later applied to the primary
study. Precise trainer instructions were developed as a result of this pilot (Appendix C). It was deduced from the pilot that criterion level expectations needed to be elevated across all sessions, and that training to independence would take fewer sessions than previously surmised. In addition, macroprompts were added to the inventory subenvironments for a more accurate baseline. Acting as natural environmental cues that might be used by any club members, the prompts added another dimension to the scoresheet. The macroprompt cue was integrated as a further response cost factor if a student exited one subenvironment and could not orient to find the subsequent subenvironment. The standard latency period of 10 seconds was noted before the macroprompt cue was verbalized as written on the scoresheet. The response cost to the student was -17 for that subenvironment.

Subjects for the principal study were selected from Worthington, Ohio. Three professional sources were used to locate subjects within this geographical location who might fit selection criteria; the Special Olympics Area Coordinator, a Worthington MH classroom teacher, and a coordinator for the summer therapeutic recreation program. Through these collective sources, 14 possible candidates emerged. Six of the original 14 were used in the primary investigation based upon their willingness to participate
and their availability for the scheduled sessions.

All subjects ranged in age from 15-22, and were individuals with moderate to severe mental retardation and adaptive behavior deficits. Some subjects had visited the Club, but no subject had been a regular member. Parent/guardian approval was obtained for each subject using the informed consent form located in Appendix A.

Ecological Inventory

The ecological inventory used in this study was a step-by-step analysis of the sequences which had been mastered in order for each individual subject to access the Club with total independence. The order of subenvironments remained precisely the same throughout. An overview of each subject’s visit to the Club during all research sessions could be described as follows:

In a parking lot outside the Club, the subject received a pacing wristwatch and a membership card. After correctly placing the watch on his or her wrist, and holding the card, the subject proceeded from the parking lot independently to the front door. The subject entered the facility through the main entrance and proceeded to the main desk, where the
card was presented to the staff member on desk duty. It was examined and handed back to the subject, who proceeded down the stairs to the locker rooms. At this point, the card was turned over to the locker room attendant at the laundry room door in exchange for a key and two towels. The subject located the locker, opened it with the key, and changed clothes to a t-shirt, shorts, white socks and sneakers. The pacing wristwatch, which was worn throughout the visit to cue activity duration, remained on the subject's wrist. Clothes were placed appropriately in the locker with the towels and any other items (purses, gym bags, coat, etc.), the locker was locked, and the key was pinned to the subject's shorts, preferably at the waist. The subject proceeded out of the locker room to the weight room, where he or she spent five minutes on either the rowing machine or the stationary bicycle, depending on availability. The criterion established was five minutes of continuous rowing, and continuous biking, on each machine. The next room was the exercise room between the weight room and the locker room. The subject stretched for running. After stretching, the subject proceeded through the locker room, climbed the stairs to the track, and entered. The subject
ran, jogged, or walked for ten minutes in the appropriate direction, and followed all the rules of the jogging track (such as fast lane-slow lane, and safe entrance-exit), stopping when the watch indicated by its beeping cue. After the subject exited the track, he or she descended the stairs on the right side and changed in the locker room for swimming. The subject entered the pool area, towel and key were placed on a table or chair, and the subject descended the ladder closest to the lap lanes to begin swimming for ten minutes. Following the swim, the subject exited the pool to the locker room, changed, exited the facility, and located the trainer in the Club parking lot to return the watch and pass.

The ecological inventory of subenvironments applicable to each of the subject's visits to the Club during this study consisted of training steps in four subenvironments. The entrance and locker room, weight room/exercise room, jogging track, and locker room to 50 meter pool portions each consisted of 17 steps within the overall ecological inventory. The entire inventory written in behavioral terms is contained in Appendix B, and the inventory checklist is located in Appendix C.
The listed environments did not include any locker room sequence due to lack of trainer control in this environment. Instead, the locker room was monitored by the Club staff as a normalized environment, but not scored as part of the independence checklist.

Description of Equipment

In the order of its use, the equipment at the Club was described as follows:
1. The stationary bicycle was a computerized device which allowed the user to set the resistance of the program and the time that the program ran. It also showed how many calories were burned at each speed and registered a constant measure of speed attained. Although these features were a part of the equipment, the only behavior that was rated was continuous, independent pedalling on the exercise bike, since the focus was independence, not how well the participants could operate the computer.
2. The rowing machine had a sliding seat and a place for foot positioning. Once again, some of the machines also had computers, but this operation was not a part of the study; instead, the study rated independent and consistent rowing on the rowing machine for five full minutes without stopping for more than 10 seconds at any one time during
the five minute period.

3. The pacing wristwatch all subjects set for the appropriate time duration for each activity. As stated, this watch was worn throughout all sessions, including in the pool. All subjects had the time setting skill perfected prior to the gathering of data. Pictures of the equipment and facilities at the Club can be seen in Appendix D.

Training of Raters

One of the most critical components of this research investigation was the ability of the trainers to instruct the subjects and accurately record the results. The following section scrutinizes this component of the research.

There were both written and verbal methods used to locate trainers for this study. Potential trainers were informed of the study's focus, the times and location of the training, the ecological inventory with the six-level total task presentation component, and the rate of reimbursement per training session. Each trainer was interviewed singly to determine his or her understanding of the various prompts in the checklist and his or her ability to follow the uniform and critical latency time
period demands. In addition, the trainers needed to understand the focus of the study, and how to facilitate subject independence while simultaneously discouraging social interaction with the subject. The trainers had to act as disinterested observers of the subject's behavior to allow for maximum independence to occur. If the appropriate responses were not emitted as the subject progressed through the inventory, the trainer needed to first allow a precise 10-second period for the response to occur, and then proceed through the linearly rated prompt levels with additional precise 10-second intervals. Some trainers showed a high interest in this teaching method. Other trainers could not precisely and accurately direct, or did not desire to work with individuals who were handicapped, and declined to assist with the research investigation.

Potential trainers who were able to understand the nature of this training, as well as the teaching aspects of the inventory and target population, and who agreed to be available, were presented with a pencil, clipboard, and the ecological inventory scoresheet. The researcher explained each item on a numbered instruction sheet corresponding to the scoresheet. The thirty-minute reliability videotape was shown to each candidate singly, who scored the checklist as he or she viewed the tape.
The videotape tracked an adolescent who was moderately/severely mentally retarded as she was "prompted" using cues from the inventory through the four subenvironments of the Club in the training sequence. After the scoresheet was complete, it was rated, and the number of correct responses tabulated. Incorrect scorings were corrected and discussed with the researcher, and any further questions were answered.

Prior to the baseline and training sessions at the Club, the trainers who had satisfied eligibility requirements to this point were given further instructions (refer to Appendix C) which critically delineated methods used at the Club. This set of instructions included practical situations which might have been occurring in an integrated adult environment, and the resultant scoring in definitive terms. These written instructions were used to guide the trainers through the four subenvironments of the Club accompanied by the principal investigator prior to student contact. During this preliminary session, each step of the inventory was discussed and demonstrated. Situational concerns were examined. Safety procedures were discussed. For this important session, the pilot study had been an effective means to illustrate situational and safety concerns that might not have been issues prior to the onset of the primary study.
Research Design

A changing criterion single subject research design was used for this study (Hartman & Hall, 1976; Tawney & Gast, 1984). The basic strategy of this design is to evaluate programs intended to chain sub-skills that were in the subject's repertoire but did not occur together or at an acceptable duration and/or rate.

The changing criterion design is a variation of the multiple baseline design. Like the multiple baseline design, the changing criterion design is based on the principle of "time-lagged" control, and is appropriate "to evaluate the effectiveness of instructional and behavior management programs that are used in educational settings" (Tawney & Gast, 1984, p. 269). Hartman and Hall (1976) describe the changing criterion design as follows: The design requires initial baseline observations on a single target behavior. This baseline phase is followed by an implementation of a training program in each of a series of training phases. Each phase is associated with a stepwise change in criterion rate for the target behavior. Thus, each phase of the design provides a "baseline" for the following phase. When the rate of the target behavior changes with each stepwise change in the criterion, therapeutic change is replicated and experimental control
is demonstrated. Thus, an investigator using this design must show that each time the criterion level is changed (increased or decreased), there is a concomitant change in the dependent variable (independent behavior in accessing various activities in the Club). This change should be relatively immediate and should follow a stable level and trend in the data in the preceding phase. A replication of effect (internal validity) is demonstrated if each stepwise change in criterion level results in a behavior change to the new criterion level (Tawney & Gast, 1984).

**Methodology**

This investigation focused on the 68 step ecological inventory, which was presented in four successive clusters as defined by the four subenvironments of the inventory. It was assumed by this investigator, as dictated by the changing criterion research design, that the phases (clusters) of this inventory could be trained in 8 sequential two-hour training periods at the Club.

The sequence was taught utilizing a behavioral chaining technique which is referred to in behavioral literature as "total task presentation" (Cooper, Heron, & Heward, 1987, p. 352). This is a variation of a forward chaining technique in which the individual receives
training on all steps in the task analysis during every session, with assistance provided by the trainer as needed to attain performance of the steps in the task analysis.

For the purpose of this study, trainer assistance (prompts) took the following forms: (I) — the trainer rates the subject's performance as occurring totally without prompting within the latency period (10 seconds between each prompting level) and was marked by the trainer as a 6-point score in the appropriate column; (W) — a one-word cue (underlined on the scoresheet) or a gesture is given to prompt the next step, and marked in the 5-point column; (VP) — a phrase is given as a "verbal prompt" and spoken to the student exactly as written on the scoresheet for a 4-point value; (VT) — verbal throughout, as an indication that the subject needed more verbal prompting than just the key phrase written on the scoresheet, and rated as 3 points; (M) — modelling, or the trainer needed to demonstrate what to do by actually performing the behavior, worth 2 points; physical prompt (PP) — the trainer had to initiate the movement by some direct hands-on approach, scoring 1 point; and unobserved (U) — the behavior required for that step was not emitted even though all the previous prompting steps were used with the 10 second latency periods between each prompt. The point value for (U) was zero, marked in the corresponding
In summary, the prompting levels had been applied using a least to most intrusive protocol, and a point value from 6 points for the (I) behavior, 5 points for (W), 4 points for (VP), 3 points for (VT), 2 points for (M), 1 point for (PP), and 0 for (U). On the scoring sheet used each session, the trainer indicated when any of the prompting methods was used by marking the corresponding block for that specific numbered step and prompt level on the grid. The data recording sheets would then indicate the occurrence of any training when the skill had not been performed independently or if, in fact, there was independent performance of behaviors (I).

Each of the 68 steps in the inventory was rated each session. In this way a common cumulative score was attained for each session. The maximum attainable score (total independence) was 408. The training sequence for the eight consecutive two-hour sessions was as follows: Baseline - the subject was taken to the facility, and independent behavior was rated after the trainer verbally gave one macroprompt cue (refer to ecological inventory scoresheet for the individual macroprompts for each subenvironment). The macroprompts were in actuality natural instructional sentences which one might have used to guide any person through the Club. This was true
especially for any adolescent or adult unfamiliar with the complex environment of the Club. Independent baseline data were formulated as each subject's starting point using this method. The macroprompt was recited one time only.

Training Session I - the subject received at least the verbal training (VP) from the trainer on the 68 steps of the inventory. This provided the instruction on the first day that presented the task to the subjects verbally, as well as teaching the mandatory sequence. For the subsequent sessions, preset criterion scores were used which had been established based on the results of the investigator's pilot study. These target levels were as follows for each training session: Session II-60% of the total independence score; Session III-70%; Session IV-75%; Session V-80%; Sessions VI and VII-90%; Session VIII-94%; Session IX-98%; and Session X-100%. These changing criteria levels were purposely not equal increments in order to more convincingly demonstrate any functional relationship between the independent and dependent variables in the study.

The pre-established criterion levels were examined each day in connection with data actually attained for each subject per day. The researcher would then determine number of training sessions per criterion level by
monitoring progress. If the subject was not able to reach criterion for any particular session, then he or she would not progress to a more demanding level, and that training session would be repeated using the same criterion level.

The researcher prepared scoresheets in advance for each day's training session on a clipboard for easy reading. The scoresheet had the subject's name, date, trainer's name, five separate areas for scoring which included the four subenvironments, and the total score for that day's training.

At the conclusion of each session, trainers added points in each subenvironment and recorded them on the score sheets, as well as a total for the day which was the sum of the subenvironment scores. The researcher verified these tabulated score sheets daily.

The response cost factor which was inherent in this training project was selected to emit the greatest degree of independent exercise behavior possible by the subjects. Response cost (Cooper, et al., 1987) is a form of punishment in which reinforcement is lost due to inappropriate behaviors. This loss of reinforcement results in the decreased probability of the future occurrence of the behavior. For this investigation, the loss of reinforcement was the loss of the freedom to proceed independently. If the subjects did not recall the
steps in the 68-step inventory, they were interrupted. Since the subjects were highly motivated to perform independently once they had been trained, necessitating trainer guidance understandably carried a response cost. The subjects had been told prior to the second training session (refer to instructions for training at the Club, Appendix C) to recall the steps in the sequence on their own, and that they should not ask the trainers what to do. Likewise, the trainers had been informed that any type of communication (verbal or nonverbal, gestures, expressions, even pointing a finger) had a response cost factor since the focus of the study was true independence, or how the subject would function if they were truly unsupervised at the Club. The effectiveness of this response cost was apparent.

Consistent behavior of the trainer in this facility also was critical. To insure this, the trainers were not allowed to know the preset criterion levels and, therefore, their behavior would not be influenced one way or the other by knowing such information. In addition, to ensure scoring uniformity, a full 10-second latency period needed to elapse prior to the delivery of any instruction, modelling, or physical prompt to a subject. The full 10-second period was critical to allow subjects adequate time to focus on self-initiation of the behavior. To wait for
an extensive period of time for a response would have drawn attention to the training session, and it was hoped that the sessions would be as normalized as possible. As one exception to this procedure, if someone from the Club, either a staff member or another Club member, intruded on any session by initiating a conversation, up to one minute of time was permitted to pass, during which time no data were gathered. The 10-second latency period (the time between the possible behavior emission and the actual performance) began as soon as the subject was focused once again on any target task.

It is important to also note that, across all subjects of the pilot and the principal study, no form of systematic reinforcement was used by the raters. Motivation was not considered to be a problem which had to be addressed since the subjects' presence at the Club itself and the trainers' attention were posited to be reinforcing per se.

Reliability

Applied behavior analysis research requires that both the dependent variables (independent exercise behavior in this study) and the independent variables (multiple prompt training through total task presentation in this study) be
described completely and assessed reliably (Cooper, Heron, & Heward, 1987, p. 92). Such description and assessment are critical to the ability to replicate research and obtain similar results. For the purposes of this study, several factors critical to the measurement of reliability were identified prior to the onset of training. It was important to find trainers who could accurately direct and record subject behavior during independence training. This objective justified the preliminary trainer interviews, the reliability videotape of a subject prompted through the 68-step inventory at the Club, and the instructional on-site training prior to data collection.

The reliability videotape was viewed prior to the onset of training. Since the primary research investigation was conducted during a two-week period of intensive training, the consistency in scoring was not subjected to historical confounding. Consecutive training sessions occurred within a two-week period across all subjects.

**Procedural Integrity**

Procedural integrity refers to a measure of the extent to which actual application of the independent
variable matches its description in methods (Cooper, et al., p. 92). For behavior analysis research to be purposeful, the demonstration of a functional relationship entails describing, quantifying, and reliably assessing both the dependent and the independent variable (Peterson et al., 1982; Poling & Parker, 1983).

To ensure the accurate application of the independent variable in this study, several methods were employed. First of all, the investigator was present at the Club for all training sessions to conduct informal and unreported checks on the trainers. One check per subenvironment per subject was established to monitor intervention. In addition, each trainer was required to attend a closing session after the subjects exited the Club to clarify their scoring techniques and individually turn in materials to the researcher. Questions and specific situations which may have occurred in the integrated adult environment of the Club were examined.

Each rater was also an employee, and received a weekly wage. This was an additional motivator to perform with accuracy and professionalism.

Two graduate students, one from Ohio State University and the other from Miami University, conducted the procedural integrity checks during the first five training days. These individuals scored a very high percentage of
agreement while rating the reliability videotape, and both demonstrated interest in the project. In addition, they were accurate and precise recorders.

Procedural integrity checks were performed by using the standard scoresheet, keeping a subject in sight through a subenvironment, then comparing a score with the subject's rater as the subject went to the locker room to change for the next activity. Across six subjects, a total of twelve subenvironment checks were accomplished.

Content and Social Validation

Content validity of the ecological inventory used to train independence at the Club was established by asking 10 teachers or aides to rate the appropriateness and accuracy of the training steps and activities. To ensure an understanding of the ecological inventory as a whole, panel members walked through the four subenvironments of the Club while judging the steps in the ecological inventory. Following this procedure, they completed the ecological inventory content validity analysis. The content validity survey is contained in Appendix E.

Also, it is necessary for applied research involving persons who are moderately and severely mentally retarded to emphasize practical and important areas of
investigation. Socially validating research questions and associated procedures concerns such things as the perceived value of target behaviors selected for change, the acceptability of the intervention procedures utilized to change the behavior, and the degree of significance which the ensuing behavior change has. Through the surveying of professionals in special education and interested significant others (parents, siblings, peers), an evaluation of the social validity of research efforts was obtained. To assess the social validity of this research investigation, twenty questionnaires were given to instructors, relatives, and supervisors who had some knowledge base of individuals who are mentally retarded. The raters were given the option to read the survey and ask questions before responding. Results were scored and tabulated by percentage of responses in each of the five categories (strongly agree, agree, uncertain, disagree, strongly disagree). Appendix F contains the social validity questionnaire.

Maintenance

It was desirable to examine behavior maintenance at the research site after the training associated with the primary study was over. For this reason, maintenance
checks were done at two weeks and eight weeks after the cessation of formal training. The ecological inventory data score sheets were prepared and the inventory checked for maintenance of independent behaviors previously trained. These checks were performed by the identical trainers employed during the primary study.

**Generalization**

Generalization data were gathered at another facility within two weeks after the final maintenance checks were completed. This occurred by taking the same subjects from the primary study to a sister facility within the Columbus area which was very similar to, but not identical to, the Club. The same scoresheets were utilized, with the same scoring technique, prompt hierarchy, and randomly assigned trainers.

**Data Analysis**

The literature of experimental and applied behavior analysis contains ample evidence of the generality of data from single-subject designs and from procedures intended to establish precise behavioral control in single organisms (Kratchowill, 1978). Other authors have
reported that it has been this emphasis on achieving and demonstrating direct individualized experimental control which contributed to the success of the functional analysis of behavior (Baer, 1977). The benefits of experimental designs and data analyses that illustrate individual, responsive, and direct behavioral control are multiple. First of all, the behavior of each subject controls the pace and procedures of the program throughout the data. The focus in this constant monitoring is truly on each individual subject. Also, the data are continuously available to the researcher when graphed after each session. Judgments and decisions concerning the data can occur immediately after the data have been recorded. Programs can be altered due to unplanned events as necessary. Yet, valid data can still be established to meet the realities of research in applied settings (Baer, 1977).

The close and continuing data contact resulting from graphic analysis enables both behaviors and results to be noticed and investigated systematically. This kind of direct and continuous contact with data may truly broaden the scope of scientific discovery (Cooper et al., 1987).

Operant research designs, with their emphasis on replication (Baer, Wolf, & Risley, 1968) and graphic analysis of data, increase the capacity for independent
evaluation of research. Graphed operant data, such as that provided in this paper, not only provide the primary data, but may also present the data needed for direct replication. In this regard, the visual analysis of graphic data represents the most rapid, reactive, and economic data analysis procedures (Kratchowill, 1978).

The main effect of this training was noted by visual inspection of all the data across baseline, training, maintenance and generalization sessions. The data were examined by visual inspection of graphs. In addition, a panel of four experts in behavioral research were consulted for more extensive interpretation of data. The panel concurred that the replications of training sessions across time had strengthened the internal and external validity of this research investigation.

The results from this investigation were presented graphically to illustrate the effect of cumulative training days on percentage of functional independence attained.

**Adaptive Behavior**

The American Association on Mental Deficiency Adaptive Behavior Scale (A.B.S.) (Nihira, Foster, Shellhass, & Leland, 1975) was intended to measure the
degree to which an individual could adapt to environmental demand. This association’s accepted definition of individuals who are mentally retarded focuses on adaptive behavior deficits as an integral part of this particular disability area, as follows:

"Significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior, and manifested during the developmental period, birth - age 22."

For the purpose of this study, the A.B.S. was administered to a parent of each subject prior to the training for verification of functional level across domains. These domains include independent functioning, physical development, economic activity, language development, numbers and time, domestic activity, vocational activity, self-direction, responsibility, and socialization. This information was used to further substantiate the category of "moderate/severe mental retardation". In addition, the possibilities for the intervention to effect positive changes in levels of adaptive behavior were explored.
Chapter IV
Results and Discussion

Chapter Four presents the findings of this study and the related discussion divided into six sections. Section one examines the reliability of the data. Section two summarizes procedural integrity checks. Contained in Section three are graphed data for a visual analysis on the acquisition and maintenance of exercise behaviors. Section four discusses content and social validity results. The generalization findings are in Section five, as well as findings related to the adaptive behavior scores. Finally, various collateral anecdotal data and miscellaneous observations are reported in Section six.

Reliability Data

As indicated in Chapter Three, a videotape of an adolescent who was moderately/severely mentally retarded being prompted through the 68-step ecological inventory at the Club was shown to potential raters to promote the highest degree of interrater reliability possible. After
an initial interview, potential trainers viewed the videotape as they marked an ecological inventory scoresheet. These results had to concur with the researcher's scored sheet with at least 80% agreement. This percentage was determined by the following formula:

\[
\frac{\text{Number of correct responses}}{\text{Number of total responses}} \times 100 = \% \text{ agreement}
\]

The range of accuracy in scoring among the trainers can be seen in Table 4.1. These data are from the trainers for the primary study only.

Each trainer who was selected attained a score of 80% or better. In fact, the average of the percentage of agreement across trainers was 92.4%.

A factor influencing reliability was the behavior of the trainers. From the onset of the study, it was apparent that the presence of trainers per se may have provided strong positive reinforcement for the subjects. For this reason, the trainers needed to be repeatedly instructed to remain as "invisible" as possible to the subjects. In addition, they were to maintain at least a ten-foot distance from the subject, if possible. The clipboards facilitated this isolation since the trainers were often focused on the scoresheets, and gazing down,
Table 4.1

Interrater Reliability across Subenvironments

<table>
<thead>
<tr>
<th>Trainer</th>
<th>Subenvironments</th>
<th>% Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A + B + C + D</td>
<td></td>
</tr>
<tr>
<td>#1</td>
<td>65/68</td>
<td>95.5</td>
</tr>
<tr>
<td>#2</td>
<td>60/68</td>
<td>88.2</td>
</tr>
<tr>
<td>#3</td>
<td>56/68</td>
<td>82.4</td>
</tr>
<tr>
<td>#4</td>
<td>64/68</td>
<td>94.1</td>
</tr>
<tr>
<td>#5</td>
<td>66/68</td>
<td>97.0</td>
</tr>
<tr>
<td>#6</td>
<td>59/68</td>
<td>86.6</td>
</tr>
<tr>
<td>#7</td>
<td>63/68</td>
<td>92.6</td>
</tr>
<tr>
<td>#8</td>
<td>61/68</td>
<td>89.7</td>
</tr>
<tr>
<td>#9</td>
<td>64/68</td>
<td>94.1</td>
</tr>
<tr>
<td>#10</td>
<td>63/68</td>
<td>92.6</td>
</tr>
<tr>
<td>#11</td>
<td>66/68</td>
<td>97.0</td>
</tr>
<tr>
<td>#12</td>
<td>67/68</td>
<td>98.5</td>
</tr>
</tbody>
</table>

Average = 92.4 %
rather than possibly establishing eye contact with the subject. Two trainers who had been used in the pilot study were not utilized in the primary study due to their inability to follow these criteria.

The Inventory Narrative, with specific and uniform trainer instructions, can be found in Appendix B. The steps were written as behavioral objectives for the purposes of precision.

Procedural Integrity Data

It can be noted in this section that the investigator monitored 100% of the training sessions at the Club, and did accomplish informal and unreported checks during all training sessions. In addition, trainers were required to remain at the Club after subjects left for a closing session to clarify specific unpredicted situations that may have occurred during the session.

Twelve inventory subenvironments were rated by two graduate student observers who had assisted in the pilot study and achieved superior agreement scores following the videotape training session. Accuracy of the independent variable application was assessed by these observers to average 91.5%. Individual ratings are found in Table 4.2.
Table 4.2

Scores Indicating Rater Agreement / Procedures

<table>
<thead>
<tr>
<th>Subject</th>
<th>Day of Training</th>
<th>% Interrater Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>88</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>88</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>94</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>94</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>94</td>
</tr>
</tbody>
</table>

Average = 91.5 %
Visual Analysis Data

This section focuses on the graphic presentation and the related analysis and discussion of the primary data gathered in this study (Figures 4.1 - 4.8). The first six figures depict each subject’s scores in a cluster formation of four dots for each training day. These dots represent a total score in each of the subenvironments of the Club. The solid horizontal lines under each cluster phase of four dots represent the preset criterion levels determined after the pilot study was completed. In percentages, the criterion levels are: 50%, 60%, 75%, 80%, 90%, 90%, 94%, 98%, 100%. The graphs are discussed individually. Figure 4.7 reflects averaged group data across the four subenvironments of the Club.

The data that are revealed in these Figures were the result of at least eight consecutive training days, and two maintenance check sessions. Experimental control of applied behavior analysis is demonstrated over socially important behaviors when "a predictable change can be reliably and repeatedly produced by the systematic manipulation of some aspects of a person’s environment" (Cooper et al., p. 107). This training module, performed with repeated applications, consistently produced data falling above the preset criterion levels even with
randomization of trainers. In this study, the data were "the product of carefully planned and executed observations of behavior" (Cooper et al., op. cit.). However, since the data did not consistently fall at the preset criterion lines, but rather above them, a true functional relationship may not be discerned between the dependent and independent variables.

In Figure 4.1, the dependent variable, exercise behavior independence, is illustrated as a percentage. The level of the baseline performance indicates that Subject One was able to perform some of the skills of the inventory, but was not able to link them together, or maintain them for the periods of time specified by the inventory.

Referring more specifically to the subenvironment data, this subject encountered great difficulty in starting and stopping the timer on his watch. He also suffered a response cost due to behavioral problems which interfered with activity maintenance during initial training. This was later controlled as reflected in the graph.

The line of progress of these data across all sessions, however, indicates that this subject was easily trained because the data followed a very high trend and sustained it. Maintenance was excellent as demonstrated
Figure 4.1

Acquisition and Maintenance of Independent Behavior Across Four Health Club Subenvironments by an Adolescent who is Moderately/Severely Mentally Retarded
by the high scores at two weeks and eight weeks. The dotted mean level lines across each session for this subject reflect the following values: 15% (Baseline), 58.8% (First Training Day), 79%, 96.8%, 97.9%, 95.2%, 97.9%, 99.6%, 98.5%. Maintenance check values were 97.9% and 99.9%.

Referring to Figure 4.2 for Subject Two, it was evident that a higher baseline value was achieved (25%). This subject had the second highest initial rating of independence in the group.

Upon examination of the four subenvironments, this subject, although physically limited with hemiplegic cerebral palsy, was highly motivated for physical exercise, encountered no difficulty with equipment of any sort, and only needed to perfect his activity recall to score well. Of all the subjects, this individual was the most enthusiastic and cooperative in all subenvironments.

The overall data then reflects a high line of progress, as well as a mean line that was maintained at a high level. The mean level lines indicated the following values; 25% (Baseline), 68.5% (First Training Day), 96%, 93.9%, 96%, 99.1%, 97.9%, 98.1%, 99.4%, 99.2%, 100%. Maintenance check values were 100% and 99%.

In Figure 4.3, Subject Three scored the lowest baseline (2.5%), and had the greatest variability in data.
Figure 4.2
Acquisition and Maintenance of Independent Behavior Across Four Health Club Subenvironments by an Adolescent who is Moderately/Severely Mentally Retarded
This subject was unique because the graphed mean data line dropped below the preset criterion level in session six, but did return to the high trend following this drop. In addition, independence was not maintained at the highest level at eight weeks.

Trainer notations across subenvironments indicated that this subject was poorly motivated, and experienced a great difficulty in sequence recall as well as knowing what clothes to wear for each sequence. Even with his low motivation, however, he still was able to maintain the five and ten minute demands of the sequence once initiated.

The mean lines point out the following values; 2.5% (Baseline), 61.7% (First Training Day), 89.7%, 96.9%, 98.3%, 99%, 86.4%, 95.4%, 94.7%, 96.2%, 97.8%, 99.8%. Maintenance check values were 98% and 96%. This graph was also unique in number of training sessions. Additional sessions were included to strengthen the independence training, and level out the variability.
Acquisition and Maintenance of Independent Behavior Across Four Health Club Subenvironments by an Adolescent who is Moderately/Severely Mentally Retarded
In Figure 4.4, the subject began training with a baseline score of 6.3%, below the group average of 14.6%. All scores in this training set were above preset changing criterion lines.

Across the subenvironments, this highly aggressive male required verbal reprimands for off-task behavior, and inappropriate social interactions during the first week of training. These reprimands were scored as part of the inventory, and did effect the desired behavior change as shown by performance and trainer notation.

The mean level lines did not indicate a consistent and strong positive trend, however, until after the fifth session (when behavioral issues were controlled). Session averages reflected the following values: 6.3% (Baseline), 66.8% (First Training Day), 90.9%, 94.5%, 100%, 96%, 98.5%, 99.2%, 98%, 99.8%. Maintenance check values were 99.4% and 99.8%.

Subject Five (Figure 4.5), like Subject Two, rated highly for baseline independence (26.5%). Another similarity was an immediate peak to the ninety-fifth percent level after one training day. These two subjects had the most accelerated trend lines during acquisition, as well as the most nearly horizontal mean level lines after day three.
Acquisition and Maintenance of Independent Behavior Across Four Health Club Subenvironments by an Adolescent who is Moderately/Severely Mentally Retarded
Acquisition and Maintenance of Independent Behavior Across Four Health Club Subenvironments by an Adolescent who is Moderately/Severely Mentally Retarded
This subject was very physically developed, but exhibited autistic-like behaviors that impeded performance during crowded conditions at the Club. If this individual had to break out of his routine and wait, these self-stimulating behaviors would emerge and become magnified. This was not an ongoing problem due to the randomization of training times and days.

Mean level lines reflected the following values: 26.5% (Baseline), 55.7% (First Training Day), 94.9%, 95.2%, 94.1%, 98.1%, 99.8%, 99.6%, 100%. Maintenance check values were 98% and 98%.

Subject Six (Figure 4.6) had a baseline independence score of 7.6%. This was below the group average of 14.6%.

It was interesting to note that inappropriate behaviors and hyperactivity interfered with an ability to maintain the checklisted behaviors of the subenvironments. No additional behavior management techniques were added other than verbal reprimands, but this subject's lowered scores were due to behavioral issues.

The line of progress rose sharply from baseline to session three, with a very high increase after a slight dip at session four. Mean level lines reflected the following values; 7.6% (Baseline), 57.9% (First Training Day), 79.4%, 98.3%, 93.5%, 95.8%, 97.5%, 100%, 98.7%, 100%. Maintenance values were 98.7% and 98.7%.
Acquisition and Maintenance of Independent Behavior Across Four Health Club Subenvironments by an Adolescent who is Moderately/Severely Mentally Retarded
The seventh graph (Figure 4.7) represents the group's average performance. Overall, 95% of the ecological inventory was trained by the third day. Importantly, all of the subjects maintained this independence training above 95% when the two-week and eight-week maintenance checks were made.

In conclusion, even though the results discussed in this chapter were most positive, a functional relationship cannot be claimed because the data consistently rose above the preset criterion lines. This might have indicated that this study was more similar to a stimulus-response presentation to the subjects. It also may have occurred that the training day I, which differed slightly in its format from the other sessions due to the trainers verbal instructions throughout the session, caused the elevation of scores that was seen across subjects. Still, the subjects did maintain a high level of independence, and this level (95%) was maintained after the two-week and eight week periods of nonintervention. Generalization checks also demonstrated high (above 90%) performance levels. In addition, social validity, procedural integrity, intrarater/interrater reliability, and content validity data all met minimum criterion levels of acceptance.
Figure 4.7
Average Performance Scores of Six Adolescents Who are Moderately/Severely Mentally Retarded Exhibiting Independent Health Club Use
Content and Social Validity Data

Content validity for the ecological inventory was established by asking ten teachers and staff to rate the appropriateness and accuracy of the training steps and activities. To ensure the most accurate rating, each panel member walked through the four subenvironments, following the 68-step inventory, and then completed the survey contained in Appendix E. The indicators that were used by this panel of ten experts were: SA (strongly agree), A (agree), MA (mildly agree), MD (mildly disagree), D (disagree), and SD (strongly disagree).

In response to the first question about Subenvironment A, 80% of the panel strongly agreed that it was appropriately designed for training this population; 20% agreed.

For Subenvironment B, the weight room, 80% of the panel strongly agreed, and 20% agreed. This subenvironment was more complex than A since it included the exercise bike, the rowing machine, and the five stretches in preparation for running.

The jogging track, Subenvironment C, was rated as strongly agree by 70% of the panel, agree by 20%, and moderately agree by 10%.
The appropriateness of Subenvironment D was rated as 80% in strong agreement, 10% agreeing, and 10% mildly agreeing.

Overall, the panel rated the 68-step ecological inventory as 90% appropriate in the first category (strongly agree), and 10% appropriate in the second category (agree).

The social validity survey, which was administered to twenty people including instructors, relatives, and supervisors, afforded opportunity for the gathering of critical data in three areas. These areas included the social significance of the target behavior, the appropriateness of the procedures, and the social importance of the results. The indicators used in this survey were SA (strongly agree), A (agree), U (uncertain), D (disagree), SD (strongly disagree).

In response to the statement of acquisition of greater independence by the target population (Question 1), 75% strongly agreed that independence could be trained. The next category was checked by the remaining 25%. Regarding adaptive behavior (Question 2), 60% strongly agreed that training could positively influence this area. Agreement was checked by 35%, and 5% were undecided.
The results for the next question were more variable. When responding to the statement that attitudes of our society can be positively influenced by viewing functional independence in the subjects (Question 3), 80% were in strong agreement, 30% agreed, 5% were undecided, and 5% disagreed. The most variable response, however, was related to the question (Question 4) about whether or not individuals who were mentally retarded had greater amounts of leisure time available. Half the respondents were in strong agreement; 25% agreed; 10% were undecided; and 5% strongly disagreed.

Question 5 addressed the topic of physical activity level tolerance. Could it be improved through training of this nature? Three-fourths of the panel strongly agreed, while 25% agreed.

When responding to the statement (Question 6) that all individuals in our society should acquire lifetime skills in recreation/leisure, 70% strongly agreed, 25% agreed, and 5% were undecided. In slight contrast, the right to accessibility question (Question 7) was rated as 65% strong agreement, 10% agreement, and 25% undecided.

In response to the question, "Are individuals who exercise healthier?" (Question 8), 80% strongly agreed, 15% agreed, and 5% were undecided. Similarly, in response to Question 9 on whether or not the skills of jogging,
swimming, and fitness activities were important for functional independence at the Club, 80% strongly agreed, 15% agreed, and 5% were undecided.

Overall, therefore, the responses to this survey were strongly positive and reinforced the belief that this study had high social validity. The respondents thought the study was important from a variety of perspectives.

**Generalization Data**

Within two weeks following the final maintenance check, four subjects from the primary study were taken to a similar facility within the Columbus area. The inventory checklist was used with the same randomized trainers. Overall, the scores within each subenvironment showed the same consistency. A much lower point value was obtained on each scoresheet, however, probably because the general floor plan of the second facility was not identical. The subjects simply got lost and could not be expected to know where to go.

The trainers, who were better at reading environmental cues and signs, were instructed to mark the "modeling" prompt for this cueing. Once the subenvironments were located, the same performance levels (above 95% independence) resulted.
SUBJECT TWO

96% 90% 96% 92%

Subenvironment A B C D

SUBJECT FOUR

92% 92% 95% 100%

Subenvironment A B C D

SUBJECT FIVE

96% 90% 96% 93%

Subenvironment A B C D

SUBJECT SIX

100% 80% 92% 92%

Subenvironment A B C D

Figure 4.8 Generalization Scores Reflecting Percentages of Independent Exercise Behavior Across Subenvironments
Adaptive Behavior Results

The American Association on Mental Deficiency’s Adaptive Behavior Scale (Nihira, Foster, Shellhass, & Leland, 1975) was administered to a parent of each subject prior to the research investigation. The purposes of this were twofold. Not only did the assessment substantiate level of mental retardation; it also indicated those areas in which the training of functional skills such as independent exercise behavior could have impact on future functional levels.

The following figures (4.9 - 4.14) are profile summaries of the A.B.S., Part One, and correspond to the six subjects of the primary investigation.

Looking at the profile for Subject One, the following generalizations can be made. This subject had low overall independent functioning, seen as an attained score of 71 in Column I. He scored in the severe range, with poor skills in this area. Physical development (Column II) was just above the 50th percentile for his age. Indeed, this was a strong, well-developed male who was capable of many activities and sports. Columns III, IV, and V, often labelled the "cognitive triad", placed him in the moderate to severe range of mental functioning, but were still high enough to indicate that he performs below his potential.
From viewing Columns VI-X, it was observed that this individual was poorly motivated both at work and at home, did not assume responsibility, and exhibited poor socialization.

This profile mirrors Subject One quite well. During the research investigation, he displayed passive aggressive tendencies such as teasing, hiding behind the cars in the parking lot, and cajoling other subjects into fights. The independence training was highly successful in spite of the behavior problems which this individual exhibited. Accessing the facility was a privilege, and sufficient incentive to suppress many of these problems.

In contrast, the profile summary for Subject Two depicts an individual with slightly higher scores on independent functioning and the cognitive triad (Column I, and Columns II, IV, and V). The scores are dramatically lower in physical development (Column II). This individual has hemiplegic cerebral palsy in addition to Down Syndrome. The physical impairment, however, did not impede full participation in the training, and positively affected his physical being. The nature of the exercise activities (symmetrical and low-impact) were highly beneficial for overall development.

Subject Two was highly motivated, displayed initiative and responsibility, and socialized well. These
attributes could also be seen in his profile by the elevated scores of Columns VI-X.

Subject Three had the only profile in which all scores placed well below the 60th percentile for his age. This subject had the most difficulty in retaining and recalling the training sequence as well. It can be posited that early environmental deprivation might have influenced this subject's low scores across domains, as well as his poor initiative and lack of motivation at home and work. He was also very emotionally immature for his age, becoming disraught at the mention of past experiences or situations.

Subject Four exhibited a pattern similar to Three except that his low scores in Columns VII-X were due to a very hostile and antisocial demeanor. This individual complained about working at his job site continually, had been in trouble with the police, and was very aggressive when given the opportunity. His relatively low levels of independent functioning had certainly been influenced by a lack of trust due to these antisocial behaviors.

The next profile (Subject Five) is unique in range of scores, from above the 90th percentile in physical development to just above the 20th percentile in self-direction. This individual exhibited autistic-like behaviors along with a degree of mental retardation. This
would explain the spread of the cognitive triad (Columns III-V), since this adolescent had many skills in numbers and language, but was unable to use them at the appropriate time, or within the proper context. And, in spite of his obvious potential in cognition, he still required constant supervision at home and work.

The profile summary for Subject Six illustrates an individual whose cognitive performance averages at approximately the 60th percentile, but whose independent functioning scores below the 40th percentile. This individual has been taught higher level academic skills, and in actuality has been mainstreamed in several academic classes at the high school she attends, but there is no application of these functional skills to independent living or to vocational activities. This may indicate the need for functional curriculum. Such a curriculum would channel current skills into practical applications of these skills, as well as examine potential future functional levels.

Another component to this individual's profile that affects variable and low scores in domains VII through X is emotional instability. This adolescent exhibited temper tantrums, extreme hyperactivity, and overall emotional volatility that impeded adult maturation. During the research investigation, behavior issues were a
concern if this subject happened to catch up to a subject whose training session preceded hers. She was skillful at using language to anger others, especially present or former classmates. The home environment was very rigid and controlling, and this would account for the elevated scores, especially in Columns VI and IX; however, when less structured environments were available, many behavioral problems arose resulting in poor performance.

This section has summarized the adaptive behavior findings of each individual subject. One interesting observation common to all subjects was a strength in time and numbers. This was probably due to the fact that watch use was trained early in the project, and this skill was reflected in the A.B.S.

The profiles help to substantiate the claim that these individuals were moderately/severely mentally retarded, as well as focus upon some of their individual areas of concern. Findings relative to adaptive behavior are as follows: (1) subjects with many different adaptive behavior profiles can all be trained to high levels of independent exercise behavior; (2) the 68-step ecological inventory approach can reflect positive results with individuals who display a wide range of physical and emotional variability; (3) a functional approach to independent exercise behavior may provide a very practical
and effective approach to channelling some higher-level skills of cognition, initiative, independence, and socialization.
### Identification

**Subject One**

Age 21

Sex M

Date of Administration 7/90

---

### PROFILE SUMMARY

**AAMD ADAPTIVE BEHAVIOR SCALE PART ONE**

<table>
<thead>
<tr>
<th>Deciles</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>D9 (90)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D8 (80)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D7 (70)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D6 (60)</td>
<td></td>
<td></td>
<td>7</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D5 (50)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D4 (40)</td>
<td></td>
<td></td>
<td>22</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D3 (30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>71</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>D2 (20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>D1 (10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

**Attained Scores**

71 22 7 22 8 5 3 5 2 13

---

*Figure 4.9  Subject One Adaptive Behavior Scores*
Figure 4.10 Subject Two Adaptive Behavior Scores

<table>
<thead>
<tr>
<th>Profile Summary</th>
<th>AMD Adaptive Behavior Scale Part One</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socialization</td>
<td>Responsibility</td>
</tr>
<tr>
<td></td>
<td>Self-Direction</td>
</tr>
<tr>
<td></td>
<td>Vocational Activity</td>
</tr>
<tr>
<td></td>
<td>Domestic Activity</td>
</tr>
<tr>
<td></td>
<td>Numbers &amp; Time</td>
</tr>
<tr>
<td></td>
<td>Language Development</td>
</tr>
<tr>
<td></td>
<td>Economic Activity</td>
</tr>
<tr>
<td></td>
<td>Physical Development</td>
</tr>
<tr>
<td></td>
<td>Independent Functioning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Deciles</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>XI</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td></td>
</tr>
<tr>
<td>VII</td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td></td>
</tr>
</tbody>
</table>

- Date of Administration: 7/90
- Sex: M
- Age: 18

Identification: Subject Two
<table>
<thead>
<tr>
<th>Attained Scores</th>
<th>D1 (10)</th>
<th>D2 (20)</th>
<th>D3 (30)</th>
<th>D4 (40)</th>
<th>D5 (50)</th>
<th>D6 (60)</th>
<th>D7 (70)</th>
<th>D8 (80)</th>
<th>D9 (90)</th>
<th>Deciles</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td></td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Independent Functioning
- Physical Development
- Economic Activity
- Language Development
- Numbers & Time
- Domestic Activity
- Vocational Activity
- Self-Direction
- Responsibility
- Socialization

PROFILE SUMMARY:
AAMD ADAPTIVE BEHAVIOR SCALE
PART ONE

Date of Administration: 7/90
Sex: M
Age: 15
Identification: Subject Three

Figure 4.11 - Subject Three Adaptive Behavior Scores
Figure 4.12 Subject Four Adaptive Behavior Scores

<table>
<thead>
<tr>
<th>Attained Scores</th>
<th>D1 (10)</th>
<th>D2 (20)</th>
<th>D3 (30)</th>
<th>D4 (40)</th>
<th>D5 (50)</th>
<th>D6 (60)</th>
<th>D7 (70)</th>
<th>D8 (80)</th>
<th>D9 (90)</th>
<th>Deciles</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AADL ADAPTIVE BEHAVIOR SCALE PART ONE

PROFIEI SUMMARY

Independent Functioning
Physical Development
Economic Activity
Language Development
Numbers & Time
Domestic Activity
Vocational Activity
Self-Direction
Responsibility
Socialization

Date of Administration
Sex N Age
19 11/20
Identification
Subject Four
Figure 4.13 Subject Five Adaptive Behavior Scores

<table>
<thead>
<tr>
<th>Attained Scores</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
<th>D7</th>
<th>D8</th>
<th>D9</th>
<th>Deciles</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>I - Independent Functioning</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24</td>
<td></td>
<td></td>
<td>II - Physical Development</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td>III - Economic Activity</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IV - Language Development</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13</td>
<td></td>
<td>V - Numbers &amp; Time</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VI - Domestic Activity</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VII - Vocational Activity</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>VIII - Self-Direction</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IX - Responsibility</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X - Socialization</td>
</tr>
</tbody>
</table>

AMID ADAPTIVE BEHAVIOR SCALE PART ONE

PROFILE SUMMARY

Date of Administration: 7/90
Sex: M
Age: 20
Identification - Subject Five

121
**Identification**

Subject Six

Age 18

Sex, F

Date of Administration 7/90

---

**PROFILE SUMMARY**

**AAMD ADAPTIVE BEHAVIOR SCALE PART ONE**

<table>
<thead>
<tr>
<th>Deciles</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>VI</th>
<th>VII</th>
<th>VIII</th>
<th>IX</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>(90)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(80)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(70)</td>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td>10</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(60)</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(50)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(40)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(20)</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Attained Scores**

69 | 23 | 9 | 27 | 10 | 13 | 4 | 10 | 4 | 15

**Figure 4.14** Subject Six Adaptive Behavior Scores
Other Results and Discussion

The results from this investigation were submitted to a panel of four experts in applied behavioral analysis. Collectively they concurred that a clear functional relationship between the independent and dependent variable was not shown in this study. They did collectively suggest other ways to analyze the data which may have influenced the interpretation of all data. As the panel suggested, this investigation may be viewed as a repeated application of an A-B single subject design across time. This might strengthen the claim that the training truly had an effect, and the effect was reflected in repeated applications of the treatment. Several other options were suggested to explore for future research.

There were other effects of this training that were not marked on the scoresheet. A parent of one subject whose related condition is hemiplegic cerebral palsy stated that she observed a marked improvement in the subject's gait as a result of the sequential training sessions. It is true that all of these activities are equilateral in nature. They use both sides of the body, and thereby would enhance symmetrical body use and strength in such an individual. In addition, the advantages of a more frequent, but not necessarily
strenuous, exercise regimen may have been illustrated by this example.

Feedback from the director of this facility was also interesting. This author was skeptical about the public response to the research investigation. Would the enrolled members of the Club have positive or negative responses to the training project as a whole? It was very encouraging to note that during the course of the study, not one complaint was made to the director or staff of the Club regarding the subjects or their behavior. The only comments made to the Club manager were supportive and positive. In addition, the subjects became increasingly social as the study progressed and they gained confidence about their routine with each session.

In addition, independent exercise behavior enabled each subject the freedom to proceed through the Club environment on their own, open to socialization with whomever they chose as long as they stayed within the criteria of the ecological inventory. Many of them openly expressed, by their smiles, that this was an enjoyable experience. They were very eager to begin each day, and were proud of their performances.

Lastly, the staff at the Club appear to have acquired a more positive attitude concerning the ability of individuals who are mentally retarded to function without
assistance. In addition, these same realizations occurred to the members who astutely observed and frequently questioned these proceedings. This author would surmise that perhaps unsupervised areas (such as the locker rooms) afforded further insights into exactly how the investigation, in turn, naturally affected the surroundings. At the very least, direct contact may have ensured that future independent use would be encouraged at this facility.
Chapter V

Summary, Conclusions, and Recommendations

Independent functioning in integrated adult environments is an effective area of programming for individuals who are moderately/severely mentally retarded. The potential for this type of programming to facilitate development in other areas such as language, socialization, cognition, adaptive behavior, functional skill development, and physical skills is substantiated by this research and other studies which have preceded it.

Recent studies have focused on the importance of a natural environment to cognitive, social, physical, and emotional development. Developmental theorists believed that human development occurs because there is an interaction between an organism and its environment (Zigler & Hodapp, 1986). Behavioral psychologists (Watson, 1924; Skinner, 1953; Baer, Wolf, & Risley, 1968) focused on the organism's reactions to environmental contingencies, rather than the active nature of the organism. Regardless of what viewpoint is espoused, the emerging trend has been clear since the 1950's and 1960's.
All individuals, regardless of their handicap, have the right to function in an environment that is the least restrictive as possible (Public Law 94-142). In addition, the "normalization principle" (Nirje, 1969) encourages a life for individuals who are mentally retarded that is normal within their own culture. This same philosophy of normalization was the philosophical backbone for the deinstitutionalization and mainstreaming movements of this century.

What kinds of methods and techniques can be used to enable individuals who are mentally retarded to function independently in such environments? It would appear that individuals who have difficulty in extracting cues from the environment could greatly benefit from clearly designed training programs of the ecological inventory design (Certo, et al., 1983). This kind of approach may provide individuals with critical cues necessary for independent and confident functioning in an integrated adult environment.

**Summary**

The primary purpose of this study was to see what amount of independence could be trained using an ecological inventory approach to health club use. The
target population was six adolescents (aged 15-22) who were moderately/severely mentally retarded.

In the first chapter, a background of the study was outlined and the research questions to be addressed were stated. Issues of environment and development were discussed, as well as the effects of some critical issues of this century such as normalization, mainstreaming, deinstitutionalization, and federal legislation. The dearth of current research in this topical area was noted as well, substantiating the importance of current works.

The literature review focused on the origins of the functional skills curriculum model, and was divided further into four sections: Lobbying, Literature, Litigation, and Law; Normalization, Least Restrictive Environment, Mainstreaming, and Deinstitutionalization; the Functional Skills Curriculum Model; and Mental Retardation.

The methods and procedures utilized during this study were outlined in Chapter Three. The study included a pilot, during which time ten individuals were trained, with follow-up data accumulated. Some changes were made in the study, such as the use of macroprompts in each subenvironment for the purpose of establishing a precise baseline. The actual study was conducted in the summer of 1990, using six subjects (both male and female) who were
trained within a two-week period. A changing criterion design was used to predict the amount of independence that would be acquired after the training of the 68-step ecological inventory.

Individual data sheets were scored and rated daily during each session. These were done by the trainers who were randomly assigned, and who also monitored progress and provided correction if independence was not demonstrated by the subject. The principal investigator reviewed each sheet daily and checked the scores for accuracy. Two weeks and eight weeks after the initial training period, maintenance checks were tabulated as well, with excellent retention by the subjects.

The visual analysis of the data presented in Chapter Four helped to summarize the data and to indicate the effects of the training whether viewed as a changing criterion design, or as a repeated series of A-B single subject designs.

**Conclusions**

Specifically, the purpose of this study was to address five research questions. These research questions, and conclusions based on gathered data, follow:
Research Question One: Will the training method used in this study be effective in facilitating overall positive change in the subjects' functional independence as they access a public recreation facility? This study did not clearly demonstrate a functional relationship between independent and dependent variables, even though a positive change, unique to each subject, occurred between initial baseline measures and the final ratings of independence at the conclusion of this study. Further, repeated applications of the training procedure yielded similar results across all subjects.

Research Question Two: Will the level of functional independence be shown to change positively for all subjects in each of the three pinpointed recreational activities of exercising (bicycling and rowing machines), jogging (10-minute walk/run), and swimming? Each subject, without exception, showed clear evidence of positive change in the three recreational activities. To be more specific, by graphing the individual scores based on 102 possible points in each subenvironment, one can observe that the lines are very nearly similar in both trend (markedly positive) and progression (stable rather than variable). Maintenance scores also remained above 95%.

Research Question Three: Will the training, or any components of the training, effect changes in adaptive
behavior as reflected in adaptive behavior scores? It was determined that this study was not sufficient in length to produce significant adaptive behavior changes. In addition, some of the Adaptive Behavior Scale items target areas of grooming and hygiene. These areas were initially part of the inventory, but later were excluded due to lack of trainer control in locker room facilities.

Alternatively, the A.B.S. was used as an instrument to verify the level of mental functioning of the subjects since adaptive behavior is part of the A.A.M.D. definition of mental retardation. Future research could possibly extend the focus of this present study relative to this important parameter.

**Research Question Four: Will any training effects be maintained two weeks and two months after the formal training terminates?** Training effects were maintained above the 98% level for the group average both at two weeks and at eight weeks. When viewed clinically (singly), no subject retained less than 97.9% of the training at either the two-week or the eight-week check for maintenance.

**Research Question Five: Will the effects of training generalize to any other situations, or to other persons such as family, community residence staff, and volunteers?** (In other words, will the independent
behaviors be obvious to others in the community?)

As illustrated by the generalization data, independent exercise behavior of these subjects had a significant degree of generalizability. This was at first demonstrated by the generalization checks of four of the six subjects at a facility similar to, but not identical to, the Club. Once the subjects had located each subenvironment at the facility, they were, once again, able to recall the sequence of trained steps with 95% accuracy. In addition, on a more informal basis, the subjects from the pilot project were able to complete visits to the Club with little or no prompting when the sequence was used for monthly visits to the Club. It seemed that two or three weeks could lapse between subsequent visits with minimal detriment to the recall of the trained sequence.

The results of this study at the end of the pilot project, as well as the principal study, also were very apparent to the families of the subjects. An opportunity was given for the adolescents to visit the Club once monthly for independent recreation, for one year following the study. Interested families were impressed with the positive changes they witnessed after dropping the subjects off at the Club, and picking them up two hours later. The subjects were motivated to exercise independently, and enjoyed the facilities at the Club,
without any type of artificial or extrinsic reinforcer offered to them other than their presence at the Club. Changes were also noted by the classroom teacher, who was able to use the self-monitoring skills which the subjects acquired for keeping students on task at work sites, and back to work from breaks at the correct time. The facility manager of the Club noted how impressed Club members were with the social skills and independence demonstrated by this study's subjects. The techniques used for on task behaviors, or activity maintenance, are still being used in the classroom eighteen months after the pilot study was terminated.

Recommendations

This research could possibly generate further empirical investigations in multiple integrated adult environments. With this specific population in mind, an ecological inventory approach might be used to study environments and subenvironments at bowling alleys, public parks that have similar recreation areas (such as walking, jogging, and bicycling paths, or a fitness parcour), recreation centers containing gymnasiums and game rooms, and public swimming pools. In addition, winter sport areas could be included such as skating rinks, downhill
and cross-country ski areas, and outside sledding and toboggan hills. Such research could also be conducted with a younger group of the same population, such as 8-12 year olds who were already deep water swimmers. It would be beneficial both from a teacher and parent viewpoint to foster functional independence at earlier ages. Possible benefits might also influence language, socialization, and the adaptive behavior of these younger subjects as discussed in Chapter IV.

In addition, teaching and research professionals might adapt and extend this research to their own populations of interest. For students with severe behavior disorders, the structure and time constraints of this inventory provide positive behavioral controls, with an obvious response cost factor for students requiring routines and regular feedback. For students with physical handicaps, the repetitions and maintained exercise may normalize tone and muscle strength. In addition, this research left impressions within the environment where it occurred. The staff and members who observed the investigation learned that individuals who appear mentally handicapped to a visible degree can possibly function independently without disturbing the existing population, or making excessive demands on the staff or the physical facility. Empirical research should also be conducted to
investigate such important collateral effects.
Bibliography


136


Francis, R.J., & Rarick, G.L. Motor characteristics of the mentally retarded. American Journal of Mental Deficiency, 1959, 63, 792-811.


Heber, R.F. A manual on terminology and classification in mental retardation (Rev. ed.), American Journal of Mental Deficiency (Monograph Supplement), 1961, 64.


APPENDIX A

INFORMED CONSENT FORM
CONSENT TO INVESTIGATIONAL TREATMENT OR PROCEDURE

I, ______________________________, hereby authorize or direct Patricia K. Owens associates or assistants of her choosing, to perform the following treatment or procedure (describe in general terms).

To train the subjects, using a system of verbal prompts, cues, modelling, and signals, through a checklisted ecological inventory approach, to access Sawmill Athletic Club with independence.

The experimental (research) portion of the treatment or procedure is:

To determine the amount of total independence that can be trained.

This is done as part of an investigation entitled:

"An Ecological Inventory Approach to Independent Health Club Use by Adolescents Who are Moderately/Severely Mentally Retarded"

1. Purpose of the procedure or treatment:

To train independent, safe and appropriate use of a community integrated health and fitness club.

2. Possible appropriate alternative procedures or treatment (not to participate in the study is always an option):

Not to participate in the study at all.

3. Discomforts and risks reasonably to be expected:

The subjects may experience some fatigue due to exercising, but all of the activity periods are moderate, and at the subject's own pacing.

4. Possible benefits for subjects/society:

To improve motivation for independent exercising and leisure time use; to be viewed by the general public as independently functioning, and capable at that.

5. Anticipated duration of subject's participation (including number of visits):

From 10-20 two-hour sessions.

I hereby acknowledge that Patricia K. Owens has provided information about the procedure described above, about my rights as a subject, and he/she answered all questions to my satisfaction. I understand that I may contact him/her at Phone No. 451-6857 should I have additional questions. He/She has explained the risks described above and I understand them; he/she has also offered to explain all possible risks or complications.
I understand that, where appropriate, the U.S. Food and Drug Administration may inspect
records pertaining to this study. I understand further that records obtained during my
participation in this study that may contain my name or other personal identifiers may be
made available to the sponsor of this study. Beyond this, I understand that my
participation will remain confidential.

I understand that I am free to withdraw my consent and participation in this project at
any time after notifying the project director without prejudicing future care. No
guarantee has been given to me concerning this treatment or procedure.

In the unlikely event of injury resulting from participation in this study, I understand
that immediate medical treatment is available at University Hospital of The Ohio State
University. I also understand that the costs of such treatment will be at my expense and
that financial compensation is not available. Questions about this should be directed to
the Human Subjects Review Office at 292-9046.

I have read and fully understand the consent form. I sign it freely and voluntarily. A
copy has been given to me.

Date: ________________   Time ______ PM   Signed ________________________________

(Subject)

Witness(es) ________________________________  (Person Authorized to Consent for Subject,
If Required)

I certify that I have personally completed all blanks in this form and explained them to
the subject or his/her representative before requesting the subject or his/her
representative to sign it.

Signed ________________________________

(Signature of Project Director or his/her Authorized
Representative)
APPENDIX B

ECOLOGICAL INVENTORY NARRATIVE
Ecological Inventory of Sawmill Athletic Club
(The Club)

Trainer Instructions: Please follow these general rules when rating a student on the inventory:

I. Try to keep the student in sight, but always wait for the latency period (FULL 10-SECOND COUNT) before proceeding to the successive prompt.

II. A nod or gesture is scored as a one-word cue (W).

III. If a door is propped open that the student should have opened, give credit. We can only assume they would have opened it.

IV. If the watch beeps in the middle of a lap (either in pool or on jogging track) the student needs to keep moving until the end of that lap and not stop where the beeping occurred.

V. Note time on clocks as you enter each environment; this will serve as a check to note if they are working watches properly.

VI. Write down any unusual or questionable events which occur so that they may be discussed at trainer's meeting at the end of the training session.

VII. The stretches in the exercise room must be corrected if they are not done precisely as trained, or if they are not held for a full count of five.
Subenvironment A.: Entrance and Locker Room

After procuring watch and membership card, Subject will perform the following steps:

1) walk 50' from the parking lot to sidewalk leading to main Club entrance

2) turn to the right, and walk on the right side, 18' to approach front door on the right

4) open front door and walk through, on right

5) open inner door and walk through, on right

6) walk 16' from front inner door to main desk

7) locate "pass" person standing behind desk

8) display membership card by holding up so the pass person can look at the card easily

9) receive card back

10) turn to the left by 90 degrees so that the stairs to the locker room are in view

11) walk down two flights of stairs in appropriate manner (keeping to right; avoiding others)

12) locate M/W locker room

13) open door to M/W locker room quietly

14) enter locker room by walking and keeping to the right side; avoiding collisions

15) exit locker room through same door (shorts)

16) check for key

17) turn body to face weight room hallway
Subenvironment B: Weight Room/Exercise Room

After entering Subenvironment B, subject will:

18) walk into the weight room for 10"  
19) enter to bike/row machines  
20) get into start position  
21) Start watch to run for five minutes, beep  
22) Use machine full time  
23) Stop when the watch sounds cue at five min.  
24) Move to bike/row machine  
25) Start watch to run for five minutes, beep  
26) Use machine full time  
27) Get off rowing machine  
28) Enter exercise area  
29) Do back leg stretch (hold for count of 5)  
30) Do ankle circles  ( " " " " " )  
31) Do knee to chest  ( " " " " " )  
32) Do sitting stretch  ( " " " " " )  
33) Do straddle seat  ( " " " " " )  
34) Raise to stand (may be assisted by rail)
Subenvironment C: Jogging Track

After completing the stretches for running, the subject must proceed back through the same locker room as follows:

35) Turn to face locker room

36) Walk the 50' length of locker room

37) Turn 90 degrees to stairs;

38) Climb 20 stairs on the right side

39) At start of track, set watch 10 mins.

40) Move within 1' of track to enter safely

41) Subject must decide when it is safe to enter

42) Enter track safely

43) Moves to appropriate lane

44) Run or walk in correct lane 5 minutes

45) Run or walk next 5 minutes, also correctly

46) Exit track at time cue

47) Move safely away from track entrance

48) Open door to stairs

49) Go down the stairs on right side

50) Turn to correct hallway for locker room

51) Walk to men's or women's locker room
Subenvironment D: The 25-meter Pool

The subject will independently make the following preparations for the swim session:

52) Enters the M or W locker room to change

53) Exits same locker room to pool (with towel and watch, and dressed in swimsuit)

54) Pool area entered and towel + key placed

55) Walks to lap lanes at shallow end of pool

56) Climbs down ladder to water

57) Starts watch for swim period

58) Begins lap swim

59) Swims for the full 10-minute period

60) Exits lap lanes at same ladder used

61) Subject picks up items to leave pool area

62) Exits pool by opening door to hall

63) Subject enters M/W locker room

64) Exits locker room dressed in clothes, with gym bag, other items

65) Climbs stairway to main desk

66) Walks past main desk

67) Subject exits front doors, right side

68) Subject walks down stairs and same steps to parking lot
APPENDIX C

ECOLOGICAL INVENTORY SCORESHEET
ECOLOGICAL INVENTORY SCORESHEET

Key: MC - Macroprompt required, minus 3
     I - Independence - 6
     W - One-word cue or gesture - 5
     VP - Verbal prompt - 4
     VT - Verbal Throughout - 3
     M - Modeling - 2
     PP - Physical Prompt - 1
     U - Unobserved - 0

A. Entrance and locker room
   MC "Go inside to your locker and change for exercise"

   1. Walk up sidewalk
   2. Turn to front door
   3. Approach front door
   4. Open front door
   5. Open inner door
   6. Walk to front desk
   7. Locate pass person
   8. Display membership card
   9. Receive card back
  10. Turn to stairs
  11. Go down stairs
  12. Locate M/F locker rm.
  13. Open door
  14. Enter locker room
  15. Exit locker room
      through same door(shorts)
  16. Check for key
  17. Turn body to wt. rm. hall

Subtotal:———
B. Weight Room/Exercise Room

MC: "Ride the bike, row the machine, and stretch for running"

18. Walk to weight room
19. Enter to bike/row machines
20. Get into start position
21. Set watch five minutes
22. Use bike full time
23. Stop at signal
24. Move to rowing machine
25. Set watch five minutes
26. Use row machine full time
27. Get off rowing machine
28. Enter exercise area
29. Do back leg stretch (5)
30. Do ankle circles (5)
31. Do knee to chest (5)
32. Sitting stretch (count 5)
33. Straddle seat (count 5)
34. Raise to stand

Subtotal:———
### Jogging Track

**MC:** "Go exercise on the track and walk/run"

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>W</td>
<td>VP</td>
<td>VT</td>
<td>M</td>
</tr>
</tbody>
</table>

35. Turn to face locker room
36. Proceed through M/W L.R.
37. Walk to **stairs** to track
38. Climb stairs **right side**
39. Set **watch** 10 min.
40. **Move up** to enter
41. **Check** to run
42. Enter track **safely**
43. Moves to app. lane
44. Run/walk **first 5 min.**
45. Run/walk **next 5 min.**
46. Exit track; time up
47. Move away from entrance
48. Open door to stairs
49. Go **down** stairs, rt.
50. Turn to correct **hallway**
51. Walk toward m/w L.R.

Subtotal: ______
D: Locker Room to 25 Meter Pool
MC: "Go dress for your 10-minute swim and I'll see you later outside"

52. Enters locker room (change)
53. Exits L.R. to pool (swimsuit, towel, watch)
54. Enters pool; items placed
55. Walks to lap lanes (shallow)
56. Climbs down ladder
57. Sets watch
58. Begins lap swim
59. Swim 10 min.
60. Exit lap lanes
61. Gather items to exit
62. Exit pool
63. Enter M/W locker room
64. Exit L.R. with clothes
65. Go up stairs to main desk
66. Walk past main desk
67. Exit front doors
68. Walk front walk to P. lot

Subtotal:———

TOTAL SCORE

SUBJECT: _____________________________

DATE: _____________________________

TRAINER: ___________________________
APPENDIX D

EQUIPMENT AND FACILITIES
Partial Lower Floor Plan

Main Floor Plan

Figure D.15 CLUB PLAN
Figure D.17  ROWING MACHINE PHOTO
APPENDIX E

CONTENT VALIDITY SURVEY
Content Validity Survey

Content validity of this ecological inventory will be established by asking teachers and staff to rate the appropriateness and accuracy of the training steps and activities. To ensure the most accurate rating, each panel member will walk through the four subenvironments at the Club, and then complete their ecological inventory content validity analysis.

The indicators to be used by this panel of experts during its content validity analysis will be as follows: SA (strongly agree), A (agree), MA (mildly agree), MD (mildly disagree), D (disagree), and SD (strongly disagree).

The five questions which comprise the content validity survey are contained in Appendix D.

1. The ecological inventory of the first segment of this research investigation (Subenvironment A) is appropriately designed for training individuals who are moderately to severely mentally retarded. (Refer to Subenvironment A, steps 1-17).

SA____ A____ MA____ MD____ D____ SD____
2. The ecological inventory of the second segment of this research investigation (Subenvironment B) is appropriately designed for training individuals who are moderately to severely retarded. (See Subenvironment B, steps 18-34).

SA_____ A____ MA____ MD____ D____ SD____

3. The ecological inventory of the third segment (Subenvironment C) of this research investigation is appropriately designed for the individual who is moderately to severely mentally retarded. (Refer to Subenvironment C, steps 35-52).

SA_____ A____ MA____ MD____ D____ SD____

4. The ecological inventory of the fourth segment (Subenvironment D) of this research investigation is appropriately designed for training individuals who are moderately to severely mentally retarded. (Refer to Subenvironment D, steps 53-68).

SA_____ A____ MA____ MD____ D____ SD____
5. The ecological inventory, when viewed generally over all of the 68 steps, is an appropriate instrument for this population in terms of its content validity:

SA_____  A____  MA____  MD____  D____  SD____
APPENDIX F
SOCIAL VALIDITY SURVEY
Social Validation

The following survey will be administered to twenty persons who are instructors of the subjects, relatives of the subject, or job supervisors of the subjects' work training sites. The results will be scored and tabulated by percentage of responses by the raters in each category.

Social Validity Questionnaire

It is necessary for applied research involving persons who are moderately and severely mentally retarded to demonstrate practical and important areas of investigation. The social validity of research procedures concerns the perceived value of those behaviors selected for change, the acceptability of the intervention procedures utilized to change the behavior and the degree of significance which the ensuing behavior change has. Through the surveying of professionals in special education and interested significant others (parents, siblings, peers) an evaluation of the social validity of research efforts can be obtained.
The following survey attempts to evaluate the social validity of this research investigation. On the basis of your understanding of the study (An ecological inventory approach to training steps necessary for functional independence at a public recreation facility) please respond to the following statements.

After reading each statement please circle the one term which most closely describes how you feel about that statement. All statements refer to an individual's functional independence in the recreation and leisure domain.

Terms: functional independence, natural environment, adaptive behavior, mainstream (and mainstreaming)

**Functional independence** - This involves an individual accomplishing the tasks involved in his/her own life, in an independent manner. It involves only those activities which represent meaningful, useful, and appropriate aspects of that individual's current or probable future environment.

**Natural environment** - The setting under situations that occur as a matter of course; uncontrolled.
Adaptive behavior - This refers to an individual's ability to adapt to the demands of his or her everyday environment. Numerous sub-behaviors are included.

Mainstream - This term may occur as a noun or a verb, and generally refers to being placed in with the general population which comprises our society; not segregated or isolated.

Code: SA = strongly agree  A = agree  U = uncertain  
       D = disagree  SD = strongly disagree

1. Adolescent and adult individuals who are mentally retarded can be trained to become more functionally independent as they access community recreation facilities.

   SA  A  U  D  SD

2. Training which occurs in a natural environment can positively influence the adaptive behaviors of an adolescent or adult individual who is mentally retarded.

   SA  A  U  D  SD
3. Attitudes of the mainstream of society (general public, general population) may be positively influenced by viewing the functional independence of individuals who are mentally retarded.

4. Individuals who are mentally retarded have a greater proportion of leisure time available to them than the average adult male or female.

5. Individuals who are mentally retarded can improve their level of physical activity tolerance through appropriate training.

6. All individuals in our society should acquire lifetime skills in recreation and leisure.
7. The right to access public or private recreational facilities is granted to all individuals by the U.S. Constitution.

SA A U D SD

8. Individuals who exercise are healthier than individuals who do not.

SA A U D SD

9. The skills of jogging, swimming, and fitness activities to be trained at the Club will be important for achieving functional independence at that facility. SA A U D SD
APPENDIX G

ADAPTIVE BEHAVIOR SCORESHEET