The effects of videotape feedback on the standing broad jump performances of mildly and moderately mentally retarded adults

by Laura Jean Sim

A thesis submitted in partial fulfillment of the requirements for the degree of MASTER OF SCIENCE in Physical Education

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Abstract:

This study was conducted to examine the effects of videotape feedback on mentally retarded adults' performance of a selected movement task. Videotape recordings of subjects' performances of the standing broad jump were replayed to the subjects to provide them with feedback information regarding their jumping performances.

Reviewed research and literature revealed that feedback plays a critical role in learning and that visual feedback is the most conducive mode of feedback in motor learning. It was found that the motor proficiency of the mentally retarded is substandard to that of the non-retarded population. Some researchers have speculated that the consistent motor deficiencies found in the retarded may be a result of their difficulties with interpreting and processing abstract forms of feedback due to their subaverage cognitive level. Implications were made in some of the sources reviewed that videotape may help enhance motor skill acquisition and mastery by the mentally retarded by presenting concrete visual feedback about movement performance.

An assessment tool designed to evaluate the development of jumping patterns in young children was utilized to assess the mentally retarded subjects' jumping skills before and after the administration of the experimental treatment. Three groups of subjects were involved in the investigation, with one group receiving no feedback, a group receiving verbal cues about their jumping performances and one group receiving verbal cues while viewing a videotape recording of their standing broad jump performances.

Descriptive statistics were computed for qualitative and quantitative aspects of the initial and final performances of the subjects. No significant difference was found between the three groups' performances following the completion of the experimental treatment. No significant differences were found between the pretreatment and posttreatment performances in any of the three groups.

It was concluded that videotape feedback, as administered in this study, has no significant effect on the learning or mastery of a motor task by mentally retarded adults. It was suggested that factors such as distractibility and inattentiveness of the subjects may have affected the results of this investigation. It was also surmised that because the subjects were at a beginning level in performances of the standing broad jump they may have lacked an appreciation of relevant aspects of the replayed performances, and hence may have not recognized many of the errors in performance.

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ABSTRACT

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Reviewed research and literature revealed that feedback plays a critical role in learning and that visual feedback is the most conducive mode of feedback in motor learning. It was found that the motor proficiency of the mentally retarded is substandard to that of the nonretarded population. Some researchers have speculated that the consistent motor deficiencies found in the retarded may be a result of their difficulties with interpreting and processing abstract forms of feedback due to their subaverage cognitive level. Implications were made in some of the sources reviewed that videotape may help enhance motor skill acquisition and mastery by the mentally retarded by presenting concrete visual feedback about movement performance.

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CHAPTER I

INTRODUCTION

Documented results from informal observation and objective assessment have revealed a consistently substandard level of motor performance and physical fitness in the mentally retarded (Rarick, Widdop and Broadhead, 1970; Rarick, 1973; Ross, 1969.) Unfortunately, little research has been done in attempt to determine the reasons why the retarded have such difficulties acquiring and mastering motor skills (Cratty, 1980; Rarick, 1973.) This lack of empirical evidence combined with the incomplete understanding of the neuromuscular mechanisms underlying the motor learning process compound the problem of explaning the motor deficiencies of the retarded (Rarick, 1973.)

In reviewing various viewpoints regarding motor performance and the mentally retarded, Rarick (1973) revealed the traditional opinion that the rate of learning and the degree of complexity of motor skills that one could master depended on an individual's level of intellegence. Many educators in the past assumed the mentally retarded to be incapable of learning or mastering motor skills, and thus neglected to provide the retarded with physical education or movement experiences. The indisputable evidence of beneficial effects of activity and general fitness to the mental and physical health of normal individuals (Astrand and Rodahl, 1977; Wilmore, 1976) applies to the exceptional population as well (Sherrill, 1977.) The recent legislative trends

regarding the rights of the handicapped have recognized the important role physical activity plays in the remediation of handicapped individuals, evident by the fact that Public Law 94-142, The Education for All Handicapped Children's Act of 1975, specifically mandates physical education. Recent research has also shed light on the relevance of activity for the handicapped by providing some evidence of the benefits of participation in various types of movement activities. Levy (1974) contended that the development of motor skills contributed in a positive way to vocational and social adjustment of handicapped persons. Rarick (1973) cited numerous studies which reported significant improvements in motor performance of retarded children as a result of structured physical education programs. Cratty (1980) believed that with an improvement in motor performance came a resultant increase in self confidence and a willingness to participate in movement activities, allowing more opportunities for the handicapped to develop their motor skills to a degree comparable to their non-disabled peers.

In light of the potential contributions movement experiences may make to an exceptional individual's well being, researchers involved in the area of motor learning and the retarded have expressed a need for further investigations. One area that was suggested by some researchers to be an important consideration in further work was teaching methods which may aid and enhance motor skill acquisition by the developmentally disabled (Levy, 1974; Cratty, 1980.)

During the last twenty-five years, research concerned with the psychomotor domain has revealed the vital role feedback plays in learning. Studies have shown that knowledge of results or information regarding performance is essential to skill acquisition and, in fact, are considered the most critical factors in the learning process (Oxendine, 1972; DelRey, 1971; Singer, 1968.) In addition to substantiating these findings, other studies have investigated the effectiveness of different modes of feedback in providing information crucial to learning, and have found visual feedback to be the most valuable in the area of motor learning (Adams, 1977; Knowles, 1973.)

Motor skill acquisition is a thoughtful process that requires comprehension and conceptualization of a task based on information provided by feedback. Deficiency in skill development may result from difficulties in interpreting the feedback and forming a mental image of the movement (Oxendine, 1972.) It has been speculated that one explanation for the learning and performance deficiencies of the retarded may be that they are unable to perceive and process information to a degree necessary to develop an internal image of a correct movement and thus have no standard on which to base performance corrections (Baumeister, 1966.) The low cognitive and perceptual levels of the mentally retarded may be such that movement errors obvious to non-retarded individuals go unnoticed by the retarded. A more tangible way of providing error information could potentially increase the

the opportunity for the developmentally disabled to recognize mistakes, while at the same time relay comprehensive information regarding correct performance. Videotape recordings may be a valuable tool in accomplishing this by providing concrete feedback that allows an individual to view a performance and become aware of errors if pointed out (Cantrell, 1977; Singer, 1968.) Videotape replay could conceivably aid in the conceptualization of a prescribed movement, a process which may be limited to a certain degree by the cognitive level of the mentally retarded.

Considering the potential benefits of physical activity on the well being of the retarded, there exists a need for the development of techniques that will enhance motor skill acquisition and mastery by the retarded. Because feedback plays a vital role in any learning process, investigation of feasible modes of feedback will aid in the determination of effective methods of teaching motor skills to the developmentally disabled. This investigation considered the use of videotape recordings as a feedback mode in the development of jumping skill by a group of mentally retarded adults.

Statement of the Problems

The problems of this study were to: (1) Examine the effects of video/verbal feedback on the performance of the standing broad jump by mildly and moderately mentally retarded adults; (2) compare the standing

broad jump performances of a group receiving video/verbal feedback, a group receiving only verbal feedback and a group receiving no feedback; and (3) determine the relationship between video/verbal and verbal feedback and performance.

Hypotheses

The following null hypotheses were formulated: (1) There will be no significant difference ($p \leq .05$) in the performance of the standing broad jump between the Control Group, the Verbal Feedback Group and the Video/verbal Feedback Group following the experimental treatment; and (2) there will be no significant difference ($p \leq .05$) between the initial and final performance of the standing broad jump in any of the groups.

Delimitations

This study was delimited to sixteen mildly and moderately mentally retarded male and female adults participating in a weekly handicapped recreation program at Montana State University in Bozeman, Montana. It was further delimited to six treatment sessions, conducted once weekly beginning on April 17, 1980 and continuing until May 19, 1980, in which standardized verbal cues were given alone and in conjunction with videotape recordings in investigating the effects of videotape feedback on the subjects' performance of the standing broad jump. Each subject's

performance of the standing broad jump prior to receiving any experimental treatment was evaluated on April 10, 1980, and a final assessment was made on June 5, 1980 following the completion of the experimental treatment.

Definitions

Developmentally Disabled-- Developmentally disabled in this study refers specifically to the mentally retarded, defined by the American Association on Mental Deficiency as individuals having significantly subaverage intellegence existing concurrently with maladaptive behaviors. This condition manifests itself between birth and twenty-one years of age (Chinn, Drew and Logan, 1975.)

Mildly Mentally Retarded-- A mildly mentally retarded individual is one whose IQ is between 52 and 67 on the Stanford-Binet scale who may become self supportive with proper training and who functions academically at approximately a fourth grade level (Cratty, 1974.)

Moderately Mentally Retarded-- A moderately mentally retarded individual is defined as a person with an IQ between 36 and 51 on the Stanford-Binet scale who is usually able to master basic social and self care skills and academically functions at a level comparable to a first grade child (Cratty, 1974.)

Verbal Feedback-- Verbal feedback in this study refers to spoken information in the form of standardized verbal cues regarding ways

to improve performance of the standing broad jump. (See Appendix C for the standardized verbal cues used in this investigation.)

Video/verbal Feedback-- Video/verbal feedback in this investigation refers to the use of videotape recordings of a subject's standing broad jump performance in combination with the standardized verbal cues to provide information about that subject's performance.

Limitations

Because of the limited number of mentally retarded individuals living in Bozeman, Montana, the population of this study was very small and a random selection of subjects was not feasible. This study was also limited by the fact that the subjects were available for treatment only one day per week. Another limitation in this investigation was the inconsistent attendance by one subject in the Video/verbal Feedback Group due to a disciplinary sanction prescribed by the individual's group home counselors. An additional limitation was the wide variance of attitudes of the subjects regarding the jumping task, as some enjoyed the treatment sessions while others were disdainful of having to repeatedly perform the standing broad jump. These attitudes may well have affected the subjects' receptiveness toward the treatment they were receiving as well as their motivation in performing the standing broad jump. Finally, despite the precautions taken in the grouping procedure, a purely homogeneous distribution was impossible.

Basic Assumptions

For the purpose of this study it was assumed that the subjects would not perform or practice the standing broad jump any time other than during the treatment sessions. It was also assumed that the subjects would not discuss their particular experimental treatment with other subjects.

CHAPTER II

REVIEW OF LITERATURE

Learning has been defined as a stable change in performance as a result of practice (Cratty, 1968) and has been a major consideration of educators and psychologists throughout this century. In the early years of investigation, extensive experimentation with laboratory animals led researchers and theorists to conclude that the learning process was a stimulus-response-reinforcement paradigm (Adams, 1971.) Despite the many diverse learning theories that soon emerged, this interpretation that learning was an open-loop process where reinforcement served to strengthen the connection between a given stimulus and the desired response formed the basic foundation for all the theories. In the last twenty years, however, attention has been concentrated on human learning processes and consequently more complex theories regarding learning have emerged (Adams, 1971; Smith, 1968.)

These newer theories refute the notion that learning occurs as a result of passive responses to stimuli and view the learner as a dynamic actor in the learning process. Smith (1968) was an advocate of a theory known as behavioral cybernetics which regarded learning as a closed-loop process that depended on sensory feedback generated by an individual's performance that served to induce and direct subsequent performances. Adams (1971) supported this closed-loop theory, stressing that error detection and correction were keynote components

of human learning. He contended that the classic stimulus-response interpretations of learning emphasized an automatic, non-congitive essence of learning which failed to account for the fact that human beings do not merely respond to stimuli and reinforcement, but actually improve performance by detecting and correcting errors made in movement. Adams explained the shortcomings of classic learning theories, stating "The cognitive domain is the striking difference between man and lower animals, and it is hard to see the laws of human learning without it." (Adams, 1971: 115.) Thus, newer interpretations of the learning process, such as the closed-loop theory supported by Smith (1968) and Adams (1971) seem to be more applicable to explaning human learning, and help provide groundwork on which to base investigations of human motor learning and performance.

Motor Learning

Like the subject of learning, the topic of motor learning lends itself to a variety of interpretations. Lockhart (1964) discussed the confusion often generated by the use of different taxonomies to refer to the same phenomenon. 'Motor learning', 'psycho-motor learning,' 'perceptuo-motor learning' and 'neuro-muscular learning' all refer to the same thing, Lockhart revealed, namely the process by which patterned motion is accomplished. Singer (1972: 1) helped clarify the concept of motor learning by defining it as "...learning that is primarily

demonstrated through movement oriented behavior..."

Alley (1968) proposed that motor learning depended on three interrelated and interdependent developmental stages. The existence of basic motor patterns and skills constituted the first level and served as the foundation on which the other two stages were built. The subsequent levels of Alley's motor learning model were an individual's perceptual organization of the foundation skills and the ability to conceptualize movement patterns. Alley believed this final stage of conceptualization to be most critical in complex skill acquisition.

Cratty (1968) discussed motor learning as involving constant adaptation to demands presented by a movement task. This adaptation, he felt, resulted from cognitive interpretation of sensory input relative to the task and depended primarily on perceptual processes. The ability to grasp an intellectual and conceptual understanding of a movement determined the degree to which an individual sucessfully mastered motor skills.

Smith (1968) and Adams (1971) both recognized the critical involvement of cognition in the motor learning process. An important construct in the closed-loop theory which both Smith and Adams advocated was the existence of an internalized conception of an optimal performance on which performers relied to detect and correct errors in a motor output.

In agreement with these views regarding cognitive involvement in motor learning, Oxendine (1972) considered motor learning to be a

thoughtful process that required intellectual as well as physical involvement. He stressed the vital importance of conceptualization in skill acquisition, and felt efficient performance depended on ones' ability to form an internal image of a movement task.

Cratty (1968) felt the perceptual involvement in motor learning depended on information received by a performer regarding a performance. He contended that through this information a performer became aware of any errors in movement and was then able to modify the next performance accordingly. Cratty summarized findings of studies in the area of information feedback and its implications to learning, and concluded that some form of feedback was essential to motor learning.

Documentation of the effects of feedback on motor learning and skill acquisition has indicated it to be a crucial variable in the learning process (Adams, 1971; Cratty 1968; Robb, 1968; Singer, 1968; Smith, 1968.) Many concerned with motor learning and human performance have identified feedback as one of the critical factors in skill acquisition (Bilodeau and Bilodeau, 1961; Knowles, 1973; Oxendine, 1972.)

Adams (1971; and Goetz, 1973) has been a major contributor to feedback theory in recent years. He believed motor learning was problematic in nature, a process which involved an initial attempt at specific movements, followed by integration and interpretation of feedback about the movements and a modification of movements based on the feedback. In Adams' view of learning, feedback provided error information on which

a performer based any alteration in motor output during subsequent performances. This concept of systematic error processing formed the crux of the closed-loop learning theory supported by Adams, who firmly maintained that without some form of feedback on which to base the detection and correction of movement errors, learning could not occur.

The idea of feedback as a means of providing error information has been supported and substantiated by others working in the field of human movement performance. Robb (1968) discussed the viewpoint that feedback provided information necessary to make comparisons between a motor output and a standard reference. Oxendine (1972) and Knowles (1973) both maintained that not only did feedback serve to provide error information, but also helped to identify correct and desired motor outputs to a performer.

Feedback has been dissected into categories and labeled according to the manner in which information is available to a performer. Feedback can be intrinsic or extrinsic, with the latter comprised of verbal, visual, tactile or auditory input (Knowles, 1973; Robb, 1968.) Investigators have concerned themselves extensively with extrinsic feedback, studying various modes and administrative options to determine the techniques most conducive to motor learning and skill acquisition.

Visual cues seem to be the most influential form of feedback in motor learning (Adams, Gopher and Lintern, 1977; Dwyer and Arnold,

1976; Singer, 1968.) Cratty (1968) felt that vision provided the most valuable sensory input to a performer because it integrated complex information with little distortion, and the information was unambiguous. In investigating visual feedback, researchers have shown the methods of model demonstration (Cratty, 1968; Singer, 1968) and the use of film to replay performances (Neufeld and Neufeld, 1972; Rothstein, 1980; Singer, 1968) to be particularly effective in providing performers with information valuable to motor skill acquisition. These modes are now being considered for use with individuals who experience difficulties with motor skill acquisition, and the effectiveness of model demonstration and film in teaching motor skills to the retarded is an area of interest in particular (Cratty, 1968; Cantrell, 1977.)

Motor Learning and the Mentally Retarded

Although extensive research has been conducted in the area of motor learning and skill acquisition, few studies have dealt with these parameters and the mentally retarded. Because of the limited empirical evidence, the question of why the developmentally disabled have difficulties mastering motor skills remains unanswered (Cratty, 1972; Cratty, 1980; Rarick, 1973.)

There has been consistent documentation of motor deficiencies in the mentally retarded (Cratty, 1980; Rarick, Widdop and Broadhead, 1970; Ross, 1969.) Rarick, Widdop and Broadhead (1970) illustrated this by

conducting a study utilizing the AAHPER Youth Fitness Test to obtain data on the degree to which retarded adolescents performed below the established norms of the nonretarded population. The components of the test were the softball throw, the three-hundred yard run/walk, the standing broad jump, the fifty yard dash, the flexed arm hang, the shuttle run and situps. In assessing four thousand retarded adolescents the authors found their overall performance to be inferior to eighty-five percent of their nonretarded peers.

Explanation of the deficits evident in the motor performances of the mentally retarded remains elusive. Rarick (1973) indicated that the lack of understanding of the neuromuscular mechanisms involved in the motor learning process perpetuated the inaccountability for the mentally retarded's motor problems. Cratty (1980) agreed, contending that because the effects of peripheral stimulation and other sensory experiences on the nervous system were relatively unknown, compounded by individual differences in neurological and biochemical makeup, pinpointing specific causes for motor deficiencies was difficult.

It is apparent the motor peoblems of the retarded escape explanation on a neuromuscular level. Speculation, nonetheless, has been made on possible causes for the performance deficiencies.

Baumeister, Hawkins and Holland (1966) felt the difficulties experienced by the retarded in motor skill acquisition stemmed from an inability to identify and respond to critical feedback regarding motor

performance. This inefficiency in perceiving errors in performance resulted in the absence of a standard on which to base modification of incorrect movement patterns.

Horgan (1977) supported this view, maintaining that the mentally retarded did not profit from feedback cues inherent in a motor task because they could not recognize errors in the movements. He also contended that in order for any feedback to be conducive to learning, a performer must understand the importance of the information provided. The retarded were most likely unable, Horgan felt, to grasp the relevance of most feedback cues regarding a motor performance.

Cratty (1974) believed the developmentally disabled's ability to learn motor skills was impeded by difficulties in the integration of sensory information. He suggested an inability to process cues indigenous to a task, or feedback provided by outside sources, hindered the development and mastery of motor skills by the retarded.

Alley (1968) regarded perceptual capability to be a product of intellectual maturation, and felt the immature cognitive level of the mentally retarded limited their perceptual potential. One of Alley's stated prerequisites to motor learning was the perceptual organization of movement patterns, and he suggested that the retarded's limited perceptual capabilities accounted for their difficulties in motor learning and performance.

Oxendine (1972) contended that problems with skill development

were a result of an individual's inability to conceptualize a movement task. He believed efficient learners were able to quickly grasp the concept of a movement and those who had difficulty forming an abstract image of a motor pattern were at a distinct disadvantage in motor learning.

Cratty (1974) suggested that qualities such as inattentiveness and distractability may account for some difficulties in information processing by many mentally retarded individuals. He further speculated that their motor learning problems may be perpetuated by learning in an instructional environment in which traditional techniques, characterized by a perdominance of verbal cues, were the major modes of delivering feedback. Cratty believed that the retarded were often incapable of understanding verbalized performance information and that they perhaps experienced problems in processing other forms of information as well because of their low cognitive capabilities.

Despite the substandard motor proficiency of the developmentally disabled, physical activity is just as important for them as for the nonretarded. Many positive effects result from frequent activity. Benefits such as an increase in cardiovascular endurance, muscular strength and endurance and flexibility as well as decreases in resting blood pressure and resting heart rate have been consistently reported (Astrand and Rodahl, 1977; Wilmore, 1976.) Participation in physical activity has also been shown to be a critical factor in weight reduction and control

(Wilmore, 1976.)

These positive effects of physical activity play just as vital a role in the health of the mentally retarded as for their nonretarded counterparts. In addition to these benefits, movement activities are important in the remediation of many compounding handicapping conditions often found in retarded individuals. Cratty (1975) discussed the use of trampoline activities to help develop leg and trunk strength, improve abnormal gait patterns and aid in establishing balance and coordination. Sherrill (1977) cited examples of activities beneficial in the therapy of joint contractures, obesity, looseness of joints, muscular weakness, balance maladies and other physically handicapping conditions that often exist in developmentally disabled persons.

Cantrell (1977) believed that participation in recreational and leisure time activities helped round out the lifestyle of the disabled. In realizing the problems faced by many retarded individuals in learning and mastering motor skills, Cantrell urged that special efforts be made and techniques utilized to teach them skills necessary for participation in physical activities.

Cratty (1968) regarded motor learning in the retarded to be comparable to the motor development of children in the respect that development could be enhanced by a variety of perceptuo-motor experiences. These movement experiences helped increase individuals' perception of their bodies and their spatial relationship to the environment, a

relationship, Cratty maintained, that played a critical role in decisions made by performers regarding motor outputs.

In discussing physical activity and the retarded, Levy (1974) outlined a contemporary view that motor skill acquisition served to help the mentally retarded adjust to vocational and leisure time situations by providing opportunities for fun and successful experiences. Cratty (1980) supported this idea, suggesting that successful movement experiences contributed to the self esteem of disabled persons.

It is apparent, then, that physical activity is important to the health of the developmentally disabled not only because physiological benefits accrue, but also because activity appears to have some positive effects on the psychological, social and emotional well being of the retarded as well. More often than not, unfortunately, physical activities conducive to eliciting many of the benefits, particularly physiological ones, require some degree of motor proficiency. In light of the generally substandard motor performance of the mentally retarded, techniques must be found and utilized that will enhance motor learning and skill development in the retarded (Cantrell, 1977.)

Feedback and the Mentally Retarded

Since feedback has been shown to be essential to learning, and it is proposed that the mentally retarded have difficulty interpreting abstract forms of information, it becomes apparent that modification in

the provision of feedback is necessary in teaching the retarded.

Some (Baumeister, Hawkins and Holland, 1966; Horgan, 1977) have suggested that supplemental feedback, such as additional visual cues and physical manipulation of the learner, help the mentally retarded to comprehend demands of a movement task. Others (Cratty, 1974; Cantrell, 1977) contended that methods of providing more concrete types of feedback have a great deal of potential for use with the developmentally disabled. Model demonstration and the utilization of film to illustrate or replay movement tasks have been proposed as two viable modes of presenting interpretable information conducive to motor skill acquisition (Cratty, 1968; Singer, 1968.)

Videotape is one film medium that has been investigated as a means of providing tangible performance information. Rothstein (1980) commented that the important role that vision played in motor learning, combined with the popularity of television, made videotape a potentially valuable instructional tool. Cratty (1968) maintained that information delivered in the form of a videotape recording was straightforward and unambiguous, and was a promising method of presenting visual feedback to a performer. Ryan (1969) explained that the benefits of allowing people to view their own performances via videotape replay lay in the fact that errors were easily recognizable and modifications were more readily implemented as a result. Neufeld and Neufeld (1972) felt that videotape recordings were valuable in that they helped individuals

form a clear picture of the elements required to perform a movement task correctly. Others (DeRoo and Haralson, 1971; Morgan, 1971; Penman, 1969; Schweider, 1977; Wadsworth, 1973) have surmised that videotape recordings provided concise and interpretable feedback regarding performance.

Unfortunately, videotape is not a panacea in the area of motor learning and skill acquisition. Investigators have found that the value of the information available to a learner in a recording of the individual's performance was contingent on a number of factors. Rothstein and Arnold (1976) analyzed fifty-two research studies concerned with the use of videotape as a tool in teaching motor skills. The parameters considered by Rothstein and Arnold were age, sex and skill level of the subjects; the task being performed by the subjects; the treatment conditions; and the length or number of administrations of the treatment. The results of their analysis were that advanced beginners and more highly skilled performers benefitted more from exposure to videotape replays than did beginners. The authors also found that repetetive replay of videotape recordings was necessary for significant improvements in performance to occur and that cues to direct a learner's attention to specific aspects of the recorded performances were essential to enhace learning and performance.

Morgan (1971) considered videotape to a very promising way to provide visual cues. She did, however, recognize the limitations

of its applicability to motor learning and skill acquisition. Morgan indicated that beginners did not benefit from viewing a videotape recording of their performances, and conjectured that beginners did not have enough of an established concept of the prescribed movement task to appreciate the error information provided by the replay.

DelRey (1971) discussed the predominance of studies which showed that the utilization of videotape recordings had little effect on motor skill development. She revealed, however, that none of the studies included directing a learner's attention to specific relevant aspects of the replayed performances. DelRey strongly suggested that by focusing on certain factors while viewing a recorded performance, a learner could better recognize and interpret critical information.

It would appear that it is the manner in which videotape recordings are incorporated into a learning situation that determines its effectiveness. As Rothstein (1980: 60) concluded, " Videotape replay has the potential to enhance the learning and performance of motor skills provided the critical factors guiding its effective use are adhered to by teachers and coaches."

Despite the numerous studies investigating the effects of videotape replay on learning, research concerning its use with the handicapped remains sorely lacking. The few who have examined videotape's value in dealing with exceptional individuals have primarily investigated it as a potential aid in modifying maladaptive and undersirable behaviors

(DeRoo and Haralson, 1971; Nelson, Gibson and Cutting, 1973; Schweider, 1977; Weisbord, 1976.) The scarcity of evidence regarding effects of the use of videotape recordings on movement patterns and motor skill development by the mentally retarded limits the progress toward determining and implementing techniques that will enhance their motor learning and performance. It is imperative that progressive instructional approaches be more thoroughly investigated if the problem of motor deficiencies in the mentally retarded is ever to be effectively dealt with (Cantrell, 1977.)

Summary

It has been shown that feedback plays a critical role in motor learning, and that perceptual processes involved with interpreting feedback are important to skill acquisition. It has been speculated that the inability to perceive and interpret error information may be a major factor underlying the motor deficiencies of the mentally retarded. Since physical activity is important to the well being of the retarded, it becomes necessary to provide them with feedback that allows for motor learning despite their cognitive and perceptual limitations. Videotape recordings may be one way to present concrete information that may be readily interpreted and processed by the developmentally disabled.

CHAPTER III

METHODOLOGY

The purpose of this study was to investigate the effects of videotape replay on the standing broad jump performances of sixteen mentally retarded adults. The method in which this was accomplished will be presented in the following order: (1) Subjects; (2) schedule; (3) instrumentation; (4) assessment procedures; (5) treatment procedures; and (6) analysis of data.

Subjects

The subjects in this study were ten male and six female mildly and moderately mentally retarded adults who were participants in a weekly recreation program for exceptional individuals at Montana State University, Bozeman, Montana. Fifteen of the subjects lived in group homes administrated by Reach Inc., a nonprofit organization that provides community services to the developmentally disabled adults of Bozeman. One subject lived semi-independently in Bozeman.

The subjects ranged in age from nineteen to forty years of age. None of the subjects had any orthopedic impairments or other physically handicapping conditions that would have inhibited their performing the standing broad jump. All subjects signed a consent form prior to the initiation of this study. (See Appendix A.)

The subjects were divided into three groups. One group was the

Control Group, the second group was the Verbal Feedback Group and the third group was the Video/verbal Feedback Group. There was a wide range of existing levels of motor proficiency within the population, so the following procedures were utilized in the grouping process to help attain homogeneity between the three treatment groups: The subjects were listed in rank order according to the scores from their initial assessments. This rank order was then stratified with three subjects per stratum. The three subjects in each stratum were then randomly assigned to one of the three treatment groups in order to ensure an even distribution according to the subjects' jumping proficiency (Horgan, 1977.) The means of the initial and final profile scores for each group are presented in Table 1., and reflect a relatively homogeneous distribution of the subjects based on their initial proficiency at performing the standing broad jump.

Schedule

This study was conducted in the Physical Education Curriculum Lab at Montana State University, Bozeman, Montana. The data for this study were collected on April 10, 1980 and June 5, 1980. The experimental treatment was administered on Thursday evenings between 6:00 p.m. and 8:00 p.m. beginning April 17, 1980 and concluding May 19, 1980. Treatment was not administered on Thursday, May 15, 1980 because some of the subjects were participating in the Montana Special Olympics in Missoula,

Table 1. Means and Standard Deviations of the Initial and Final Profile Scores of Each Group, t-Values and Probability of the Intragroup Comparisons of the Initial and Final Performance.

	Control (N=5)		Verbal (N=6)		Video/verbal (N=5)	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
INITIAL	4.67	1.21	4.60	1.14	4.60	1.52
FINAL	5.17	2.32	4.20	1.09	4.80	1.64
t-value	-.89		1.63		-.53	
PROB	.42		.18		.62	

* Significance was tested at the .05 level.
$t_5 = 2.57$; $p \leq .05$

Table 2. Means and Standard Deviations of the Initial and Final Distance Measurements of Each Group, t-Values and Probability of the Intragroup Comparisons of the Initial and Final Performance.

	Control (N=5)		Verbal (N=6)		Video/verbal (N=5)	
	$\overline{X}$	SD	$\overline{X}$	SD	$\overline{X}$	SD
INITIAL	26.70	8.63	27.04	11.76	32.76	17.30
FINAL	27.60	10.85	30.06	17.89	33.42	18.44
t-value	-.30		-.96		-.22	
PROB	.77		.39		.84	

* Significance was tested at the .05 level.
$t_5 = 2.57$; $p \leq .05$

Montana.

Instrumentation

The standing broad jump is utilized in numerous fitness test batteries as a test of leg strength and power. It has a validity coeffecient greater than .90 and a reported reliability of .97 (Matthews, 1973.) The procedures for administering and performing the standing broad jump were those described in the AAHPER Special Fitness Manual for Mildly Mentally Retarded Persons (AAHPER, 1976: 18.) These procedures are presented in Appendix B.

The standing broad jump was chosen as the movement task in this study because it was a relatively uncomplicated task which the subjects would be able to perform with some degree of success. Another concern in the selection of the standing broad jump for use in this study was that all of the subjects were known to have immature jumping patterns, and hence there was potential for improvement in all the subjects' jumping proficiency during this investigation.

The instruments used in this study to film and replay the subjects' standing broad jump performances were a Sony 3/4 inch Videocamera, model AVC-3260, and a Sony Videocassette recorder, model VO-2600. The replay of the videotape recordings was viewed on a Sony Trinitron Color Receiver/Monitor, model CVM-1250.

This study was mainly concerned with the quality of jumping per-

formance, but it also considered measurements of quantitative achievement. The objective quantitative measurement consisted of recording the distance jumped in each of the five trials in both the initial and final assessment sessions. The mean distance from each session constituted the evaluation criterion of quantitative performance.

The qualitative aspect of the subjects' performances was evaluated subjectively through use of an assessment tool developed by McClenaghan and Gallahue (McClenaghan and Gallahue, 1978: 104.) The tool is presented in Appendix B. This tool is comprised of lists of performance traits commonly occuring at various stages in the development of a mature jumping pattern. It was designed for use in assessing the development of children's jumping patterns and was applicable to the population of this study as all of the subjects performed the standing broad jump at some point below the mature level on the developmental scale. This investigator assumed the tool to have face validity as other sources from the field of motor development have substantiated McClehaghan and Gallahue's breakdown and descriptions of the developmental stages in jumping by revealing characteristics common to the various performance levels (Corbin, 1980; Wickstrom, 1977.)

Assessment Procedures

An initial evaluation of each subject's jumping pattern was conducted on April 10, 1980 and a final evaluation of the pattern of each

subject was done on June 5, 1980. The assessment procedures consisted of each subject performing five consecutive standing broad jumps after receiving the following standardized verbal instructions from the investigator: "When I ask you to jump, I want you to jump as far as you can. Keep your feet together the whole time. Put your toes on the white line. Ready? Jump." The initial five and final five performances of each subject were recorded on videotape to ensure an accurate qualitative assessment by allowing the assessors to view the performances repeatedly. (See Appendix B for an explanation of the scoring procedures.)

The investigator collected the quantitative data by measuring and recording the distances of each jump. Two female assistants conducted the qualitative assessment. Both assistants had background in the area of fundamental motor patterns through their experiences as physical educators. Both had been employed as graduate teaching assitants of elementary physical education by Montana State University, Bozeman, Montana, and taught physical education in the Bozeman Public School District for one year. Each also had one year's experience working with the handicapped in the Bozeman public schools, concentrating on the development of fundamental movement patterns and motor skills with mentally retarded children. Through their experiences working with handicapped and nonhandicapped children, both assistants became very familiar with the characteristics of the developmental stages in jumping.

The assistants were trained in use of the assessment tool by the

investigator. A reliability coefficient of 1.0 was established for the assistants through a pilot study conducted between January 22, 1980 and February 5, 1980. The assistants made an initial assessment of the pilot study subjects and conducted another assessment of the subjects two weeks later. The subjects of the pilot study were seven mildly and moderately mentally retarded male and female high school students attending Bozeman Senior High School, Bozeman, Montana. In addition to establishing the reliability of the assistants in use of the assessment tool, another purpose of the pilot study was to determine the clarity of the standardized verbal instructions and verbal feedback cues to mentally retarded individuals. The pilot study further established a standard procedure for the delivery of feedback and allowed the investigator and the assistants to become familiar with using the video equipment and the assessment tool used in this study.

Treatment Procedures

The experimental treatment was administered to the subjects on an individual basis. The prescribed treatments for the groups were:

Control Group: Each of the five subjects in the Control Group was given the standardized instructions prior to the first standing broad jump performance in each treatment session. Each subject then performed ten consecutive jumps and received no feedback whatsoever on how to improve the jumping pattern. Following every jump,

the investigator said, "Nice job. Please jump again." No other communication took place between any subject and the investigator during the treatment sessions.

Verbal Feedback Group: Each of the six subjects in the Verbal Feedback Group was given the standardized instructions prior to the first standing broad jump performance in each treatment session. Each subject performed ten jumps per session. After each jump, a subject received standardized verbal cues (see Appendix C) from the investigator that were appropriate for aspects of the performance that needed improvement. Following the administration of the verbal feedback cues, the investigator said, "Nice job. Please jump again." No visual cues were given any to any of the subjects, and no communication other than the standardized instructions, standardized verbal cues and the request to repeat the jumping task took place during the treatment sessions.

Video/verbal Feedback Group: Each of the five subjects in the Video/verbal Group was given the standardized instructions prior to the first standing broad jump performance in each treatment session. Each subject performed ten jumps per session. Before the first jump, each subject viewed a videotape recording of a model performing a mature standing broad jump pattern. The subject then performed three consecutive jumps which were recorded on videotape. Following the three jumps, the videotape recording was replayed to

the subject while the investigator provided standardized verbal feedback cues that were appropriate for apsects of the performances that needed modification. After the administration of the feedback, the investigator said, "Nice job. Please jump three more times." This procedure of administering feedback following three jumps was was done three times. Just prior to the tenth and final jump of each session, the subject again viewed the model performance. No verbal or visual cues other than the standardized instructions, standardized verbal feedback cues and the videotape replays were provided.

The standardized verbal feedback cues (see Appendix C) were developed by the investigator based on Wickstrom's (1977) description of the components of a mature jumping pattern. Wickstrom synthesized numerous sources of information regarding performance characteristics of an efficiently executed standing broad jump, and found the following factors to be crucial to optimal performance:

1. The deeper the crouch, given that the leg flexion was not extreme, the greater the distance that could be covered.
2. The arms helped facilitate and enhance the jump by serving to shift a jumper's weight when the arms were first swung behind the body, then swung vigorously forward to a hyperextended position above the head. The arms also helped maintain the the momentum of the body in flight by remaining hyperextended

with the elbows straight.

3. The optimal takeoff angle was approximately forty-five degrees.
4. The heels were pulled off the floor and the jump was initiated from the toes, followed in succession by the extension of the hips, then the knees and then the ankles.
5. The extension of the lower extremeties was done rapidly to facilitate the jump. The knees and hips flexed soon after takeoff, and the knees extended again to position the feet in front of the body in preparation for landing. The knees and hips flexed upon contact with the landing surface to absorb the impact of the landing and to help decelerate the body smoothly.

The verbal feedback cues were developed with these performance factors in mind. The cues were also worded simply in order to help present the feedback information as clearly and understandably as possible to the mentally retarded subjects.

The procedure of replaying the videotape recordings to the subjects was established by the investigator based on Cratty's (1968) ideas regarding the most effective way to present visual feedback by means of videotape replay. Cratty felt that when learners viewed a model as well as their own performances, they had a clear standard of reference on which to base corrections in their movements. He also contended that learning was enhanced when practice closely followed viewing of either a model or a learner's own performance on a videotape recording.

With Cratty's viewpoints in consideration, the investigator designed the videotape feedback treatment procedure to allow the subjects to view a model performance of the standing broad jump as well as their own performances, and to provide an opportunity for practice immediately following the replay of the performances. Each subject in the Video/verbal Feedback Group received the videotape feedback treatment as follows: (a) View model performance; (b) perform three jumps; (c) view replay of the three jumps; (d) perform three more jumps; (e) view replay of the second set of three jumps; (f) perform three more jumps; (g) view replay of the third set of three jumps; (h) review model performance; and (i) perform the tenth and final jump.

Analysis of Data

All of the data collected were analyzed by the Sigma Seven Computer located in the Computing Center at Montana State University, Bozeman, Montana. The hypotheses were tested using the following SPSS programs:

t-test-- a subprogram used to test the significance of the difference between a pretreatment and a posttreatment measurement of a variable within one group.

ONEWAY analysis of variance-- a subprogram used to test the significance of the difference between two or more groups when one variable is being considered.

Descriptive statistics were computed for all raw scores obtained in assessing the subjects. The statistics were then subjected to tests of significance using the SPSS program described. Both hypotheses were tested at the .05 level of significance.

Hypothesis 1 was tested by subjecting the data from the final performance assessment to a test of significance that would reveal the difference between the three treatment groups' performance of the standing broad jump following the experimental treatment period. Hypothesis 2 was tested by subjecting the data from the intial performance evaluation and the final performance evaluation to a test of significance that would reveal the difference between each group's initial performance and final performance of the standing broad jump.

CHAPTER IV

RESULTS

The purpose of this study was to investigate the effects of videotape feedback on the standing broad jump performances of retarded adults. A subjective evaluation of the subjects' jumping patterns and and objective measurement of the distances jumped preceeded and succeeded the administration of the experimental treatment. The assessment scores were statistically analyzed and the following comparisons were made: (1) a comparison of the final performances of all three experimental groups; and (2) a comparison of the initial and final performances of each group. The results are presented in the following order: (1) descriptive statistics; and (2) hypotheses testing.

Descriptive Statistics

The means and standard deviations of the initial and final performance profile scores for each group are presented in Table 1. The means and standard deviations of the initial and final distance measurements for each group are presented in Table 2.

Hypotheses Testing

Two hypotheses were tested in this study. The results will be presented for each hypothesis in the following manner: (a) statement of hypothesis; (b) description and interpretation of the method of

statistical analysis; (c) results of the statistical analysis; and (d) behavioral interpretation of the test statistic.

HYPOTHESIS 1

There will be no significant difference ($p \leq .05$) in the perfomance of the standing broad jump between the Control Group, the Verbal Feedback Group and the Video/verbal Feedback Group following administration of the experimental treatment.

This hypothesis was tested by subjecting the raw data to a ONEWAY analysis of variance. The statistical analysis using a ONEWAY analysis of variance revealed the differences between the final standing broad jump performances of the three groups. An F-probability greater than .05 would result in acceptance of the null hypothesis, with the subsequent conclusion being that no significant difference in the subjects' performance of the standing broad jump occurred as a result of the verbal or video/verbal feedback treatment.

The results of the ONEWAY analysis of variance between the profile scores of the three groups are presented in Table 3. The results of the ONEWAY analysis of variance between the distance measurements of the three groups are provided in Table 4. No significant difference between the final performance profiles or the final performance distance measurements was found. The null hypothesis was accepted, and it was concluded that the administration of the verbal feed-

Table 3. Degrees of Freedom, Sum of Squares, Mean Squares, F-Ratio and Probability of the Intergroup Comparison of the Final Performance Profile Scores of Each Group.

SOURCE	DF	SS	MS	F	PROB
Between Groups	2	2.566	1.238	.393	.683
Within Groups	13	42.434	3.264		
Total	15	45.000			

* Significance was tested at the .05 level.
$f_{2,13} = 3.80$; $p \leq .05$

Table 4. Degrees of Freedom, Sum of Squares, Mean Squares, F-Ratio and Probability of the Intergroup Comparison of the Final Performance Distance Measurements of Each Group.

SOURCE	DF	SS	MS	F	PROB
Between Groups	2	92.500	46.250	.186	.832
Within Groups	13	3228.855	248.373		
Total	15	3321.355			

* Significance was tested at the .05 level.
$f_{2,13} = 3.80$; $p \leq .05$

back had no significant effect on the standing broad jump performances of the mildly and moderately mentally retarded adult subjects.

HYPOTHESIS 2

There will be no significant difference ($p \leq .05$) between the initial and final performances of the standing broad jump in any of the three groups.

This hypothesis was tested by subjecting the raw data to a Paired t-test. The statistical analysis using a Paired t-test revealed the differences between the initial and final standing broad jump performances of each group. A t-probability greater than .05 would result in acceptance of the null hypothesis, with the subsequent conclusion being that no significant difference in any of the groups' standing broad jump performances occurred as a result of their respective experimental treatment.

The results of the Paired t-test between the initial and final mean profile scores are presented for each group in Table 1. The results of the Paired t-test between the initial and final mean distance measurements are given for each group in Table 2. No significant difference between the initial mean profile score and the final performance mean profile score was found in any of the groups. No significant difference between the initial performance mean distance measurement and the final performance mean distance measurement was found in any of the groups.

The null hypothesis was accepted, and it was concluded that the absence of feedback, the administration of verbal feedback and the administration of video/verbal feedback had no significant effects on the standing broad jump performances of the mildly and moderately mentally retarded subjects.

CHAPTER V

DISCUSSION OF RESULTS

The purpose of this study was to examine the effects of videotape feedback on the standing broad jump performances of mildly and moderately mentally retarded adults. Videotape feedback was presented by replaying videotape recordings of subjects' performances while providing verbal cues concurrently.

Differences Between the Final Performances of the Three Groups

Results of the ONEWAY analysis of variance revealed no significant difference between the mean profile scores of the final performances of the Control Group, the Verbal Feedback Group and the Video/verbal Feedback Group. It was hypothesized that no significant difference between the three groups would be found following the completion of the experimental treatment.

Results of the ONEWAY analysis of variance revealed no significant difference between the mean distance measurements from the final performances of the Control Group, the Verbal Feedback Group and the Video/verbal Feedback Group. It was hypothesized that no significant difference between the three groups would be found following the completion of the experimental treatment.

Differences Between the Initial and Final Performances of Each Group

The results of the t-test revealed no significant difference between the intial mean profile score and the final mean profile score in any of the three groups. The results also revealed that no significant difference existed between the initial mean distance measurement and the final mean distance measurement in any of the three groups. It was hypothesized that no significant difference would be found as a result of any of the experimental conditions.

The results of this study revealed that extrinsic verbal and visual cues did not positively effect the motor learning of the subjects. Knowles (1973) found similar results when she investigated the effects of extrinsic feedback on the learning or two gross motor skills by moderately and mildly mentally retarded males. She discovered that providing feedback regarding the outcome of a performance following completion of the performance yielded no significant benefits. In Knowles' study, the subjects in one treatment group were informed of the results of their performances in terms of numerical scores in addition to receiving verbal cues on how to improve the quality of the performance. Subjects in another group received only verbal cues regarding how to improve their movements while subjects in a third group received no feedback whatsoever. The results of Knowles' study revealed that none of the feedback provided had any significant effect

on the learning and performance of the movements tasks in the study. She concluded that extrinsic feedback provided after the completion of a performance did not benefit the mentally retarded.

Baumeister, Hawkins and Holland (1966) also conducted a study investigating the effects of extrinsic feedback on the motor performance of the mentally retarded. In contrast to Knowles' feedback administration, Baumeister and his associates provided their subjects with feedback during performance of a pursuit rotor task by flashing a light whenever the subjects were on target. The investigators found that the retarded subjects significantly improved their performances when provided feedback concurrently with their performances.

The disparity between Knowles' findings and the outcome of Baumeister, Hawkins and Holland's study stimulates speculation about the most effective way to present feedback to the mentally retarded. The need for conceptualization may perhaps be reduced when pertinent information is delivered during performance rather than following its completion. Since it has been suggested that motor performance problems of the retarded may be a result of difficulties in processing abstract information, concurrent provision of feedback may be an effective method of presenting concrete information to retarded performers. Perhaps had the videotape feedback in this investigation somehow been provided concurrently with the performances of the standing broad jump, the outcome of this study may have been different.

The results of this investigation may have been influenced somewhat by the attitudes of the subjects toward the movement task and the experimental treatment. Cratty (1974) discussed inattentiveness and distractability as factors that might potentially inhibit efficient information processing by the mentally retarded. Some subjects in the Verbal Feedback Group and the Video/verbal Feedback Group often became impatient with having to perform the standing broad jump ten times and consequently did not always pay close attention when feedback was being provided. The subjects in the Video/verbal Feedback Group were initially quite attentive to the videotape replays, but after three treatment sessions grew uninterested in viewing their performances.

Despite the contentions held by some (Cratty, 1968; Neufeld, 1972; Ryan, 1969) that videotape cna present tangible and interpretable information, this present investigation found that the use of videotape to relay performance information did not benefit the mentally retarded subjects' learning or performance of a movement task. Perhaps the low cognitive level of the subjects limited their perceptual capabilities as Alley (1968) suggested. It appears that although feedback was provided to the retarded subjects in a concrete manner, the subjects were still unable to perceive or modify errors in performance even when the errors were specifically pointed out to the subjects by the investigator.

The mentally retarded subjects in this study were possibly at too

low of a performance level to benefit from the videotape replays. Following their analysis of literature concerned with the effectiveness of videotape replay on motor skill acquisition, Rothstein and Arnold (1976) concluded that beginners did not seem to profit from exposure to videotape recordings of their performances. DelRey (1971) indicated this also, and speculated that beginners did not benefit from videotape replay because their attention was usually not directed to pertinent aspects of the recorded performances. Most of the retarded subjects in this present study performed the standing broad jump at a beginning skill level. The subjects receiving the video/verbal feedback treatment were specifically directed to certain factors of their performances while viewing the replays of their jumps, as DelRey suggested. Since there was no significant difference between the initial and final performances of the Video/verbal Feedback Group, it would appear that mentally retarded individuals at a beginning performance level do not profit from videotape feedback even when their attention is directed to specific aspects of recorded performances.

Summary

The results of this study failed to find videotape feedback to be a positive tool in enhancing the mentally retarded's motor learning and performance of a selected motor task. Unfortunately, few other studies have investigated the use of videotape with the mentally retarded, and

the results of this study should not be considered conclusive. Factors that may have affected the outcome could have been inattentiveness or distractibility (Cratty, 1974.) Poor perceptual processing may have also accounted for the lack of significant changes in performance (Alley, 1968.) The fact that the subjects were at a beginning level at the motor skill used in this study may have been a factor in the lack of significant effects of the videotape feedback (Rothstein and Arnold, 1976.)

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Purpose

The purpose of this study was to examine the effects of videotape feedback on mentally retarded adults' performance of a motor task. Videotape recordings were utilized as feedback regarding performances of the standing broad jump of mentally retarded subjects.

The conclusions of the reviewed literature regarding feedback was that it played a critical role in the learning process, and that visual feedback was the most influential type of feedback in motor learning. The literature concerned with videotape indicated that the value of using videotape recordings to provide feedback lay in the fact that the recordings presented information in a clear and concise manner. Literature dealing with motor learning and the mentally retarded revealed that an inability to conceptualize movements may be one explanation for the difficulties experienced by the retarded in motor learning and skill acquisition. Implications were made in some sources that videotape could potentially aid the developmentally disabled in motor skill learning by presenting information necessary for learning a skill in a concrete manner, thus reducing the need for conceptualization.

Procedures

An initial assessment was made of sixteen mentally retarded adults' jumping patterns while they performed the standing broad jump. The subjects were then divided into three groups to undergo the following treatments: (1) Control Group: The subjects practiced the standing broad jump and received no feedback regarding their performances; (2) Verbal Feedback Group: The subjects practiced the standing broad jump and recieved standardized verbal cues on how to improve their jumping patterns; and (3) Video/verbal Feedback Group: The subjects practiced the standing broad jump and received standardized verbal feedback cues while viewing a videotape recording of their performances.

The subjects received their respective treatments once weekly for a period of six weeks. A final evaluation was made of the subjects' jumping patterns following the conclusion of the treatment sessions.

Descriptive statistics were established for the initial and final performances of the standing broad jump. A ONEWAY analysis of variance as used to compare the final performances of the three groups. A t-test was used to compare the initial and final performances of each group.

Results

There was no significant difference between the final performances of the three groups following the experimental treatment. There were no significant differences between the initial and final performances

of any of the groups.

Conclusions

The following conclusions can be formulated specifically for the population of this study based on the results of the investigation. Caution should be exercised in generalizing the results to other populations.

1. In this study, feedback provided by verbal cues has no significant effect on the learning or mastery of the standing broad jump by the mentally retarded subjects.
2. In this study, feedback provided by videotape replay accompanied by verbal cues has no significant effect on the learning or mastery of the standing broad jump by the mentally retarded adult subjects.

The lack of a more discriminating tool may be one factor underlying the non-significant results. The tool used in this study was designed for use to generally assess the jumping patterns of young children. It was the most appropriate tool found that could be adequately modified for use in this study.

Videotape may be a potentially valuable tool to deliver concrete and interpretable visual feedback to mentally retarded individuals. Established movement patterns are, however, difficult to change, and the fact that the subjects in this study were all adults with firmly

established jumping patterns may have been an element in the outcome of the investigation. A general conclusion of this study is, nonetheless, that videotape feedback, as administered in this study, does not have a significant effect on the standing broad jump performances of mildly and moderately mentally retarded adults.

Recommendations

Evidence of the effects of videotape feedback on the motor learning and performance of mentally retarded individuals in sorely lacking. The results of this study revealed no significant effects of this mode of feedback, although the literature indicated that the potential of videotape as a feedback technique with the retarded was promising. The following recommendations for further research in the areas of videotape as a feedback mode and motor learning and the mentally retarded are offered:

1. Conduct studies to investigate the effects of videotape feedback on the learning and performance of young mentally retarded individuals. Retarded children and youth still in the developmental stages may benefit from this type of feedback.
2. Conduct longitudinal studies involving larger populations of mentally retarded persons. Studies such as these may yield more conclusive evidence regarding feedback and the motor

learning process in the mentally retarded by incorporating many motor skills in the investigations.

3. Devise more dynamic ways to deliver videotape feedback to mentally retarded individuals. By presenting feedback information in a manner that is stimulating, retarded learners may display more interest and enthusiasm in learning and practicing motor skills. Feedback treatment and opportunities for practice should also be provided at more frequent intervals than the limitations of this study would allow.
4. Develop assessment tools designed specifically to evaluate movement patterns and motor skills of the mentally retarded. Currently, inadequate means of assessing the motor proficiency of developmentally disabled individuals often inhibits effective prescription of therapy or remedial activities which could aid the retarded in overcoming their motor deficiencies. Work in this particular area would be a major contribution to the field of motor learning and the mentally retarded.

APPENDICES

APPENDIX A

LETTER OF CORRESPONDENCE AND SUBJECT CONSENT FORM

PHYSICAL EDUCATION TRAINING PROJECT FOR THE EXCEPTIONAL INDIVIDUAL
DEPARTMENT OF HEALTH PHYSICAL EDUCATION AND RECREATION
CRAIG STEWART, ED.D PROJECT DIRECTOR
MONTANA STATE UNIVERSITY, BOZEMAN MONTANA 59717

March 13, 1980

Dear Group Home Counselors,

My name is Laura Sim, and I am a graduate assistant working with Dr. Craig Stewart at Montana State University. As partial fulfillment of the requirements for a Master of Science degree I intend to conduct research concerning motor skill acquisition by the mentally retarded. I would like to do a study using the individuals participating in the Thursday night recreation program here at the University.

I plan to investigate the effects of using videotape feedback in the development of jumping skill with the developmentally disabled. There is some evidence that indicates videotape is a valuable method of providing performance information that may enhance motor learning by the retarded, but much more research in the area is drastically needed.

The participants in the study will work on jumping skills for approximately twenty minutes each Thursday, beginning on April 10th and continuing until June 5th. The videotape recordings of the subjects will be used only as feedback to the individuals, and will remain strictly confidential. All the statistical results will be presented anonymously in the published thesis, and will be avail-

able to you upon request.

If you have any questions, concerns or objections, please feel free to contact me during the day at 994-2260 or in the evening at 586-0889. It will be a great help if you would encourage the clients to attend the program regularly as their presence and participation is essential to the outcome of the study.

Thank you very much for your cooperation.

Sincerely,

Laura J. Sim

MONTANA STATE UNIVERSITY

HUMAN SUBJECTS IN RESEARCH CONSENT FORM

Title of research: The Effects of Videotape Feedback on the Standing Broad Jump Performances of Mildly and Moderately Mentally Retarded Adults.

Investigator: Laura J. Sim, Graduate Assistant
B.E.H. Training Project
Department of Health, Physical Education and Recreation
Montana State University
Bozeman, Montana

I, _____, have been provided: A
(name of participant)

general description of the above named investigation and its purpose; an explanation of why I was selected to participate; and an explanation of my responsibilities as a participant.

I hereby consent to participate in the investigation.

_____
signature of participant

_____
date

APPENDIX B

PROCEDURES FOR THE STANDING BROAD JUMP AS DESCRIBED IN THE AAHPER SPECIAL FITNESS MANUAL FOR MILDLY MENTALLY RETARDED PERSONS

AND

THE ASSESSMENT TOOL DEVELOPED BY McCLENAGHAN AND GALLAHUE

Procedures for the standing broad jump as described on page 18 of the AAHPER Special Fitness Manual for Mildly Mentally Retarded Persons:

Equipment:

Mat, Floor, or outside jumping pit and tape measure.

Description:

Pupil stands with the feet several inches apart and the toes just behind the take-off line. Preparatory to jumping, the pupil swings the arms backward and bends the knees. The jump is accomplished by simultaneously extending the knees and swinging the arms forward.

Rules:

1. Allow three trials. (*NOTE: Five trials were given.)
2. Using a tape, measure from the take-off line to the back of the heel nearest the take-off line.
3. When the test in given indoors, it is convenient to tape the

tape measure to the floor at right angles to the take-off line and have the pupils jump along the tape. The scorer stands to the side and takes the measurement.

Scoring:

Record the best of the three trials in feet and inches to the nearest inch. (* NOTE: For this study, the mean of five trials was utilized. The distances were recorded in inches and measured to the nearest one-half inch.)

The assessment tool on the following page was developed by McClenaghan and Gallahue (McClehaghan and Gallahue, 1978: 104.) The following modifications were made by the investigator to adapt the tool for use in this study:

1. Performance characteristics for trunk action at the elementary level were added as there were none listed in the original tool.

2. A scoring system was devised in order that the tool may be adapted for statistical treatment. This system consisted of assigning a numerical value to each of the performance levels. The initial stage was assigned the number one, the elementary stage the number two and the mature stage the number three. The subjects were evaluated by assessing the actions of the arms, trunk and lower extremeties separately. By adding the numbers assigned to the level at which they performed each body action, a total score, referred to in this study as the profile score, was determined. For example, a subject whose arm action was at the initial level (a value of one,) trunk action was at the elementary level (a value of two,) and leg-hip action was at the initial level (a value of one) would have a profile score of four. It was this profile score that was subjected to statistical analysis to determine the results of this investigation.

3. Blanks on which to record the distances of the five trials, the profile scores and the subject identification number were added.

	INITIAL	ELEMENTARY	MATURE
ARM ACTION	Limited swing; arms do not initiate the jumping action. During flight, sideward/downward or rearward/upward to maintain balance.	Initiate jumping action. Always remain toward front of body during preparatory crouch. Move out to side to maintain balance during flight.	Move high and to the rear during preparatory crouch. During takeoff, they swing forward with force and reach high. Arms are held high throughout the jumping action.
TRUNK ACTION	Moves in vertical direction; little emphasis upon length of jump.	Slight angle of trunk; a little more emphasis on horizontal distance.	Trunk is propelled at approximately a 45 degree angle. Major emphasis is on horizontal distance.
LEG—HIP ACTION	Preparatory crouch is inconsistent in terms of leg flexion. Difficulty using both feet. Extension at takeoff is limited. Weight falls backward at landing.	Preparatory crouch is deeper and more consistent. Extension is more complete at takeoff. Hips are flexed during flight, and thighs are held in a flexed position.	Preparatory crouch is deep and consistent. Complete extension of ankles, knees, and hips at takeoff. Thighs are held parallel to ground during flight; lower leg hangs vertically. Body weight at landing is forward.

Subject #_____

Profile Score_____

Distances #1_____ #2_____ #3_____ #4_____

#5_____ $\overline{X}$ Distance_____

APPENDIX C

STANDARDIZED VERBAL FEEDBACK CUES

LEGS:

1. crouch: "Bend your knees more before you jump."
2. takeoff: "Straighten your legs as fast as you can when you jump."
3. takeoff: "Try to jump off your toes."
4. Landing: "Bend down when you land."

ARMS:

5. crouch: "Swing your arms behind you before you jump."
6. takeoff: "Swing your arms forward over your head when you jump and keep then high in the air the whole time."
7. landing: "Keep your arms in front of you where you can see them when you land."

TRUNK:

8. takeoff: "Lean forward more when you jump."
9. flight: "Keep leaning forward when you are in the air."
10. landing: "Bend forward when you land."

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BIBLIOGRAPHY

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Sim, Laura J
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