THE EFFECT OF THE PREP PRESCHOOL PLAY PROGRAM ON THE PLAY SKILLS AND FREE PLAY PATTERNS OF MODERATELY (TRAINABLE) MENTALLY RETARDED CHILDREN

Dissertation for the Degree of Ph. D

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This is to certify that the

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Elizabeth Jane Watkinson

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ABSTRACT

THE EFFECT OF THE PREP PRESCHOOL PLAY PROGRAM ON THE PLAY SKILLS AND FREE PLAY PATTERNS OF MODERATELY (TRAINABLE) MENTALLY RETARDED CHILDREN

By

Elizabeth Jane Watkinson

The purpose of the study was to investigate the effects of a preschool play program (PREP) on the play skills and free play patterns of moderately (trainable) mentally retarded children. The study was undertaken in the second year of a programmatic research project whose purpose was to develop instructional materials for the teaching of play skills to retarded children. The PREP program is an individualized instructional program which uniquely combines free play with direct skill instruction to improve the quality and quantity of play of the retarded child.

Specifically the study investigated the effects of an eight-month PREP program on free play patterns and play skills of twenty-one retarded children between the ages of four and seven years. Play patterns were assessed using videotaped samples of preprogram and postprogram free play. Based on 800 seconds of free play the percentage of time spent in each of the following five categories of play was determined: Non-play, Prerequisite Skills, Primary Skills, Elementary Skills, Advanced Skills. Categories were

behaviorally defined and encompassed all behaviors seen in free play. In addition, four specific play skills were investigated with respect to changes seen in these skills after instruction. Daily records of the children's performances in running, jumping down, tricycle riding and swinging on a bar during individualized instruction were analyzed to determine the effects of the program on these prescribed skills. Performances were recorded on sequential tasks leading to efficient execution of these four skills as well as on response levels within each task that reflected the amount of teacher intervention required.

Results of the free play analysis indicated that the children initially had very unsophisticated play patterns, spending a large percentage of their time in Non-Play (20.65 percent) and Prerequisite Skills. A statistically significant change occurred from pretest to posttest however, with the percentage of time in Elementary and Advanced Skills increasing from 8.41 percent to 28.29 percent. This change accompanied a decrease in the amount of time spent in inactivity, and a decrease in the number of behaviors exhibited in each sample of play.

In the analysis of specific skill learnings it was found that 100 percent of the children learned to swing on a bar, 50 percent of the children learned to ride the tricycle, while small but measurable improvements were demonstrated in running and jumping down. Analysis of the free play patterns of the children who failed to make gains in these S

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these specific play skills showed that these children spent a large percentage of time in the lower categories of play on both the pretest and the posttest.

The author concluded that an individualized program of play skill instruction combined with unstructured free play in a stimulating play environment could result in measurable and meaningful changes in the quality and quantity of play demonstrated by the preschool moderately retarded child.

THE EFFECT OF THE PREP PRESCHOOL PLAY PROGRAM ON THE PLAY SKILLS AND FREE PLAY PATTERNS OF MODERATELY (TRAINABLE) MENTALLY RETARDED CHILDREN

by

Elizabeth Jane Watkinson

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1977

DEDICATION

This thesis is dedicated to Lyle and his friends in the early childhood classes at Winnifred Stewart School.

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ACKNOWLEDGEMENTS

The writer wishes to express her appreciation to the many people who have contributed to this thesis and the development of the PREP Preschool Play Program.

Thanks are extended to Dr. Janet Wessel, chairperson of the doctoral committee, for her professional direction and interest throughout the course of these graduate studies as well as for her friendship and personal guidance. Thanks are also extended to Dr. Lawrence Alexander, Dr. Donald Burke, Dr. Lee Shulman and Dr. Paul Vogel for their willingness to assist in the preparation and completion of this thesis.

To the staff of the PREP program, Valerie Hunt, Barry Lovell, Brenda Lovell and Margaret Medak, the writer wishes to express her sincere appreciation for continued support and assistance throughout the development of the program.

To the children and teachers from Winnifred Stewart School, special thanks are extended for their willingness to participate in the PREP Program and for the special times spent in shared play.

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CHAPTER I

INTRODUCTION

The Problem

Throughout the preschool years a very large proportion of the normal youngsters time is spent in unstructured free play. During this time the child acquires the fundamental movement skills of locomotion and object manipulation (Piaget, 1951; Espenschade and Eckert, 1967; Wickstrom, 1970) that are practiced and applied in interactions with the objects encountered in the home, in the yard and in the playground. The child learns to run and jump and climb, to slide on slides, hang from bars, ride tricycles and scooters and to throw and kick balls and other objects.

The unstructured free play activity of the preschooler contributes greatly to his social, emotional, cognitive and motor development. It is the vehicle through which a good proportion of the child's learnings are acquired. At the same time play is a reflection of the child's cognitive and motor competencies (Piaget, 1951). The expression of these competencies through play begins with the neonate and continues, with increasing sophistication in play skills and play patterns, throughout life. By the age of four and five, young children have usually developed a wide range of skills

to be used in free play. For a large proportion of these children the skills appear to be acquired without major difficulty and without much intervention by parents and teachers.

What about the child then who does not play? Presumably this is indicative of an absence of the competencies required for play. Presumably too it is an indication that the social, emotional, cognitive and motor advantages that are usually gained through play are being missed. Unfortunately, this appears to be what happens to the retarded child. During the period of his life in which play should take up the majority of his waking hours, the retardate is listless and inactive (Benoit, 1955; Kuiper, 1967). Unlike the normal preschooler he lacks sophistication in both the quality and the quantity of his free play. He spends a good proportion of his time in idleness, rarely interacting with objects or peers and rarely initiating the skills of locomotion and object manipulation that are seen so frequently in normal youngsters (Noble, 1975).

The preschool retarded child demonstrates a lag in his play behavior that is comparable to the lag displayed in motor development (Carr, 1975), physical fitness (Stein, 1963) and other movement characteristics (Francis and Rarick, 1960). Observations of four-year-old mentally retarded children in free play indicate that they showed play behaviors that were approximately two years behind the play of normal four-year-olds in terms of space management, imitation, partic

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participation and interaction with materials (Knox, 1974). They spent a good proportion of their time simply watching others, and their object manipulation skills were immature. Clearly they lacked the skills to make constructive use of their free play.

The retarded child's failure to attain the motor skills and play patterns of normal youngsters may be attributed to several factors. It may be related to the circular effects of his inability to respond adequately to his mother or caretaker during the months of infancy, leading to a decrease in stimulation given to him in the natural give and take of parent and child (Calder, 1972). It may be related to a lack of opportunity to move and play that is based on parental protectiveness (Benoit, 1955). Alternately the motor retardation may be due to the child's inherent lack of ability to make use of the opportunities presented to him. Unlike the normal child, the incidental instruction and exposure to play that arise during early childhood may be insufficient to bring about play skill learnings.

Whatever the cause, this discrepancy between the play skills of the normal and retarded preschooler suggests that the young retarded child needs to be taught play skills that he can apply during his free play time, and needs to be given plenty of opportunity to use what skills he has in unstructured free play.

The PREP Preschool Play Program is an experimental program that attempts to teach retarded preschoolers the play s

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play skills that are acquired incidentally in free play by normal youngsters. The program began in 1974 in the Department of Physical Education at the University of Alberta under the direction of Dr. Pat Austin. The purpose of the program was to design instructional materials for the assessment, prescription and instruction of play and movement skills for moderately mentally retarded children between the approximate ages of three and seven years. The present study took place within the context of this ongoing research program.

Statement of the Problem

The purpose of this study was to determine the effects of The Preschool Play Program (PREP) on the play skills and play patterns of young moderately retarded children. The goal of the program was to increase the quality and the quantity of the skills the children initiated during their free play time. Instructional objectives designed to facilitate acquisition of the goal were written in terms of play skill learnings and specific strategies, using operant techniques, were defined for each objective written. A diagnostic-prescriptive instructional approach was used in the treatment.

The program was designed to bring about changes both in what the child chose to do in free time and in what the child could do when asked, shown, or prompted. As a result, performances in both of these dimensions of play skill patter

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patterns were seen as possible sources of data for demonstrating the program's effectiveness.

The study attempted to answer the following questions:

1. What are the effects of participation in an eight month PREP program on the quality and quantity of play skills initiated during free play time?

2. What are the effects of participation in an eight month PREP program on the performance of specific play skills during instructional time?

Scope of the Investigation

The study was undertaken in the midst of an ongoing research project whose focus was on the development of instructional materials for teaching play skills to retarded children. Five areas of instruction were identified for inclusion in the program: Body Awareness Skills, Body Control Skills, Locomotor Skills, Object Control Skills and Skills for Use on Specific Pieces of Equipment. Within each content area, several skills were identified for direct instruction. During the year of the program twenty-eight such skills were being used, either on a pilot basis or following formative evaluation (see Appendix A). While each of these skills required extensive analysis, only those for which replicable instructional materials had been designed and tested were included in the study.

The long-range goal of the program was to increase pla

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play skills initiated during free time. For the preschool child, these skills would normally be applied in free play in the home, in the yard, or at the playground. While the PREP program has attempted to identify and teach those skills that are relevant to these situations, the scope of the present study was limited to the application of the play skills in free play in the room in which instruction took place. It would certainly be of interest, in later studies, to examine the application of these learned skills in the playground or home setting.

Limitations of the Study

The use of the one-group pretest-posttest design, and the single subject design limited the study in terms of being able to interpret the results as being solely dependent on treatment. Maturation and history were possible sources of invalidity in the group design, while these and other factors possibly confounded the effects of the single subject studies. The generalizability of the studies was also limited by the nature of the design and the selection of the subjects.

The small sample size and the process of its selection limited the degree to which the results of the study can be generalized. The sample was an intact group of twenty-one students from the early childhood classes at Winnifred Stewart School in Edmonton, Alberta. The group was chosen because of its geographical proximity to the play center and because of the willingness of the school to transport the chi

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the children as a group to the University campus. The size of the sample was limited because of the difficulty of providing an individualized program for a larger number of children.

Definition of Terms

Free Play Time. Time during which the child is free to choose the activities he will engage in, the equipment he will use, and the skills he will apply without the intervention of a teacher.

Individualized Instruction. Instruction that is based on the assessed needs of an individual child.

Instructional Time. Time during which a teacher is in close proximity to a child and is directing her attention and energies to improvement of the child's performance on prescribed skills.

Moderately Retarded (trainable). Children with a measured intelligence quotient between 30 and 50 on a standardized intelligence test.

Play Skills. Those behaviors demonstrated in play that are a result of maturation and learning.

Shaping Techniques. Specific instructional strategies designed to facilitate acquisition of each task in the Task Sequence. These strategies include specific verbal cues, demonstrations, manipulative prompts, and manipulations.

Task Sequence. A logical arrangement of specific behaviors ordered in terms of difficulty whose acquisition in seg

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in sequential order may lead to the attainment of the Terminal Performance Objective.

Terminal Performance Objective. "A specific statement of a learning outcome expressed in behavioral terms which describes what the learner is able to do at the end of instruction (Vogel, 1974)". (page 9).

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CHAPTER II

REVIEW OF THE LITERATURE

The Motor Deficit of the Retarded Child

Introduction

Research into the motor performance of the mentally retarded has shown repeatedly that retardates perform well below the level of their normal peers on measures of physical fitness and motor achievement (Francis and Rarick, 1960; Stein, 1963; Rarick, Widdop and Broadhead, 1970; Kral, 1972; Bruininks, 1975). The degree to which these deficits in performance can be attributed to lack of physical maturation, intellectual function, or motivation, or to insufficient opportunity to practice has not been determined.

The deficit appears to establish itself early in life. At six weeks of age children with Down's Syndrome perform well below normal infants on the Bayley Infant Scales of Mental and Motor Development (Carr, 1970). By two years of age retardates (who typically are unable to walk alone) are even further behind normal peers (who are able to stand on one foot and walk a straight line). The developmental milestones usually achieved in infancy and childhood in normal individuals, do appear in approximately the same sequential order

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order but at a much later age in retarded children (Burkett, 1974; Carr, 1975).

The slowness in achieving the developmental milestones of infancy and early childhood probably results in an insufficient opportunity to practice skills once they are learned. In infancy the retardate who is late to make developmental gains may inadvertently receive less than the optimum stimulation. Calder (1972) suggested that:

> If the baby is 'good' he tends to attract less attention, and is possibly more passive and less responsive to approaches made to him than expected. Such conditions will result in a reduction of the number of approaches made and the amount of stimulation given to the infant. (page 19)

This problem becomes more exaggerated as the child grows older. The simple, repetitive and often stereotyped movements of infancy persist into the early childhood years (Kuiper, 1967; Frances, 1970; Carr, 1975) and the skills normally learned in the first two years of life do not appear until the child is older. In walking behavior, for example, normal children typically become independent by 11 1/2 months of age, while only 30 percent of children with Down's Syndrome achieve this by 24 months of age (Carr, 1975). By the time the retarded child is four or five years his motor skill repertoire has fallen well behind that of normal children his age. As a result, he is likely to have fewer opportunities to receive stimulation, a much narrower range of movement experiences and fewer opportun

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opportunities to receive positive reinforcement of his motor achievements.

Play Patterns of the Retarded

Play is as essential to the development of the retarded child as it is to other children, both for its intrinsic value and for its contribution to all areas of the child's development. Benoit (1955) stressed the need for research and practice in the area of play for the retardate. He suggested that retardates were deprived of suitable opportunities for play because of a lack of appropriate play equipment and facilities, a lack of imagination on the part of play leaders in finding suitable activities for the retarded, and a hesitance to allow retarded children to play because of the potential danger involved to themselves and equipment. The biggest need, he suggested, was to train teachers, parents and caretakers in how to engage these children in constructive play. Fulfilling this need requires research into the specific play patterns of the retarded and subsequent design and evaluation of strategies of instruction that will effectively improve play skills (Benoit, 1955; Wehman, 1975).

Benoit (1955) suggested that the lack of opportunity to play resulted in deficit play skills in the retarded. Whether this deficit is due in fact to lack of practice or whether the retardate is simply unable, because of cognitive or motivational limitations, to use play time con

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constructively is yet unconfirmed. Certainly it is clear that the retarded child spends less time in play activity. A study of ten multihandicapped children 30 to 58 months old (including three mentally retarded children) showed that these children had less total play time than a control group of nonhandicapped children (Gralewicz, 1973). The handicapped children spent 350 minutes in play over a three day period, while the total play time of the controls over the same period was 480 minutes.

During free play the retarded child uses his time less efficiently as well, further increasing his practice deficit. In one study, retarded children of 4 to 8 years with Down's Syndrome were compared to normal children of the same age on selected aspects of their play (Linford, et al., 1971). Filmed sessions of free play revealed that normal children demonstrated much more movement, in terms of speed, frequency and distance covered than the Down's Syndrome children during the same period of time. The two groups differed in their preference for equipment, also, with the normal children spending considerably more time on each chosen piece of apparatus.

An exploratory study on young retarded children in free play was carried out at the University of Alberta (Wall, 1974). Play behavior was categorized as creative, purposeful, watching or nothing. Wide individual differences in the type of play engaged in were noted and it was found that five of the fifteen children studied spent 55 percent of thei

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Further confirmation of this inefficient use of play and practice time was found in a later study conducted at the University of Alberta on young trainable retarded children (Noble, 1975). The focus of the study was on both the quantity of time spent constructively during free play and the quality of play skill demonstrated. The results clearly showed that retarded children of four to seven years spent a good deal of their time in complete idleness and that during the time they were active, the sophistication of their play skill was well below that expected of normal children of the same age. As a group, the subjects spent approximately 20 percent of their free time in complete inactivity, while 33 percent was additionally spent in simple locomotor activity or unpurposeful interaction with objects. These figures are well above those described in studies with normal children (Rosenthal, 1973). The range of time spent in non-play (inactivity) was wide with one child spending 64 percent of his time doing nothing and 24 percent of his time in simple locomotion and another child spending 25 percent of his time in those two categories combined (Noble, 1975).

Clearly, then, retardates spend a good deal less time in active play. Whether or not this leads to the deficit in skill or whether the skill deficit results in less constructive use of free play time is not clear. Presumably, both

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both effects are possible: the retardate lacks the play skill required to engage himself constructively during free time and therefore he does not use play time for skill practice, resulting in further play skill deficit in comparison to the normal child.

Studies have demonstrated very clearly that the retardate lacks skill and sophistication in his play behavior compared to his normal peers (Keeran, Grove and Zachofsky, 1969; Noble, 1975). Kuiper (1967) described the retardate's play behavior as characterized by simple, repetitive, stereotyped movements usually directed towards his own body. This is representative of the play behaviors seen in very young normal children (Piaget, 1951). Certainly these behaviors do persist longer in retarded youngsters (Carr, 1975) and may even increase in frequency again later in the life of the retardate (Frances, 1970). However, within the population of retarded youngsters, the skill and sophistication of play responses vary widely according to age and severity of the deficit in cognitive functioning. Some children may approach normal development of play skills and play behavior while others show very little, if any, play skill at all (Noble, 1975). In the majority of retarded youngsters, however, the degree of skill demonstrated falls well below that of the normal child, or is achieved at a much later date.

On the playground and in the playroom the retarded child lacks both range and depth in his play skills. This skill deficit has been demonstrated through observations of retarded children in free play. Noble (1975) found only a small percentage of skilled activity (less than 20 percent) taking place in a playroom containing equipment such as ladders, slides, climbing frames, scooterboards, balls and mats. His subjects were three to seven year old trainable retarded children. Keeran, Grove and Zachofsky (1969) developed an instrument to assess the play skills of severely retarded children, adolescents and young adults in their interation with playground equipment and found comparable results. Sequential steps of competency on each piece of equipment were written as an assessment scale. Each scale was divided into proficiency levels representing (a) complete absence of skill in using the equipment (b) minimal skill in use of the equipment, (c) use of the equipment with help, and (d) proficiency in using the equipment. The investigators found that the merry-go-round was used proficiently by the largest number of experimental subjects (50 percent) while the swings were used proficiently by 31 percent of the subjects. The tunnels, wide slide and stair slide were used well by 26 percent, 20 percent and 15 percent of the subjects respectively. While very few of the experimental subjects were totally lacking in skill on the apparatus, a fairly substantial percentage of the subjects showed no more than minimal skill in using the swings (51 percent), the merry-go-round (28 percent), the wide slide (32 percent), the tunnels (26 percent) and the stair slide

(58 percent). The authors did not describe the specific behaviors included in 'minimal skill'. However, one can assume from the competencies described for using the swings that "sits on employee's lap and holds chain" would be considered 'minimal skill'.

The control subjects who were not chosen for special instruction reflected slightly better competencies. In using the swings, merry-go-round, tunnels, wide slide and stair slide the percentages of subjects demonstrating proficiency were 66 percent, 75 percent, 69 percent, 64 percent, and 58 percent respectively. These subjects ranged in age from under eight years to 29 years however. Clearly, for this age range they demonstrated a lack of the skills required to use playground equipment constructively and proficiently.

Studying Play Behavior

Studies that have examined the nature of play with both retardates and normal children have focused on different aspects of play for its analysis. Linford and his associates (1971) looked at the amount of movement in terms of time and space. Gralewicz (1973) used total play time, play with others, play alone, and categories involving TV watching as dependent measures in her study of multihandicapped children. Still others have looked at the social qualities of play. In an early study Parten (1932) examined the play of normal preschoolers, using the size of the play group as a dependent measure. She also attempted to find the relat

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relationship between the type of social participation being engaged in (solitary, onlooker, parallel, associative, or cooperative) and the kind of toys being used. Some parts of this study were replicated in a later study (Barnes, 1971).

A study of young educable mentally retarded children investigated the social aspects of play using a modified version of Parten's categorization of play (Knapczyk and Yoppi, 1975). Five categories of play behavior were defined: onlooker, solitary, parallel, cooperative, and competitive. Five children aged eight to ten years who showed no spontaneous competitive play and little cooperative play during the baseline period increased both of these categories of play when social and token reinforcement were given for these behaviors. The authors concluded that frequency of cooperative and competitive play behavior in retarded children could be developed and maintained using operant techniques.

A further modification of these play ratings was used in a study designed to train social responses in severely retarded youngsters of approximately four to eleven years of age (Paloutzian, et al., 1971). Degrees of social interaction in free play were defined behaviorally and used as an assessment scale. The scale was an ordinal one composed of eight levels of behavior: autistic, unoccupied, independent play, observing, attempted interaction, parallel play, associative play and cooperative play. The trainers used pro

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used prompting and modelling techniques to increase the level of the children's play during the treatment and found that social interaction in play could be facilitated through training of interactive responses.

Few studies have looked specifically at play skill as a dependent measure, though play activities such as ball-rolling, passing a bean bag, or pulling a wagon have been identified as overt behaviors to be used in assessing and training cooperative play (Paloutzian, et al., 1971). Wehman (1975) recommends that more emphasis be put on investigating overt play behaviors, including the frequency and the diversity of play behaviors as well as the frequency and nature of interactions in play. Certainly it seems, at least to the physical educator, that both the frequency of play behaviors and the sophistication of the play skill are two highly significant aspects of play behavior.

Florey (1971) attempted to design a classification scheme for the overt behaviors seen in play. She classified behaviors such as reaching, grasping, mouthing, jumping, and climbing according to the age at which these behaviors typically emerge in young children and according to the objects on which they were enacted: human (parents, peers, self) or non-human (unstructured, those that combined to form new shapes, those that did not lend themselves to changing shape or form). She recommended the classification scheme as a possible instrument for observing play in practical and research settings.

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Studies of the spontaneous free play of normal preschool children have looked at the kinds of equipment or toys used, the frequency of their use, and duration of activity as dependent measures in analysis of play behavior (Hulson, 1930; Clark, Wyon and Richards, 1969; Rosenthal, 1973). One author used specific behaviors and their frequencies to examine the impact of reducing and augmenting the amount of play equipment available in a playground (Johnson, 1935). Frequencies of running, swinging, sliding, climbing, jumping, and other less vigorous behaviors were used to arrive at a total number of occurrences of active and less active behaviors.

Few studies have been done to analyze the retarded child's play in behavioral terms. One attempt was made to examine the choice of play materials and the amount and kind of activity engaged in by mentally deficient children (Horne and Philleo, 1942). Six categories of play type were defined: constructive activity, original constructive activity, activities with games and toys, manipulative activity, inspection and observation, and miscellaneous. Specific behaviors were given as examples in each category. Relationships between the type of activity engaged in, and the kinds of toys preferred, showed that the mentally retarded children spent more time in games with toys which required highly specific play skills. Normal children, on the other hand, tended to engage in constructive or creative play with toys that required a good deal of imagination in their use. Actual skill applied in using the toys was not dealt with.

Only one other study was found that used behavioral definitions of play in observing the retarded. Keeran, Grove and Zachofsky (1969) looked at the proficiency with which severely retarded children interacted with certain pieces of playground apparatus. The categories of skill defined and the results of this study have been reported in another section of this review.

The design of programs of motor skill instruction is based on the assumption that the program fulfills a need. The literature strongly suggests that the play of the mentally retarded needs improvement. However, the dissimilarity of the measures of play used makes it difficult for program designers to determine which specific needs are to be fulfilled. In establishing priorities for instructional objectives, this information is crucial. If specific play skills are to be chosen as instructional objectives in preschool programs, then the play of the retarded must be examined using behavioral definitions of these skills, and assessment devices designed for the purpose of implementing and evaluating instructional programs (Wehman, 1975).

Activity Programs for the Retarded

Introduction

The recognition of play and motor skill deficits in retarded

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retarded children has resulted in the development of several programs of instruction whose focus is to improve play. The specific objectives of these programs vary considerably. A number of them reflect an interest in the development of the affective behaviors required for play (Whitman, et al., 1970; Bradtke, Kirkpatrick and Rosenblatt, 1972; Knapczyk and Yoppi, 1975; Kazdin and Erickson, 1975). Others focus on the development of motor abilities as measured by standardized tests of motor performance or scales of motor development (Harvey, Yep and Sellin, 1966; Cannon, Moffett and Moffett, 1970; Stephens, et al., 1970; Chasey and Wyrick, 1971; Morrison and Pothier, 1972; Newcomer and Morrison, 1974; Morrison and Newcomer, 1975). A few of the programs reflect objectives of specific play skill learnings (Buell, et al., 1968; Peterson and McIntosh, 1973; Flavell, 1973).

One program directed itself toward the development of basic skill performances and other game components by young educable mentally retarded children (Ross, 1969). The training program was designed to improve games skills by teaching skills within the context of simple games rather than using drill and repetition. Other aspects of the program included: a focus on learning the social components of play, active participation of all students, the use of short periods of instruction with frequent changes in activity, the use of adult models, and a close relationship between the games played and traditional playground games.

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progress in sport and games skills beyond that of a control group who participated in the special physical education program prescribed for special classes in California. Ross suggested that the results support the aspects of the training program outlined and raised some questions about the effectiveness of the special education curriculum. This curriculum used nursery rhymes, singing games and simple motor tasks unrelated to the games and play of normal children as the basis of the movement program.

Ross' study points out the need to examine carefully the content of programs given to young retarded children as well as the specific strategies used in program instruction. She stressed the need to teach basic games skills in conjunction with the social aspects of play, and to teach these in a manner which reflects consideration of the learning and performance characteristics of retarded children.

Two weaknesses in reporting studies of this nature were noted in reviewing the literature and have been referred to previously by Wehman (1975) and Vogel (1974).

Firstly, few of the studies gave adequate descriptions of their specific program objectives or instructional procedures to allow replication of the program. Several studies listed the categories of skills or the activities engaged in (Stephens, et al., 1970; Cannon, Moffett and Moffett, 1970; Chasey and Wyrick, 1971), others gave reference to sources for guidelines in conducting similar programs (Morrison and Pothier, 1972; Newcomer and Morrison, 1974; Morrison and

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Newcomer, 1975), while others gave examples of training programs designed for one individual subject (Bradtke, Kirkpatrick, and Rosenblatt, 1972). The constraints of space and time make it understandable that treatment descriptions be made brief, but the lack of replicable programs points to the need for the development of accessible descriptions of program goals, objectives and instructional strategies.

The second weakness observed in the literature reviewed was that the dependent measures on which program effectiveness was assessed rarely were derived directly from program objectives. In the majority of cases, a standardized test or scale was used to assess program effectiveness and no mention was made of the relationship between the measure and the instructional objectives (Stephens, et al., 1970; Chasey and Wyrick, 1970; Newcomer and Morrison, 1974; Morrison and Newcomer, 1975). In other studies the information from these tests was used to design program objectives (Lillie, 1968). Two reports did not give performance data as evidence of program effectiveness, but did give descriptive reports on changes observed in individual subjects (Kugel, 1970; Bradtke, Kirkpatrick and Rosenblatt, 1972). Three studies reflected complete congruence between objectives of the instructional program and measures of program effectiveness (Ross, 1969; Cannon, Moffett, and Moffett, 1970; Hardiman, et al., 1975).

All studies that were reviewed reported improvement in at least one area of motor function thus confirming the hypothesi

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hypothesis that instruction and practice in play and motor skills can result in increases in skill in retarded children.

Individualized Instruction

In reviewing these studies, and in examining curriculum materials designed for groups of handicapped children and adults, it becomes clear that individualized instruction is the instructional approach most often recommended. Large scale curriculum projects in self-help, social, motor and language skill learnings appear to have, without exception, adopted the model of individualizing instruction according to a child's assessed needs (Connor and Talbot, 1966; Shearer, *et al*., 1973; Johnson and Werner, 1975; Wessel, 1976; Kysela, 1976). According to Wessel (1975):

> The variability and heterogeneity that exists among mentally retarded clearly indicates the need for individualization of programing. (page 5)

She suggested that prescriptive instruction is based on the application of these processes:

1. diagnosis of each child's strengths and weaknesses based on the child's performance on hierarchical sequences of skill development,

2. prescription of instruction based on the child's needs,

3. instruction on sequential objectives accompanied by evaluation of the child's progress in learning.

The majority of the programs that were designed to increase motor skills recommended an individualized, Diagnost

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diagnostic-prescriptive approach to instruction. Two studies attempted to assess the relative effectiveness of individualized instruction, and in both cases support for this approach was clearly demonstrated. In one of these studies, a recreation program for trainable mentally retarded children was designed to include assessment of each child's functioning on two batteries of tests from which individual prescriptions were made. Results showed that the diagnostically designed program was effective in increasing performance on both batteries of tests (Cannon, Moffett and Moffett, 1970). Morrison and Pothier (1972) conducted remedial motor training programs with mentally retarded children of preschool age using three approaches: (a) social attention in activities, (b) social reinforcement of gross motor activities, (c) social reinforcement for activities prescribed from a developmental skills assessment. Individualized programs were designed and administered for those in group (c) while those in groups (a) and (b) engaged in randomly selected activities of a gross-motor play nature. The dependent measure for all three groups was the Denver Developmental Screening Test. Subjects in the individually-prescribed sensorimotor activity group made significantly greater gains in gross-motor and language development during the six month program than did subjects in the other two groups. The treatment for this group included training activities in skills that generally were expected to appear next in normal development, and presenting the component parts of these tasks from simple to mplex

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complex until the whole response was learned. The study supported the use of individually-prescribed programs of instruction in motor skill development.

Newcomer and Morrison (1974) used a play therapy approach to improve the gross motor skills of institutionalized retarded children. The Denver Developmental Screening Test was used as a pretest and posttest measure of performance. Children were assigned to individual and group therapy and received ten sessions of directive therapy, then ten of non-directive therapy, followed again by directive therapy. Directive therapy was that in which the therapist structured and conducted activities in each of the four areas of skill, while non-directive therapy was that in which the therapist structured the environment by choosing certain toys, but allowed the children to initiate the play activity.

Individual or group therapy was defined entirely by the numbers involved. No differences were found between the individual and group therapy treatments but both groups receiving therapy increased their developmental skills while a control group did not. Since 'individual' in this case referred only to one-on-one play therapy, and not individualized or diagnostic-prescriptive therapy, this study cannot be viewed as unsupportive of individualized instruction. Lack of descriptive detail about the program methods and specific differences between individual and group, directive and non-directive, make it difficult to draw implications for instruction from this study. A later study (Morrison and

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Newcomer, 1975) looked at the differential effects of directive and non-directive therapy and found no difference between the two approaches in making developmental changes as measured by the Denver Scales.

Individualization of instruction appeared to be implemented differentially in the programs reported. In one study (Stephens, et al., 1970), the twelve experimental subjects were homogeneously grouped into training groups of four children for whom activities were chosen based upon assessment. Within these groups, training strategies were individualized based on three levels of teaching: physical guidance, demonstration and verbal explanation. Scales of performance within each activity were used to assess the child's reaction to instruction. The scale was a modification of that used by Connor and Talbot (1966) which reflected a continuum ranging from no interest in the activity to completion of the activity without assistance. Training sessions included instruction in locomotor skills, balance skills (trampoline, balance board, skipping), arm-hand coordination and manual dexterity. Increases in performance on scales of motor achievement were found over a three month exploratory period.

In some studies individualization referred to selection of specific motor skills for instruction from a predetermined list of appropriate motor skill objectives based on preprogram assessment (Stephens, et al., 1970) while in others, individualization refers to the design of a complete program of instruction after assessment (Kugel, 1970;

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Bradtke, Kirkpatrick and Rosenblatt, 1972). One study reported the effects of a 'diagnostically based motor development program' but failed to report how the assessment and diagnosis were used in prescription and instruction of motor skills (Lillie, 1968). In fact, the program described more closely resembled a group-oriented, pre-planned approach. One study (Chasey and Wyrick, 1971) contained no reference at all to individualized or diagnostic-prescriptive instruction, and it was assumed therefore that this study did not attempt to use an individualized approach. It is interesting to note that the retarded children receiving this program did make gains in gross motor skills over and above a control group.

Roswell (1974) described an individualized program of play instruction for severely retarded children that was designed for and implemented in an institutional ward. Play activities and toys were graded in six-month stages from 0 to over 25 months. Children were assessed on developmental scales and prescribed one of five stages of play activities. Progress was measured by change from one set of toys to the toys in the next stage. Approximately 20 percent of the children made a gain of one stage in a one-year period. The assessment device appeared, however, to lack sensitivity to the changes in the remaining children, since the author suggested that additional progress was made within each stage of play described that was not reflected in change from one stage to the next.

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The individualized approach to skill instruction was employed in the study of the effectiveness of the I CAN curriculum for elementary school-aged trainable mentally retarded children (Vogel, 1974). Meaningful changes in running and three object control skills (catch, throw and roll) were found for sixty-five children receiving instruction from either physical education specialists or classroom teachers.

Instructional Strategies Using Operant Techniques

Operant techniques of modifying and shaping behavior have been used successfully with both normal and retarded children. These techniques have been applied to a wide range of skills with measurable success.

The use of positive reinforcement immediately following completion of a desired response has been recommended for use in increasing response frequencies (Becker, Englemann and Thomas, 1971; Kazdin and Craighead, 1973). A number of studies have applied this technique to the learning of social, self-help and motor skills. Morris and Dolker (1974) used candy and verbal praise as reinforcers of cooperative ball rolling. Reinforcement of completed responses seemed to work best in conjunction with the modelling by a more highly skilled peer and verbal prompting by the instructor. A similar study (Whitman, Mercurio and Caponigri, 1970) used primary reinforcers and praise to improve ball rolling and block-passing tasks and found, incidentally, that social interac

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interactions in other forms of play increased along with the frequency of these two target behaviors.

Two studies used reinforcement procedures to increase the appropriate use of play toys with severely and profoundly retarded youngsters (Flavell, 1973; Abbas, 1973). Both studies were concerned with increasing the number of times toys were used successfully or the total time spent in playing with toys, and decreasing or eliminating undesirable behaviors. Both studies demonstrated favorable results. Flavell concluded that toy play was incompatible with stereotypic (undesirable) behaviors and that increase of toy play would therefore result in decrease of the latter kind of behavior.

Social reinforcement was used to increase the climbing behavior of a preschool boy whose play skill repertoire was very narrow and whose free play pattern consisted largely of onlooker behavior (Johnston, et al., 1966). Reinforcement was used on successive approximations of the desired climbing behavior, beginning with approaching the climber and ending with constructive play on the climbing frame. Climbing behavior on the frame increased with reinforcement and decreased when it was withdrawn. Once acceptable frequencies of climbing-frame behavior had been achieved, reinforcement was given intermittently and climbing behavior on other pieces increased. The authors suggested that the new skill gained in climbing encouraged the boy to increase his activity in other areas of the playground.

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Smith (1972) demonstrated that young non-institutionalized retardates (age 3-10 years) could profit from operant techniques in learning motor skills. The author investigated the relative effects of tangible and social reinforcers given on continuous and intermittent schedules. She found that while both schedules and both types of reinforcers resulted in gains in number of motor responses completed, social reinforcers, used intermittently resulted in larger gains in children who were enrolled in the program. Smith suggested that young trainable retardates in different stages of training are sensitive to more efficient schedules of reinforcement that do not require continuous application of tangible rewards.

Altman and Talkington (1971) recommended the use of modelling with reinforcement procedures, and suggested that imitative behavior should be shaped by reinforcing successive attempts to imitate. Wehman (1976) reviewed the literature in self-help, play, social, language and classroom skills and said

> Generally, modelling is used in conjunction with other behavior-shaping procedures such as physical guidance and verbal cues, and augmented with positive reinforcement. Gradually, discriminative stimuli, i.e., model or physical prompt, are faded until the behavior is under control of natural environment cues. (page 41)

Johnston's study demonstrated the efficacy of this approach (1966).

Prompting has also been recommended as a method of generating responses which can then be shaped or reinforced

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(Strain, Cooke and Appollini, 1976). Once prompts have served their purpose of assisting in the initiation of a modified behavior, they must be systematically faded (Kazdin and Craighead, 1973).

Paloutzian (et al., 1971) used verbal cues, simultaneously with a demonstration, and followed immediately by physical prompting to establish motor behaviors in severely retarded children. Physical prompts were faded so that response was made to the verbal cue and demonstration. He found these procedures facilitated learning of social interaction in motor skills.

All of these operant methods have been recommended for teaching motor skills (Becker, Engelmann and Thomas, 1971; Bricker, 1970; Parker, 1972). Parker recommended that backward chaining be used in teaching sequences of motor skills. He used ball catching as an example of a behavior that could be shaped using operant techniques. Buell, et al., (1968) applied some of these techniques to one subject who demonstrated a deficit in motor and social skills. She was concerned with the child's behavior on outdoor play equipment. During a baseline stage the pre-school girl showed a very low rate of use of the equipment. Approximately 2 percent of her play time was spent in interaction with the equipment. The teachers prompted the child verbally and physically to get on the equipment, and then reinforced her as long as she stayed on it. This was followed by reinforcement without prompts. The authors found that the frequency of spontaneous

use of outdoor play equipment increased to approximately 70 percent of the child's free time with reinforcement. Moreover, concommitant increases were observed in verbalizations to other children and in incidents of cooperative play, while undesirable behaviors decreased in frequency.

Operant techniques have been shown to be effective in teaching tricycle riding to retardates. One report recommended using behavior shaping techniques to teach severely retarded children to sit on the trike, to put each foot on the pedal, and finally to press on the pedal. Primary reinforcers were used initially, followed by social reinforcement. Eventually the tricycling behavior itself was found to be reinforcing (Bensberg, Colwell, and Cassel, 1965). The authors recommended the use of these techniques in teaching self-help skills as well.

Tricycle riding was the focus of another study that attempted to improve this skill in young retarded children, aged three to eight years (Peterson and McIntosh, 1973). The investigators used an automated stationary tricycle that dispensed sweetened cereal in fixed ratios of pedalling, and at fixed intervals. Shaping techniques were used to teach the children to approach and mount the tricycle and to actually pedal the tricycle in the stationary position. All of the subjects learned to ride the tricycle and transferred this learning to riding tricycles in other settings.

Hardiman (*et al.*, 1975) investigated the effects of operant techniques on the motor skill behavior of a four

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four-year-old handicapped child in six activities: stepping through a horizontal ladder, ascending and descending small steps, sliding down a board, rolling, climbing and walking a balance board. Four response levels were defined that applied to all six activities: (1) being close to the equipment, (2) touching the equipment, (3) unskilled performance, and (4) skilled performance. Responses at each of these levels were behaviorally defined for the six activities. After a baseline period, skill training was implemented using primes, contingent attention, physical assistance and forced practice. Each day after training observations were made on the child under one of several conditions: primes, contingent attention, primes plus contingent attention or general attention. The authors found that during the baseline phase unskilled participation was generally increased with primes and contingent attention, but skilled performance was not. Skilled participation during free play was increased with an average of six training sessions per activity, and was maintained after the training period under conditions of teacher primes and primes with contingent attention. The authors concluded that social reinforcement techniques were not sufficient to bring about changes in skill in activity, though they did result in increases in frequency of activity. Primes were found to be superior to contingent attention in increasing the frequency of activity, and training in several activities resulted in increased skill in related activities.

The response levels defined were found to be adequate for recording the child's performance in all activities.

Hardiman's study provides support for the application of operant techniques along with specific skill training in the systematic instruction of play skills with handicapped children. The study, furthermore, offers evidence of the benefits of applying these principles within an individualized program of instruction.

Curricula for Instruction of Motor Skills

After reviewing the literature concerning play development in retarded children, Wehman (1975) concluded that there was a need for the development of replicable program materials that could assist teachers and parents in dealing with this aspect of the retarded child's development:

> A need exists to establish a play skill curriculum for mentally retarded children. A broad range of play skills arranged horizontally in conjunction with a logically sequenced ability hierarchy is needed for programming direction for the student. (page 244)

Several large-scale curriculum projects have directed themselves towards the development of instructional materials for individualized instruction in skills for young mentally retarded children. A number of these have focused on the learning of language, self-help and personal-social skills with only a cursory treatment of motor skill learnings.

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construction of instructional objectives to knowledge about normal sequences of development in language, social, and motor skills. Bricker and Bricker (1972) and Connor and Talbot (1966) have chosen skills for the motor development section of their curricula that are typical of normal children of the same or younger ages. Johnson and Werner (1975) have identified sequential tasks leading to walking, stair climbing and grasping that reflect consideration of the schedules of normal sequential development found in infants. Other curricula have been designed with consideration of the developmental stages in motor skill learnings identified by Wickstrom (1970) and Seefeldt (1971).

The specific instructional objectives chosen vary from curriculum to curriculum depending on the target population for whom the materials were designed and the scope of the content to be included. These objectives are stated behaviorally and sequenced using a task analytic procedure. Instructional objectives are directly related to the assessment tools provided so that an individualized, diagnostic-prescriptive model can be applied. In several curricula instructional strategies are tied directly to each instructional objective. The strategies that are recommended range from general perscriptions for activities, games, or equipment arrangement to precise verbal cues, modelling and prompting procedures.

Two programs for young moderately to severely retarded children recommend the use of reinforcement and other operant techniques to assist children in attaining sequential nstruct

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instructional objectives (Bricker and Bricker, 1972; Schearer, et al., 1973). Both programs recommend that teachers keep accurate data on student performance for the purpose of evaluation of instruction. Unfortunately, these curricula focus most heavily on self-help, language and cognitive skills and therefore only a very narrow range of motor skill objectives is included.

Two programs have been developed in Canada that are designed to improve the skills of very young Down's Syndrome children (Kysela, 1976) and severely and profoundly retarded children (Martin, et al., 1975). Both programs focus on self-help, cognitive or fine-motor manipulative skills that have motor components. Similar scales of teacher intervention employing physical guidance, physical prompts, and verbal prompts are used for assessment and instruction in specific skills. Reinforcement schedules, and shaping and fading techniques are employed to help the child reach target behaviors. Recording and graphing procedures are described as well as guidelines for modifying the instructional strategies applied.

Connor and Talbot (1966) designed a fairly extensive curriculum for trainable children. The instructional materials included behavioral descriptions of five levels of performance in self-help, motor, language and personal-social skills. Many of the motor skills described were appropriate for play (tricycling, sliding, jumping, running, wagon). While the sequencing of these skills appeared to be logical and reasonable, the teaching strategies were lacking in detail a

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detail and in range and were not applied in a systematic manner. Operant techniques were not recommended. The authors did provide techniques for recording student progress through the program.

A curriculum for the moderately retarded was designed to improve the gross and fine motor skills, social behavior, perception, self-care and language skills of infants from zero to two years of age (Johnson and Werner, 1975). The motor skills included standing, walking, reaching and grasping and selected manipulative skills. Tasks were sequenced in order of difficulty and the authors recommended using rewards, behavior shaping, manual guidance, and imitative techniques to bring about appropriate skill learnings. They suggested too that daily records be kept of the child's performance on selected skills for evaluating the child's progress.

The most extensive set of program materials for teaching motor skills to the retarded was developed at Michigan State University under the direction of Dr. Janet Wessel (1975, 1976). The focus of the project materials is on teaching moderately retarded children the skills of body perception, locomotion, object control, fitness and aquatics. The instructional objectives are sequentially and hierarchically arranged and based on developmental changes seen in normal children. Specific instructional strategies, involving application of operant techniques, are written for each instructional objective. Game activities have been suggested for

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for the practice and application of the motor skills that have been learned. Materials, equipment and class organization are specified for each game activity. A teacher's manual has been developed and evaluated with both physical education specialists and classroom teachers.

The developers of the I CAN curriculum have demonstrated empirical evidence of the effectiveness of their program in helping retarded youngsters between the ages of six and twelve achieve the motor skill objectives. Dependent measures of program effectiveness have included teacher feedback (Wessel, 1975) as well as student performance data on skill learnings (Vogel, 1974; Wessel, 1975) and as such have been directly related to achievement of program objectives. The program has been implemented and effectively used with a wide range of handicapping conditions. The I CAN curriculum is characterized by:

1. diagnostic and prescriptive instruction of specific motor skills based on assessment of student needs,

2. continuous recording of student status for evaluation of instructional effectiveness and for accountability,

3. associated cognitive and affective learnings,

4. the use of manipulation, prompts, imitation, and verbal cues to facilitate learning,

5. the use of games and group activities for skill practice (Vogel, 1974; Wessel, 1975; Knowles, Vogel and Wessel, 1975).

The PREP Preschool Play Program (Watkinson, *et al.*,

1976) is an extension of the I CAN program in that it focuses on the development of motor play skills for younger retarded children. It is composed of developmentally-based sequential learning objectives in a broad range of play activities. The teaching procedures are very explicitly described for each task and based on techniques that have been demonstrated as effective in other programs or studies. Furthermore, it is an individualized program that requires a comprehenisve assessment of each child's play skills before instruction begins. The validity of its skill sequences has been tested in the formative stages and empirical evidence of its effectiveness in changing play behavior is currently being sought.

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CHAPTER III

METHODS AND PROCEDURES

Design

There are usually two intended outcomes of an instructional program (Taylor and Maguire, 1972). One is the achievement of target behaviors in the educational context and the other is generalized application of this behavior at appropriate times in the life setting. The goal of the PREP program was stated as 'learning to play' and this referred to application of learned skills in a free play setting. As a result, the teachers were concerned primarily with changes in the children's free play behavior, or the degree to which newly acquired skills were applied in free play. At the same time, it was recognized that all of the skill learnings would not be reflected in changes in free play since many skills could not be adequately overlearned during the instructional program. For this reason, an attempt was made to look at individual skill learnings in selected skills to determine the effects of instruction on specified target behaviors. Achievement of these skills was defined by performance within the educational context of individual instruction.

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In order to investigate both of these aspects of the effects of the treatment two study designs were required. The first design was chosen to answer the question of whether or not the instructional program resulted in changes in free play patterns. The one-group pretest-posttest design (Campbell and Stanley, 1963) was chosen as suitable for answering this question. Videotaped assessments of the children's free play patterns before and after the eight month program were used as the source of data.

The question of whether or not the children made progress through the skill sequences during individualized instruction was answered using the single subject design (Bijou et al., 1969; Birnbrauer, Peterson and Solnick, 1974). Assessment of status and progress on the sequential instructional objectives was done and recorded daily by the teachers in the process of individualized instruction. These data were used to study the effects of the program in changing the children's behavior during instructional time.

Population and Sample

Population

The focus of the study was on the population of moderately to severely retarded children often classified as trainable because of their ability to profit from educational programs. The study limited its concern to the young child who is entering school. In the normal populat

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population this would refer to the child of four or five years of age. However, in the retarded population, this age limit would extend to seven or eight years because these children are late to enter formal schooling due to late identification or extended home care. In Alberta, children in this age range would enter programs that are designated as 'preschool', 'early childhood' or 'sense training' and the focus of these programs would be to prepare the children for the elementary curriculum by teaching them prerequisite skills in self-help, language, social and motor development.

Sample

The sample was made up of twenty-one children who attended the early education classes at the Winnifred Stewart School for Retarded Children in Edmonton, Alberta. Retardation was established prior to the study by family physicians and psychologists. Each subject met the following criteria for entrance to the school:

1. The child was medically diagnosed as retarded without severe secondary handicaps.
2. The child demonstrated some skill in self-feeding.
3. The child demonstrated skill in walking.
4. The child was toilet-trained, or demonstrated readiness to profit from toilet-training.

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School attended the PREP Preschool Play Program on the University of Alberta campus three mornings per week throughout the school year. The criterion for inclusion in the study was attendance in the program from September 1975 to June 1976 without major absences. Of the twenty-six children who attended the program during the school year, only twenty-one met this criterion. Two females and two males entered the program after October, 1975 and therefore were not included in the study. One child who began the program in September left Winnifred Stewart School in January 1976 to attend a school for the dependent handicapped and was therefore excluded from the study also.

The sample consisted of seventeen males and four females between the ages of four years, two months and eight years, seven months at the start of the study. The mean age of the group was five years, eight months. Of the seventeen males, ten were diagnosed as having Down's Syndrome while three of the four females were similarly diagnosed. Five children were diagnosed as brain-damaged while the remaining children were reported as being retarded due to unknown causes.

All of the children lived in homes with natural or foster parents. Twelve of the children had attended Winnifred Stewart School for at least six months prior to the study, and had attended the PREP program for a four-month period in the school year preceding the start of the study.

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The competencies required for entrance to school are typical of those demonstrated in young retardates entering educational institutions throughout Canada. The variability of etiology, the frequency of representation of males and females, as well as the range of skill displayed in self-help, language and motor development make the sample typical of the population of trainable mentally retarded children in this age range.

Treatment

The children participated in the PREP Preschool Play Program on the University of Alberta campus three mornings a week from October 1975 until June, 1976 with the exception of a three week Christmas break, a one-week Easter vacation, and other holidays. In total, the program operated for eighty-four instructional days during this time.

The program was loosely structured around the following time schedule:

9:25	Children arrive
9:30 - 10:15	Free play and individualized instruction
10:15 - 10:30	Group play and instruction, juice break
10:30 - 11:15	Free play and individualized instruction
11:20	Children return to school

The children were accompanied by two classroom teachers who were not involved in the instructional program, but di

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but did supervise the toiletting and juice break. Five PREP staff were involved in instruction, including one undergraduate physical education student, two graduate physical education students and two physical educators. All teachers received training in the use of the program model and the instructional materials prior to the beginning of the program. Training consisted of instruction in all facets of the program using films, videotapes and other audio-visual aids. Three of the teachers had had several months of experience in the program during the year preceding the study.

During the initial week of the program the children were given freedom to play in the play room in order to give them time to feel comfortable before assessment began. This gave the teachers time also to learn the children's names and develop a rapport with them that would make assessment and instruction possible. The room contained slides, ladders, mats, trampoline, climbing apparatus, boxes, benches and small equipment that were rearranged at least on a weekly basis.

The next two weeks were spent gathering baseline assessment data on each child by means of videotape and individual student assessment by the teachers. For this period of time each teacher was assigned to four or five children for assessment. After the baseline period children were reassigned based on teacher preference.

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instruction on prescribed play skills. The prescription was based on a comprehensive assessment of play skills made by the assigned teacher. Teachers followed the method of assessment, the criteria for prescription, the instructional strategies and the guidelines for evaluation of progress that were specified in the PREP teacher's guide (Watkinson *et al.*, 1976).

The Program Model

The program model uniquely combined freedom and choice in play with skill instruction. The children were free to play at whatever level of sophistication they were capable of, to be interrupted only at well-chosen moments by the teacher who interjected assessment or instruction in prescribed activities at this time. Typically, then, a child spent a large percentage of his time in free play and at intervals throughout this time he received brief periods of instruction on prescribed skills. Those children who showed less sophistication in their play skills received more assistance and instruction while those who used their free time constructively spent more time in free play alone, or with other children. It was assumed that those children who were engaged in active, sophisticated play were making gains in their play skills through self-initiated practice. Those children on the other hand, whose play was characterized by inactivity and little interaction with objects were unlikely to be making the games they could with teacher

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teacher intervention. The program model then did not attempt to reduce the variability of the group by differential instruction to the skilled and unskilled, but rather recognized that gains could be made in free play time, provided that children were somewhat self-initiated. The range of student outcomes was not expected to be restricted through this approach.

The program content was organized sequentially by Task sequences and hierarchically by skill categories and Terminal Performance Objectives. The organization and content of the skills are presented diagrammatically in Figure 1 with the goal of 'Play' at the apex of the hierarchy. Specific skills were grouped by skill category: body awareness, body control, locomotion, object control and specific equipment. Each skill identified within the skill categories had been written as a Terminal Performance Objective (TPO) with a Task Sequence containing enabling skills that lead to acquisition of the TPO. Specific instructional strategies (Shaping Techniques) were included for each task in the Task Sequence. Examples of these materials can be found in Appendix C.

The instructional model was that of individualized instruction as described by Wessel (1975). This model is characterized by five processes:

1. Assessment of each child's play skill repertoire.

2. Prescription of instruction based on needs identified through assessment.

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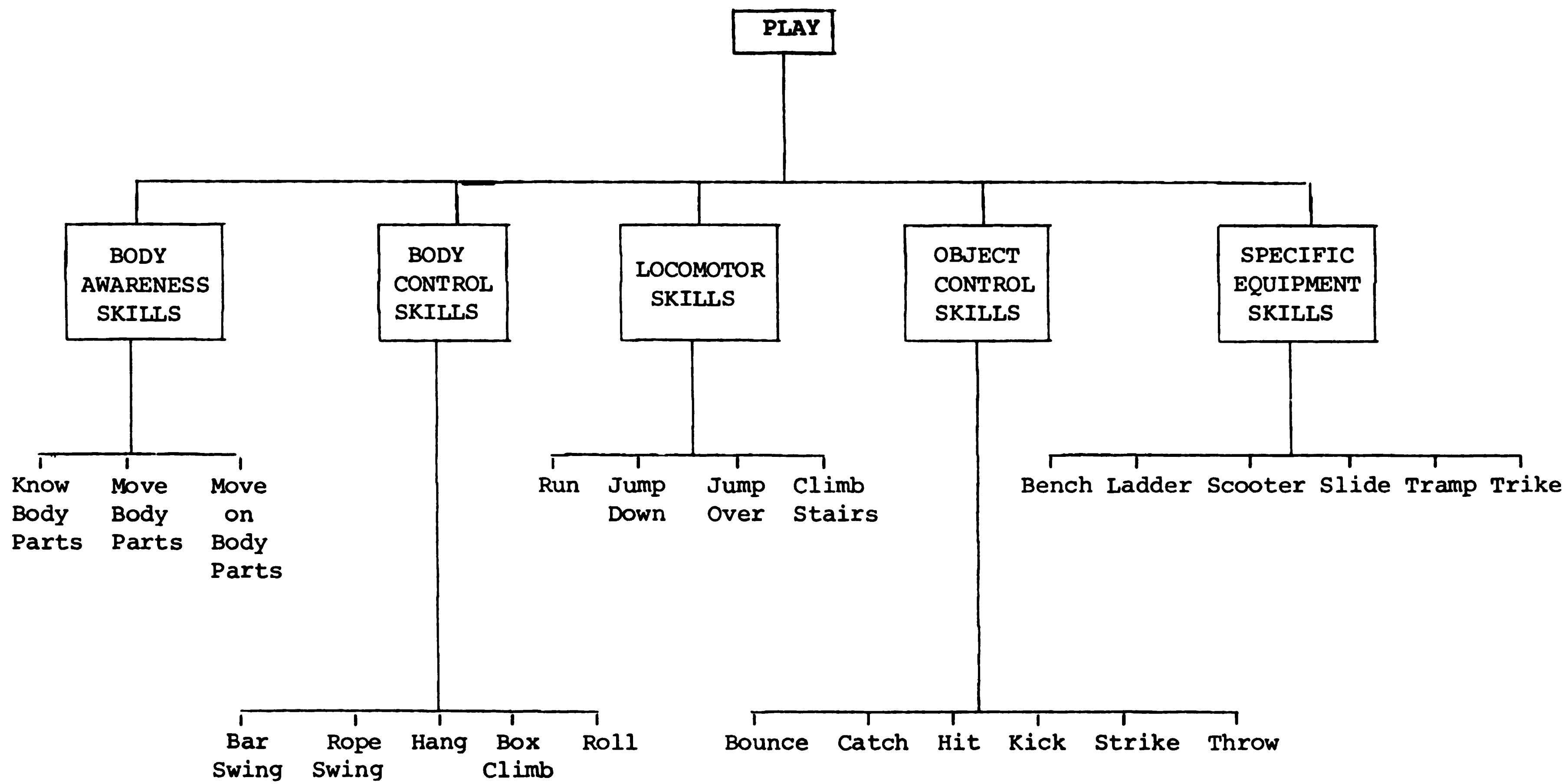

Figure 1: Hierarchy of Play Skills

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3. Instruction on prescribed skills using strategies that are suitable for each child.

4. Evaluation of individual student progress.

5. Modification of the original prescription based on evaluation of the effectiveness of instruction.

Assessment

Teachers assessed the children using the PREP Individual Student Profile (Appendix B). This profile specifies Terminal Performance Objectives (TPO), a Task Sequence leading to attainment of each TPO and five levels of student response on each task.

The first four levels of response required some intervention by the teacher, while the fifth level of response (Initiation) was recorded if the child demonstrated the skill voluntarily during free play.

Teachers spent a minimum of ten minutes of every morning in direct observation of the children in free play during the first three weeks of the program. During this time initiation of TPO's and tasks within a Task Sequence were recorded on the Individual Student Profile. Following the observation period teachers continued with direct assessment on the TPO's using the remaining response levels and following the guidelines of the manual (Watkinson *et al.*, 1976).

The children were initially assessed on fourteen play skill sequences in the Profile that had previously undergone format

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formative evaluation to determine validity of the sequence, applicability to this population and feasibility as instructional objectives (Watkinson, 1975). As skills were identified for development and evaluation within the instructional program they were added to the Student Profile and the children were assessed on them.

Prescription

Once a comprehensive assessment of the child's skills had been completed the teacher prescribed two or three skills for individual instruction. TPO's were chosen for instruction based on priorities outlined in the teacher's manual. Instruction within a TPO was prescribed for the task that followed the one the child was capable of doing with a verbal cue or demonstration.

Instruction

Teachers attempted to spend a minimum of five minutes of instruction per day on each prescribed skill, using the strategies outlined on the TPO sheets. The Shaping Techniques described on those sheets follow the continuum outlined in the Learner Response categories. Teachers began by using complete manipulation of the child's body to perform the response, then reduced this to physical prompting and finally to demonstration and verbal cue. Shaping and fading techniques were used as described in the PREP manual (Watkinson, *et al.*, 1976). TPO sheets for the skills of tricycling, jumping down, running, and bar swinging can be found in Appendix C.

Evaluation

Teachers kept daily records of student behavior on the Daily Record Form in Appendix D. The TPO and the task in which instruction took place were recorded along with the child's response level (M, MP, D, VC, I) and an estimation of the time spent in instruction.

Teachers used the information from the Daily Record Form to:

1. know where instruction should begin each day, and
2. be sure each child was getting sufficient instructional time on each prescribed skill.

At the end of every month this information was transferred on to graphs so that an ongoing record of a child's behavior in each prescribed skill was kept.

Teachers used the information from the graphs to:

1. determine overall progress of the child on each prescribed skill,
2. determine when to terminate instruction because of insufficient progress or achievement of the TPO, and
3. make decisions regarding instructional strategies that had been implemented over each two week period.

Decisions were made based on guidelines from the teacher's manual.

Free Play and Group Instruction

The remainder of the treatment consisted of free play time in the play room, and fifteen minutes of group instruction as described in the PREP manual. Group instruction focused on skill practice with some emphasis also on group skills such as listening, taking turns and sharing teacher attention.

One Group Design

Rationale

The one-group pretest-posttest design was chosen as suitable for answering the question regarding changes in free play patterns of the children since the study took place in a natural setting in which the controls characteristic of more sophisticated designs were not feasible. Campbell and Stanley (1963) described this design as 'pre-experimental' because it lacks the control required to eliminate possible rival hypotheses such as those of history and maturation. Since the present study was undertaken in the midst of formative evaluation of newly-designed program materials, this design was seen as the most appropriate. More sophisticated experimental designs to overcome the weaknesses related to internal and external validity would hopefully follow the present study once further aspects of the treatment have been thoroughly evaluated.

Specific Design

This part of the study was specifically designed to look at the effects of an individualized program of instruction in play skills on the play patterns demonstrated during free time.

Videotaped samples of free play behavior were taken of each child prior to and following the eight-month program. Tapes were subjected to analysis to determine the amount of time typically spent in five categories of play or non-play. Differences between pretest and posttest group means of time spent in each category of play were determined.

Internal and External Validity

Campbell and Stanley (1963) list maturation, history, testing, reactivity, instrumentation, statistical regression and the interaction of these variables with selection as possible sources of error limiting the internal and external validity in the one-group pretest-posttest design. Testing and reactivity are least likely to confound the treatment effect when videotapes are used rather than observers, and especially when the subjects are allowed a period of habituation to the presence of the videotape such as they were in this study (Johnson and Bolstad, 1973). The lack of the subjects' awareness of the purpose of a videotape recorder makes reactivity particularly unlikely in the present study.

The children entered the program in September 1975 at which time the pretesting was begun. The program ended eight months later with posttesting. Certainly this is a period of time during which maturation may affect the motor skills of young children. Examination of individual subject's skill in the posttest however, focusing on the relationship between the changes observed in play, the specific activities receiving instruction and the changes in those not receiving instruction was undertaken in an attempt to determine the likelihood of maturation being solely responsible for the changes observed. It is highly unlikely that maturation would have effects on individual subjects that coincided with the effects that were the focus of instruction. While history also can be viewed as a rival hypothesis to treatment, it is again unlikely that similar histories would produce differential effects on the subjects congruent with changes expected from results of specific instruction. An attempt was made to examine the results of the group design in light of changes in subjects with different program histories to determine whether or not history offered a strong alternative hypothesis to treatment.

The single group study is also subject to influence from changes in instrumentation especially where human observers are used and are subject to fatigue or to expectations of changes in the pre and post measures (Campbell and Stanley, 1963). In the present study, the assessment of videotaped films was carried out by three members of the project staff. The staff were familiar with all aspects of the program including the purpose of the play assessments. An attempt was made to minimize the effects of instrumentation by randomizing the order in which the samples were assessed. However, it could not be assumed that the staff were unaware of which samples were pretest samples and which posttest since changes in the children may have communicated this information. As a result, a naive observer was trained to read the tapes and subsequently assessed random samples of pretest and posttest data. Percent agreement between the naive observer and the project staff were calculated on pretest and posttest samples. These are reported in Table 2.

The interaction of selection factors and the independent variable is a possible source of external invalidity in the one-group pretest-posttest design. The sample used in this study was an intact group rather than a random selection of preschool trainable retarded children. Furthermore, a number of the subjects in the group had attended the program for some months prior to the beginning of the study. While the nature of this particular sample may have had an influence on the effectiveness of the treatment, it is likely that the effect would be a conservative one since the gains made in the previous year of the program would be reflected in the pretest.

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Instrumentation

The dependent variable in the group study was the quantity of time spent in five categories of behavior during free play time. The five categories of play and non-play were behaviorally defined and were based on an ethological study of retardates' play behavior completed in the previous year of the program (Noble, 1975). The categories were ordered classifications of behavior that reflected developmental changes in motor skill.

The five categories of play were defined as follows. Examples of skills to be included in each category accompanied the definitions of play behavior. Further examples can be found in Figure 2.

Category 1: Non-Play

Definition: The child maintains a static posture or changes posture without locomotion or interaction with objects.

Category 2: Prerequisite Skills

Definition: The child demonstrates simple movement skills such as those usually acquired by eighteen months of age.

Body Awareness: examining body parts, being in a special place.

Body Control: sliding on seat on floor

Locomotion: crawling, walking, shuffling

Category 2 Category 3 Category 4 Category 5

	Category 1 NON-PLAY	Category 2 PREREQUISITE SKILLS	Category 3 PRIMARY SKILLS	Category 4 ELEMENTARY SKILLS	Category 5 ADVANCED SKILLS
BODY AWARENESS		-examining body parts -being in a special place	-removing shoes	-hiding	
BODY CONTROL	-sitting -lying -standing	-sliding on seat on floor	-continuous rolling -getting onto a box -sliding down wide slide	-hanging -swinging -walking a beam -sliding down long slide	-swinging on a rope -inverted balance -inverted hang
LOCOMOTION	None	-crawling -walking -shuffling	-fast walking -stepping up or down	-running -leaping -jumping -climbing	-run, jump and roll
OBJECT CONTROL	No objects	-holding -carrying -dropping -swinging	-putting in -taking out -hurling -pulling -pushing -chasing a rolling ball	-throwing -catching -kicking -tricycling -riding a scooter	-kicking or throwing to target or partner -ball bouncing -rope jumping

Figure 2. **Examples of Movement Skills Found in Each of Five Categories of Play**

Object Control: holding, carrying, dropping, swinging.

Category 3: Primary Skills

Definition: The child demonstrates immature execution of the fundamental skills of body awareness, body control, locomotion, and object control.

Body Awareness: dressing and undressing

Body Control: continuous rolling, getting up onto a box

Locomotion: fast walking, stepping up or down

Object Control: putting in and taking out, hurling, pushing, pulling, chasing.

Category 4: Elementary Play Skills

Definition: The child demonstrates mature skill patterns in executing skills of body awareness, body control, locomotion, and object control.

Body Awareness: hiding

Body Control: hanging, swinging, walking a beam

Locomotion: running, leaping, jumping, climbing

Object Control: throwing, catching, striking, kicking, tricycling, scooterboarding.

Category 5: Advanced Play Skills

Definition: The child demonstrates competence in integrating or combining fundamental skills of locomotion, body

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body control, or object control in interaction with children or special play equipment.

Body Control: rope swing, inverted balances or suspension

Locomotion: run, jump and roll

Object Control: kicking at a goal, throwing at a target, jumping rope, ball bouncing.

The instrument was judged as having face validity since the categories of play were behaviorally defined in observable terms and were derived from the behavioral outcomes specified for the program. The categories were ordinal in nature since they represented a hierarchical and sequential arrangement of motor skills based on the developmental changes observed in young children (Gesell and Armatruda, 1947; Wickstrom, 1970). The skills described in the lower categories of the behavior code precede in time of appearance and degree of difficulty the more sophisticated play skills of the latter categories. Scalogram analyses of specific skill sequences encompassed by these categories revealed that subjects who can perform higher level skills can perform those in the lower categories, while subjects who perform lower level skills are not necessarily proficient in high level ones. These analyses were completed in pilot testing in the first year of the program (Watkinson, 1975).

Interobserver accuracy of the three observers were determined using fifteen randomly selected samples of the

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pretest data. Observer accuracy was determined by identifying the number of agreements and disagreements between observers. The data were analyzed second by second on the 1500 seconds to determine agreement and disagreement in categorizing specific events. The number of observer agreements was divided by the sum of agreements and disagreements and multiplied by 100 percent to calculate the percentage agreement (Johnson and Bolstad, 1973). Table 1 contains the frequency of disagreements found and the percentage agreement obtained between pairs of the three observers. Chance agreement between observers was calculated to be 31 percent. Johnson and Bolstad (1973) suggested that the percentage agreement should be significantly larger than that found by chance alone, but that 80 - 85 percent agreement was a realistic upper limit for observation codes that contained complex categories. On the basis of this, the observed percentage agreements were seen as being indicative of a high degree of observer agreement in the instrument.

A trained naive observer who was unfamiliar with the subjects and the program assessed ten samples of randomly chosen pretest and posttest data. Interobserver accuracy between these readings and the observer readings was calculated using the same method. Percent agreement was found to be 88.9 percent on the pretest samples and 86.7 percent on the posttest samples. The similarity of

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TABLE 1

INTEROBSERVER AGREEMENT ON 1500 SECONDS OF PRETEST DATA

	Observers 1 and 2	Observers 1 and 3	Observers 2 and 3
Frequency of Disagreements	206	208	185
Percentage of Agreement	86.26%	86.13%	87.66%

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these percentages indicates that there was not a systematic shift in the posttest readings of the PREP staff. (Table 2).

Procedures for Data Collection

Children were videotaped during free play time in the second and third week of the program and again at the end of the program. Eight samples of one hundred seconds of play were taken. Noble (1975) found in a similar study that eight samples were sufficient to get a representative sample of the child's behavior. His data revealed that continued sampling after 800 seconds did not change the percentages of time spent in the categories of play defined. Subjects were videotaped in random order each day and no more than two samples of any child were taken on one day. After taping, a 100-second count was dubbed onto the tape.

Two observers were trained by the investigator on pilot samples taken during the first week of the program. Agreement was established between each observer and the investigator on fifteen randomly chosen samples of pretest data before analysis of the remaining tapes was completed. The two observers and the investigator then assessed pre-test and posttest tapes in random order.

The procedures for analysis were as follows:

1. The observer watched the taped sample of free play behavior at least once before beginning assessment.

2. With repeated viewings the observer identified the action units engaged in by the child throughout the

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TABLE 2

INTEROBSERVER AGREEMENT BETWEEN NAIVE OBSERVER AND PREP STAFF ON 1000 SECONDS OF PRETEST AND POSTTEST DATA

	Pretest	Posttest
Frequency of Disagreements	116	133
Percentage of Agreement	88.4%	86.7%

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sample. An action unit was defined as a specific behavior initiated by the child and engaged in without shifts of attention. The action units were written in order of appearance on the tape. Posture changes were included with the behavior that followed if the change was made to accomplish that behavior. Behaviors that were repeated without a shift of attention were recorded as one action unit.

3. The observer determined the time of the beginning and ending of each action unit and recorded these times. This required repeated viewings of the tape.

4. The length of each action unit was determined by adding the seconds between and including the start and the stop of the behavior.

5. Each action units was rated according to the categories of play described in the Play Assessment. A number of 1 to 5 corresponding to the Play Level observed was recorded for each action unit.

When all tapes had been analyzed using this procedure, the number of seconds spent in each category of play was summed over the eight pretest samples and recorded for each subject. This was repeated with the posttest samples.

Treatment of the Data

Percentage of time spent in each category of play or non-play was calculated for each subject and the group in the pretest and the posttest.

The number of action units engaged in by each

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subject over the eight pretest samples and the eight posttest samples was determined. Group pre and post means were calculated and a t-test was used for testing the significance of the difference between means of dependent samples (Glass and Stanley, 1970).

The number of seconds spent in each category of play and non-play on the pretest and posttest was calculated for each subject and the group. In testing for the significance of the difference between the centroids of a sample in a test-retest multivariate design, Tatsuoka (1971) recommends using the difference score as the dependent measure. Consequently, the difference scores for each individual in the five categories of play were determined. Only the scores from the first four categories were used in determining the significance of the difference scores since the fifth score was a linear combination of the other four. The Hotelling T^2 technique (Tatsuoka, 1971) was used to determine the significance of the difference scores from pretest to posttest of the sample in the first four categories of behavior. This technique is used to test the significance of the difference between the centroid of a multivariate normal population and a known population centroid.

Single Subject Design

Rationale

The use of the single subject design has been strongly recommended in cases of applied research (Birnbrauer,

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Peterson and Solnick, 1974) especially in observational studies with children (Bijou *et al.*, 1969). Birnbrauer suggested that single subject studies meet the following criteria to be distinguished from case histories:

1. reliable data must be gathered
2. the recording of data must be done repeatedly
3. methods must be described sufficiently to permit replication
4. effects of the treatment must be found in repeated analyses.

The purpose of the present study was to determine the effects of an individualized program of play skill instruction. Since a wide range of skills was chosen for instruction and very few children had exactly the same prescription, the single-subject design was seen as most appropriate to look at individual changes in skill performance in behaviors that were well defined in criterion-referenced terms and checked for reliability in a previous phase of the program. The third criterion was met in the detailed description of the treatments found in the PREP instructional materials (Watkinson *et al.*, 1976). An attempt was made to meet the fourth criterion by analyzing individual progress in skills in which more than two children received instruction.

The type of single-subject design used was the Simple Time Series (Birnbrauer, Peterson and Solnick, 1974; Campbell and Stanley, 1963). In this design behavior is assesse

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assessed prior to and during a well-monitored treatment, and changes in the behavior of an individual are subjected to descriptive analysis. Studies based on this type of design are frequently used to gather initial data relative to program effectiveness that can be used to generate hypotheses for experimental testing at a later date.

Specific Design

The purpose of the PREP program was to provide individualized instruction in play skills for twenty-one retarded children based on an assessment of skill at the beginning of the program. The assessment was completed on fourteen play skills, each one written as a Terminal Performance Objective with a Task Sequence of enabling skills. Assessment of individual children was accomplished during the two week baseline period at the beginning of the program using the procedures outlined in the PREP Manual (Watkinson, 1976). Baseline data for the group study was also collected at this time. Assessments were completed on twelve additional Terminal Performance Objectives during the course of the program.

Following the assessment, two or three skills were prescribed for instruction for each child based on guidelines in the teacher's manual. Because of the heterogeneity of the skill repertoires in the sample, a wide range of skills were prescribed for instruction. By the end of

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the program twenty of the possible twenty-six skills in the assessment were prescribed for at least one child for a period of time.

The present study however, attempted to limit its analysis to selected Terminal Performance Objectives. Those Terminal Performance Objectives that satisfied the following criteria were identified as potential ones for analysis:

1. Terminal Performance Objectives that had previously undergone formative evaluation

2. Terminal Performance Objectives that were judged as having high priority for further evaluation because of their importance in the play repertoire of children

3. Terminal Performance Objectives that were prescribed for more than one child for a period of at least six weeks

4. Terminal Performance Objectives that were seen as being representative of ontogenetic and phylogenetic skills of childhood.

The following Terminal Performance Objectives met these criteria and were selected for analysis in this study: tricycle riding, running, jumping down and bar swinging.

Internal and External Validity

Campbell and Stanley (1963) showed that history, maturation and instrumentation are factors that might be confounded with treatment in producing changes in a single subjec

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subject study. As a result, this design was seen as weak in factors relating to internal validity. However, since the purpose of this part of the study was to monitor changes in behavior that occurred during instruction, this was viewed as the best possible design. The small size of the sample, and the lack of representativeness in its choice also jeopardizes the generalizability of the study. Birnbrauer, Peterson and Solnick (1974) suggested that further replications of single subject studies in different field settings demonstrating the same results are required to strengthen the external validity of this type of study.

Instrumentation

Performance on selected play skills was measured on the PREP Individual Student Profile (Appendix B). This profile is a criterion-referenced measurement device that can be used to assess a child's performance on the Task Sequences of twenty-six Terminal Performance Objectives.

Each Terminal Performance Objective represents a play skill that is seen as highly desirable in the skill repertoire of young children. One to seven tasks leading up to the TPO are included in the Profile to increase the specificity of the assessment. The last task in the sequence is the TPO. The Profile also contains a method for the assessment of the child's level of response within each of these tasks. Performance is recorded as being initated (I), or as meeting the criterion task with the assistance of the teache

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teacher's verbal cue (VC), demonstration (D), manipulative prompt (MP), or complete manipulation (M). Specific descriptions of the behavior required to meet each task in the sequence and the response level within each task are found in the instructional materials of the PREP program (Watkinson *et al.*, 1976). These materials are organized alphabetically by content area (body awareness, body control, locomotion, object control and specific equipment skills) and by Terminal Performance Objective.

The instrument is designed to be used by the teacher unobstrusively in the midst of instruction. Assessment, therefore, was repeated with each instructional situation. Assessments made after the baseline period were recorded onto Daily Record Sheets (Appendix D) by the teacher and later transferred onto graphs.

Treatment of the Data

Assessment data gathered prior to and during instruction were translated into graphic representations to display the child's best performance on a specific task sequence during each week of instruction. Discrete learning curves (Bijou *et al.*, 1969) were thus generated for each subject on each prescribed skill.

These curves were examined with consideration of the following:

1. the change in performance from the beginning of instruction to its termination

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2. the length of time required to attain the TPO

3. the shape of the learning curves

4. the variability in performance and learning of those children for whom the skill was prescribed

5. the appropriateness of the tasks and the response levels for assessment and instruction.

Hypotheses

The purpose of the study was to investigate the effects of the PREP Preschool Play Program on the play skills and free play patterns of moderately mentally retarded children. The application of the one-group pretest - posttest design (Campbell and Stanley, 1963) and the single subject simple time series design (Campbell and Stanley, 1963; Bijou *et al.*, 1969) was used in testing the following hypotheses:

1. The children will exhibit a decrease from pretest to posttest in the percentage of time spent in non-play during free play.

2. The children will demonstrate an increase from pretest to posttest in the percentage of time spent in elementary and advanced play skills during free play.

3. The children will exhibit a decrease from pretest to posttest in the average number of action units engaged in during free play.

4. At least 60 percent of the children will demonstrate improvement in the prescribed skills of running,

jumping down, tricycle riding and bar swinging after at least six weeks of individualized instruction in these skills.

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CHAPTER IV

RESULTS

Assessment of Free Play Patterns

Two research hypotheses were stated concerning the children's free play behavior prior to and following participation in the PREP play program. One suggested that assessment of the amount of time spent in non-play would reflect a decrease in percentage of time spent in this category of behavior in the posttest. Concomitant with this change an increase in the more sophisticated categories of play (elementary and advanced play) was predicted.

Percentages of time spent in each of the five categories of play and non-play were calculated for each subject and the group for the pretest and posttest. Group percentages are displayed in Table 3. For individual subject's play data, see Appendix F. In the pretest, large proportions of time were spent in the first three categories of play (Non-Play, Prerequisite Skills, Primary Skills) and very little time spent in Elementary and Advanced Play Skill. In the posttest, however, the percentage of time spent in Categories 1 and 2 decreased considerably while the time spent in Elementary and Advanced Skills increased. The largest changes were found in Categories 1, 2 and 4. The

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TABLE 3

PERCENTAGE OF TIME SPENT IN EACH CATEGORY OF PLAY IN PRETEST AND POSTTEST

	Non-Play	Prerequisite Skills	Primary Skills	Elementary skills	Advanced Skills
Pretest	20.65%	37.37%	33.57%	7.75%	.66%
Posttest	9.96%	29.76%	31.99%	25.18%	3.11%

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subjects decreased the amount of time spent in Non-play from 20.65 percent to 9.96 percent, while the percentage of time spent in Elementary Skills increased from 7.75 percent to 25.18 percent.

Large individual differences were seen in the raw data with the percentage of time spent in Non-play in the pretest ranging from 1.38 percent to 57.25 percent, and similar ranges being found in the posttesting in Non-play and Elementary Skills.

Gains scores in each category of play were calculated for each subject. The Hotelling T^2 technique (Tatsuoka, 1971) was used to determine the significance of the gains in Categories 1 to 4. The results of this analysis are presented in Table 4. The F-ratio obtained was found to be significant at the .001 level of significance indicating that a significant change occurred from pretest to posttest in time spent in these categories of play. Simultaneous comparisons of the mean gains in Categories 1 to 4 and the population mean gains of zero were conducted to determine where the significance lay. The F-ratios found in Categories 1, 2 and 3 were insignificant while the F-ratio in Category 4 was found to be significant at the .01 level (Table 5). A significant change occurred in the percentage of time spent in Elementary Play Skills then, from preprogram testing to postprogram testing. The children increased the amount of time spent in more sophisticated play activities after the eight-month program.

TABLE 4

RESULTS OF HOTELLING T^2 ANALYSIS

T^2	F	df	Probability
34.1717	7.2615	4, 17	0.001

TABLE 5

SIMULTANEOUS COMPARISONS OF THE MEANS OF CATEGORIES 1 TO 4 AND THE POPULATION MEANS OF ZERO

Category	T^2	F	df	Probability
1. Non-Play	9.7716	2.0765	4, 17	0.1288
2. Prerequisite Skills	6.8089	1.4469	4, 17	0.2618
3. Primary Skills	0.1380	.0293	4, 17	0.9982
4. Elementary Skills	23.4333	4.9796	4, 17	0.0077

Frequency counts of the number of children initiating specific play skills during the pretest and posttest videotaped samples of free play were made (Table 6). Skills were organized by categories identified in the PREP instructional materials. A broader range of skills was initiated in the posttest assessment of free play, and larger frequencies were found on the posttest in seventeen elementary and advanced play skills. In other words, not only did the amount of time spent in skilled behavior increase, but also the range of skills increased, along with the number of children initiating these skills.

Action Units

It was hypothesized that changes toward more highly skilled patterns of free play would be accompanied by a decrease in the number of behaviors engaged in during samples of free play time. As a result the number of action units engaged in by each subject over the eight pretest samples and the eight posttest samples was determined (Table 7). Group pretest and posttest means and standard deviations for 800 seconds of play are presented in Table 7. A correlated t-test for the significance of the difference between sample means (Glass and Stanley, 1970) yielded a t value of 2.758. With 20 degrees of freedom, this value was found to be significant at the .05 level of significance. A t-test for the significance of difference of

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TABLE 6

ELEMENTARY AND ADVANCED PLAY SKILLS INITIATED IN

VIDEOTAPED SAMPLES OF FREE PLAY

Skill Category	Skill	Subjects Initiating in Pretest	Subjects Initiating in Posttest
Body Awareness	Wrestling	0	2
Body Control	Bar Swing	1	7
	Hang on Bar	0	3
	Inverted Hang	1	0
	Beam Walk	0	2
	Rope Swing	0	4
	Forward Roll	0	1
	Climb Cargo Net	0	2
Locomotion	Run	3	8
	Jump	5	3
	Climb	4	16
	Jump and Roll	1	1
Object Control	Throw	7	3
	Kick	2	2
	Strike With Stick	1	2
	Bounce Ball	0	1
	Partner Toss	0	3
	Strikes Ball off Tee	0	1
	Target Throw	1	0
Specific Equipment Skills	Sliding	1	9
	Scooter on Slide	7	6
	Trampoline	5	7
	Tricycle	4	5
	Inclined Bench	1	0
	Jump Ball	0	2
	Scooter on Floor	0	1

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TABLE 7

NUMBER OF ACTION UNITS IN 800 SECONDS OF PREPROGRAM AND POSTPROGRAM FREE PLAY

	Mean	Standard Deviation
Pretest	80.67	18.80
Posttest	67.38	23.97

sample variances yielded a t value of 1.226 which was found to be insignificant (Table 8).

These results supported the research hypothesis indicating that the subjects did initiate fewer action units during free play after the eight month program of free play and individualized instruction. It was assumed that this decrease in action units, coupled with increases in play sophistication, was desirable since it indicated that the

TABLE 8

T-TESTS FOR THE SIGNIFICANCE OF DIFFERENCES BETWEEN PRETEST AND POSTTEST MEANS IN NUMBER OF ACTION UNITS

	df	t	Probability
Means	20	2.758	.012
Variances	19	1.226	.235

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children were spending longer periods of time in the initiation of skilled behavior.

Results of Specific Skills Instruction

It was hypothesized that 60 percent of the children receiving instruction in prescribed skills would demonstrate measurable improvements in these skills over the course of instruction.

Four skills were selected for analysis. These were skills that had been prescribed with some frequency and met the following criteria:

1. They had undergone formative evaluation,
2. they were judged as having high priority for development and evaluation because of their contribution to children's play.
3. they were prescribed for more than one child,
4. collectively they included both ontogenetic and phylogenetic skills.

The four skills selected were: running, jumping down, tricycle riding and swinging on a bar.

Four other skills were prescribed with equal frequency and met the four criteria but were not chosen for analysis. Two of these skills, climbing and striking, underwent major revision during the year, even though they had been formatively evaluated the preceding year. As a result, the data collected on student performance in these skills was incor

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incomplete. One skill, catching, was not chosen for analysis because it required the interaction of a teacher and child and therefore was not applicable to free play as defined within this study. The fourth skill, throwing, was omitted because it was not judged as being as crucial to the free play of children as the locomotor skills of running and jumping and because it typically is acquired in its mature pattern at a later age than either of these locomotor skills (Wickstrom, 1970).

Table 9 contains the frequencies of prescriptions for each of these four Terminal Performance Objectives, along with the frequency and percentage of children who: reached the TPO, made a gain of at least one task in the Task Sequence, made gains within a task, and made no gains. Achievement of the TPO was defined as performance of the TPO at the level of Initiation or Verbal Cue. Changes from task to task at the response level of complete manipulation were recorded on the graphs but were not viewed as gains since they did not reflect changes in the student's independence or skill.

In all TPO's at least 50 percent of the subjects made gains of one or more tasks in the Task Sequence, while the percentage of students reaching the TPO ranged from 0 percent in jumping to 100 percent in bar swinging.

Individual learning curves are presented by TPO in Appendix E for each of the four skills. Performance by task and response level leading to the TPO are plotted

TABLE 9

CHANGES OBSERVED IN PRESCRIBED SKILLS DURING

INDIVIDUALIZED INSTRUCTION

TPO	Ss Receiving Instruction	Ss Achieving TPO	Ss Achieving One One Task or More	Ss Achieving New Level Within Task	Ss Making No Gains
Running	10	1 (10%)	5 (50%)	3 (30%)	2 (20%)
Jumping Down	9	1 (11%)	8 (89%)	0 (0%)	1 (11%)
Tricycling	11	5 (45%)	6 (55%)	1 (9%)	4 (36%)
Bar Swing	7	7 (100%)	0 (0%)	0 (0%)	0 (0%)

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against weeks of instruction. Teachers did not prescribe instruction for subjects at the same time throughout the program; therefore some subjects may have received some weeks of instruction in one skill in the fall, while others did not begin on that skill until the spring. Regardless of when their instruction began, the first week was recorded in the first square of the graph.

The curves reflect the subject's best performance each week in the prescribed skill. Teachers were instructed to begin instruction on the next task once the first task was consistently performed at the response level of demonstration or verbal cue. As a result teachers did not wait until children initiated each task before moving on. However, initiation of any task in the sequence was recorded on the first occasion of being observed, regardless of how far along the task sequence individual instruction had progressed. Skills that were thus initiated, observed and recorded are marked by an X in the appropriate square in the learning curves in Appendix E.

The individual differences for running in subjects' initial performances and learning rates are reflected in the curves. Only one subject reached the TPO, and then only at the response level of verbal cue. This subject entered the instructional period at Task 3 (running with inconsistent periods of non-support). For the majority of subjects the length of instruction was between six and ten weeks. One subject received instruction for sixteen weeks while

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another received instruction for twenty weeks. A marked inconsistency from week to week was noted for several of the subjects, with gains in one week being lost in the ensuing weeks. Only four of the subjects had progressed beyond a fast walk even after weeks of instruction, and two of these evidenced inconsistent periods of non-support in their running pattern. The graphs displayed marked variability in the subjects' entering and terminal behaviors, as well as in the time required to see change and the general shape of the learning curves.

In the TPO of jumping down the same variability is displayed in initial and terminal performance. Only one child reached the TPO and that child (S14) initiated the skill on the week following the termination of instruction. Three subjects achieved task 4 and three more task 3. Both of these tasks involve a two-foot take-off and landing with an observable period of flight. All children made measurable gains within eight weeks of direct instruction.

In tricycle riding wide individual differences were apparent in the amount of change over the instructional period and in the amount of time required to reach the TPO. Five children attained the TPO at the level of initiation (S5, S7, S12, S14 and S18). The range of time required to reach that performance level was wide with one child initiating tricycle riding and steering after seven weeks of instruction and another doing the same after twenty weeks. Five children did not progress past the first task of sitting on th

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on the trike while being pushed. Four of these required manipulative prompts to keep their feet on the pedals while another could do this with a verbal cue. Subject 16 received instruction in the last ten weeks of the program and may have made some progress with extended time. Two subjects had instruction terminated for a period of several weeks. When instruction began again however, the children continued to make no measurable progress towards the TPO.

In examining the learning curves for swinging on a bar it can be noted that the shape of the learning curves for six of the subjects was highly similar, with all six achieving the TPO at the Initiation Level by the fifth or sixth week of instruction. Subject 15 reached the TPO in 13 weeks at the response level of verbal cue and maintained this level of response until the termination of instruction. Wide individual differences were seen in the seven children at the beginning of instruction, with one child entering the task sequence at the lowest level of performance and another beginning on the third task with manipulative prompts.

These results support the research hypothesis since at least 60 percent of the subjects made measurable gains in the skills of running, jumping down, riding a tricycle and swinging on a bar. The degree to which these measurable gains can be considered meaningful or reasonable however requires the consideration of the time spent in instruction. These and other factors will be discussed in the next chapter.

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CHAPTER V

DISCUSSION

Free Play Behavior

Results of the Pretest

Results from the pretest indicated that the children spent a large proportion of their time in non-play (20.65 percent) and simple movement skills (37.37 percent) such as walking, crawling or holding objects. The range of time spent by individuals in these categories was large with some children spending as little as three percent in non-play and one child spending 57 percent of her time in non-play. Within the sample, fourteen children spent at least 15 percent of their time in complete inactivity. All of these children spent a considerable proportion of their remaining time in simple movement skills (Category 2). In fact, twelve children spent more than 60 percent of their free play time in these two categories combined. Using Rosenthal's definitions of play behavior (Rosenthal, 1973), all of this time would be categorized as non-play. In view of the highly stimulating nature of the environment, this percentage represents an extremely large amount of time spent in unsophisticated levels of play behavior. Considering

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too that a number of the subjects had been in the program for several months in the previous year and that all of the children had had a week of free play during which they could be accustomed to the play room and the teachers, it is likely that this percentage is a conservative estimate of the time spent in non-play and simple movement by the population of retarded youngsters. Clearly these results support the view expressed by others (Benoit, 1955; Wehman, 1975; Gralewicz, 1973) that retarded children do need to increase their ability to use free play time constructively.

Since very little of the group's time was spent in skilled activity (8.41 percent in Categories 4 and 5 combined), it can be assumed that the children lacked the play skills required to make the best use of free time. Only three of the subjects initiated any Category 5 (Advanced Skill) behavior and six subjects demonstrated no behavior at all that could be categorized as either Elementary or Advanced play skill. Analysis of the specific skills observed in these categories revealed that fifteen identifiable skills were initiated. Only four of these were initiated by more than four children: jumping, throwing, jumping on the trampoline, and going down the slide on the scooter. The children who initiated these skills tended to be those who had had previous experience in the program. It is likely that they received some instruction in these skills before the pretesting, since these were viewed as high in priority for instructional materials development in the previous year.

The large amount of time spent in Non-play supports the findings of Noble (1975) and Linford _et al_., (1971). Since Noble's lowest category of play closely resembled that of the present study, and the environment in which the free play behavior was assessed was virtually the same, it is not surprising that his figure for Non-play (approximately 20 percent) was almost identical to the pretest figure of the present study. This appears to confirm that these children spend a good deal of time in inactivity. Linford (1971) suggested that the gross energy expenditure of children with Down's Syndrome was low because of inactivity. He found that these children had low velocities of movement and shorter amounts of time spent in movement during free play than normal children.

Other studies have also confirmed the lack of skill evidenced in the retarded child's movement. Keeran, Grove and Zachofsky (1969) found that a large number of severely retarded children and adolescents lacked proficiency in using playground equipment. The present study found a lack of time spent in proficient play and those skills that were performed proficiently were exhibited by only a few subjects.

The results of the pretest showed a large percentage of time spent in non-play and in very simple movement skills and very little time spent in skilled behavior. Furthermore, the range of elementary and advanced play skills demonstrated was small and those skills that were initiated were generally done so by a small number of individuals. This suggests a clear

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clear need for the retardate to acquire a wider range of play skills and to learn to initiate these play skills in a proficient manner in free play.

Changes in Play Behavior

A significant shift in play behavior was seen from preprogram testing to postprogram testing. The percentage of time spent in Non-play decreased from 20.65 percent to 9.96 percent and a similar change occurred in the time spent in Prerequisite Skills. While these changes did not prove to be statistically significant, a close look at individual subjects revealed that very large decreases were made in time spent in Non-play. Four children increased their active play time by more than 30 percent of the total time (see S_{16} in Figure 3).

The largest change from pretest to posttest occurred in Category 4 Play (Elementary Skills). A statistically significant increase was found from preprogram to postprogram testing. Whereas only 7.75 percent of the group's time was spent in this category of play in the pretest, by the end of the program this had increased to 25.18 percent. This category of play includes skills such as jumping, riding a tricycle, running, climbing, using a scooterboard or bouncing on the trampoline. It was on the development of these specific skills that the program of individualized instruction had focused (Watkinson *et al.*, 1976).

Maturation has been recognized as an alternative

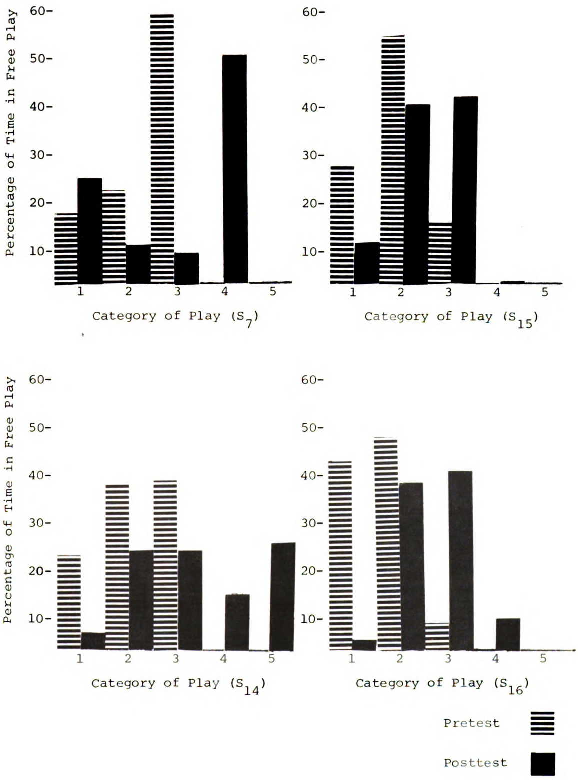

Figure 3. Percentage of Free Play Time Spent in Each of Five Categories of Play by Four Subjects on Pretest and Posttest

hypothesis to treatment in one-group studies (Stanley and Campbell, 1966). In the present study, however, it appears that a strong case can be made for eliminating this as a competing hypothesis because of the nature of the changes that occurred. Many of the tasks that were initiated in the posttest but not on the pretest (see Table 10) were those that had received considerable instruction (four weeks or more) in the program. Individual prescriptions for skill instruction by subject can be found in Figure 4. Of those play skills that were prescribed for individual instruction approximately 20 percent were initiated in the free play samples. This represents the number of TPOs or mature skills initiated during the taping time. It does not include skills that were initiated at a lower task level, or those that were initiated at times other than the posttest filming. Those skills that did not appear in the subject's pretest, but did appear on the posttest are marked with an asterisk.

An analysis of the frequency of initiation of prescribed skills and those not prescribed for instruction in the posttest samples of free play behavior revealed that approximately twice as many of the prescribed skills were observed on the posttest (Table 10). This did not include skills that were observed on both the pretest and the posttest. In other words children initiated more of the skills that had received instruction during the program than they did skills that had not received instruction. This supports

TABLE 10

FREQUENCIES OF PRESCRIBED AND UNPRESCRIBED SKILLS OBSERVED ON THE POSTTEST SAMPLES OF FREE PLAY

	Locomotion	Body Control	Object Control	Special Equipment
Prescribed Skills*	1	8	5	20
Unprescribed Skills*	3	2	2	11

*including only those skills not seen on the pretest.

Subject	Prescribed Skills: LOCOMOTION	BODY CONTROL	OBJECT CONTROL	SPECIAL EQUIPMENT
S_1	run, jump down		throw	*tramp, climb, *slide
S_2	run	bar swing	throw, catch, kick	trike, *tramp, *climb
S_3		*bar swing	throw, strike, catch	*climb
S_4			throw, catch, strike kick	tramp, *climb
S_5	run		throw, catch, strike	*trike, slide, climbing, *tramp
S_6		bar swing	throw, strike, kick	climb
S_7	jump down	rope swing	throw, strike	*trike, tramp
S_8	jump over	rope swing	strike	*climb
S_9	run	*bar swing		*climb, tramp, trike
S_{10}	run			*tramp, *climb, trike, *slide
S_{11}	run		throw, catch	climb
S_{12}				trike, climb, tramp, slide
S_{13}	*jump down	*rope swing	throw, catch, *strike	*scooter, climb
S_{14}	jump down	*rope swing, bar swing	throw	trike, climb
S_{15}	run, jump down	rope swing, bar swing		climb, scooter, tramp, trike
S_{16}	jump down	*hang, *bar swing		*climb, slide, tramp, trike
S_{17}	run, jump down		throw, catch *strike	climb
S_{18}	jump down	*rope swing	strike, *throw	trike, *climb
S_{19}	run		*throw, catch	*climb, trike
S_{20}		*rope swing	throw, catch, *strike	climb
S_{21}	run, jump down			tramp, slide, *climb, *scooter

*Skills that were initiated in free play during posttest but not during pretest.

Figure 4: Individual Prescriptions for Skill Instruction

the hypothesis that the treatment rather than maturation was responsible for the changes in free play. It must be remembered however that the free play samples were by no means a comprehensive assessment of what the child could do in free play since they were intended only to sample patterns of behavior.

Many of the skills (both prescribed and unprescribed) that were initiated on the posttest and not on the pretest required interaction with play equipment such as bars, ropes, tricycles, trampolines, scooters, slides, climbing apparatus. They are skills that have been referred to as 'ontogenetic' skills because they are likely to be influenced by learning and experience (Espenschade and Eckert, 1967; McGraw, 1935). Those skills that are often referred to as 'phylogenetic' did not appear to be initiated as frequently, even when they had received intensive instruction. These are the skills (run, jump, throw, catch, kick) that are most likely to be affected by maturation, according to developmentalists. These skills which reflect more complex movement patterns are likely more difficult to learn and require more time and instruction to acquire. It appears that eight months was insufficient time to bring about changes in the initiation of phylogenetic skills, though it was sufficient time for gains to be made in ontogenetic skills.

Individual Differences in Play

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individual to individual as expected. All but one child increased the amount of time spent in the two highest categories of play. All children exhibited at least one instance of skilled activity (Category 4 or 5). On the posttest assessment, five of the children spent at least 50 percent of their time in Category 4 and 5 behavior, and fifteen children spent at least 15 percent of their time in behavior of this type. Individual differences in amount of change observed and kinds of behaviors initiated were quite apparent.

One child increased his Category 4 activity times from 0 percent to 50.63 percent. While it cannot be shown conclusively that the change was due to instruction, it is probably worth nothing that he received daily instruction in tricycle riding, a skill which he could not initiate at the time of pretesting, but which was seen frequently on the videotapes of the posttest. Histograms showing changes in play skill behavior of this subject (S_7) and others are presented in Figure 3.

Another subject made large increases in the time spent in both Elementary and Advanced Play Skills. From a pretest percentage of 0.125 percent in these categories of play, Subject 14 (Figure 3) increased to 41.25 percent in these categories. The larger change was made in Category 5 (from 0.0 percent to 26.75 percent). A considerable amount of time was spent during the posttest in the activity of jumping off a bench to swing on a rope. This was an advanced play skill that had been prescribed for instruction for this student during the winter months of the program. The skill was not present during initial assessment but was achieved during the program and initiated during posttest assessment. In fact, rope swinging became a highly favored activity and was observed on seven occasions in the posttest, totally 207 of the 800 seconds of sampled free play. This only includes actual time spent in swinging and does not reflect the time spent in close proximity to the rope (holding it and looking elsewhere) between turns.

Other subjects showed posttest increases in prescribed skills. Subject 9 increased his Category 4 play from 0 percent to 18 percent of his sampled time. Of the 144 seconds of Elementary Skills initiated during free play on the posttest, 143 seconds were spent on two prescribed skills: bar swinging and climbing. Clearly in this case the posttest changes seem to be directly related to the prescribed treatment. The learning curve for bar swinging for this subject can be found in Appendix E.

While some children demonstrated little change in the amount of skilled behavior they initiated, they did at least increase the proportion of time spent in Category 3 behavior (Primary Skills). One boy, for example (S_{15} in Figure 3), increased from 16.75 percent on the pretest to 43.875 percent on the posttest in this category. The change probably reflects the instruction he received in running which increased the frequency of fast walking

(Category 3) even though he did not achieve a mature pattern of running (Category 4). The learning curve for running for Subject 15 can be found in Appendix E. Although the curve does not reflect rapid acquisition of the Terminal Performance Objective, in fact the frequency of fast walking behavior increased considerably throughout the year. In the videotaped pretest no initiation of fast walking was observed, while in the posttest, fifteen separate instances of fast walking were observed totalling 37 seconds of this activity. While this does not reflect a high percentage of free play time, it does indicate that the skill was being initiated voluntarily, even if only for one or two seconds, and that in itself is highly meaningful for a child who spent more than 82 percent of his free time in Non-play and Prerequisite Skills on the pretest.

Subject 16 (Figure 3) also made significant changes in his pattern of play. Inactivity accounted for 43.88 percent of his time in the pretest, and Prerequisite Skills accounted for an additional 48.75 percent of his free play time. On the posttest these dropped to 4.50 percent and 40.88 percent respectively, while Primary Skills and Elementary Skills were observed for 44.75 percent and 9.88 percent of his play time. Activity on the climbing apparatus accounts for a very large proportion of his time in both of these categories of play. Climbing was a prescribed skill that received instruction during at least four months of the program.

Changes in Action Units

The results indicated that a significant change occurred in the number of action units demonstrated from the preprogram to the postprogram testing. The subjects displayed approximately ten behaviors during a one hundred second sample of play during the pretest. In the posttest this was reduced to eight behaviors. Large individual differences were apparent as was suggested by the large value of the standard deviation on both assessments. One child averaged seventeen attention shifts during the pretest (approximately one behavior every five or six seconds) while another engaged in only six behaviors during the same period of time.

The decrease in action units may be indicative of a shift towards more sophisticated play patterns. Linford *et al.*, (1971) found that normal children spent longer periods of time on one piece of apparatus than retarded children did. The continual shifting of attention from one behavior to another makes practice of skills difficult.

The decrease may be the result of the kinds of skills that were initiated on the posttest. The incidence of climbing for example increased markedly from pretest to posttest (Table 8). While only four children initiated climbing behavior in the pretest, sixteen children initiated this activity in the posttest. Climbing is an activity which requires prolonged attention if only for the sake of safety.

Once a child began to climb the ladder of A-frame the activity required his full attention until he got off.

While Linford's study (1971) suggested a relationship between skill and time spent per activity, no trends could be detected in the present study. Several children who spent very little time in sophisticated play changed behaviors infrequently, while those who were highly skilled remained in one activity for long periods of time also. There were also both skilled and unskilled children who demonstrated highly frequent changes of activity. It would seem however, that as children increase their sophistication of play skill, as occurred from pretest to posttest, a decrease in the number of action units engaged in would be desirable for further practice and application of the new skills.

Individual Skill Learning

Running

The results showed that 80 percent of the children for whom running was prescribed made some gain in running skill. According to Sorenson (1971) and Vogel (1974) this could be judged as evidence of effectiveness. However, it is important to note that six of the children made no progress beyond a fast walk, with or without use of the arms, with as much as six to sixteen weeks of instruction. Whether this is due to the nature of the skill, the nature of the

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children or the nature of instruction cannot be determined. It is possible that many retarded youngsters lack the motivation required to run at higher speeds, or that their immature body proportions, especially in Down's Syndrome make this an especially difficult skill to acquire. The relative influence of growth, learning and maturation in the development of fundamental motor skills has been debated in the past and remains an unresolved question.

It is interesting to note the relationship between achievement in running and the free play analysis. All of the six children who failed to achieve more than a fast walk spent a large proportion of their free play time in idleness (from 17 percent to 57 percent). More importantly, five of these children exhibited no occasions of elementary or advanced play skill. It is perhaps unreasonable to expect mature running patterns to be developed in children whose other play skills are so unsophisticated. For these children the achievement of fast walking, particularly if it is initiated or is the response to a verbal cue, can probably be considered very meaningful change in skill.

Retarded children appear to require extended practice before measurable gains can be achieved. Vogel (1974) recommended that two to five hours be allotted for running instruction and practice for maximum improvement. If the PREP teachers allotted five minutes per day for three days a week, this time could only be met in nine or more weeks of instruction. Perhaps the amount of time spent daily in instruction on each skill needs to be increased significantly if maximum gains are to be made in this skill. An increase in time spent in instruction may also decrease the fluctuations seen in individuals from day to day. Increasing the number of weeks spent in intense instruction of this skill should also be recommended. In the majority of these cases in the present study instruction was carried out for less than ten weeks. Perhaps the nature of the skill requires that the child receive instruction and practice daily over a much longer period of time.

Jumping Down

In the TPO of jumping down 89 percent of the children who received instruction made gains of at least one task, demonstrating that the program was very effective in changing student performance on this skill. Only one child failed to make any gains in performance throughout the program.

The extremely low frequency of children reaching the TPO raises a question about the appropriateness of this task as the target behavior. Wickstrom (1970) suggested that new heights may be perceived as difficult and may result in a less mature form of jumping than was previously used. Perhaps a jump from hip height is regarded as too difficult to be undertaken by the majority of preschool retarded children. The use of carefully graded benches and boxes designed to gradually increase the height of jumping would be important in teaching this skill. The PREP room contained only three different heights of equipment for jumping and the difference between the bench judged as knee height for most children and the box judged as hip height may actually have been too large to be used effectively for instruction. In such a case it would perhaps be better to use the fourth jumping task, from knee height, as the target or terminal behavior.

Tricycle Riding

The results of the tricycle riding showed a wide spread in achievement, with five children acquiring the TPO and five children remaining at task one. One child (S_{19}) learned to push the pedals on the tricycle but did not learn to steer before instruction was terminated at the end of the program.

The frequency of children attaining the TPO during the instructional program is evidence that this skill can be effectively taught using the PREP instructional materials. However, the high incidence of complete failure to make gains in tricycle riding raises some question about the process of instruction. There are several possible reasons for the failure of these children to learn this skill. The first one may be related to the nature of Task 1 in the tricycling sequence. The shaping techniques for this task focus on having the child sit on the tricycle with his feet on the pedals while he is being pushed. Attainment of the task at even the level of manipulative prompt is highly reinforcing simply because the child gets to ride the tricycle with the assistance of the teacher. It is likely that the reward of being pushed may not have been as stringently applied as it should have been. The teacher must make it clear that getting pushed is contingent on placing the feet on the pedals and keeping them there. Similarly, in Task Two, the child receives his reward of being pushed before he in fact is required to make his response (pushing on the pedals after being given an initial push). In fact the consequences of pushing the pedals himself are probably not reinforcing: the tricycle slows down, the teacher stops pushing and gives social reinforcement. A better technique to be applied may be to attempt to teach Task 3 first, where the child is required to make an initial push on the pedals from a stop. In this instance the reinforcer of continued pushing by the teacher could immediately follow the child's correct response. Delaying the prompts could then be used as an effective means of increasing the child's willingness to respond.

An alternative explanation of the results of the tricycle riding instruction with the five unsuccessful children may be related to the inappropriateness of the prescription. While prerequisite motor skills for tricycle riding have not been specified in the literature it is possible that these children lacked the skills required to initiate pedal pushing. It is interesting to note for example that four of these five children were receiving instruction on the elementary locomotor skill of running and were skill performing at the level of a fast walk, while only one of the six c

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children that reached Task 3 or the TPO was at the fast walking stage. Perhaps fast walking is a prerequisite skill for tricycle riding or at least is somewhat related to it, perhaps through the skill required to push with the legs.

This difference is also reflected in the free play assessments. Those who did achieve the TPO in tricycling and those who did not achieve the TPO differed also in the changes made in free play. Those children who learned to ride the tricycle made an average gain of approximately 27 percent in time spent in elementary and advanced skills during free play. Those children who did not reach the TPO in tricycle riding showed only a 10 percent gain in these two categories of play. The latter group had less sophisticated patterns of play in both the pretest and posttest of free play. Perhaps it is not expedient to attempt to teach tricycle riding when the children's overall play patterns are still very immature.

It is possible that the Task Sequence is insensitive to the changes that actually did occur. An intermediate step in the sequence may be pushing with one foot, pushing with the feet on the floor, or perhaps pushing the pedal down without completing one revolution. Further analysis of the sequence may reveal enabling objectives that would help the teacher to monitor the child's progress towards the TPO.

Finally, it is possible that the intensity of the instruction, either in terms of time or application of the shaping procedures was insufficient for these children.

Daily five minute instructional periods may be too short to allow the child time to make measurable gains in skill.

Bar Swinging

The results of individualized instruction on learning to swing on a bar presented very positive evidence for the effectiveness of the instructional materials in this skill. One-hundred percent of the children for whom this was prescribed reached the TPO. Six of the seven children did so within seven weeks of instruction. The curves for acquisition of the skill are highly similar indicating that the Task Sequence was appropriate for the majority of the children. It is difficult to determine why this skill particularly was the most successful of the four chosen for analysis. It may be related to the high degree of reinforcement generated by completion of the task itself. The feeling of vertigo that is the result of being suspended may be highly rewarding for young children.

In looking at the free play patterns of the children who learned bar swinging through individualized instruction it is interesting to note that four of the seven initiated the skill during the posttest videotapes assessment. Since the goal of the PREP program is to learn to apply new skills to play it is evident that the goal was reached with those subjects.

<u>Effects of Individualized Instruction</u>

The results of individualized instruction revealed large differences between skills in terms of the effectiveness of the program in changing the children's behavior. Instruction in bar swinging was 100 percent effective in TPO achievement while instruction in jumping down resulted in no subjects reaching the TPO. However, in all of the tasks analyzed at least 64 percent of the children made some measurable gain. This would be considered as evidence of effectiveness in new materials such as those used (Sorenson, 1971; Vogel, 1974; Wessel, 1975). However, it is important to look at the amount of change that can be considered as meaningful within the context of the program. In the PREP program a change within a task from one response level to the next may be meaningful if it occurs within a reasonable time span. If, however, the change is observed only after ten or twenty weeks of instruction the gain is hardly worth the effort of intense instruction. In this case, instructional time may be better spent on other skills.

At the same time many retarded hcildren make so few gains in skill that even the smallest detectable change can be viewed as successful participation in a program. For this reason it is important to look at each child's play patterns along with the changes seen in other skills. Analysis of all of this information may result in a more reasonable interpretation of 'meaningful change'.

In all four tasks analyzed it appears that those who made significant gains (reached the TPO or improved more than one task) generally made a gain of at least one task in the initial three weeks of instruction. Perhaps an initial period of three weeks could be recommended as a trial period for the appropriateness of a prescription. During this time a gain of one task should be considered meaningful change and evidence that the child is likely to be successful in that skill. Teachers should be encouraged to change the TPO prescription if children fail to make a one-task gain during this time.

The percentages of children experiencing improvement in the skills in which they received individualized instruction is indicative of a substantial degree of program effectiveness. These findings are generally supportive of other studies in which the diagnostic-prescriptive approach was found to be successful. The fact that this instruction took place within a highly stimulating environment for play and was accompanied by positive changes in free play patterns supports Ross's notion that skills should be taught in the social context to which they apply (1961). Certainly the advantage of having numerous opportunities for the application of these skills in free unstructured play cannot be overlooked.

It is important that the areas in which little change occurred not be ignored. Data from these sources can be used to generate new ideas about the appropriateness of the model and the program content and the applicability of certain strategies to subjects who do not make gains readily. Analysis of such data should result in increased effort on the part of the program staff to investigate modifications to the existing instructional materials.

Implications for Changes in the Treatment

The Program Model

Support for the program model of individualized instruction incorporated into free play can be found in the changes in free play behavior after the program of instruction. While it cannot be concluded that the individual gains made in prescribed skills actually resulted in gains in free play patterns, it has been shown that these changes occurred together over the eight month period. A closer examination of the relationship between these factors would perhaps substantiate a causal relationship.

The large variability in prescriptions, initial performances on selected skills, and progress with instruction lends further support to the use of an individualized approach in instruction. At the same time the progress of the majority of the children through the Task Sequences indicates that common instructional objectives, based on developmental changes, can be used effectively for the assessment, prescription and instruction of these skills with a wide variety of children.

Student performances were examined on a monthly basis to determine whether instruction should be continued or terminated. However, stringent guidelines were not written to help teachers make these decisions. In looking at the learning curves of the children who made few gains in tricycle riding it is apparent that after several weeks of no progress the prescription should have been changed. Teachers should be cautioned to examine the graphed data at more frequent intervals to decide whether the instruction is being effective. Guidelines for terminating instruction based on this performance data should be made clear.

Instruction did end when a child reached a TPO and initiated it several times on different occasions, as specified in the Task Sequence. Further monitoring of these skills was not done. A maintenance system incorporated into the program model would provide for systematic review of these tasks at regular intervals to ensure that the skill is being maintained. Perhaps through twice weekly review of these skills the children will be prompted to perform them more often in free play. Eventually the frequency of complete initiation of these skills may increase. A similar process of maintenance on language and self-help skills with young Down's Syndrome children has been implemented and judged effective (Kysela, 1976).

Terminal Performance Objectives and Task Sequences

Analysis of the children's progress through skills

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has revealed that some tasks that were identified as appropriate and achievable in formative evaluation are in fact not achievable within an eight month program. The TPO for jumping down appeared to be inappropriate given the kind of equipment found in the PREP room. Analyses of more of the TPO's might reveal the need for modification of others as well.

Tasks within the Task Sequences were identified as being in need of modification. The second and third tasks in the tricycling sequence appear to require revision, and a more graduated Task Sequence in terms of the height of jumping down may be effective.

Learner Response Levels

The absence of performance at the response levels of manipulation and, to some extent, manipulative prompts in the higher level tasks of the TPOs raises some questions about the applicability of these response levels at higher levels of skill. In the first one or two tasks of running, jumping down, tricycling and bar swinging these response levels appear with some frequency in the learning curves. However, in the last one or two tasks of each sequence the responses recorded were typically at the level of demonstration or verbal cue. It seems likely then that once a child has achieved some competency in the skill (as reflected in attainment of the first one or two tasks at the level of demonstration, verbal cue or initiation) he is unlikely to require extended physical assistance to move on to the next task. At this point in time he may even refuse to be physically manipulated. Removal of these techniques of instruction in the latter part of the Task Sequence should be recommended to teachers.

Similarly, it appears that all response levels are not appropriate in all Terminal Performance Objectives. Demonstration was not recorded in the tricycle riding sequence for example. Whether this was because of the relative difficulty of demonstating adequately on a small tricycle or whether the technique was in fact not applicable to this skill cannot be determined from the present data. It is possible that a sixth level of response, that of physical gesture, should be incorporated into the response and teaching continuum. The teachers frequently appeared to gesture with their feet in tricycle riding, and with their arms in running and jumping, without actually completing a good demonstration. In skills such as tricycle riding, the gesture could be used as an alternative technique to demonstration.

Analysis of the tricycle riding sequence indicated that the application of operant techniques of reinforcement should be more closely examined in each of the skill sequences. This would help determine the most effective type of reinforcement to be applied at each stage of skill learning. It is likely that the intrinsic reinforcement provided within the four tasks analyzed influence to a great extent the learning of these skills. The sensations created by swinging, being airborne in the jump, moving quickly on the tricycle and on the feet should be taken advantage of in the teaching of these skills.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to investigate the effects of the PREP Play Program on the play skills and free play patterns of young moderately retarded children. Assessments of the children's play patterns during unstructured free time and assessments of individual progress in skill learning during individualized instructional time were used as dependent measures.

Assessment of the free play patterns of the children prior to the treatment revealed that they were unskilled in their play and spent large proportions of their time in inactivity. A statistically significant difference between pretest and posttest scores indicated that the play patterns of retarded children could be changed, however. A decrease in the amount of inactivity and an increase in the amount of skilled activity is evidence of this change. Clearly the treatment had a significant effect in improving the free play patterns of the subjects.

Monitoring of the changes in individuals on four selected skills during individualized instruction revealed

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that measurable changes were made in the majority of the children. Bar swinging was most effectively achieved, while tricycling, jumping down and running were achieved by smaller proportions of the group. The meaningfulness of these changes was determined considering time spent in instruction. It is clear however, that retarded children can learn these skills and can learn to initiate them appropriately in free play.

Improvement in free play patterns was accompanied by a significant decrease in the number of action units initiated during the play samples. This was interpreted as a positive change in play and practice patterns that would perhaps lead to further skill increases.

Analysis of the frequency of target (prescribed) and non-target skills used in the posttest suggested that those skills that received individualized instruction during the program were initiated more frequently in free play than skills that did not receive specific instruction.

Conclusions

The following conclusions were supported by analysis of the results.

1. Preschool trainable retarded children spent a large percentage of their free play time in unsophisticated patterns of play. The variability was large, however, with some children spending the majority of their free time in inactivity while others spend more time in skilled activity.

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2. The percentage of time spent in elementary play skills was increased through participation in the PREP Preschool Play Program. This increase was accompanied by decreases in Non-play, and increases in the range of play skills initiated.

3. Increases in sophistication of free play patterns was accompanied by a decrease in the average number of action units engaged in during free time. In other words, the children spend more time on each activity that was initiated.

4. Retarded children improved their skill in running and jumping down through an individualized program of instruction in these skills. Eight months however, was insufficient time for them to attain skilled patterns in these activities.

5. Retarded children learned to swing on a bar and ride a tricycle through an individualized program of instruction in these skills. Bar swinging was learned in six or seven weeks of instruction for the majority of children while tricycle riding was achieved by approximately 50 percent of the children during a period of five months.

Recommendations

The following recommendations are made for the implementation of the Preschool Play Program:

1. That student performance data receive careful

scrutiny more frequently, perhaps after every week or two weeks of instruction.

2. that criteria or guidelines be developed for determining when to continue or terminate instruction based on student performance data.

3. that a maintenance system be implemented to provide for systematic review of learned skills.

4. that the frequency and duration of instructional time be increased in skills such as running and tricycle riding that require extensive practice before measurable change takes place.

5. that teachers be made aware of the time that is typically required to achieve TPOs. In prescribing skills for instruction teachers could then choose one skill each from those that take a relatively long time (running, jumping down) and those that take a relatively short time (bar swinging) to achieve.

6. that the recommendations for use of demonstration, manipulation, and manipulative prompts be removed from the tasks or task sequences in which they are not appropriate.

7. that the Terminal Performance Objective for jumping down be changed to Task 4: 'jumping down from knee height'.

8. that Task 2 in the tricycle riding Task Sequence be omitted in the instructional sequence.

The following recommendations can be made for future research within the PREP Program.

1. that the relationship between achievement of skills during instructional time and the initiation of these same skills in free time be more extensively examined.

2. that the prerequisite skill learnings for the play skills of the PREP program be systematically identified and verified.

3. that systematic investigation of operant techniques for increasing skill development be undertaken in specific skills, beginning with those of highest priority in play.

4. that further investigation be done to determine the effects of individual instruction on the other skills included in the program.

5. that replications of the study in other skill areas include a longer period during which baseline data is gathered on each skill to determine the natural growth rates in these skills for retarded children.

6. that the generalized effects of skill learning be examined to determine the degree to which retarded children can apply these skills in other situations at school, in the home, in the yard and in the playground.

APPENDIX A

HISTORY OF THE PREP PROGRAM

AND

GUIDELINES FOR THE DEVELOPMENT OF PREP

INSTRUCTIONAL MATERIALS

HISTORY AND EVALUATIVE CONTEXT OF THE PREP PROGRAM

The Department of Physical Education at the University of Alberta, under the leadership of Dr. Pat Austin, recognized the need for the development of instructional program materials that could be used in preschool programs for the retarded to foster the development of play skills. Financial assistance from the Government of Alberta, Department of Social Services and Community Health, Division of Services for the Handicapped, was acquired in 1974 for the development of these instructional materials. As a result, a facility was made available and a program for preschool retarded children was begun on a twice-a week basis in January 1974.

The first six months of the program were devoted to the delineation of the target population, the program goals, potential program objectives and a tentative program model. The following decisions were made:

1. that the target population for these instructional materials would be trainable mentally retarded children of preschool age (3-7).

2. that the goal of the program would be to develop gross motor play skills.

3. that the program model would combine both free play and individualized instruction on play skills.

The clinic itself was set up in the basement of the Education building on the University of Alberta campus. The facility was modified to include toiletting facilities, a viewing room and an area of approximately 2,500 square feet to be used for instruction. Play equipment such as that found in playgrounds or other play facilities was purchased and installed. Graduate and undergraduate physical education students were hired and trained to work with young retarded children.

The development of the program materials was conducted within the limits of other project goals which included service as a demonstration center to local institutions, practicum experience for undergraduate students and direct service to the children. As a result, the program was interrupted for filming, visitors and outside evaluation frequently. However, as the staff and students became accustomed to the presence of outsiders the program proceeded in a relatively normal manner in spite of these activities.

Development and Evaluation of Prep Program Materials

Development of an instructional program of any kind requires constant ongoing evaluation of its effectiveness. The process of formative evaluation is one in which determination of effectiveness is not left until the product is complete, but rather is continuous, beginning with the first attempts at development of materials and continuing through implementation of all stages (Stake, 1967). Information for this type of evaluation comes from numerous sources, some of greater importance than others during different phases of the program. Initially the opinions of professionals, teachers and other experts are used to determine the feasibility of the program materials. When instructional objectives and other materials have been formulated based on these judgements, the appropriateness of their application to the target population can be informally tested using small samples from that population. Based on information from these trial applications, modification and revision can take place before the materials are implemented with larger samples to determine program effectiveness.

The development and evaluation for feasibility of the PREP Program materials was begun in 1974 when the target population, the goals of the program and the program model were identified by the program staff.

From this point on, development and formative evaluation of the program were continuous and inseparable. The evaluation was conducted in two phases which overlapped in terms of time. the purpose of the first phase was to identify appropriate content for the program, develop instructional objectives and a teacher's manual and test all materials for feasibility using small samples of children in the program. The second phase of the evaluation was begun in September 1975, before phase one was completed. The major purpose of this phase was to attempt to implement the intended program and determine its effectiveness on the target population in achieving the program goals and objectives.

Phase I Evaluation 1974-75

The purpose of the first phase of evaluation was to develop and test for feasibility the preschool play program (PREP Program) that combined the use of individualized instruction and free play to improve the play skills of retarded children.

The procedural model for the development of curriculum materials and initial evaluation of feasibility outlined in the Final Report of the Programmatic Research Project in Physical Education for the Mentally Retarded Child in The Elementary School (Wessel, 1975) was adopted for use in the development of the PREP program materials. The development of guidelines for writing objectives, the specification of criteria for the evaluation of their technical acceptability, and the choice of procedures for the initial evaluation of feasibility were based on the working papers and evaluation plan of that project.

Application of this procedural model to the PREP program resulted in the formulation of the following questions which were used to guide the evaluation:

1. What are the play skills that constitute acceptable instructional content for young trainable mentally retarded children?

2. How are the instructional materials to be developed?

3. Are the written instructional objectives appropriate for this population?

Each question was answered using descriptive and evaluative techniques designed to generate data on which to base judgements relative to the appropriateness and feasibility of the program.

Question 1: Identification of Program Content

The first question dealt with the identification of possible appropriate instructional objectives and associated strategies for teaching play skills to retarded preschoolers. Three basic sources of data were recognized as potential suppliers of information about the choice of relevant play skills for the retarded. These three sources included: the literature concerning the nature of development of motor skills in normal youngsters, the literature concerning the nature of skill development in the retarded, and observations of normal and retarded youngsters in play made by the program developers during the first year of pilot study in the program.

Four areas of skill development were typically identified throughout the literature: body awareness skills, locomotor skills, object control (manipulative) skills and body control skills. To this the project staff added those skills that are specific to pieces of play equipment found in the home, in the playground or in play schools. An attempt was made to identify specific skills in each of these categories.

Initially, the skills that are normally achieved by preschoolers were chosen as instructional objectives since it seemed that the program goal emphasized the need to teach the skills that would effectively reduce the difference between the skill levels of retarded and normal children. The literature concerning the nature of mental retardation suggested that trainable mentally retarded children are typically from two to four years behind normal peers in motor development (Francis and Rarick, 1960; Kral, 1972; Knox, 1974; Carr, 1975). For this reason, emphasis was put on motor skills that are usually acquired during the second and third year of life. A review of pertinent literature resulted in the identification of fundamental skills of object control, locomotion and body awareness that are normally part of the skill repertoire of young children. Later, during the testing for appropriateness, some of these skills were discarded because of the amount of time required for their achievement.

Finally, constant observation of normal preschoolers and retarded preschoolers in free play resulted in the identification of some skills that were specific to pieces of play apparatus. These, too, were chosen as appropriate skill objectives since they were skills that were required for functional play activity in a community or school playground.

The identification of skills as possible instructional objectives continued throughout the course of the program implementation. New skills were suggested by new pieces of apparatus and these were incorporated into the program for evaluation. A complete list of skills identified for devleopment from 1974-76 is presented in Figure 5.

Suggested skills were approved for further development and feasibility testing by the program staff. A group concensus was sought in informal staff meetings before skills were approved for inclusion in the program. Criteria for acceptability were outlined in the Guidelines for the Development of PREP Instructional Materials (see Appendix A) and 80 percent agreement by the staff was used to determine whether or not a skill should be included in the materials for further development.

Question 2: Development of Instructional Materials

The PREP program materials were developed on the assumption that learning and development are sequential and hierarchical (Gesell, 1947; Gagne' , 1965; Robb, 1966) and that instruction can be facilitated through the identification and specification of behavioral objectives (Mager, 1962; Davis, Alexander and Yelon, 1974). As a result, the staff of the program chose to use a task analysis procedure to determine sequential instructional objectives and associated strategies for instruction.

Based on the working papers of the Programmatic

BODY AWARENESS	BODY CONTROL	LOCOMOTION	OBJECT CONTROL	SPECIFIC PLAY EQUIPMENT
Body Parts	*Swinging on a bar	*Running	*Throwing	*Sliding down a slide
Movement of Parts	Climbing onto a box	*Jumping down	*Catching	*Trampolining
Total Body Movements	Rolling	*Jumping over	Rolling	Scooter on floor
	Inverted Hang	*Ascending stairs	*Kicking	*Scooter on wide slide
	*Rope swinging	*Descending stairs	Striking with a bat	*Tricycling
			Hitting with a hockey stick	
			Bouncing	

*Pilot-tested and evaluated prior to the present study.

Figure 5: Play Skills Identified for Development 1974-76

Research Project (Wessel, 1975), a set of guidelines was developed to assist the curriculum developers in writing instructional objectives and associated teaching-learning activities for the PREP program. The guidelines included statements of procedure for identifying and writing sequential objectives, the criteria to be met by these objectives, and suggestions for the writing of teaching-learning activities. It was intended that these guidelines be followed in the writing of the curricular materials. Revision of the materials was to be based on small sample pilot testing of the objectives.

Objectives were initially checked for technical acceptability by the project director using the criteria set forth in the guidelines. Objectives were then redistributed to project staff who checked each Terminal Performance Objective and Task Sequence for technical acceptability on teacher feedback forms.

Objectives were checked for being reasonable in terms of sequence, behaviors, conditions and standards by the project director and development staff before testing for feasibility and again after the feasibility testing period.

A criterion of 80 percent agreement on the Teacher Feedback Form was used to determine whether or not the objectives or the teaching strategies would be revised. Specific revisions that were not described on the feedback forms were determined by a group concensus during staff meetings.

Eight Terminal Performance Objectives (TPOs) were initially chosen as having high priority for development and testing for feasibility. These were submitted to critical examination by the project staff and then were implemented with groups of children for a period of several weeks. Following this, project staff filled out a feedback form concerning the relevance and technical acceptability of the TPOs and Task Sequences and reported on any Teaching-Learning Activities that had been used during the trial period. This process was repeated throughout 1974-75 with continued modification and revision of the objectives and Teaching-Learning Activities.

Initial assessment of the children's performance on the Task Sequences revealed that performance depended on the amount of teacher assistance given on each task. Since the differences in performance brought about by teacher intervention seemed to occur within the tasks of the Task Sequence, the project staff attempted to define the levels of response possible within each task based on the varying conditions of teacher assistance. Five categories or levels of response were identified: Initiation, Verbal Cue, Demonstration, Manipulative Prompt, and Manipulation.

In the first stages of program development, these levels of performance were not incorporated into the TPO sheets, but were written separately as a tool for recording student performance during instruction. However, the program staff agreed that the presentation of one well-tested technique for instruction and assessment of each subtask in the Task Sequence would be valuable to teachers using the PREP objectives. As a result, a new column headed 'Shaping Techniques' was included on the TPO sheet. The information included in that column could be used to:

1. assess student performance within each sequential objective, and

2. provide a detailed account of an appropriate instructional technique for that objective.

The guidelines were subsequently rewritten to include this step in the development process and the TPO sheets were revised accordingly.

The recommendations for material revisions were incorporated into the subsequent production of the TPO sheets. Recommendations were generally of the following types:

1. Inclusion of additional intermediate instructional objectives into the task sequence to make the Task Sequences more sensitive to the performances and improvements of the children.

2. Modification of the standards, behaviors and conditions to suit the typical performances of the children after instruction.

3. Inclusion of the column containing Shaping Techniques for more accurate assessment and instruction on each task in the Task Sequence.

4. Expansion of the Teaching-Learning Activities to include alternative shaping techniques, ideas for 'games' and modifications to the environment.

5. Expansion of a TPO into several TPOs of fundamental or advanced application of a skill.

At the same time a Teacher's Manual and supplemental audio and visual materials were developed to train teachers in the use of the instructional materials and program model. The manual was pilot tested with existing staff in the summer of 1975, and in the fall of 1975-76. Verbal and written feedback were gathered from the developers and users and a revised manual was written in the spring of 1976.

Question 3: Appropriateness of the Instructional Materials

Evaluation of the appropriateness of an educational product involves establishing that the product is suitable for use with the intended population, that the objectives are perceived as being educationally relevant and that they appear to be reasonable and achievable. Data in the form of teacher feedback or student performance on the objectives can be used to establish this (Wessel, 1975).

The PREP materials were designed for trainable mentally retarded children between the ages of three and eight. Information was gathered on each subject to determine initially that the groups in the PREP program in 1974-75 and in 1975-76 were, in fact, samples of the target population. Data revealed that 90 percent of the children were from the intended population. The importance of the selected terminal performance objectives was determined by asking the classroom teachers and PREP staff whether or not each terminal objective was important for this group. Those that were judged as important by at least 80 percent of all staff were maintained in the program.

The suitability of the content of the Task Sequences was determined from teacher feedback on the Teacher Feedback Form and from student performance data. Small groups of children (eight or ten per group) were assessed on each task in the sequence to determine whether or not the tasks were suitable for the range of student ability found in the sample. Data from this assessment were gathered and tabulated to determine the distribution of subjects within the task sequence. A frequency count was made for each task in the sequences of all Terminal Performance Objectives and the frequency was found to differ from task to task and sequence to sequence depending on the task difficulty and the distance between steps in the sequence. When most children performed within the range of the sequence, however, the Task Sequence was seen as being reasonable and suitable for the group. If the frequencies within the sequence were well distributed, and at least one child was performing each task in the sequence, the Terminal Performance Objective was judged as being achievable.

Each sequence was then re-examined more carefully to determine whether or not the sequential tasks were in a logical order and whether or not additional steps needed to be added within the sequence. A scalogram analysis was performed on each sequence. These analyses showed whether or not the order of the sequence held for the group of children assessed and whether or not steps needed to be added or omitted to facilitate progress through the sequence and allow for the detection of small changes in performance. Assessment of student performance and subsequent scalogram analyses were conducted on all sequences as they were written.

The recommendations for material revisions based on teacher feedback and student performance data were incorporated into subsequent editions of the Terminal Performance Objective sheets. Changes were of the following types:

1. Deletion or change of Terminal Performance Objectives not judged as important.

2. Deletion of initial steps in Task Sequence that were performed by 100 percent of the sample.

3. Addition of steps to the end of a Task Sequence when more than 20 percent of the subjects were performing the Terminal Objective prior to instruction.

4. Inclusion of intermediate tasks in the task sequences to assist in discriminating between performances.

5. Exclusion of tasks that did not discriminate between good and poor performances.

6. Development of advanced Terminal Performance

Objectives to accommodate those subjects performing at the top of an existing Terminal Performance Objective prior to instruction.

The appropriateness of the shaping techniques was determined by examining pertinent literature which revealed that operant techniques of shaping behavior such as those included in the PREP materials have been applied successfully in teaching children self-help skills (Bensberg, Colwell and Cassel, 1965; Giles and Wolf, 1966; Nelson, Cone and Hanson, 1975) and motor skills (Johnston, Kelley and Harris, 1966; Parker, 1972; Peterson and McIntosh, 1973; Wessel, 1975).

Guidelines for the Development of PREP Instructional Materials

A major purpose of the PREP Program is the development of instructional materials for the Physical Education of mentally retarded preschool children. These materials are designed to assist the teacher of retarded children in doing the following things:

1. Choosing appropriate content for preschool children.

2. Assessing children's needs in motor skill development.

3. Prescribing activities that will help the child to gain needed skills.

4. Teaching these skills in a manner that is appropriate for each child.

5. Assessing the progress of each child.

This purpose is best achieved by planning and developing a series of learning objectives that are hierarchically arranged in sequences leading to terminal objectives and including for each objective a detailed example of teaching strategies that facilitate acquisition of the objective.

The following guidelines are written to assist the developers in writing these objectives. The guidelines consist of a series of steps for writing materials and the

criteria to be met at each step. An example is included from the PREP materials to clearly demonstrate the product expected.

1. Identify the broad areas of content important in the physical education of preschool retarded children.

   1.1 Content areas should contain skills and knowledges required for playing or learning to play.

   1.2 Content areas should contain skills and knowledges required as a base for learning recreational and leisure skills.

   1.3 Content areas should contain skills and knowledges required as functional movement skills for daily living at home and at school.

   Example: PREP content areas identified to date include:

   Body Awareness
   Body Control
   Locomotion
   Object Control
   Specific Equipment Skills

2. Identify the skills within each content area which the child is expected to achieve before leaving the program. A skill should meet at least one of the following criteria in order to be included in the program:

   2.1 It should be within the range of play skills identified in developmental schedules for normal children of similar or younger ages.

   2.2 It should be identified by teachers or other school personnel as a functional behavior required for success in school.

2.3 It can be an entry behavior (or prerequisite) for existing physical education curricula for elementary school age trainable mentally retarded youngsters.

<u>Example</u>: For the content area of Locomotion the following play skills have been identified:

Running
Jumping.

3. <u>Write each skill or competency in behavioral terms as a terminal performance objective (TPO)</u>. Each objective must include the behavior that must be observed to demonstrate achievement of the competency, the conditions under which the behavior is to be observed and the standards that must be reached in the performance.

The following criteria must be met by each statement of a terminal performance objective:

3.1 The standards of the performance must be sufficient to insure that they cannot be expected to be met by chance.

3.2 The standards, behavior and conditions required should reflect the value of the behavior. A behavior that is a prerequisite for an activity that is extremely important in the child's movement repertoire should have standards that would reflect strong mastery of the skill. One that is an intermediate step between more major objectives may have lower standards for competency.

3.3 The terminal performance objectives must reflect content that is achievable with a year or less of programmed instruction. Objectives that are likely to take more than that time should be broken into fundamental and advanced skills.

Example: For the skill of jumping, several terminal performance objectives (TPO's) were written. One reflects basic fundamental mastery of the skill: "To jump over a line 2 inches wide with a two foot take-off and landing, three times in a row." Another reflects more advanced application of the skill: "To jump over a moving rope turned by teacher, three times in a row".

4. <u>Do a task analysis of each terminal performance objective</u>. For the purposes of the PREP program a task analysis consists of the identification of a sequence of subtasks that, once accomplished, should lead to the acquisition of the terminal performance objective. The sequence of subtasks should be arranged in an easy-to-difficult sequence and may be based initially on the developmental motor stages seen in normal preschoolers. The last step in the sequence should be the TPO.

   The following criteria should be met in writing the task analysis:

   4.1 All necessary subtasks should be identified and arranged in a sequence.

   4.2 Subtasks which are not necessary but may seem to facilitate acquisition of subsequent subtasks should be included at least initially in the task sequence.

4.3 Each subtask should be qualitatively different from the preceding one. Differences should not reflect improvement in time or number of repetitions. However, where quantitative differences seem to reflect increased mastery of a task that may not show other improvement over a long period of time include this as a separate subtask to facilitate the assessment of student progress.

4.4 The subtasks should reflect small changes in performance or steps toward a skill so that improvement can be easily detected.

4.5 The sequence need only reflect one possible way of achieving the skill.

Example: For the terminal performance objective of jumping the following sequence of subtasks was identified:

Stepping over a line on floor
Jumping off floor
Jumping over a 2" line on floor, one foot to two feet
Jumping over a 2" line on floor, two feet to two feet.

5. Write each subtask as a behavioral objective.

Identify the behavior required (observable performance by the student before or after instruction), the conditions of performance (the situation in which the behavior will be demonstrated) and the standards of performance (the level of acceptable performance and the number of times this performance must be observed).

The criteria for these statements are the same as those for the writing of terminal performance objectives.

Example: The behavioral objective for the first subtask in jumping is "To step down from shin height, one foot to the other foot, three times".

6. Identify the pre-entry skills for each terminal performance objective. Pre-entry skills are those skills that are prerequisites to the first task in the sequence. Acquisition of these skills is not required for participation in that terminal performance objective but it is suggested that the child who has these skills is more likely to be successful during instruction.

   Suggested criteria for identification of pre-entry skills are:

   6.1 These skills may be cognitive skills such as knowledge of body parts, vocabulary or concepts.

   6.2 These skills may be affective skills such as attention to a teacher, sharing space or equipment.

   6.3 These skills may be psychomotor skills that are normally attained in early childhood such as walking, grasping, reaching.

   Example: The pre-entry skills for throwing include: "Grasp and release an object held within arms reach."

7. Write the Shaping Techniques for each subtask in the sequence. The shaping technique should reflect one possible way in which a child can be taken from having no response but attending,

through to performing the response with a verbal cue.

The following criteria must be met for the writing of the Shaping Techniques:

7.1 Each of the following steps in the shaping process should be described if it is applicable to the objective:

Attending (A):

This means that the child is generally attentive to the situation in which instruction or assessment are taking place. It involves one or all of the following things:

1. Child watches a demonstration but does not perform.

2. Child maintains eye contact throughout verbal instruction but does not perform.

3. Child watches object withwhich he is expected to interact but does not respond positively to it.

4. Child ceases other activity, or refrains from looking around, fidgeting, etc.

Example: In the first subtask of running, the shaping technique for attending may be written "Hold child's head to face yours and when eye contact is made say 'Run, (John)'".

Manipulation (M):

This means that the child allows the instructor to manipulate his body so that the required response is completed with maximum

manual assistance from the instructor. It usually involves the instructor aligning his body with the child's in such a way that he can exert force to move the child's body in the required pattern.

Example: In the first subtask of running the technique for manipulation may be written "Run backwards holding both of child's hands and pull him into a fast walk."

Manipulative Prompt (MP):

This means that the child performs the complete task using physical support or a prompt from the instructor or the environment. Either the child or the instructor may initiate the prompt. The physical prompt may occur at the beginning, in the middle, or at the end of the response.

At the beginning of the response the child may need to be manipulated into the proper preparatory stance or movements. For example the overhand throw may require the instructor putting the child's arm up over his shoulder, and placing his opposite foot forward.

In the middle of the response, the child may need support for balance. For example, in the vertical jump the child may complete

the preparatory movement and the instructor lifts under shoulders to help the child get off the floor.

At the end of the response the child may need support for balance, or prompts for follow-through that may improve the execution of the response. For example in the horizontal jump if the child can complete response alone but does not jump far, the teacher may stand in front of the child, facing him from an appropriate distance and hold out her hands for child to reach for or hold on landing.

<u>Example</u>: In the first subtask for running, the technique for prompting may be written "Run backwards holding the child's hands but giving periodic pulls to increase his pace. Let grasp on hand go when pace is increased, holding your hand just out of child's reach without allowing contact. Regrasp hand if pace slows."

<u>Demonstration (D)</u>:

The child performs the complete task after being given an adequate demonstration by the teacher or another child.

Demonstrations may be repeated or may be ongoing. Demonstrations should include an exaggeration of the points to be learned.

Example: In the first subtask of running, the demonstration technique may be written "Run in front of child exaggerating the knee lift and arm swing."

Verbal Cue (VC):

The child performs the task given a verbal instruction that is clear and simple. Verbal instructions should be included at all points in the instructional process.

Example: In the first subtask of running, the technique may be written "On each trial say 'Run, Lyle'. Repeat these words before and throughout each attempt."

7.2 Include only one set of shaping techniques and be sure each part of the technique (A, M, MP, D, VC) is a lead-up to the next.

8. Write alternative or additional teaching suggestions for each subtask in the sequence. These may include alternative shaping techniques, other play experiences, ideas for simple motivational 'games' or suggested modifications to the environment.

The following guidelines should be remembered in writing Other Teaching Suggestions:

8.1 They can include activities which can be performed alone, with a partner or in a group.

8.2 There should be a wide variety of activities suggested for each instructional objective.

8.3 They should include a thorough description of the teacher's role.

8.4 They should include a description of the equipment required.

Example: In the first subtask of running, the following shaping technique may be written: "Stand facing child standing on top of wide slide or incline and hold out hands. Pull child's hands to start and then let go so that child does a fast walk down incline."

9. Put the TPO, Task Sequence, Shaping Techniques, and Other Teaching Suggestions in the format shown in the example on the following page.

APPENDIX B

REVISED INDIVIDUAL STUDENT PROFILE

PREP Preschool Play Program
Department of Physical Education
University of Alberta

INDIVIDUAL STUDENT PROFILE

NAME: ______________________________

DATE: ______________________________

BODY AWARENESS

TPO Identifying Body Parts

1. On command identifies the following:

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
- head						
- tummy						
- nose						
- eyes						
- ears						
- mouth						
- seat						

2. On command identifies the following:

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
- feet						
- hands						
- arms						
- legs						
- fingers						
- toes						

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
3. On command identifies the following:						
- knees						
- elbows						
- shoulders						

<u>TPO Moving Body Parts</u>

1. On verbal cue, does (moves) the following

- shake head						
- clap hands						
- wiggle fingers						
- stamp feet						
- bend knees						

<u>TPO Moving On Different Body Parts</u>

1. On seat pushes with hands						
2. On hand and knees						
3. On stomach pushes with arms and legs						
4. On back pushes with feet						
5. On hands and feet - face down						
6. On hands and feet - face up						

BODY CONTROL

<u>TPO Bar Swing</u>

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Hangs from bar with hands						
2. Steps off bench to hang on bar						
3. Swings on bar						
4. Swings on bar, returns to bench						

<u>TPO Box Climb</u>

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Climbs onto hip high box						
2. Climbs onto chest high box						

<u>TPO Forward Roll</u>

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Rolls onto back						
2. Rolls into sitting position						
3. Rolls into squatting position						

<u>TPO Inverted Hang</u>

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Hangs from hands and knees on parallel bars						
2. Hangs from hands and knees on single bar						
3. Hangs from knees on single bar						

<u>TPO Rope Swinging</u>

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Holds on with hands while being swung						
2. Holds on and locks legs while being swung						
3. Swings on rope with initial push						
4. Swings on rope						

LOCOMOTION

TPO Climbing Up Stairs	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Climbs stairs on knees						
2. Climbs stairs, marking time with support						
3. Climbs stairs alternating feet with support						
4. Climbs stairs alternating feet without support						

TPO Climbing Down Stairs	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Descends stairs on seat						
2. Descends stairs marking time with support						
3. Descends stairs alternating feet with support						
4. Descends stairs alternating feet without support						

TPO Jumping Down	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Steps down off box of shin height						
2. Steps down off box of knee height						
3. Jumps down off box of knee height, one foot take-off, two foot landing						
4. Jumps down off box of knee height						
5. Jumps down off box of hip height						

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
<u>TPO Jumping Over</u>						
1. Steps over a line on floor						
2. Jumps 1/2" off floor						
3. Jumps over a line, one foot take-off, two foot landing						
4. Jumps over a line						
<u>TPO Running</u>						
1. Fast walk						
2. Fast walk, arms pumping						
3. Runs with instances of non-support						
4. Mature run 20'						

OBJECT CONTROL

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
<u>TPO Bouncing</u>						
1. Drops ball, chases and picks up						
2. Taps bouncing ball intermittently						
3. Bounces ball 3 times moving and following it						
4. Bounces ball in place						
5. Bounces ball 5 times and catches						
<u>TPO Catching</u>						
1. Chases rolling ball						
2. Traps rolling ball						
3. Traps dropped ball						
4. Traps tossed ball						
5. Catches tossed ball						
<u>TPO Hitting</u>						
1. Pushes a stationary puck with hockey stick						
2. Swings stick to hit puck						
3. Stops puck and hits						
4. Hits puck with direction						
<u>TPO Kicking</u>						
1. Pushes ball with foot						
2. Kicks stationary ball, knee swing						
3. Walks and kicks stationary ball						

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
TPO Striking						
1. Strikes a ball off a tee with bat						
2. Strikes a bounced ball with bat						
3. Strikes a tossed ball with bat						
TPO Throwing						
1. Drops object into basket						
2. Hurls from sitting position						
3. Hurls from standing position						
4. Throws with direction						
5. Throws with direction and body rotation						
6. Mature throw						

SPECIFIC EQUIPMENT SKILLS

TPO Inclined Bench	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Lie on stomach, pulls up with hands						
2. Kneeling, pulls up with hands						
3. Crawls up on hands and knees						
4. Crawls up on hands and feet						
5. Walks up						

TPO Ladder Climbing - Up	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Climbs 5 rungs marking time						
2. Climbs 5 rungs alternating, not simultaneously						
3. Climbs 10 rungs alternating, not simultaneously						
4. Climbs 10 rungs alternating hands and feet						

TPO Ladder Climb Down	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
1. Climbs down 5 rungs marking time						
2. Climbs down 5 rungs alternating, not simultaneously						
3. Climbs down 10 rungs alternating, not simultaneously						
4. Climbs down 10 rungs alternating hands and feet						

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
TPO Scooter on Floor						
1. Sits on scooter, propels with feet						
2. Lies on stomach, propels with hands						
3. Lies on stomach, travels after push						
4. Lies on stomach, pushes, travels						
5. Runs and hops on scooters						
TPO Scooter on Slide						
1. Slides on stomach, holding scooter						
2. Slides with stomach on scooter						
3. Slides down sitting on scooter						
TPO Sliding						
1. Slides down incline on seat						
2. Slides on back feet first						
3. Slides on stomach feet first						
4. Slides on stomach head first						
5. Slides on back head first						

	No Response	Manipulation	Manipulative Prompt	Demonstration	Verbal Cue	Initiates
TPO Trampoline						
1. Walks on trampoline						
2. Bounces on body parts						
3. Bounces without leaving surface						
4. Instances of feet leaving bed						
5. Jumps consecutively						
TPO Trampoline Seat Drop						
1. Jumps, lands sitting on bed						
2. Jumps, drops to seat, bounces back to feet						
3. Seat drop						
TPO Tricycling						
1. Sits with feet on pedals						
2. Pedals after initial push						
3. Pedals 20' forward						
4. Steers tricycle around obstacles						

APPENDIX C

INSTRUCTIONAL MATERIALS FOR SELECTED TERMINAL PERFORMANCE OBJECTIVES

TO RUN WITH A MATURE PATTERN

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
1 Move 10 feet with a fast walk (one foot always in contact with ground) on five occasions.	M. Run backwards holding child's hands and pull him into a fast walk. Continue pulling with each step. MP. Run backwards holding child's hands, but giving periodic pulls to increase his pace. Allow child to continue pace as much as possible holding your hands for support. Begin to release hands periodically when child is moving quickly. Run backwards holding hands just out of child's reach. D. Run in front of or beside child exaggerating the leg lift. VC. "Run!"	Chase the child from behind. Set up a "shute" (two walls made of mats standing on edge) for child to run through. Set up a track with lines on the floor or obstacle to go around or between. Hold onto one end of rope or hoop and gently pull child. Say "One, two, three, GO!" Hold the child from behind by encircling him with arms. Then open arms and say "Run!" Start child at top of incline and pull him. Release hands as he approaches bottom.

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
2 Move 10 feet with a fast walk moving arms bent at the elbows in a forward and backward action on five occations	M. Walk behind child holding his arms at the wrist. Pump them back and forth as he does a fast walk. MP. Pump one arm only, allowing child to move the non-assisted arm. Reduce time of arm contact. D. Stand beside child and move bent arms back and forth vigorously. VC. "Swing your arms".	Give child the ends of a rope while you hold onto the rest of it. Run backwards in front of him and pull on alternate ends of rope.
3 Run 20 feet with instances when neither foot is in contact with the floor (a period of no support) on five occasions.	M. Hold child's hand and run beside him increasing the speed and lifting him slightly off the ground with each step. This may be done on an incline. MP. Start child on top of incline. Pull him so he has to take big steps down incline. Reduce support so that you let go of his hand before he reaches the bottom. D. Run in front of child exaggerating the period of non-support by taking long strides. VC. "Run", "Run faster".	Two teachers hold one hand of child and run with him. Set up a "gate" at top of incline by encircling child in arms. Say "Go!" and open arms for child to run. Stand at bottom of incline (or across room) and hold out arms. Toss child gently in air when he "runs" into your arms. Run in front of child holding out hands behind so child tries to catch them.

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
4 Run 20 feet with a non-support phase (neither foot in contact with the ground), using bent arm swing in opposition to legs on five occasions.	M. Run with child, holding his hand and pulling, increasing the pace so that child moves quickly and his feet leave the ground for longer periods of time. MP. Run with child, holding his hand and reduce the amount of pulling, but maintain vigorous movement of arms. D. Run in front of or beside child and exaggerate arm swing. VC. "Swing your arms!"	Play follow the leader with teacher leading ("Catch me"). Start running slowly and get faster and faster. Throw a ball and "race" with the child to get it. Encourage child to chase someone else on the tricycle.

LOCOMOTION

TPO

EQUIPMENT

Boxes and benches of various heights

TO JUMP DOWN FROM A BOX

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
1 Step down from shin height one foot to the other foot, three times in a row, on three separate occasions.	M. Face child, hold both hands and pull so child steps off bench. MP. Pull with only one hand. Give child hand and release earlier with successive attempts until very little or no contact is made. D. Stand beside child and step down. VC. "Step <u>down</u>".	Step down from bench into hoop target on floor, jump board, etc. Stand behind child holding under shoulders or holding hands around front of child. Give gentle push at shoulders or short pull from hands. Step down with child, holding his hand and reducing prompt.
2 Step down from knee height one foot to the other foot, three times in a row on three separate occasions.	M. Stand beside child, holding both hands Pull child off the bench as you step down. MP. Stand beside child, holding one hand Pull child off the bench as you step down. Reduce to holding out one hand for child to reach for as he steps down. D. Teacher steps down off bench. VC. "Jump down".	Gradually increase height from which child steps down. Use a small set of stairs for child to step down.

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
3 Jump down from knee height with a one foot take-off and two foot landing, three times in a row on three separate occasions.	M. Stand facing child and hold both of child's hands. Pull child off bench, MP. Hold hands out to child so that he leaves bench without contact and reaches for hands before landing. Reduce length of contact time. Reduce so that hands are held out to child but contact is not allowed. D. Jump off bench exaggerating the time in air by jumping <u>up</u> and <u>forward</u>. VC. "One, two, three, <u>jump</u>".	Jump from bench into hoop. Jump over rope or box on floor in front of bench. Jump through a hoop held up at the end of a bench. Give verbal cue to jump that builds up excitement, e.g. "One, Two, Three, JUMP!" accompanied by clap of hands or 'rocket noise'. Encourage child to land low, with knees bent. Reduce prompt to a brief lift at take-off allowing child to land alone. Release child's hands while he is in the air.
4 Jump down from knee height with a two-foot take-off and landing, three times in a row, on three separate occasions.	M. Hold child's hands from in front. Pull downward on arms so that child crouches (or have someone bend his knees from behind). When child is in crouch position, pull up on hands and lift child up and off bench to floor. Be sure child is momentarily suspended.	Jump onto a crash pad, into sand, snow or foam rubber. Run to the edge and jump. Move target further away from take-off spot. Fade prompts by releasing child's hands in air decreasing contact time in successive trails.

continued

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
Continued	MP. Manipulate child into crouch then hold hands out in front so that child reaches for them as he jumps. Reduce contact time until child touches hands only on landing. Finally, hold out hands but do not allow contact throughout jump.	
	D. Jump off bench from two feet exaggerating the knee bend and forward armswing. Bend knees on landing.	
	VC. "Jump Down".	
5 Jump down from hip	M. Face child, hold both hands and support child after he initiates the jump.	Gradually increase height of jump.
	MP. Hold one hand. Fade prompts by releasing child's hands in air, decreasing contact time in successive trials.	Say 'Jump to me' and stand back 4' - 5'.
		Jump onto crash pad.
	D. Jump off high box, exaggerating the knee bend on take-off and on landing.	Do a jump, land and roll (or fall) on a crash pad.
	VC. "Jump".	

SPECIFIC EQUIPMENT SKILLS | TPO | EQUIPMENT

Tricycle

TO PEDAL A TRICYCLE

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
1 Sit on tricycle with hands grasping handlebars, feet maintaining contact with the pedals while being pushed 20 feet on three separate occasions.	M. Stand behind child, place feet on pedals and hands on bars. Keep hands on child's hands and push trike from behind. When child can hold on with hands, put your hands on his feet on the pedals and hold them there while you push. MP. Push from behind or beside trike holding only one of child's hands on trike. Reduce to placing hands and feet on trike to start and then pushing from behind. Tap hands or feet when they come off pedals and handlebars. D. Stand behind child, reach around him and grasp handlebars to demonstrate grip. VC. "Put ycur <u>feet</u> on the <u>pedals</u>" and "Hold on".	Tie a rope to front of tricycle and pull child. Put straps on the pedals to hold feet on. Wait until child's hands and feet are in proper position before you push.

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
2 Push tricycle pedals six times after being given an initial push on three separate occa-stions.	M. Stand beside or behind trike and push down on child's thighs, knees or feet are on pedals. MP. Push knees of child and stop, allowing trike to continue. Push again before trike stops. D. Point to other children riding trike. VC. Continually say "Push (the pedals)", "Push hard!"	Push trike hard enough so that the child rides for 10 to 20 feet alone. A fast push will help child attend to task. Use repeated pushes so that trike does not stop. Walk backwards in front of tricycle and pull on child's trouser legs to keep bike going.
3 Pedal for 20 feet start-ing from a stopped posi-tion (child initiates motion himself) on three occasions.	M. Place pedal at highest point. Push down on child's knee to initiate motion. Repeat on other leg. MP. Place pedal at highest point. Push slightly on knee. Reduce pushes to taps. D. Stand beside child and lift foot. Push foot towards floor. VC. "Push hard".	If there are two teachers available, one can stand behind the child to help initiate the movement while the other stands in front and claps or calls child's name.
4 Pedal the tricycle for 20 feet steering around 3 obstacles placed in path-way on three separate occasions.	M. Hold handles of trike and steer around the obstacles as child pedals.	Place chairs, boxes, etc. in child's pathway. Form pathways on floor with ropes, tape or sticks for child to follow.

Continued

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
Continued	MP. Slightly turn the handles as child approaches the obstacle so that tricycle doesn't stop. Repeat to straighten out. Reduce prompt until you just touch child's hand to indicate turn.	Set up obstacle courses of cones for child to ride around.
	D. Stand behind child with arms around him and move handles to right and left while child pedals.	
	VC. When approaching obstacle teacher says "Turn!"	

BODY CONTROL

TPO

TO SWING ON A BAR

<u>EQUIPMENT</u>

Horizontal bar above head height

Bench.

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
1 Hang from horizontal bar (above head height) unsupported for five seconds, three times on three separate occasions.	M. Stand behind child and lift him up to the bar, placing hands on bar. Teacher puts hands firmly over child's and child hangs from bar. MP. Lift child up to bar. Child grabs onto bar. Teacher holds child lightly under shoulders. Reduce support until child hangs alone. D. Teacher or another child hangs from bar. VC. "Hold on".	
2 Stand on bench and hold onto bar with two hands. Step off bench and hang under bar for five seconds on three separate occasions.	M. Stand child on bench and place child's hands on bar. Place one hand over child's hands, lift child's feet off the bench and allow child to hang.	Put a chair or box near the bar if a bench is not available.

Continued

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
Continued	MP. Stand child on bench. Child grabs bar. Lift child's feet off bench and allow to hang for 5 seconds. Reduce lift until child steps off bench alone. D. Watch another child step off bench and hang from bar. VC. "Ready, set, swing!"	
3 Stand on bench and hold onto bar with two hands. Step off bench and swing back and forth at least twice on three separate occasions.	M. Child stands on bench holding bar. As child steps off bench, swing child's legs forwards and backwards. MP. Child stands on bench holding bar. As child steps off bench, prompt child to swing legs forwards and backwards. Reduce prompt until child swings alone. D. Teacher steps off bench and swings on bar. VC. "Swing!"	
4 Stand on bench and hold onto bar with two hands. Step off bench and swing back and forth at least twice. Return with feet onto bench, on three separate occasions.	M. Child stands on bench holding bar. Allow child to step off and swing forwards and backwards. On the backward swing, grab child's legs and place them back on bench behind child.	

Continued

TASK SEQUENCE	SHAPING TECHNIQUES	OTHER TEACHING SUGGESTIONS
Continued	MP. Child steps off bench, swings forwards and backwards. On the backward swing, touch child's legs and steer them towards bench. Child then steps back onto bench. Reduce prompt until child returns to bench alone.	
	D. Teacher steps off bench, swings and returns to bench.	
	VC. "Swing".	

APPENDIX D

REVISED DAILY RECORD AND GRAPHING FORMS

PREP Preschool Play Program
Department of Physical Education
University of Alberta

DAILY RECORD FORM

NAME: ____________________________

MONTH: ____________________________

	TPO ______________			TPO ______________			COMMENTS
	TASK	RESPONSE LEVEL	TIME/ NUMBER	TASK	RESPONSE LEVEL	TIME/ NUMBER	
Week 1 MONDAY							
WEDNESDAY							
FRIDAY							
Week 2 MONDAY							
WEDNESDAY							
FRIDAY							

STUDENT ______________________________

TPO ______________________________

PREP Preschool Play Program
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		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
TASK 5	I																																								
	VC																																								
	D																																								
	MP																																								
	M																																								
TASK 4	I																																								
	VC																																								
	D																																								
	MP																																								
	M																																								
TASK 3	I																																								
	VC																																								
	D																																								
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TASK 2	I																																								
	VC																																								
	D																																								
	MP																																								
	M																																								
TASK 1	I																																								
	VC																																								
	D																																								
	MP																																								
	M																																								

DAYS IN INSTRUCTION

APPENDIX E

RAW DATA: INDIVIDUAL LEARNING CURVES FOR SELECTED TERMINAL PERFORMANCE OBJECTIVES

STUDENT S1

TPO Running

PREP Preschool Play Program
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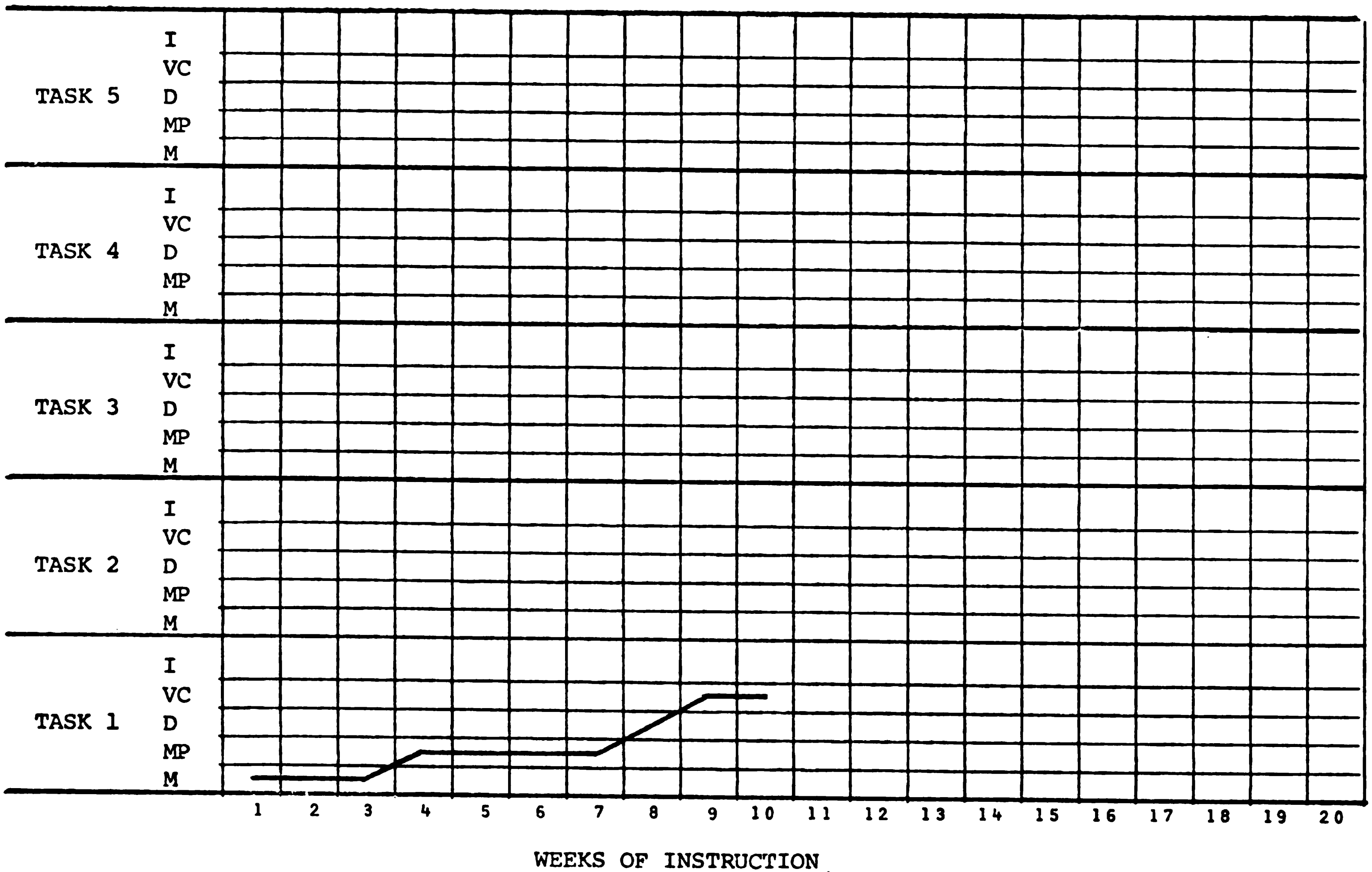
University of Alberta



STUDENT S2

TPO Running

PREP Preschool Play Program
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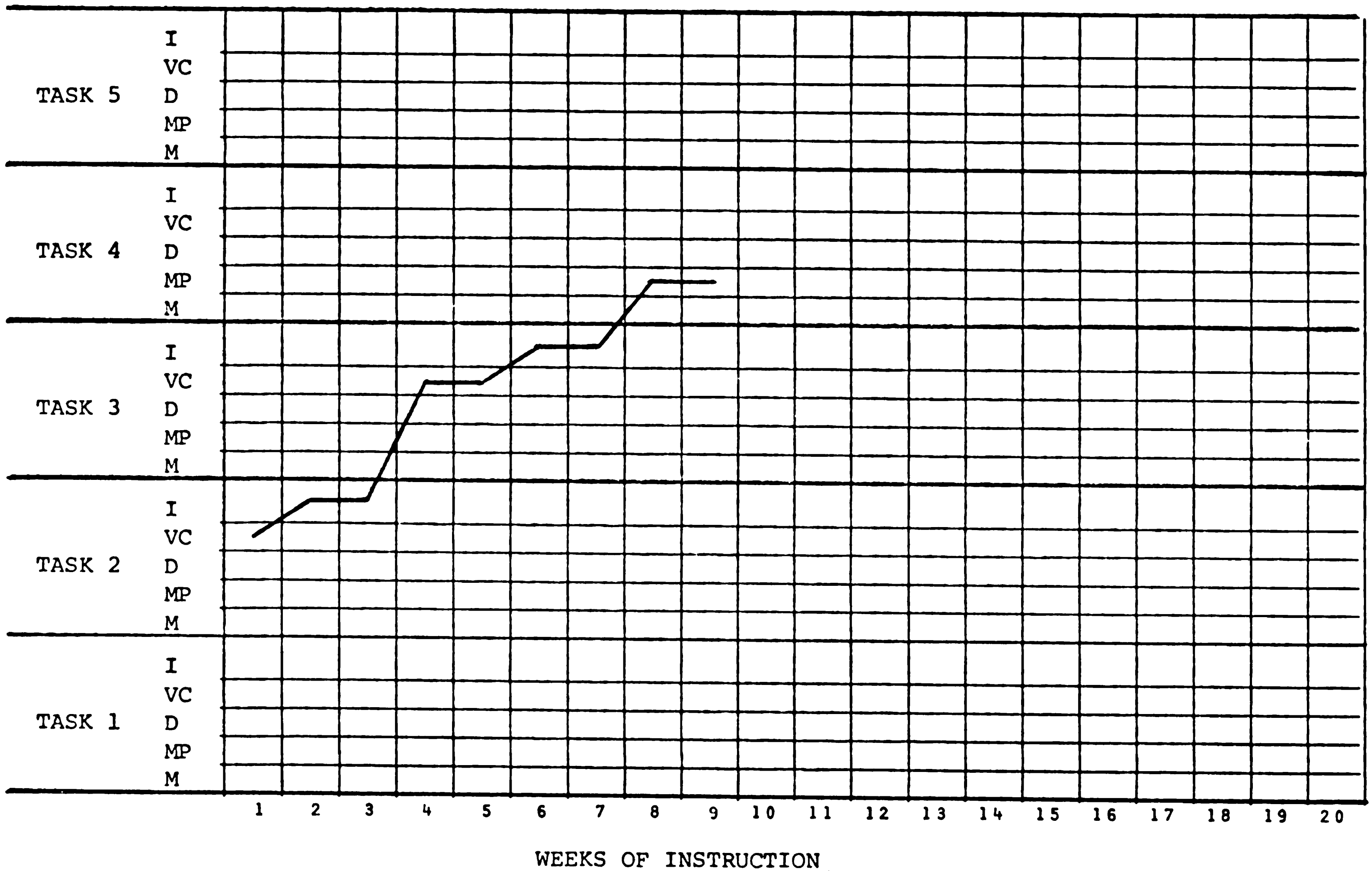

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TPO Running

PREP Preschool Play Program
Department of Physical Education
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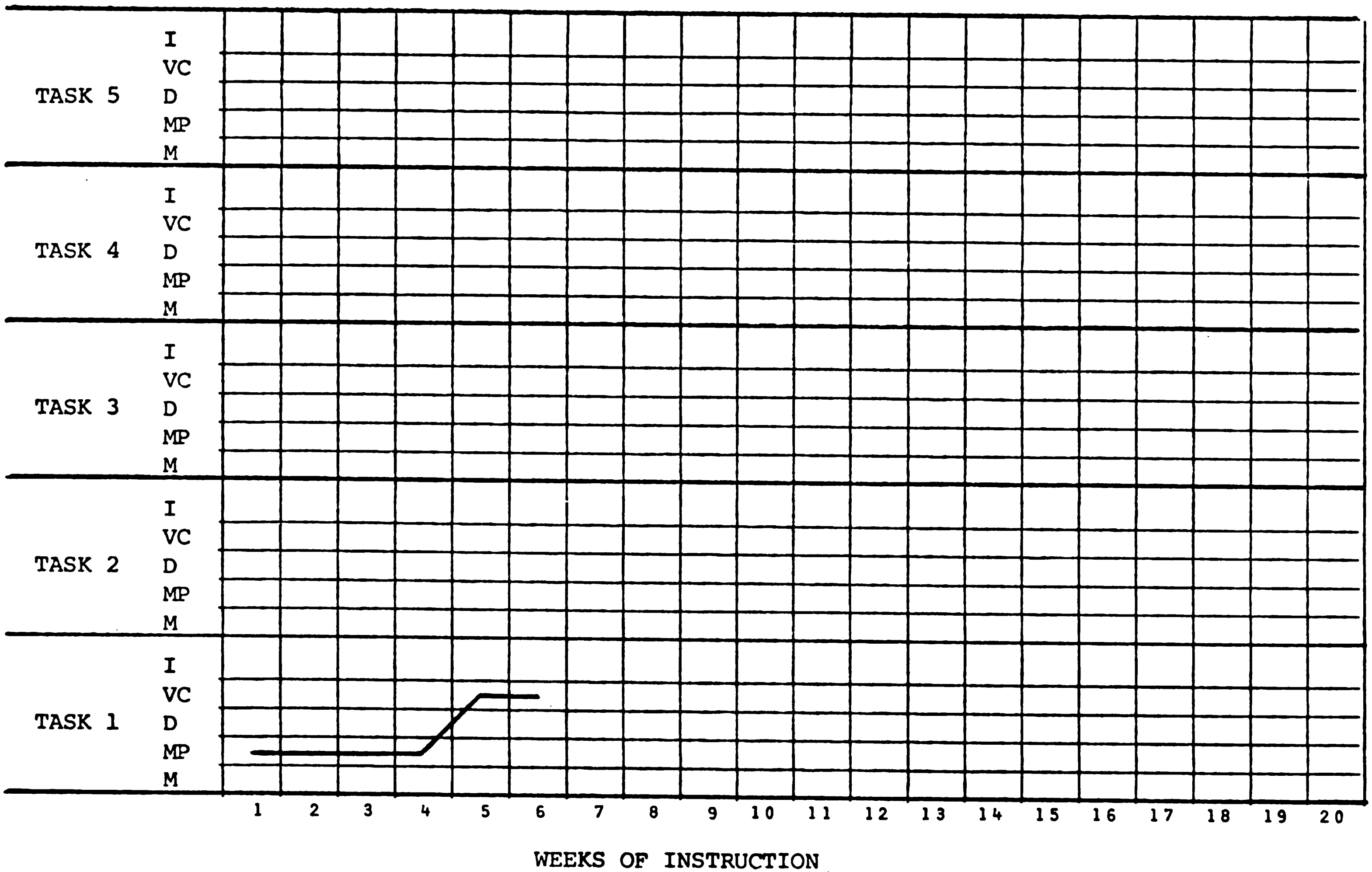
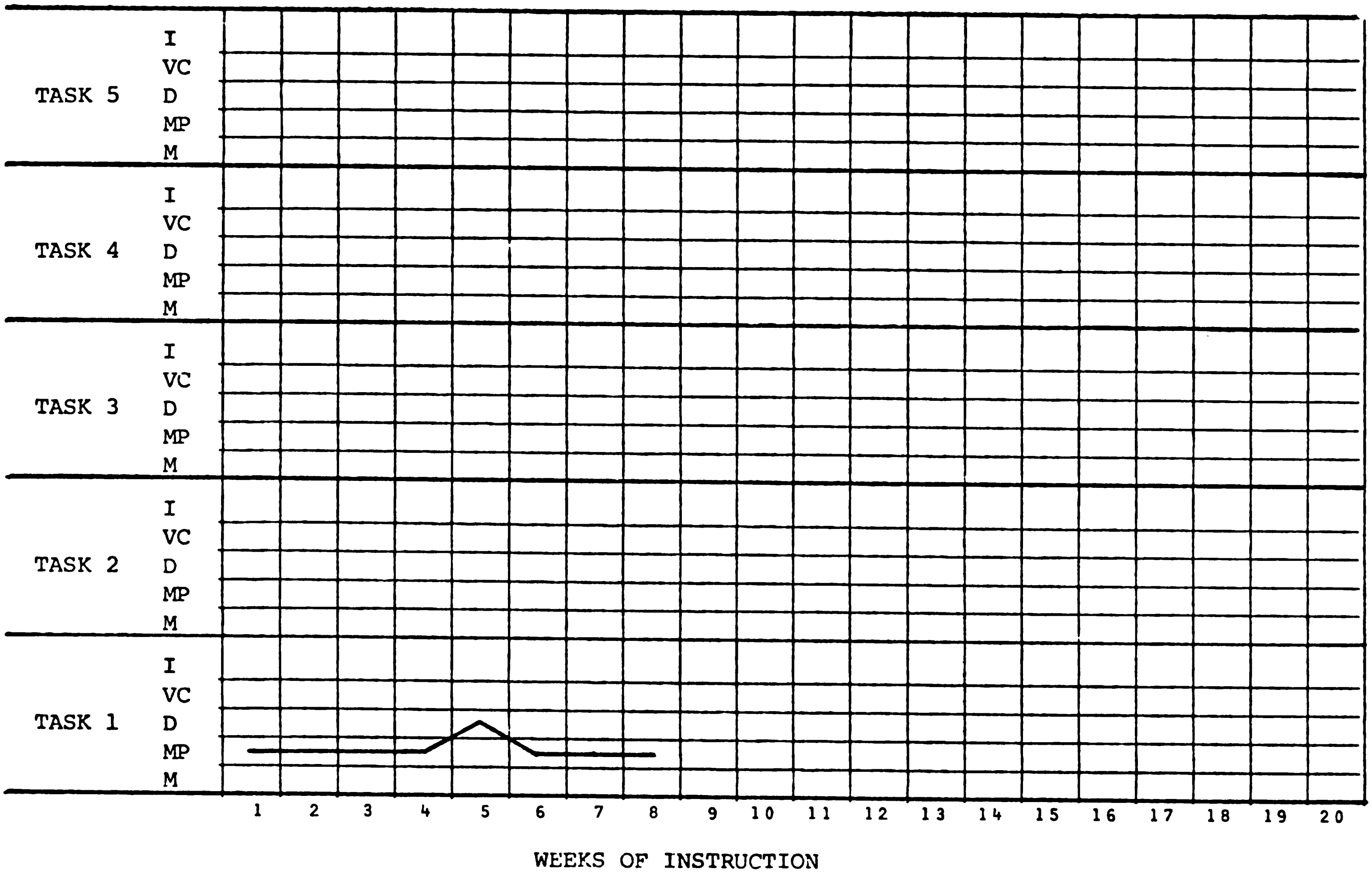


STUDENT S9

TPO Running

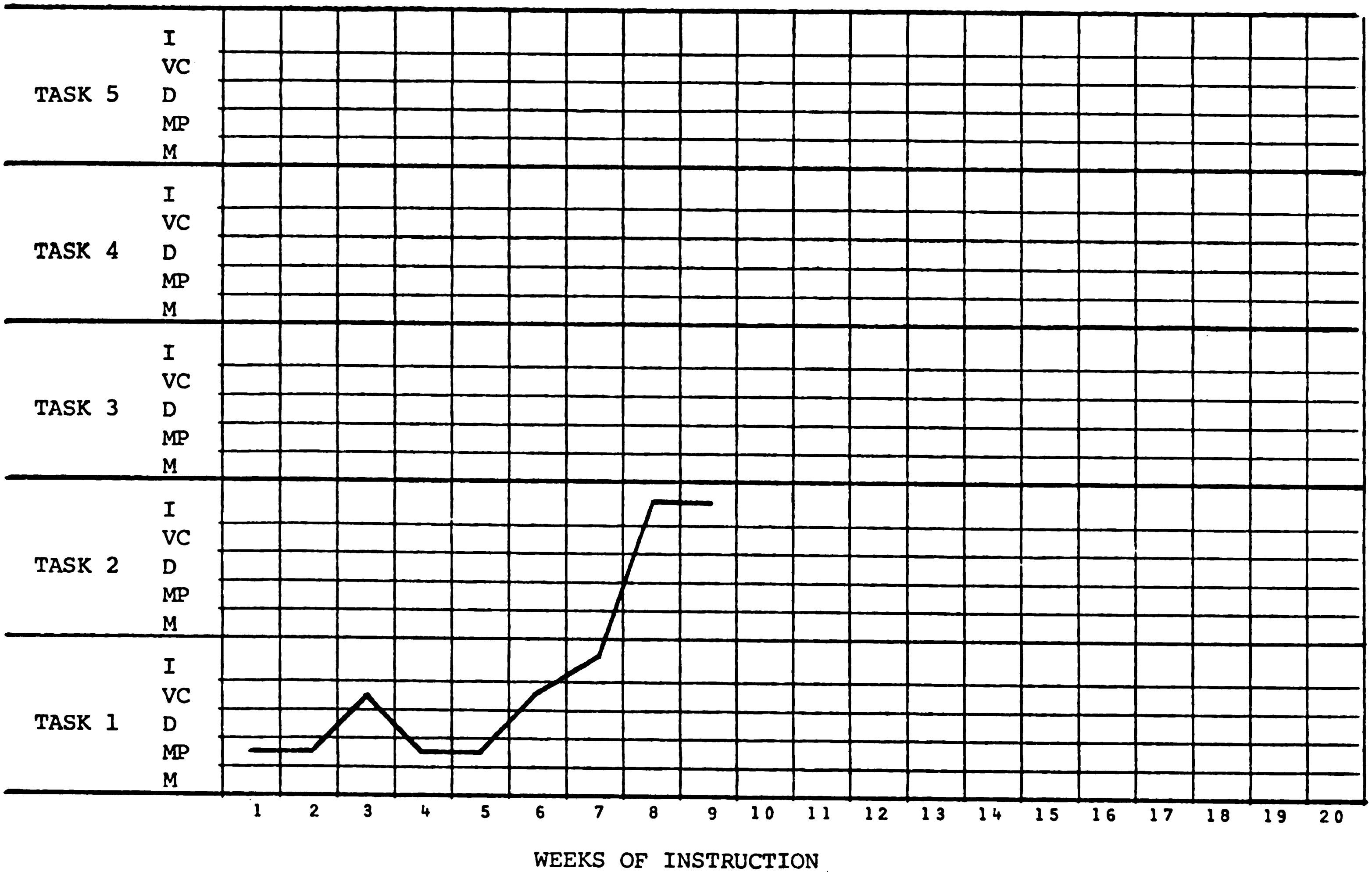
PREP Preschool Play Program
Department of Physical Education
University of Alberta



STUDENT S10

TPO Running

PREP Preschool Play Program
Department of Physical Education
University of Alberta



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TPO Running

PREP Preschool Play Program
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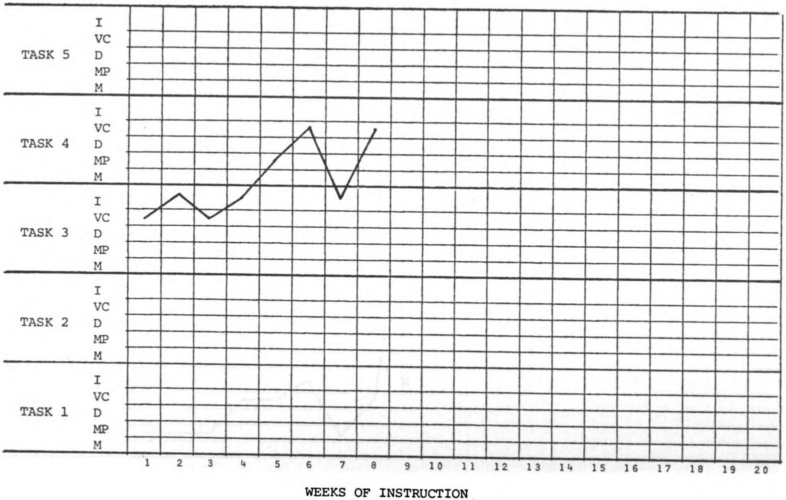

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TPO Running

PREP Preschool Play Program
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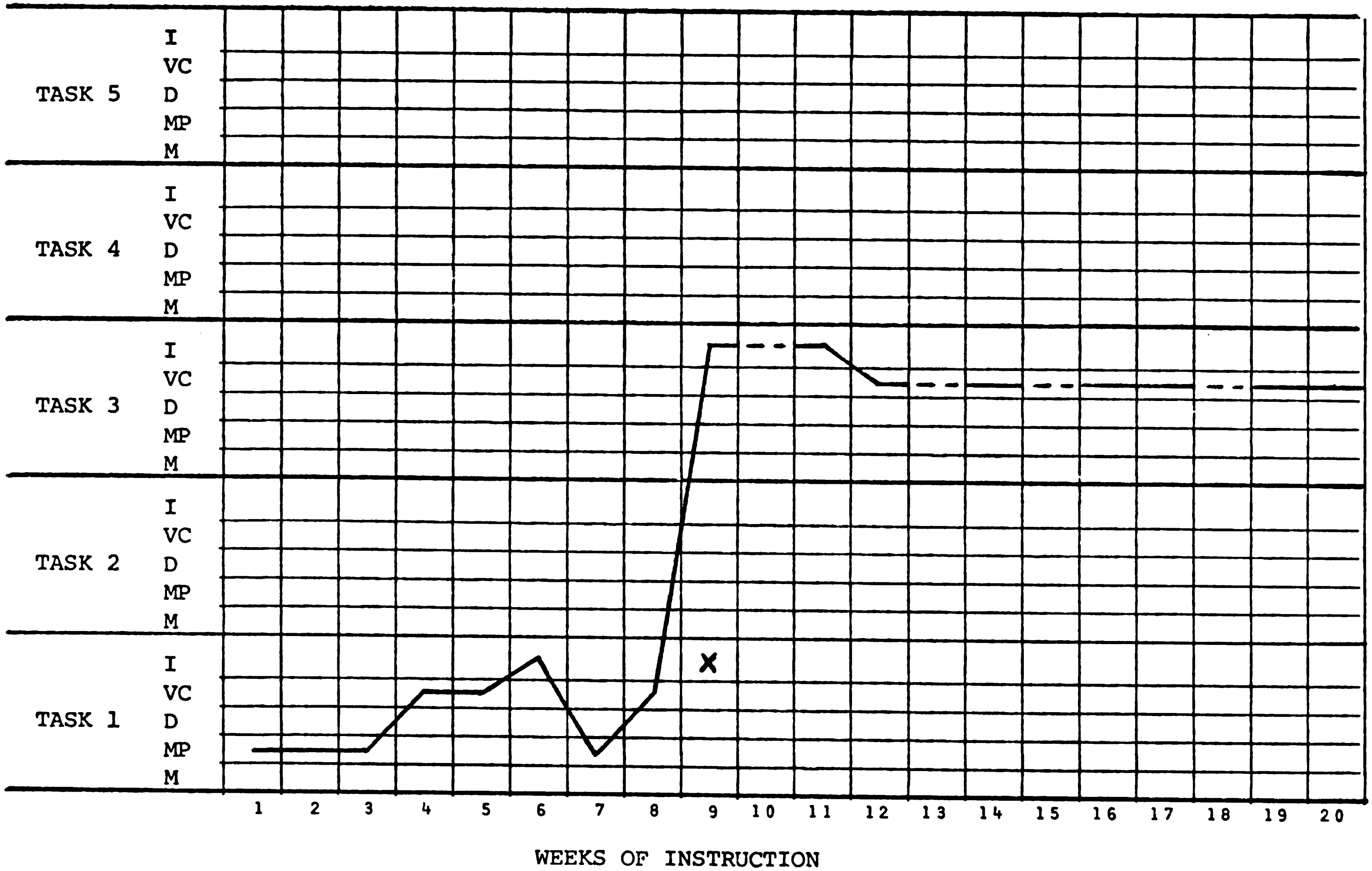

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TPO Running

PREP Preschool Play Program
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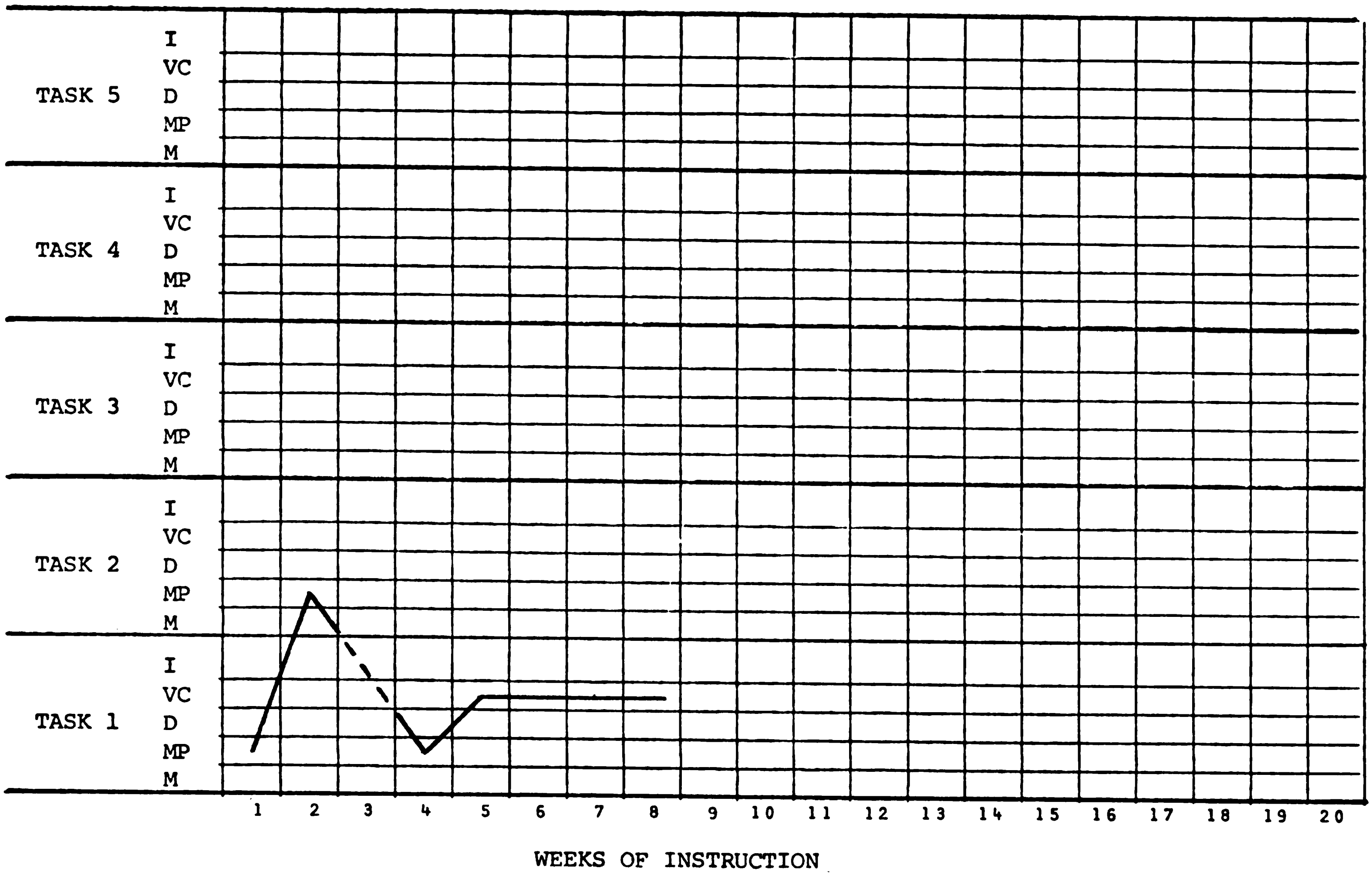
University of Alberta



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TPO Running

PREP Preschool Play Program
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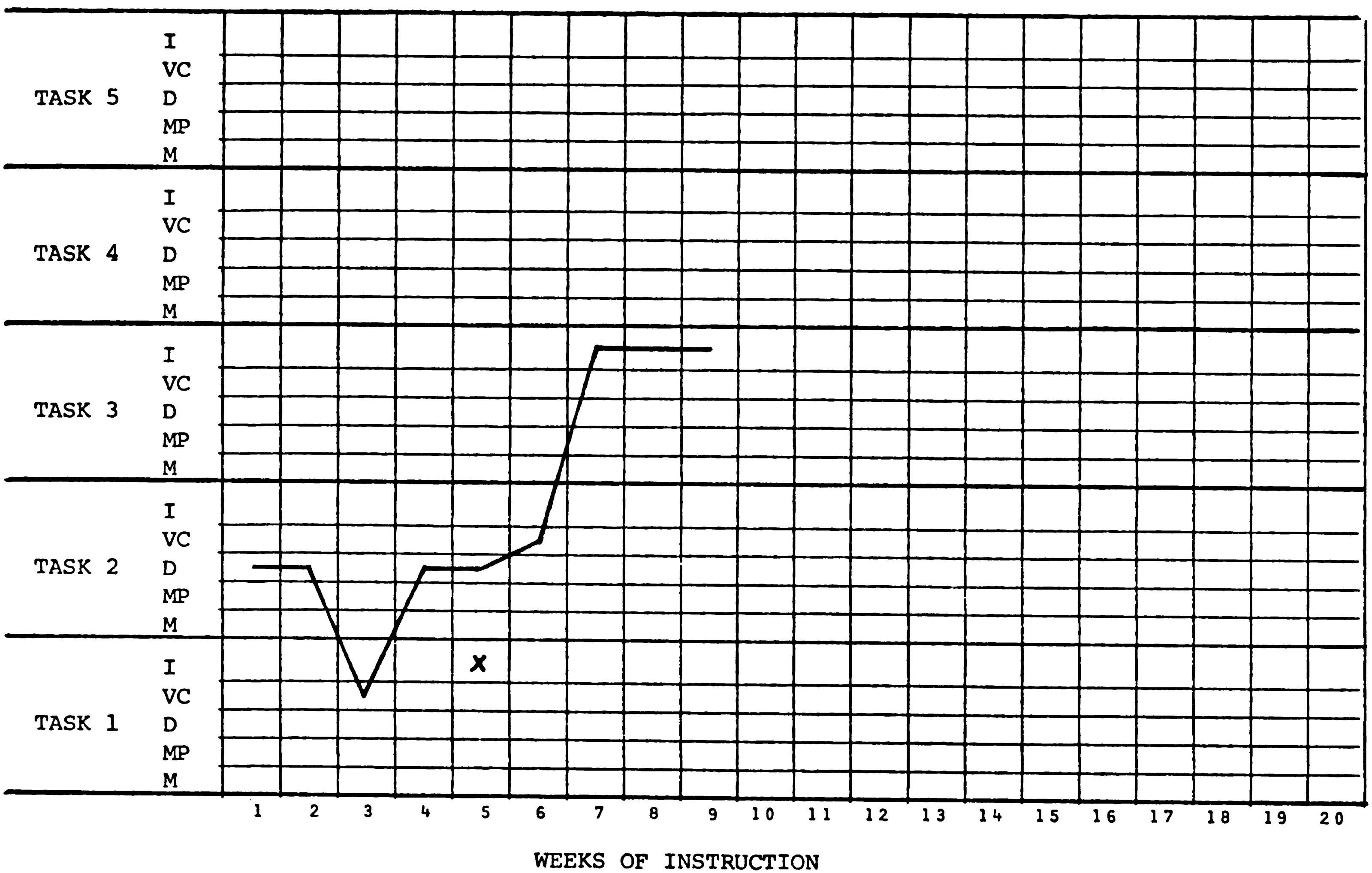

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TPO Running

PREP Preschool Play Program
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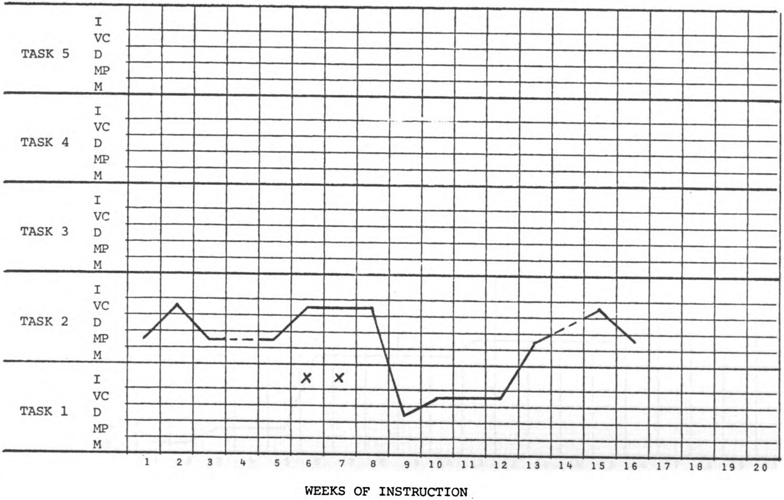

STUDENT S1

TPO Jumping Down

PREP Preschool Play Program
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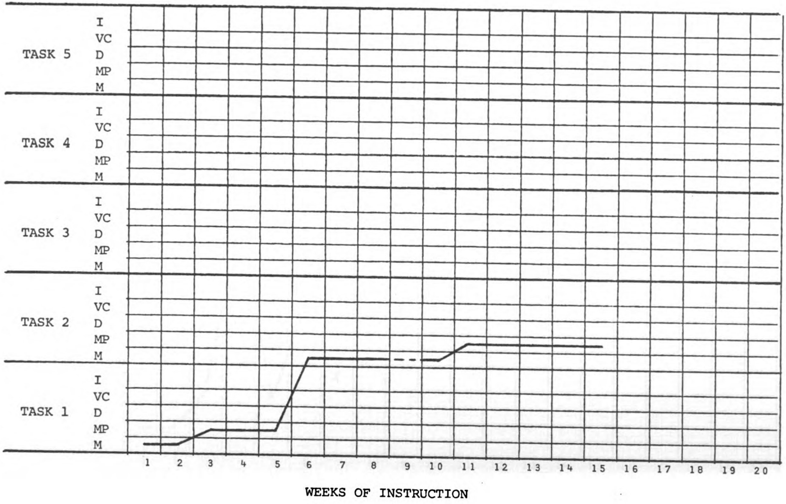

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TPO Jumping Down

PREP Preschool Play Program
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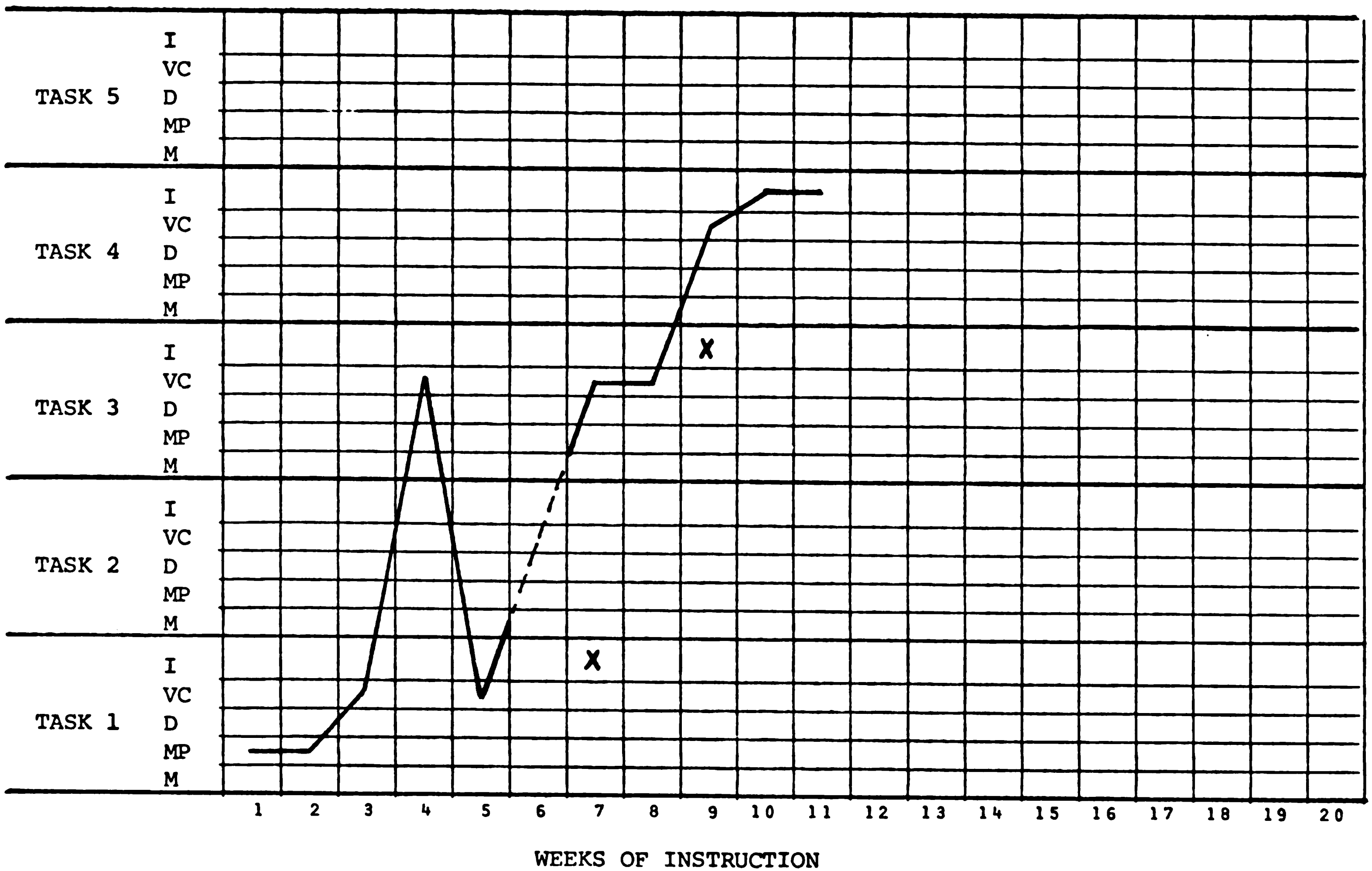
University of Alberta



STUDENT S13

TPO Jumping Down

PREP Preschool Play Program
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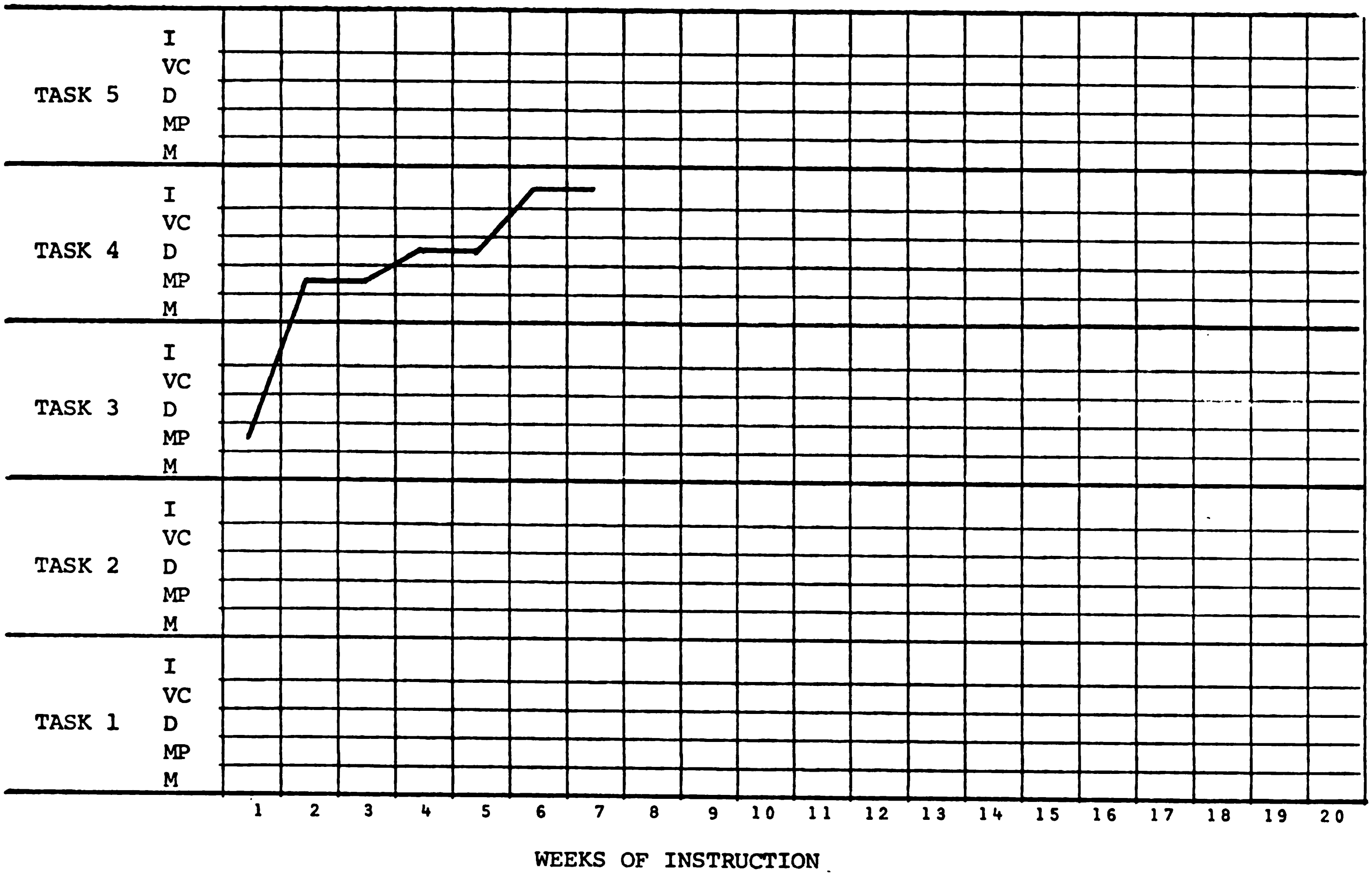
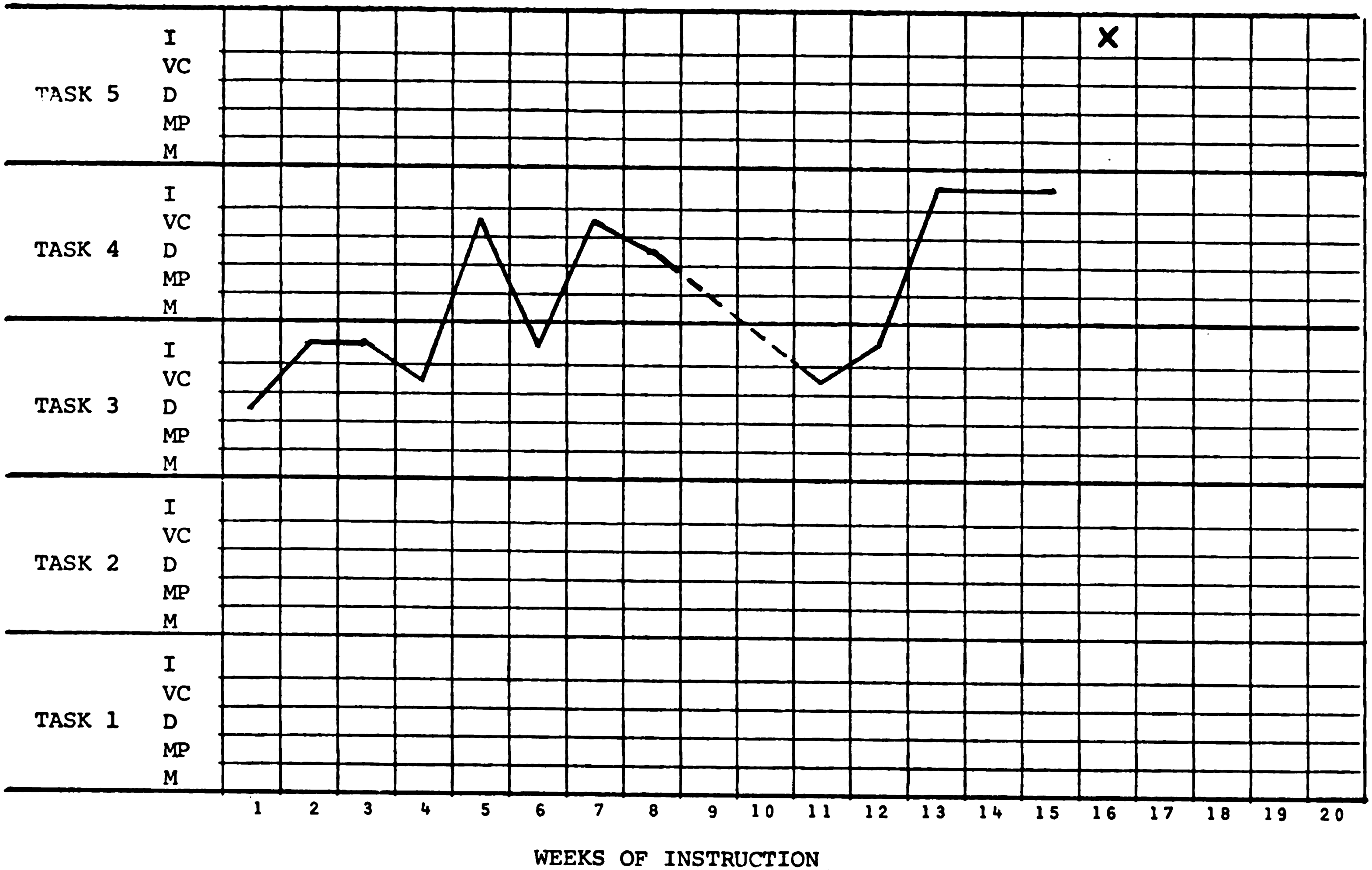


STUDENT S14

TPO Jumping Down

PREP Preschool Play Program
Department of Physical Education
University of Alberta



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TPO Jumping Down

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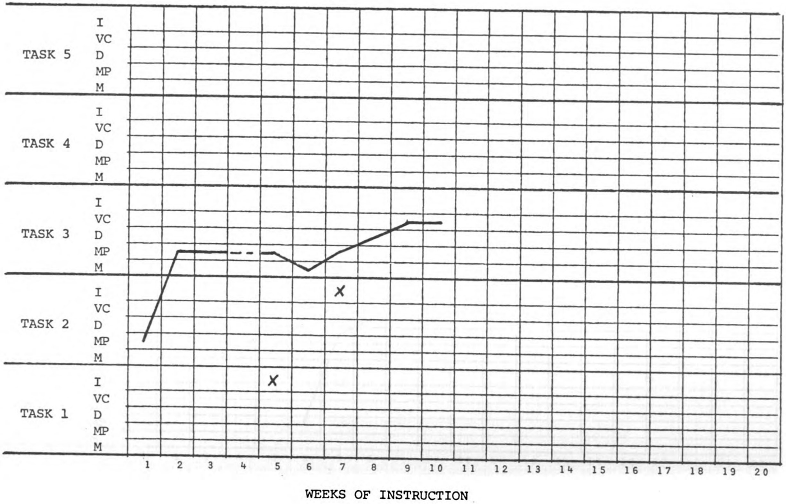
University of Alberta



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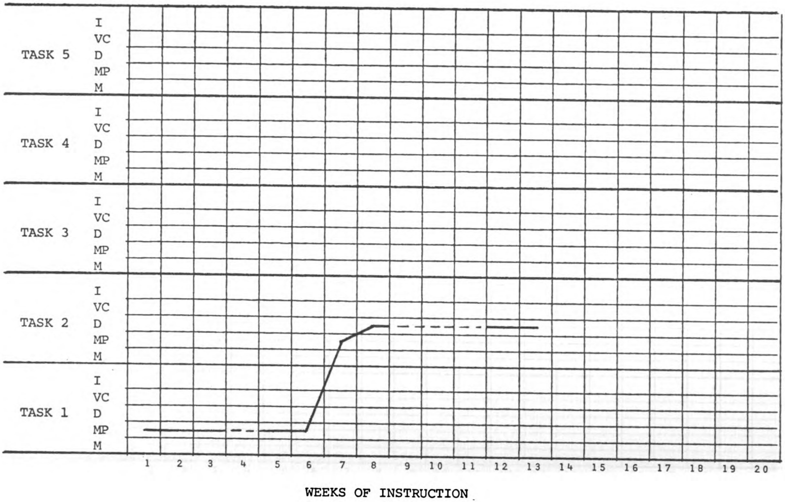
TPO Jumping Down

PREP Preschool Play Program
Department of Physical Education
University of Alberta



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TPO Jumping Down

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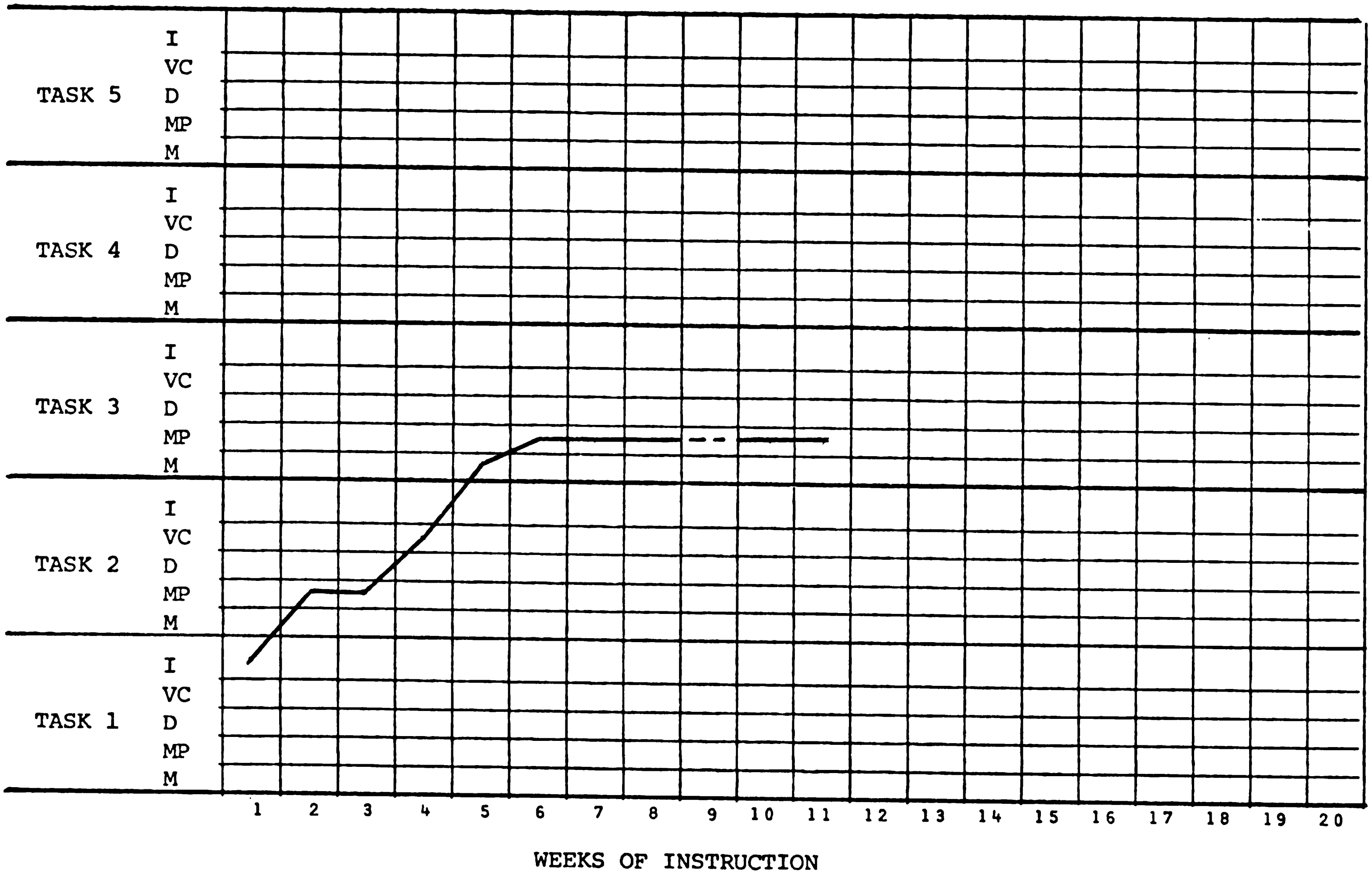
University of Alberta



STUDENT S18

TPO Jumping Down

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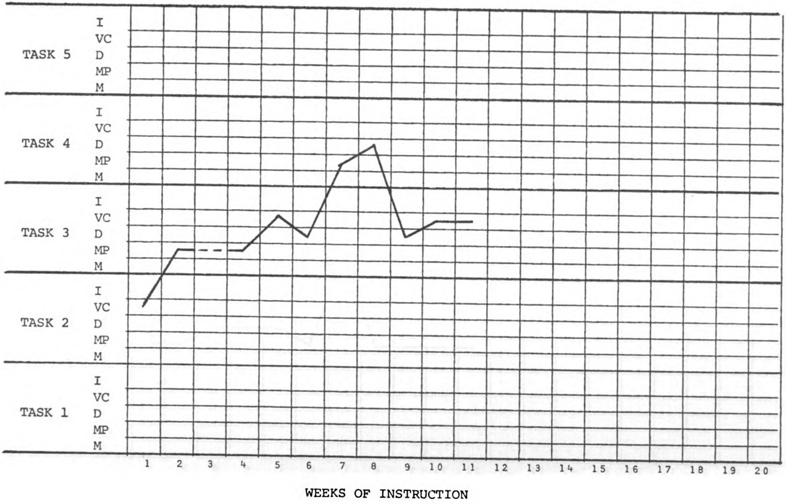
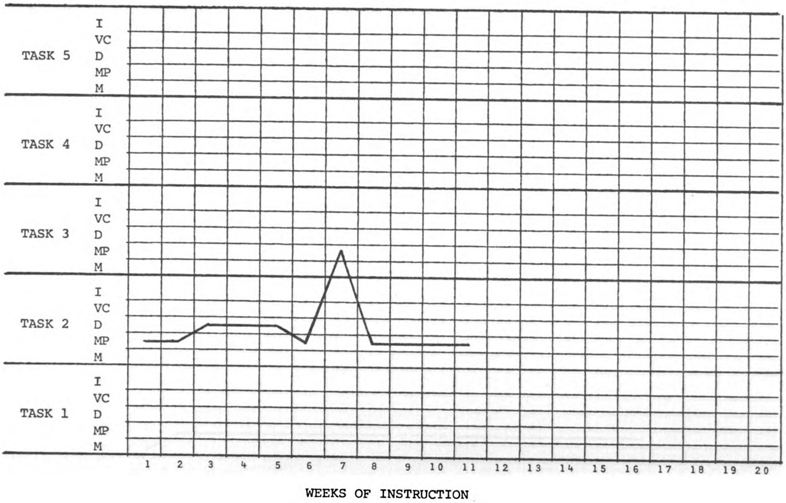


STUDENT S21

TPO Jumping Down

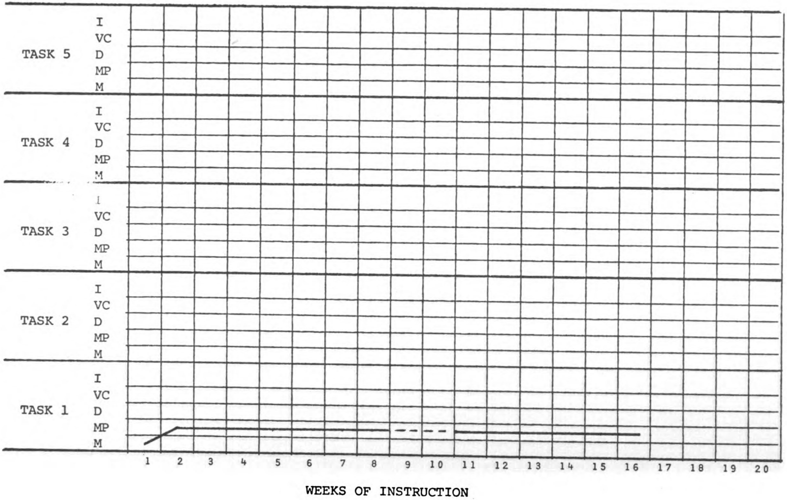
PREP Preschool Play Program
Department of Physical Education
University of Alberta



STUDENT S2

TPO Tricycling

PREP Preschool Play Program
Department of Physical Education
University of Alberta



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TPO Tricycling

PREP Preschool Play Program
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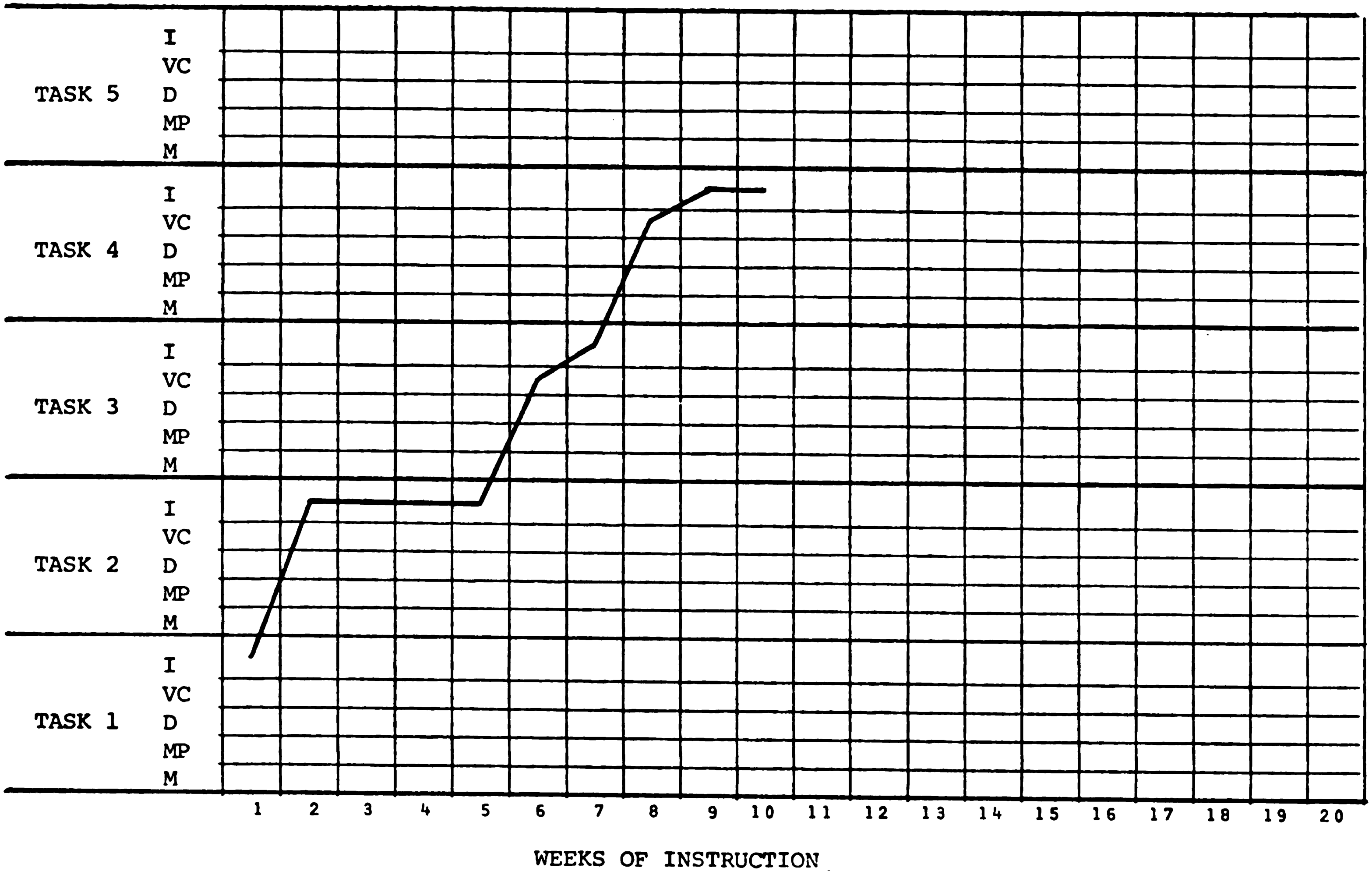

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PREP Preschool Play Program
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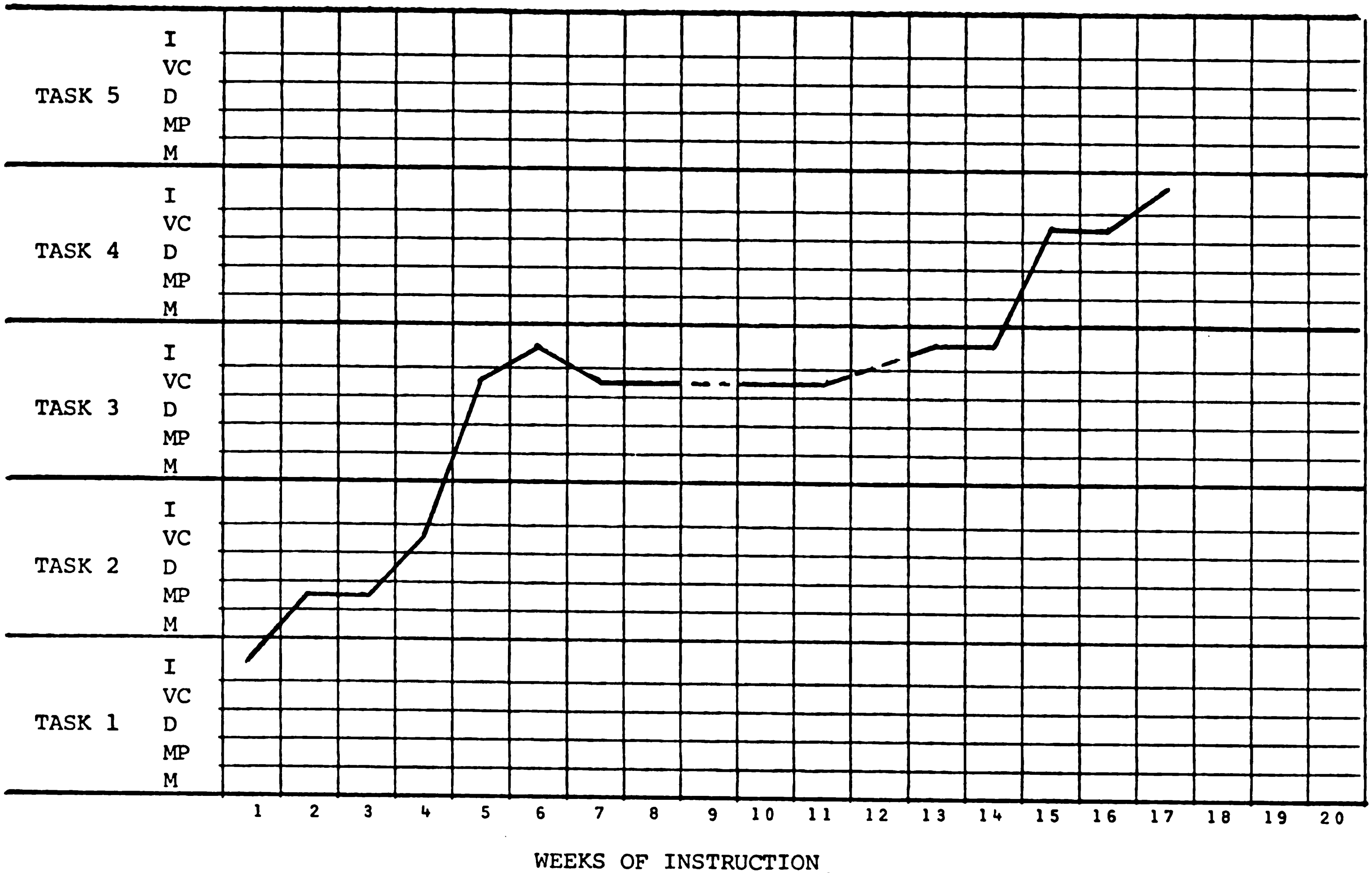

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PREP Preschool Play Program
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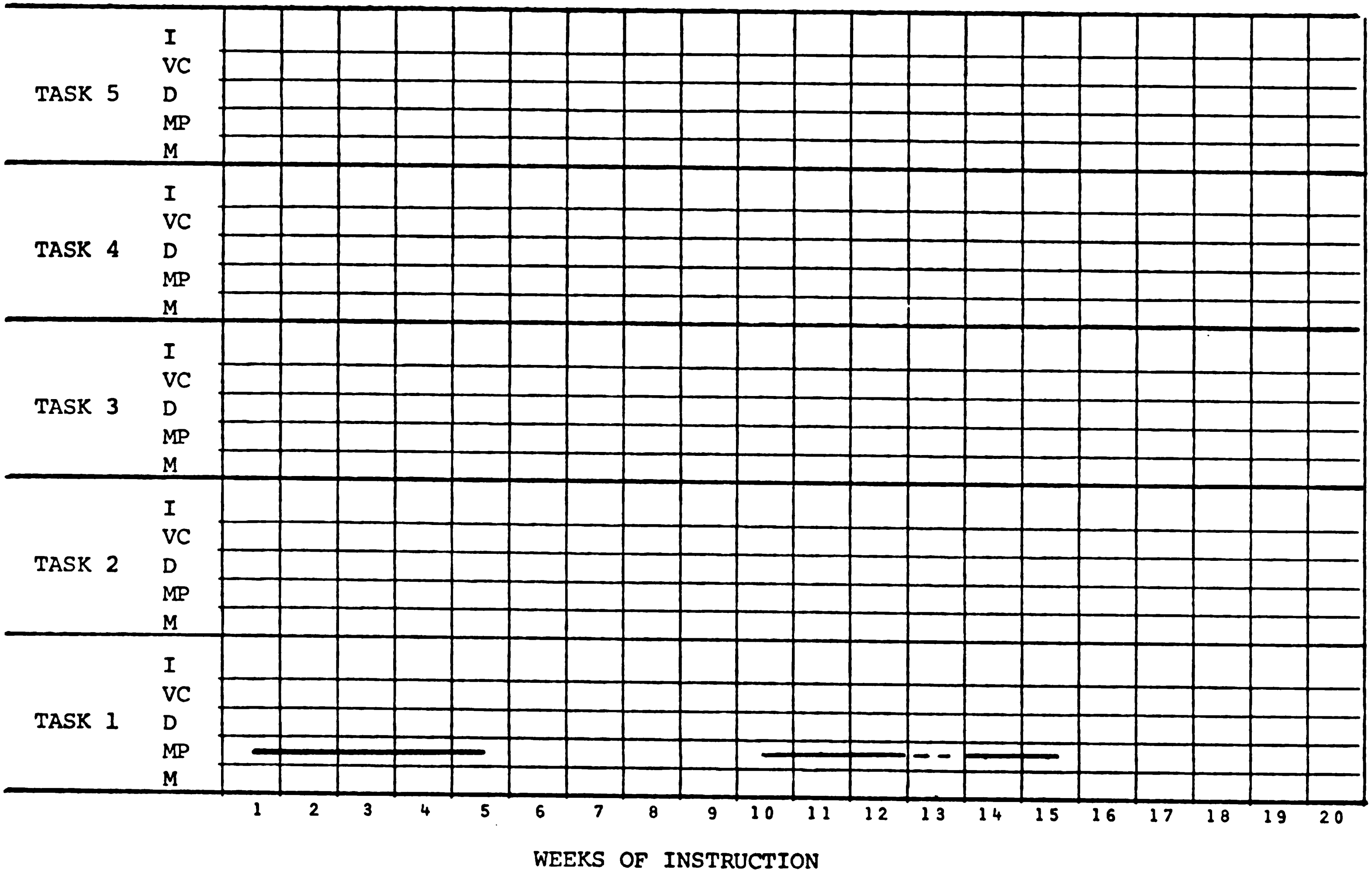
University of Alberta



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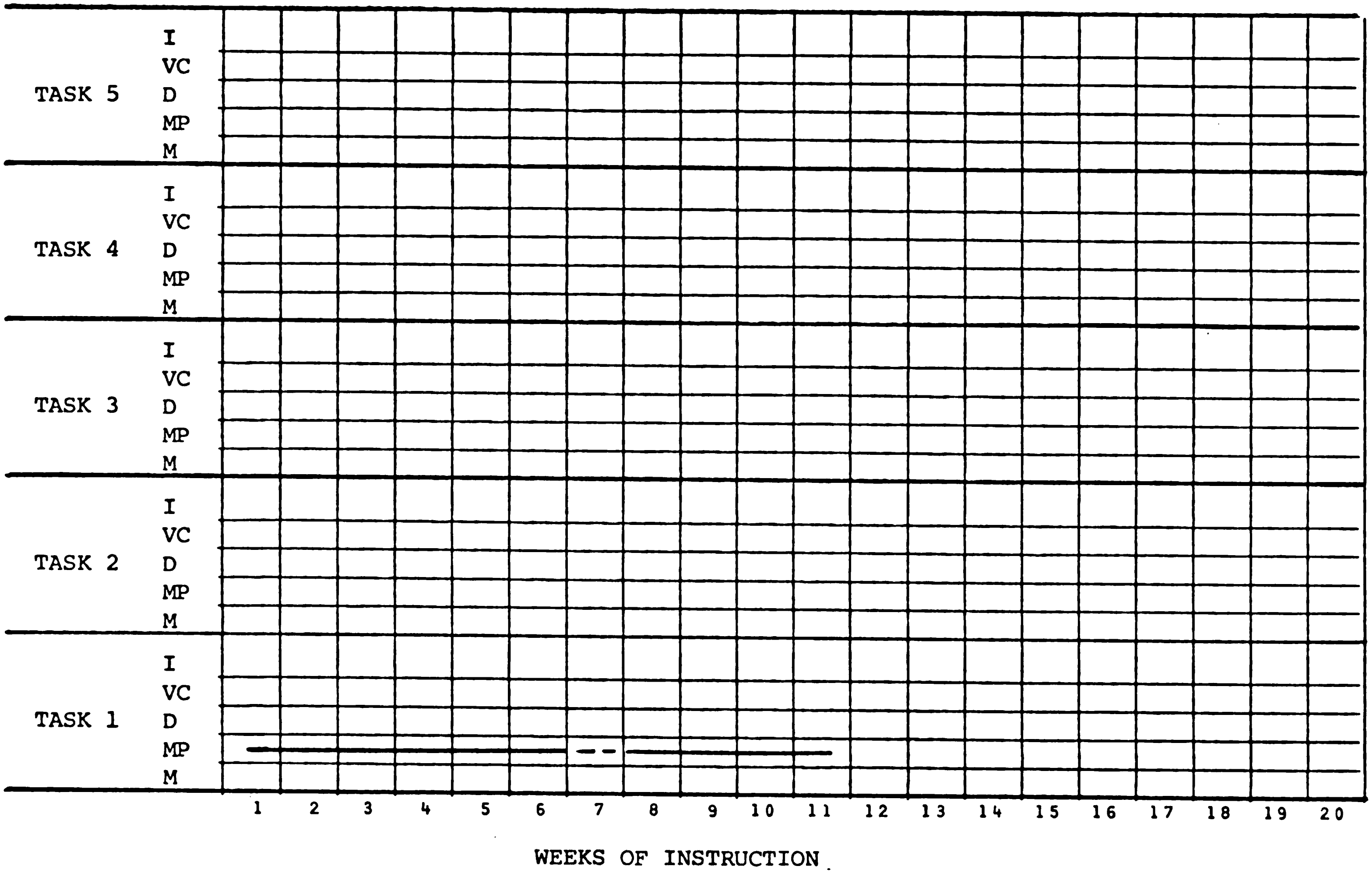
PREP Preschool Play Program
Department of Physical Education
University of Alberta



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PREP Preschool Play Program
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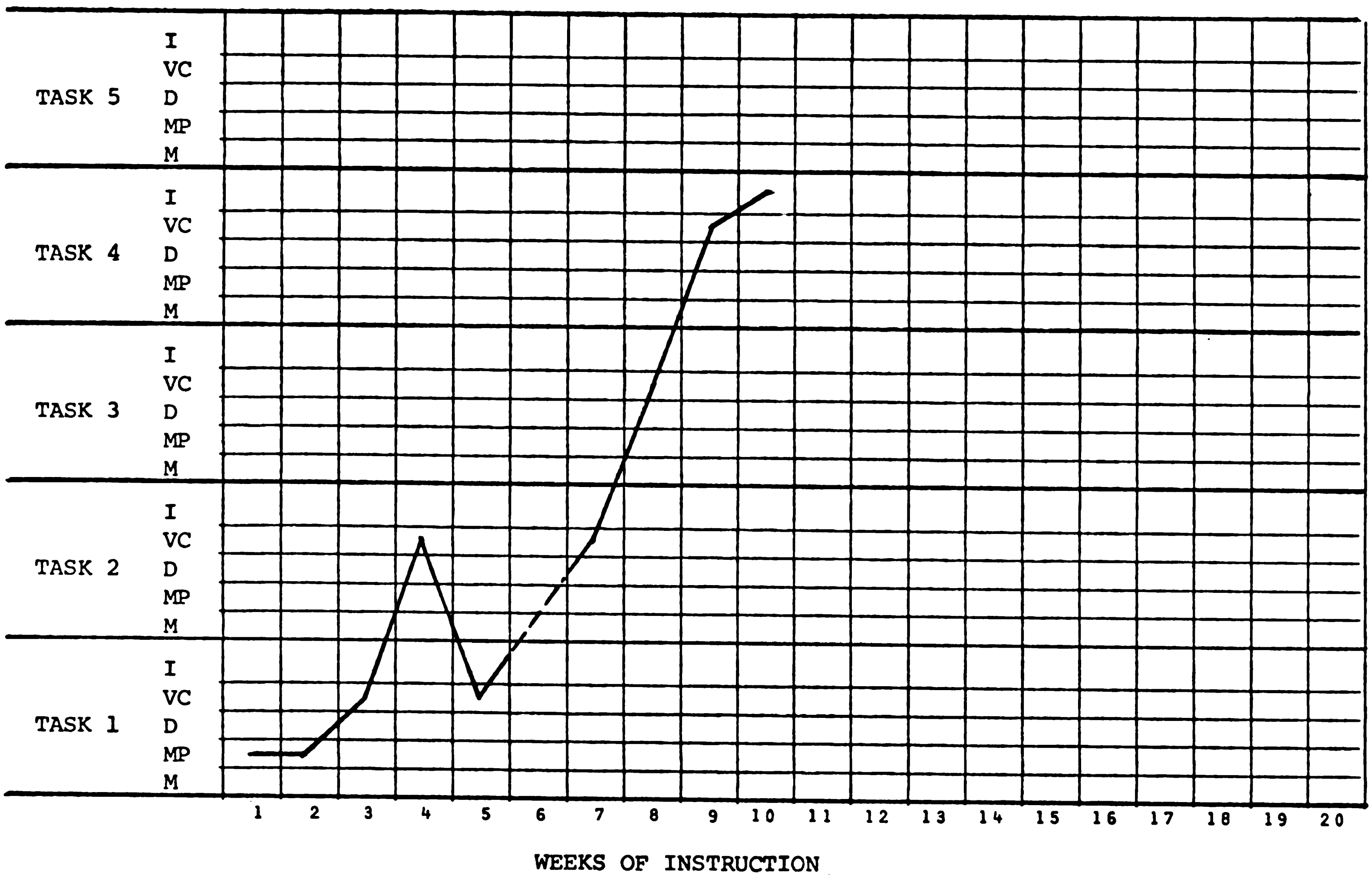

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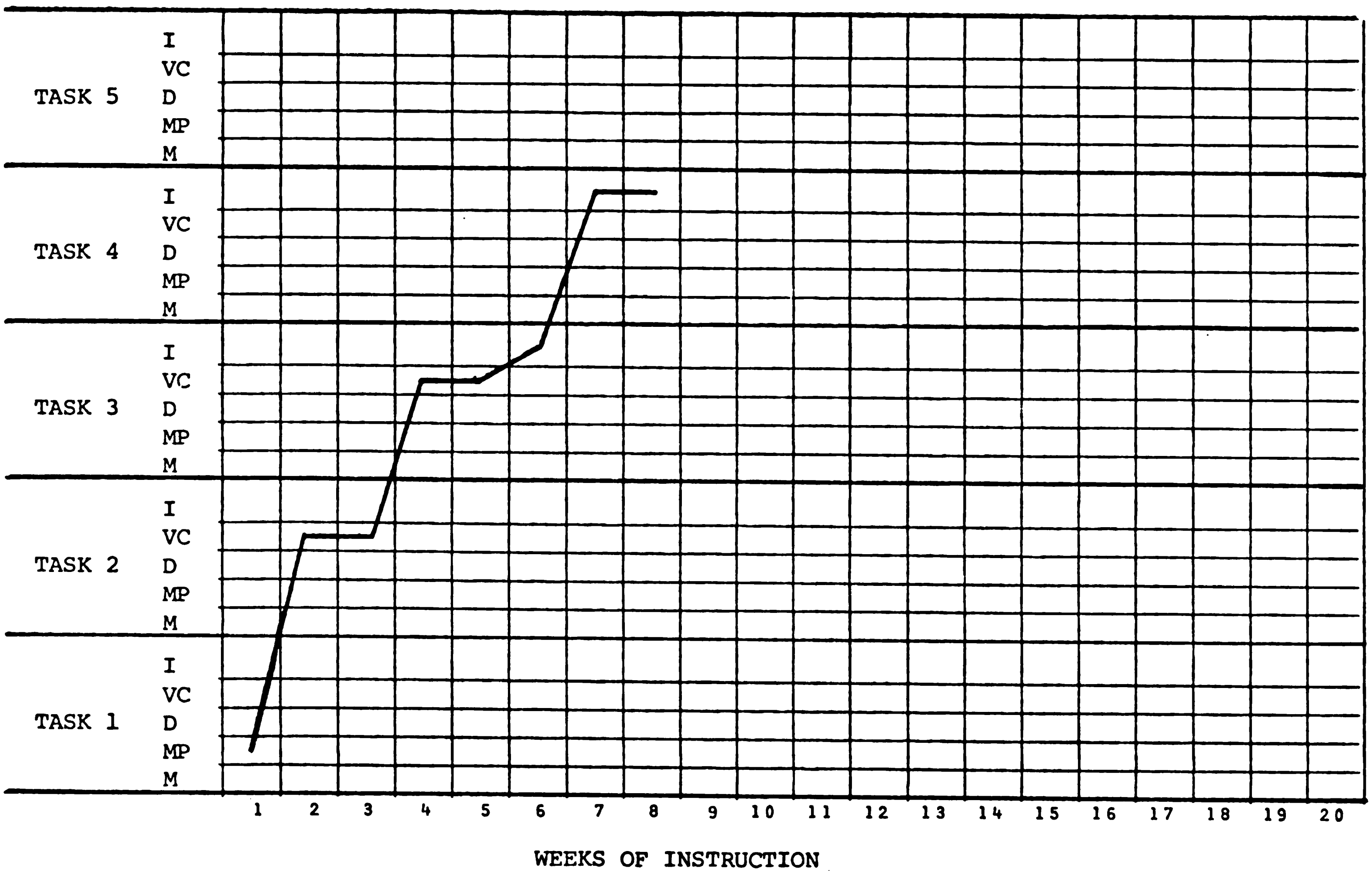

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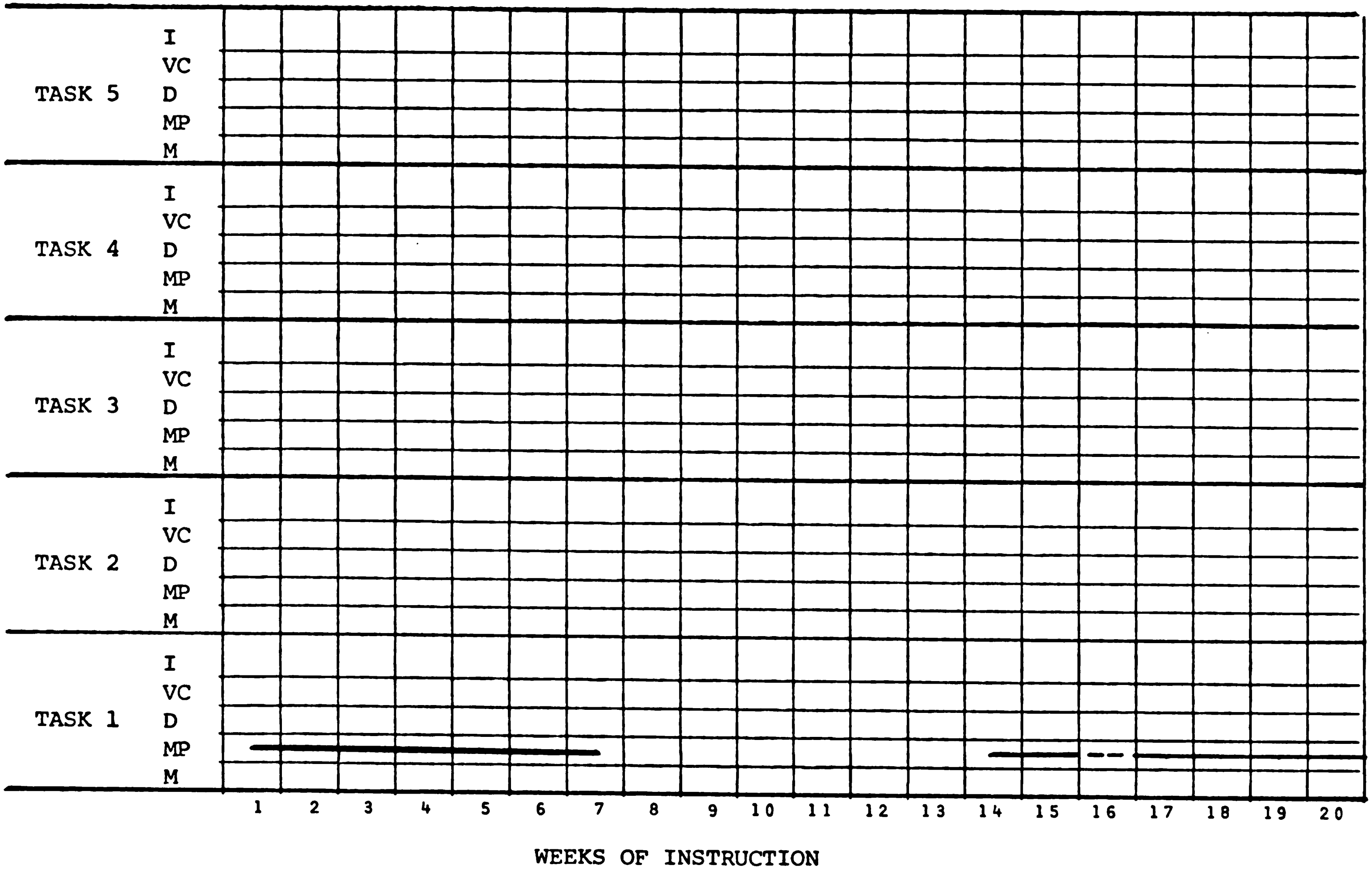

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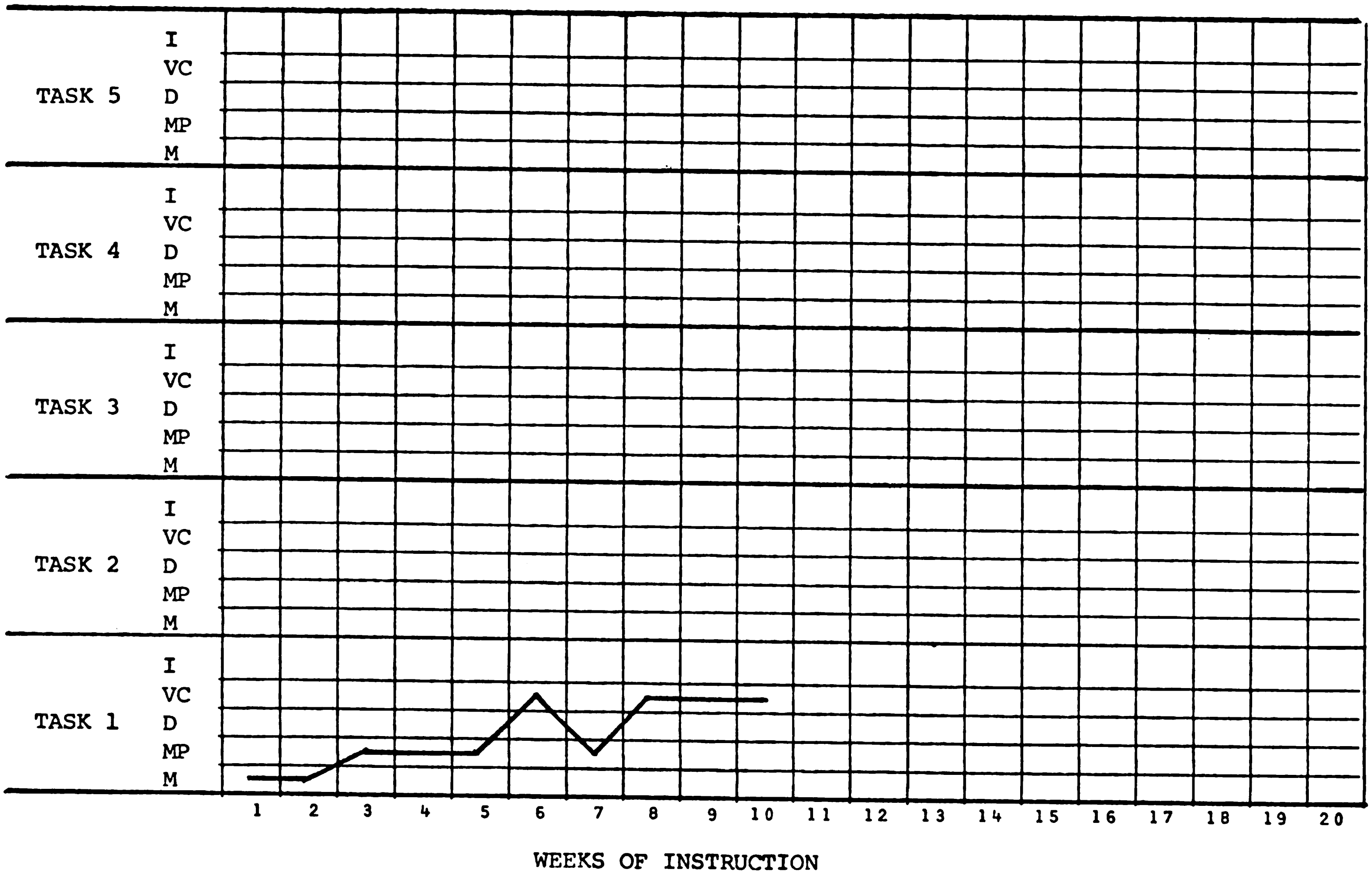

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TPO Tricycling

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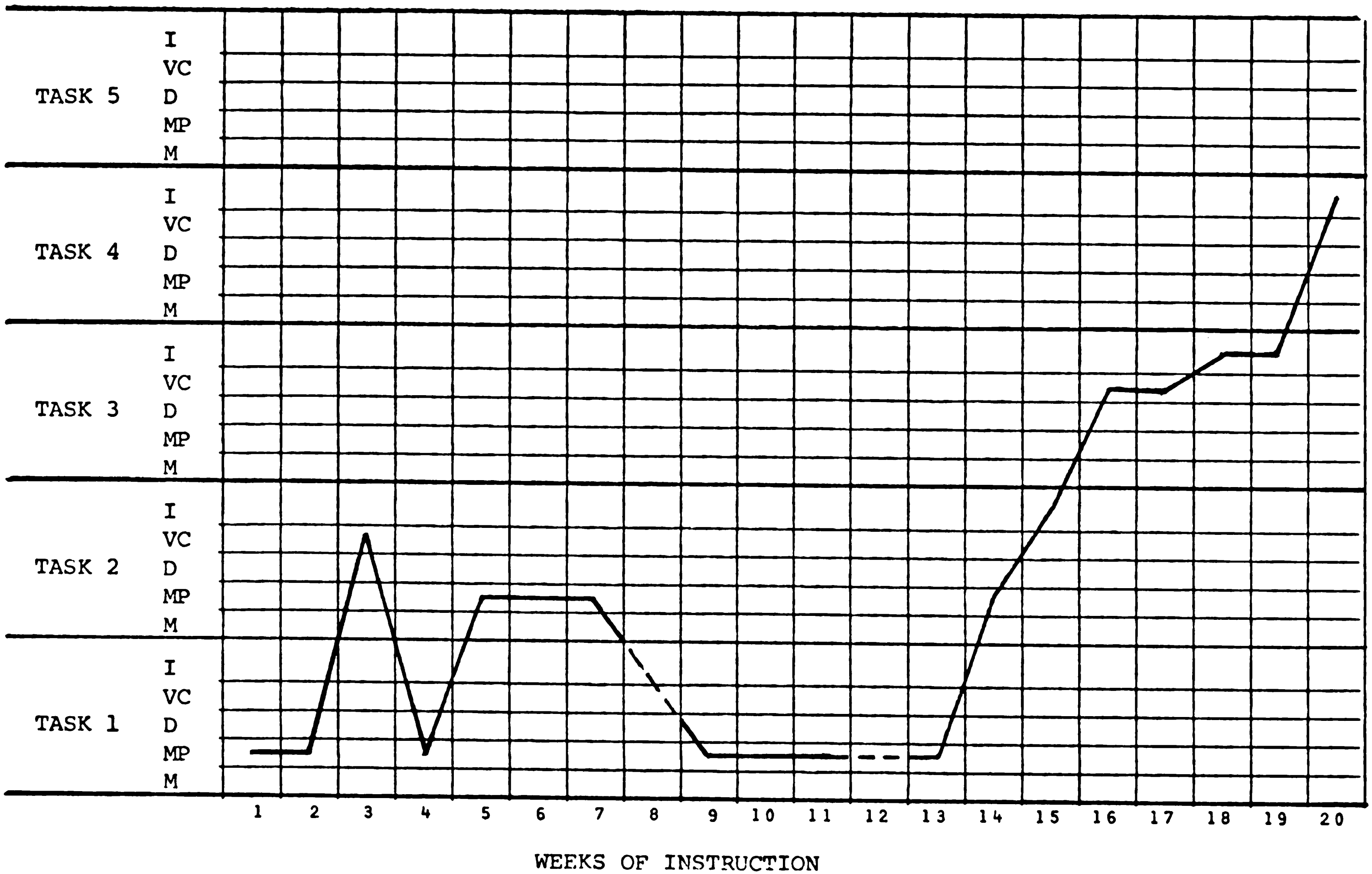

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TPO Tricycling

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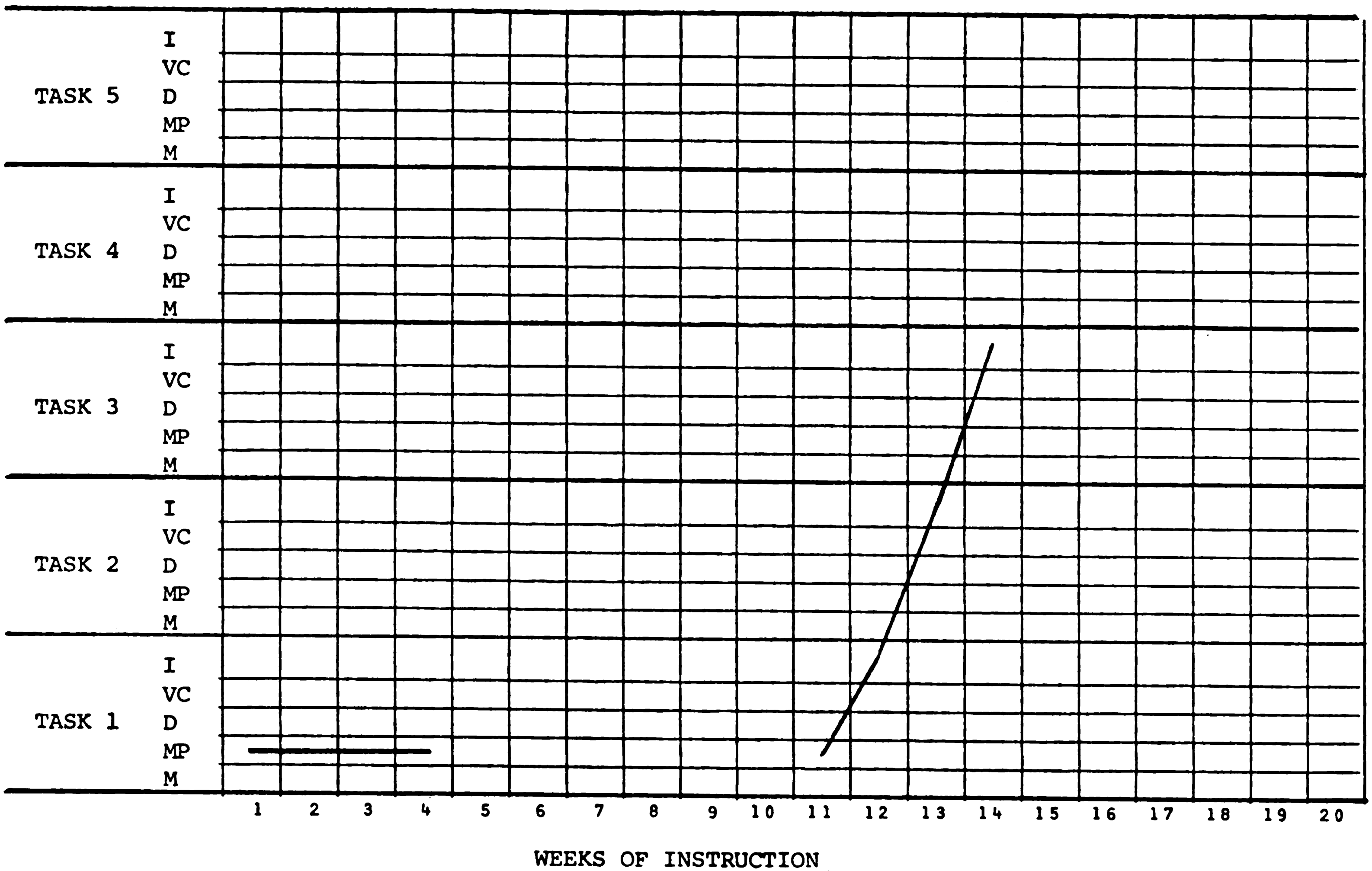
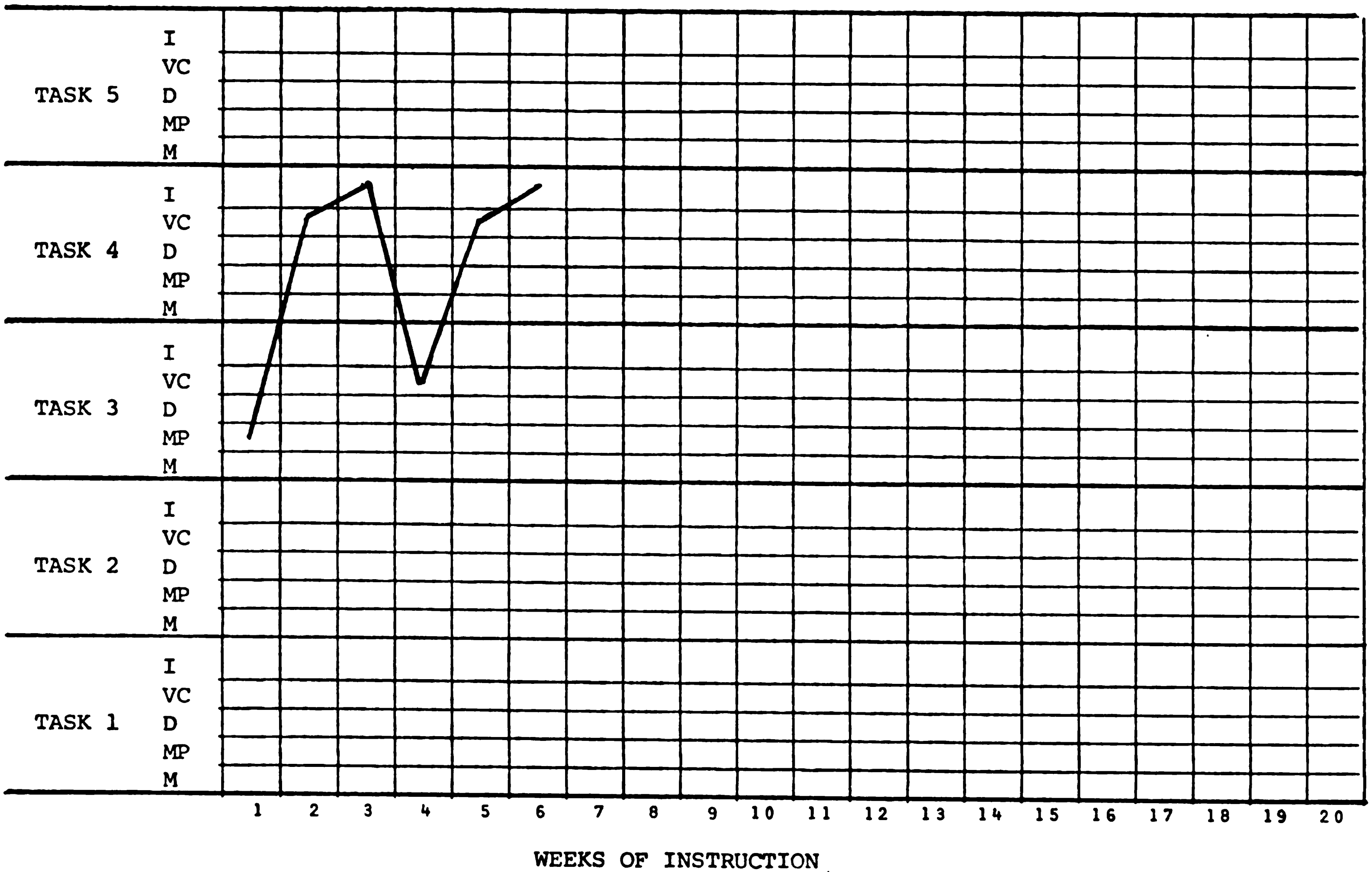


STUDENT S2

TPO Bar Swinging

PREP Preschool Play Program
Department of Physical Education
University of Alberta



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TPO Bar Swinging

PREP Preschool Play Program
Department of Physical Education
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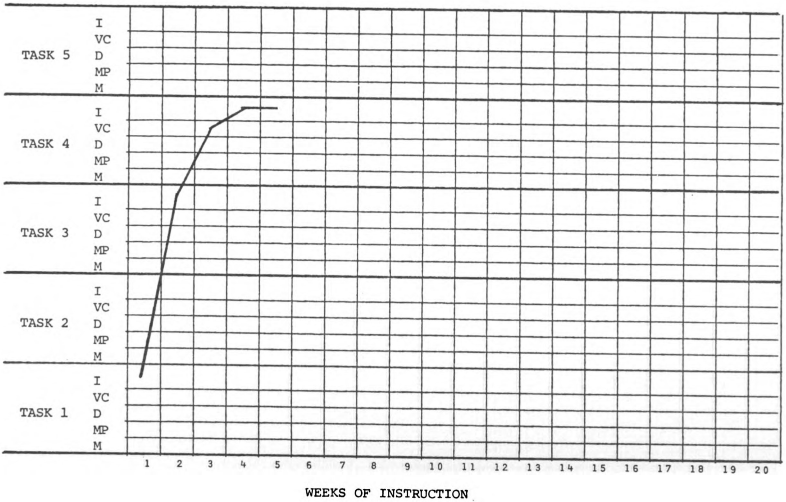

STUDENT S6

TPO Bar Swinging

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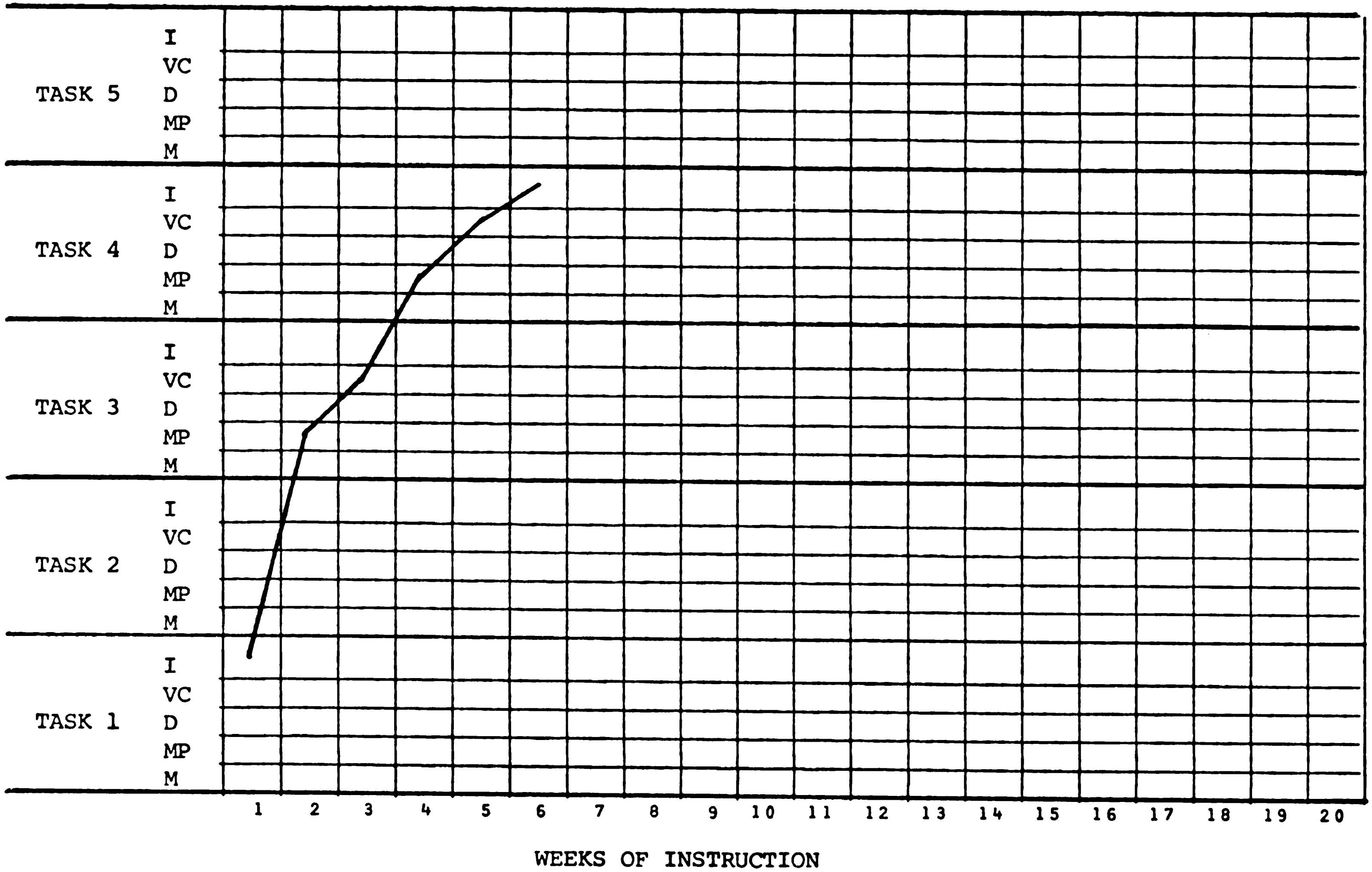
University of Alberta



STUDENT S9

TPO Bar Swinging

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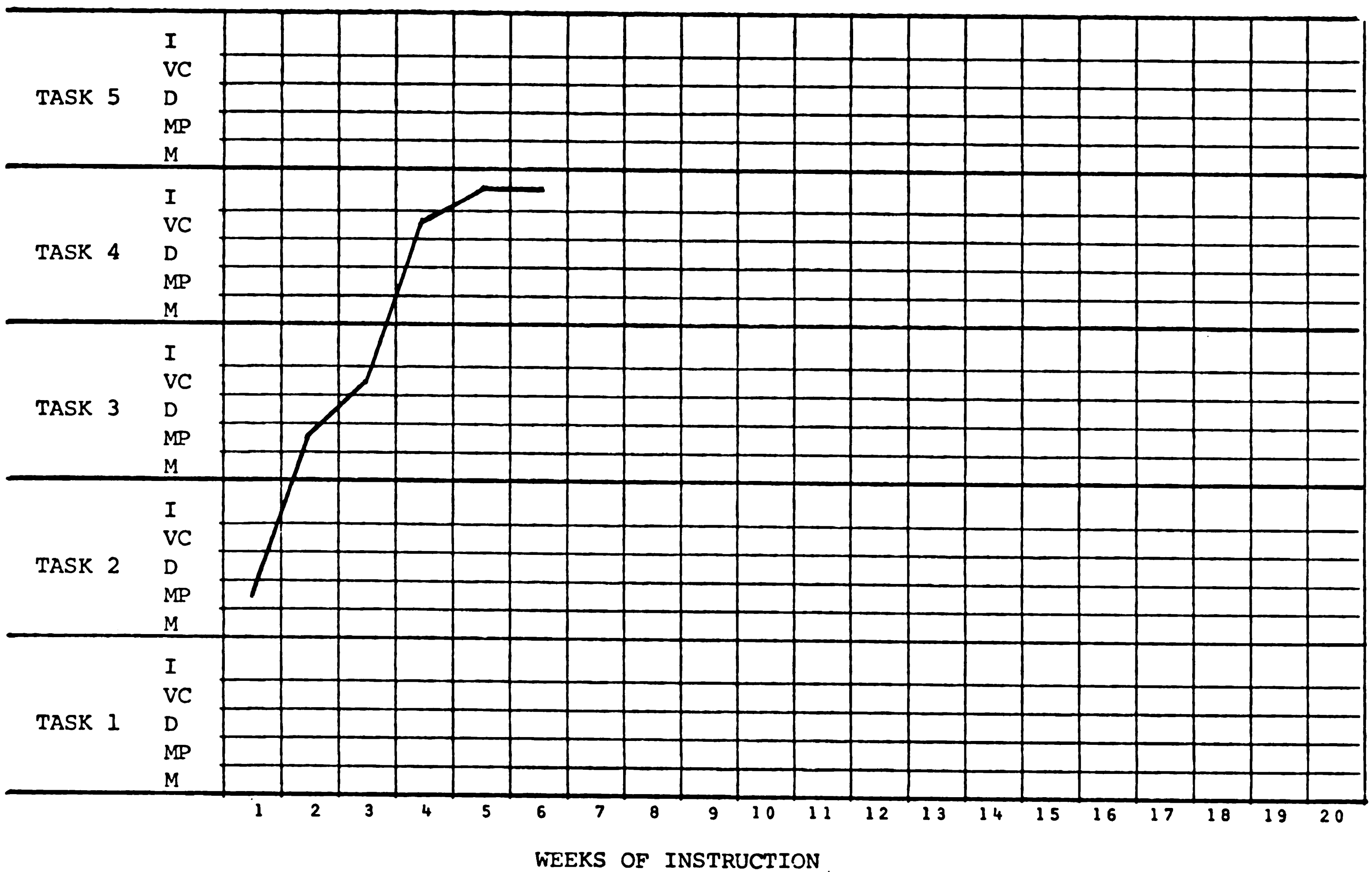
Department of Physical Education
University of Alberta



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TPO Bar Swinging

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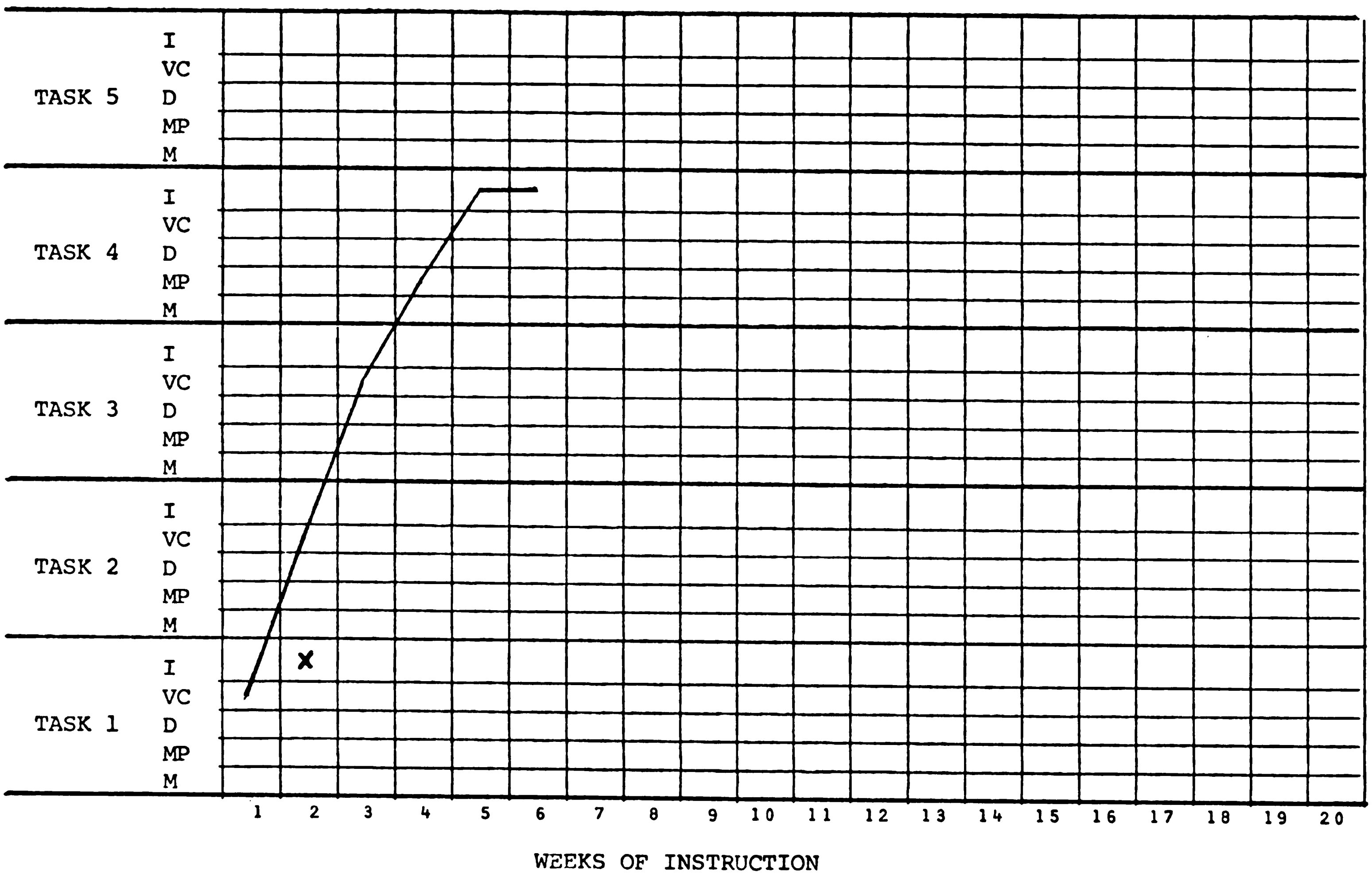
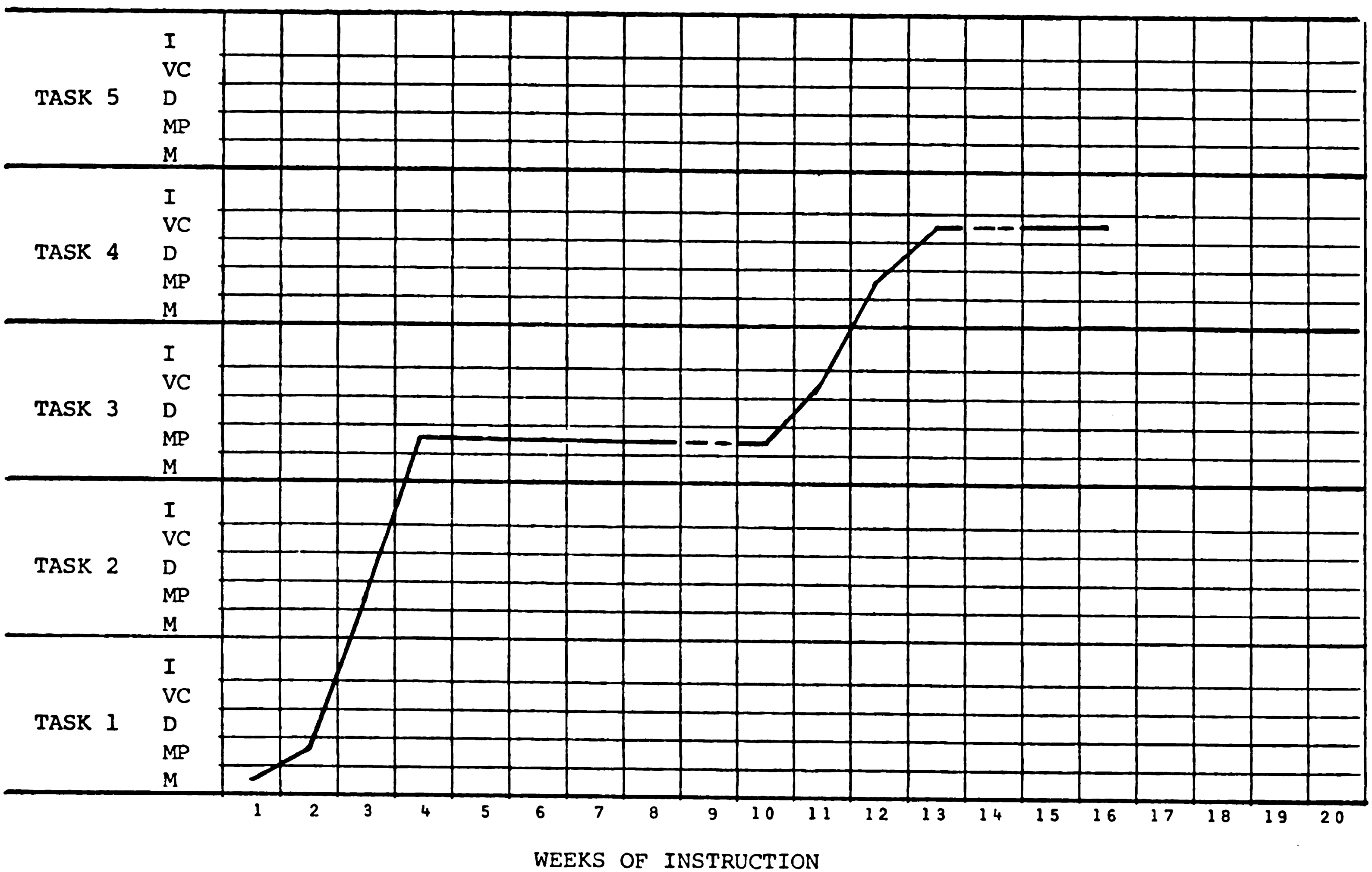
University of Alberta



STUDENT S15

TPO Bar Swinging

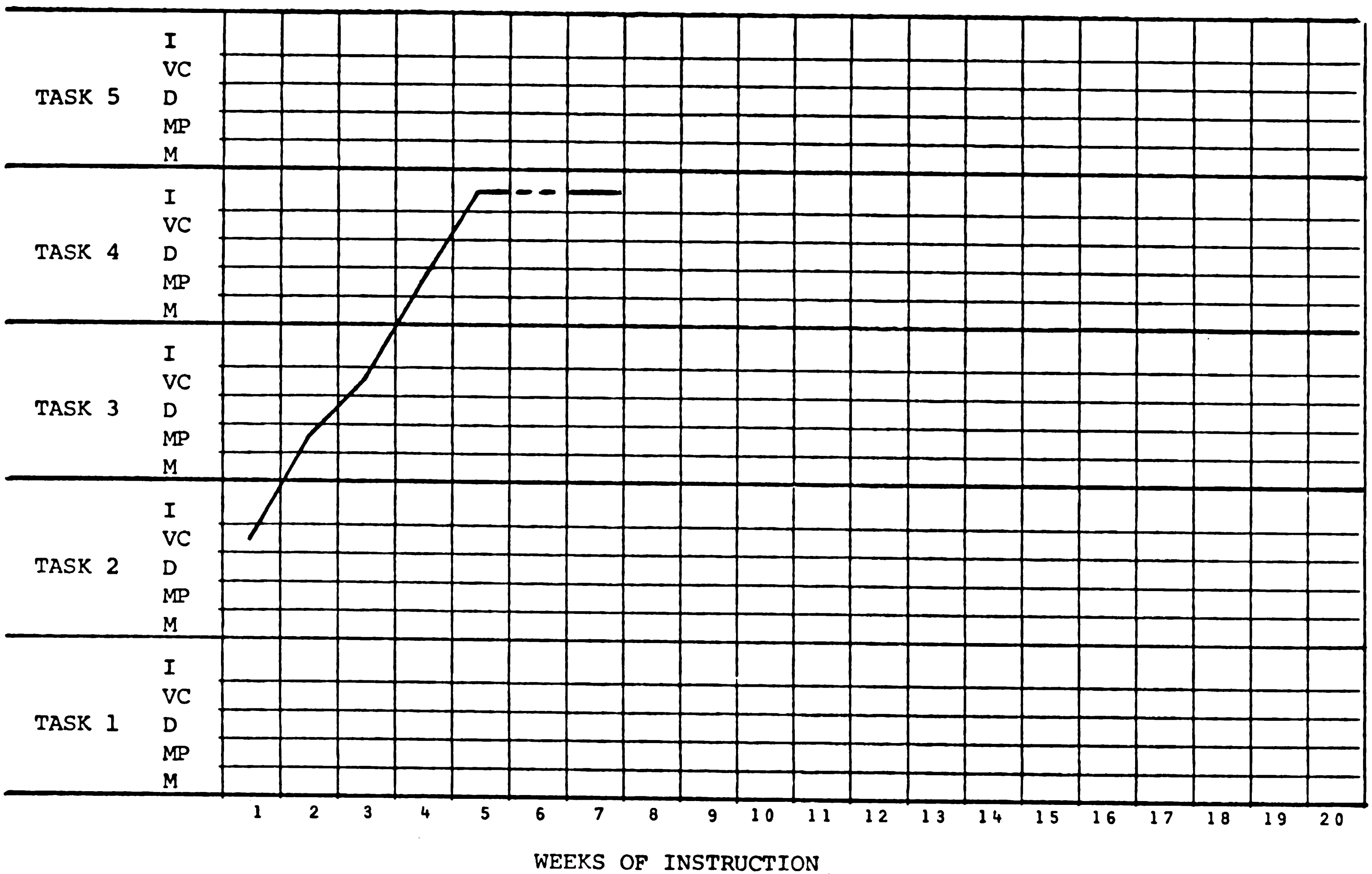
PREP Preschool Play Program
Department of Physical Education
University of Alberta



STUDENT S16

TPO Bar Swinging

PREP Preschool Play Program
Department of Physical Education
University of Alberta



APPENDIX F

RAW DATA: PRETEST AND POSTTEST SCORES ON PLAY ASSESSMENT

RAW DATA: PRETEST PLAY SCORES IN SECONDS

SUBJECTS	PLAY CATEGORIES 1	2	3	4	5	ACTION UNITS
S_1	284	293	223	0	0	52
S_2	11	191	487	111	0	70
S_3	121	250	280	149	0	106
S_4	91	289	404	16	0	133
S_5	181	343	179	97	0	50
S_6	28	233	394	155	0	82
S_7	141	183	476	0	0	65
S_8	68	142	353	237	0	66
S_9	137	474	189	0	0	65
S_{10}	458	255	87	0	0	77
S_{11}	375	299	72	54	0	68
S_{12}	31	246	361	162	0	71
S_{13}	190	327	244	16	23	93
S_{14}	180	308	311	1	0	96
S_{15}	217	444	134	5	0	95
S_{16}	351	390	59	0	0	91
S_{17}	145	367	219	59	10	90
S_{18}	154	391	247	8	0	81
S_{19}	77	188	473	62	0	81
S_{20}	65	269	218	170	78	76
S_{21}	165	396	239	0	0	86

RAW DATA: POSTTEST PLAY SCORES IN SECONDS

SUBJECTS	PLAY CATEGORIES 1	2	3	4	5	ACTION UNITS
S_1	35	390	267	108	0	71
S_2	35	323	310	132	0	66
S_3	52	110	92	471	75	59
S_4	76	275	359	90	0	126
S_5	88	174	291	247	0	58
S_6	34	90	342	334	0	47
S_7	204	99	92	405	0	55
S_8	224	170	245	123	38	74
S_9	191	271	194	144	0	78
S_{10}	140	182	312	166	0	64
S_{11}	98	533	117	52	0	40
S_{12}	23	217	368	192	0	58
S_{13}	57	198	125	317	103	85
S_{14}	53	206	211	116	214	63
S_{15}	101	337	351	11	0	136
S_{16}	36	327	358	79	0	65
S_{17}	12	264	76	448	0	45
S_{18}	92	241	303	164	0	58
S_{19}	56	132	491	109	5	56
S_{20}	4	145	168	396	87	44
S_{21}	63	308	302	127	0	67

BIBLIOGRAPHY

Abbas, K. A. and E. C. Donoghue, Improving the children's play, Special Education, 1973, 62, 4, 35-37.

Altman, R. and L. W. Talkington, Modeling: An alternative behavior modification approach for retardates, Mental Retardation, 1971, 9, 2, 20-23.

Barnes, K. Preschool play norms: A replication, Developmental Psychology, 1971, 5, 99-103.

Becker, W. C., S. Engelmann, and D. R. Thomas, Teaching: A Course in Applied Psychology, Palo Alto: Science Research Associates Inc., 1971.

Benoit, E. P. The play problem of retarded children, American Journal of Mental Deficiency, 1955, 60, 41-55.

Bensberg, G. J., C. N. Colwell, and R. H. Cassel, Teaching the profoundly retarded self-help activities by behavior shaping techniques, American Journal of Mental Deficiency, 1965, 69, 3, 674-679.

Bijou, S. W., R. F. Peterson, F. R. Harris, K. G. Allen, and M. S. Johnston, Methodology for experimental studies of young children in natural settings, The Psychological Record, 1969, 19, 177-210.

Birnbrauer, J. S., C. R. Peterson, and J. V. Solnick, Design and interpretation of studies of single subjects, American Journal of Mental Deficiency, 1974, 79, 2, 191-203.

Bradtke, L. M., W. J. Kirkpatrick, and K. P. Rosenblatt, Intensive play: A technique for building affective behaviors in profoundly mentally retarded young children, Education and Training of the Mentally Retarded, 1972, 7, 1, 8-13.

Bricker, D. and W. Bricker, Toddler Research and Intervention Project Report Year II. IMRID Behavioral Science Monograph No. 21, Nashville: George Peabody College, 1972.

Bricker, W. A. Identifying and modifying behavioral deficits, American Journal of Mental Deficiency, 1970, 75, 1, 16-21.

Bruininks, R. H. Physical and motor development of retarded persons, In: N. R. Ellis (Ed.) International Review of Research in Mental Retardation, New York: Academic Press, 1975, 7, 209-261.

Buell, J., P. Stoddard, F. R. Harris, and D. M. Baer, Collateral social development accompanying reinforcement of outdoor play in a preschool child, Journal of Applied Behavior Analysis, 1968, 1, 2, 167-173.

Burkett, L. M. Developmental throwing patterns and relationships of lever lengths to throwing in institutionalized Down's Syndrome children, New Zealand Journal of Health, Physical Education and Recreation, 1974, 7, 2, 22-25.

Calder, J. E. Physical activity and the mentally retarded, The Australian Journal of Physical Education, 1972, March, 16-30.

Campbell, D. T. and J. C. Stanley, Experimental and Quasi-Experimental Designs for Research, Chicago: Rand McNally College Publishing Company, 1963.

Cannon, F. C., H. W. Moffett, and L. O. Moffett, Diagnostically designed recreation program for trainable mentally retarded children, Journal of Leisure Research, 1970, 2, 2, 93-103.

Carr, J. Mental and motor development in young mongol children, Journal of Mental Deficiency Research, 1970, 14, 205-220.

Carr, J. Young Children with Down's Syndrome, Institute for Research into Mental and Multiple Handicap, Monograph 4, Butterworth and Co. Publishers, London, 1975.

Chasey, W. C. and W. Wyrick, Effects of a physical development program on psychomotor ability of retarded children, American Journal of Mental Deficiency, 1971, 75, 5, 566-70.

Clark, A. H., S. M. Wyon and M. P. M. Richards, Free-play in nursery school children, Journal of Child Psychology and Psychiatry, 1969, 10, 205-216.

Connor, F. P. and M. Talbot, An Experimental Curriculum for Young Mentally Retarded Children, New York: Teachers College Press, 1966.

Davis, R. H., L. T. Alexander and S. L. Yelon, Learning System Design, New York: McGraw-Hill Book Company, 1974.

Espenschade, A. S. and H. M. Eckert, Motor Development, Columbus, Ohio: Merrill Publishing Company, 1967.

Flavell, J. E., Reduction of stereotypies by reinforcement of toy play, Mental Retardation, 1973, 11, 4, 21-23.

Florey, L. An approach to play and play development, The American Journal of Occupational Therapy, 1971, 25, Sept., 275-280.

Francis, R. and C. L. Rarick, Motor Characteristics of the Mentally Retarded, Cooperative Research Monograph No. 1, Washington, D. C., U. S. Department of Health, Education and Welfare, 1960.

Francis, S. H. Behavior of low-grade institutionalized mongoloids: Changes with age, American Journal of Mental Deficiency, 1970, Vol. 75, No. 1, 92-101.

Gagne, R. M. The Conditions of Learning, Holt, Rinehart and Winston, Inc., 1965.

Gesell, A. L. and C. S. Armatruda, Developmental Diagnosis: Normal and Abnormal Child Development, New York: Hoeber, 1947.

Giles, D. K. and M. M. Wolf, Toilet training institutionalized severe retardates: An application of operant behavior modification techniques, American Journal of Mental Deficiency, 1966, 70, 5, 766-780.

Glass, G. V. and J. C. Stanley, Statistical Methods in Education and Psychology, Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1970.

Gralewicz, A. Play deprivation in multihandicapped children, The American Journal of Occupational Therapy, 1973, 27, 2, 70-72.

Hardiman, S. A., E. M. Goetz, K. G. Reuter, and J. M. LeBlanc, Primes, contingent attention and training: effects on a child's motor behavior, Journal of Applied Behavior Analysis, 1975, 8, 4, 399-409.

Harvey, A., B. Yep, and D. Sellin, Developmental achievement of trainable mentally retarded children, The Training School Bulletin, 1966, 100-108.

Horne, B. M. and C. C. Philleo, A comparative study of the spontaneous play activities of normal and mentally defective children, The Journal of Genetic Psychology, 1942, 61, 33-46.

Hulson, E. L. An analysis of the free play of ten four-year-old children through consecutive observations, Journal of Juvenile Research, 1930, 14, 3, 188-208.

Johnson, M. W. The effect on behavior of variation in the amount of play equipment, Child Development, 1935, 6, 1, 56-68.

Johnson, S. M. and O. D. Bolstad, Methodological issues in naturalistic observation: Some problems and solutions for field research, In: Hamerlynck, L. A., L. C. Handy, and E. J. Mash, Behavior Change: Methodology, Concepts and Practice, the Fourth Banff International Conference on Behavior Modification, Research Press, Champaign, Illinois, 1973.

Johnson, V. M. and R. A. Werner, A Step-by-Step Learning Guide for Retarded Infants and Children, Syracuse: Syracuse University Press, 1975.

Johnston, M. S., C. S. Kelley, F. R. Harris and M. M. Wolf, An application of reinforcement principles to development of motor skills of a young child, Child Development, 1966, 37, 379-397.

Kazdin, A. E. and W. E. Craighead, Behavior modification in special education, In: L. Mann and D. A. Sabatino (Eds.), The First Review of Special Education, Philadelphia: Buttonwood Farms, 1973.

Kazdin, A. E. and E. Erickson, Developing responsiveness to instructions in severely and profoundly retarded residents, Journal of Behavior Therapy and Experimental Psychiatry, 1975, 6, 17-21.

Keeran, C. V., F. A. Grove, and T. Zachofsky, Assessing the playground skills of the severely retarded, Mental Retardation, 1969, 7, 3, 29-32.

Knapczyk, D. R. and J. O. Yoppi, Development of cooperative and competitive play responses in developmentally disabled children, American Journal of Mental Deficiency, 1975, 80, November, 245-255.

Knowles, C., P. Vogel, and J. A. Wessel, Project I CAN: Individualized curriculum designed for mentally retarded children and youth, Education and Training of the Mentally Retarded, 1975, 10, 155-160.

Knox, S. H. A play scale, In: Mary Reilly (Ed.) Play as Exploratory Learning, page 247-266, California, Sage Publications, Inc., 1974.

Kral, P. A. Motor characteristics and development of retarded children: Success experience, Education and Training of the Mentally Retarded, 1972, 7, 1, 14-21.

Kugel, R. B. Combatting retardation in infants with Down's Syndrome, Children, 1970, 17, 5, 188-192.

Kuiper, H. Sensation and activity, The Journal of Mental Subnormality, 1967, 13, 4, 64-66.

Kysela, G., K. Daly, A. Hillyard, and L. McDonald, The early education project: A home and school approach to the early education of handicapped children, Mental Retardation Bulletin, 1976, 4, 1, 29-35.

Lillie, D. L. The effects of motor development lessons in mentally retarded children, American Journal of Mental Deficiency, 1968, 72, 803-808.

Linford, A. G., C. Y. Jeanrenaud, K. Karlsson, P. Witt, and M. D. Linford, A computerized analysis of characteristics of Down's Syndrome and normal children's free play patterns, Journal of Leisure Research, 1971, 3, 44-52.

Mager, R. F. Preparing Instructional Objectives, Belmont, California: Fearon Publishers, 1962.

Martin, G., M. Murrell, C. Nicholson, and B. Tallman, Teaching Basic Skills to the Severely and Profoundly Retarded, Portage La Prairie, Manitoba, Manitoba Institute on Mental Retardation, 1975.

McGraw, M. B. Growth: A Study of Johnny and Jimmy, New York: Appleton-Century-Crofts, 1935.

Morris, R. J. and M. Dolker, Developing cooperative play in socially withdrawn children, Mental Retardation, 1974, 12, 6, 24-27.

Morrison, D. and P. Pothier, Two different remedial motor training programs and the development of mentally retarded pre-schoolers, American Journal of Mental Deficiency, 1972, 77, 3, 251-258.

Morrison, T. L. and B. L. Newcomer, Effects of directive vs. non-directive play therapy with institutionalized retarded children, American Journal of Mental Deficiency, 1975, 79, 2, 666-669.

Nelson, G. L., J. D. Cone, and C. R. Hanson, Training Correct utensil use in retarded children: Modeling vs. physical guidance, American Journal of Mental Deficiency, 1975, 80, 1, 114-122.

Newcomer, B. L. and T. L. Morrison, Play therapy with institutionalized mentally retarded children, American Journal of Mental Deficiency, 1974, 78, 6, 727-733.

Noble, A. An Instrument to Assess Sensori-motor Play of Pre-school Trainable Mentally Retarded Children, Unpublished Master's thesis, Department of Physical Education, University of Alberta, Edmonton, Alberta, 1975.

Paloutzian, R. F., J. Hazazi, J. Streifel, and C. L. Edgar, Promotion of positive social interaction in severely retarded young children, American Journal of Mental Deficiency, 1971, 75, 4, 519-524.

Parker, J. L., Operant methods for teaching slow learning children sequential motor tasks, Slow Learning Child, 1972, 19, 12-16.

Parten, D. A. and A. O. Ross, Social reinforcement of children's motor behavior: A review, Psychological Bulletin, 1965, Vol. 64, No. 1, 65-73.

Peterson, R. A. and E. I. McIntosh, Teaching tricycle riding, Mental Retardation, 1973, 11, 5, 32-34.

Piaget, J. Play, Dreams and Imitation in Childhood, London: Routledge and Kegan Paul Ltd., 1951.

Rarick, G. L., J. H. Widdop, and G. D. Broadhead, The physical fitness and motor performance of educable mentally retarded children, Exceptional Children, 1970, 36, 509-519.

Robb, M. D., The Dynamics of Motor Skill Acquisition, Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1972.

Rosenthal, B. A. An ecological study of free play in the nursery school, Dissertation Abstracts, 1973, 34, 4004-A.

Ross, S. A., Effects of an intensive motor skills training program on young educable mentally retarded children, American Journal of Mental Deficiency, 1969, 73, 6, 920-926.

Roswell, D., Developmental play for severely subnormal children, Chapter 8 In: Gunzberg, H. C., Experiments in the Rehabilitation of the Mentally Handicapped, IRMMH Study Group 6 (Institute for Research into Mental and Multiple Handicap, London: Butterworths, 1974.

Schearer, D., J. Billingsley, S. Frohman, J. Hilliard, F. Johnson and M. Schearer, The Portage Guide to Early Education, Portage, Wisconsin: Portage Project, 1973.

Seefeldt, V. C., Sequential Motor Development, unpublished paper, Michigan State University, East Lansing, Michigan, 1971.

Smith, P. B., Acquisition of motor performance of the young TMR, Mental Retardation, 1972, 10, 5, 46-49.

Sorenson, G., Evaluation for the improvement of instructional programs: Some practical steps, Evaluation Comment, 1971, 2, 4, 13-17.

Stake, R. E., The countenance of educational evaluation, Teachers College Record, 1967, 68, 523-540.

Stein, J. U., Motor function and physical fitness of the mentally retarded, Rehabilitation Literature, 1963, 24, 230-242.

Stephens, B., B. Baumgartner, P. Smeets, and W. Wolfinger, Promoting motor development in young retarded children, Education and Training of the Mentally Retarded, 1970, 5, 3, 119-124.

Strain, P. S., T. P. Cooke, and T. Appollini, Teaching Exceptional Children: Assessing and Modifying Social Behavior, New York: Academic Press, Inc., 1976.

Tatsuoka, M. M., Multivariate Analysis Technique for Educational and Psychological Research, New York: John Wiley and Sons, Inc., 1971.

Taylor, P. A. and T. O. Maquire, A theoretical evaluation model, Chapter 12 in: Taylor, P. A. and D. M. Cowley, Readings in Curriculum Evaluation, Dubuque, Iowa: Wm. C. Brown Company Publishers, 1972.

Vogel, P. G., The effect of teacher type and instructional time on the achievement of selected fundamental motor skills by elementary age trainable mentally retarded children, Unpublished Doctoral Dissertation, Michigan State University, East Lansing, Michigan, 1974.

Wall, A. E., Equipment preference and free play practice patterns of preschool moderately mentally retarded children, Unpublished paper, PREP Program, Department of Physical Education, University of Alberta, 1974.

Watkinson, J. Annual Report of the Physical Activity Research and Demonstration Project (PREP), Department of Physical Education, University of Alberta, 1975.

Watkinson, J., V. Hunt, B. Lovell, and M. Medak, PREP: A Preschool Play Program for Retarded Children, Department of Physical Education, University of Alberta, 1976.

Wehman, P., Establishing play behaviors in mentally retarded youth, Rehabilitation Literature, 1975, 36, 8, 238-246.

Wehman, P., Imitation as a facilitator of treatment for the mentally retarded, Rehabilitation Literature, 1976, 37, 2, 41-48.

Wessel, J. A., Programmatic Research Project in Physical Education for the Mentally Retarded Child in the Elementary School: Final Report. U. S. Department of Health, Education and Welfare, Office of Education, Bureau of Education for the Handicapped, June, 1975.

Wessel, J. A., I CAN, Northbrook, Illinois: Hubbard, 1976.

Whitman, T. L., J. R. Mercurio, and V. Caponigri, Development of social responses in two severely retarded children, Journal of Applied Behavioral Analysis, 1970, 3, 2, 133-138.

Wickstrom, R. R., Fundamental Motor Patterns, Philadelphia: Lea and Febiger, 1970.