This is to certify that the

dissertation entitled

PERCEIVED PHYSICAL AND ACTUAL MOTOR COMPETENCE IN KOREAN CHILDREN WITH MILD MENTAL RETARDATION: RELATIONSHIP TO AGE, GENDER, AND PARENTAL PHYSICAL ACTIVITY

presented by

Ji-Tae Kim

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Kinesiology

Crystal F Branta
Major professor

Date 3/20/03

PERCEIVED PHYSICAL AND ACTUAL MOTOR COMPETENCE IN KOREAN CHILDREN WITH MILD MENTAL RETARDATION: RELATIONSHIP TO AGE, GENDER, AND PARENTAL PHYSICAL ACTIVITY

By

Ji-Tae Kim

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Kinesiology

2003

ABSTRACT

PERCEIVED PHYSICAL AND ACTUAL MOTOR COMPETENCE
IN KOREAN CHILDREN WITH MILD MENTAL RETARDATION:
RELATIONSHIP TO AGE, GENDER, AND PARENTAL PHYSICAL ACTIVITY

By

Ji-Tae Kim

The purposes of this study were to investigate the relationship of perceived physical competence and actual motor competence relative to age, gender, and parental physical activity in children with mild mental retardation (MMR). The participants consisted of 112 children from 8 to 11 years of age with MMR who attend special schools for students with MR in Korea, and their parents. The Test of Gross Motor Development, Second Edition (TGMD-2; Ulrich, 2000) and the Pictorial Scale for Perceived Physical Competence for Children with Mental Retardation (PSPPCCMR; Ulrich & Collier, 1990) were the instruments used to assess the perceived physical competence and actual motor competence of participant children. The Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985) was used to assess leisure time physical activity of participant parents. The statistical tests (Pearson product-moment correlation, MANOVA, t-test, and ANOVA) were performed at the .05 alpha level. The results of this study indicated that the relationship between perceived physical competence and actual motor competence in children with MMR was statistically significant. There were significant effects of gender and parental physical activity on perceived physical competence and actual motor competence, but there were not effects of age and interaction of gender, age, and parental physical activity. This study suggests that applying Harter's theory (1978) to children with MMR results in

similar findings with regard to the relationship between perceived and actual physical competence and parental influence on perceived physical competence. From this study, the data regarding perceived physical competence and actual motor competence of children with MMR have implications for adapted physical educators or special education teachers to develop a more effective physical education program or curriculum for instruction in basic motor skills.

DEDICATION

This dissertation is dedicated to my parents, Jong-Hun Kim and Jung-Ja Park, and my wife, Ji-Won Chang, for all of their support.

ACKNOWLEDGMENTS

I wish to express my sincere appreciation to the following individuals who have made so profound an impact on my life and contributed so generously to the completion of this manuscript.

First and foremost, I would like to thank my advisor, Dr. Crystal Branta, for all the encouragement and insight she offered throughout my doctoral program. I am also indebted to the support and advice of the members of my committee, Dr. Gail Dummer, Dr. Martha Ewing, and Dr. Eugene Pernell, Jr.

To classroom teachers, administrators, students, and parents from five special schools, I would like to thank you for your willingness to participate in this study. Especially, I will never forget all the classroom teachers' assistance in data collection.

To my fellow graduate students, Kyung-Suk Min, Dae-Sun Ko, and Ho-Sang Chong, I would like to thank you for helping with the data collection and statistical analysis. I would also like to thank my friend, Mr. David Krise, who edited my imperfect English. I would also like to express my sincere appreciation to my friend's wife, Mrs. So-Young Jung, for making the pictorial version of the questionnaire.

Finally, I would like to thank my parents who have supported and believed in me throughout my educational pursuit. I would also like to thank my wife for always encouraging me to follow my dreams.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

CHAPTER ONE

INTRODUCTION

The development of fundamental motor skills (FMS) is an integral component of physical activity programs for children in elementary school. Because children need the opportunity to encounter and learn many physical skills, the types and range of skills presented in physical education should be varied (Pangrazi, 1998). Unfortunately, growing evidence indicates that many elementary aged children do not experience appropriate movement opportunities necessary for the development of basic motor skills, because of limited facilities, limited time, and incorrect assumptions of some teachers that children already have acquired these skills (Buschner, 1994; Walkley, Holland, Treloar, & Probyn-Smith, 1993). This deficit is likely to have a damaging effect upon later development and participation. Fowler (1981) explained the benefits from learning FMS, and emphasized a need for children in elementary school to continue work on the FMS. Through the acquisition of FMS, all children, regardless of the presence or lack of disability, constantly increase their physical and cognitive potential for learning more advanced skills for sports and various physical activities (Eichstaedt & Lavay, 1992; Ignico, 1994; Seefeldt & Haubenstricker, 1982). In addition, learning FMS helps children develop a stronger self-concept as well as various social skills (Gallahue, 1989; Williams, 1983). Therefore, research regarding perceived and actual competence in relation to the FMS would provide useful information in a physical education setting of elementary aged children with disabilities in order to improve program planning and performance objectives.

Problem

Overview of the Problem

Children with mental retardation (MR) generally demonstrate delays in the motor/physical and learning/cognitive areas, although not all children with MR display the same characteristics. Research reveals that the levels of motor and physical performance of children with MR tend to be significantly lower than those of children without disabilities. Children with mild mental retardation (MMR) lag on the average from one to four years behind their peers without disabilities in motor development (Bouffard, 1990; DiRocco, Clark, & Phillips, 1987; Rarick, 1973). Much of the research being conducted in the field of MR deals with weaknesses in learning processes, such as attention, memory, retention, or generalization. Because of their limited cognitive ability, children with MR learn more slowly and inefficiently than those without disabilities (Gearheart, Weishahn, & Gearheart, 1996; Hoover & Horgan, 1990; Nugent & Mosley, 1987).

The delays in the physical/motor and learning/cognitive areas may influence how children with MR form judgments about their competence in a specific domain, such as academic or physical activity. For example, deficits in motor/physical performance and weaknesses in learning processes may cause children with MR to refrain from participation in a physical activity due to lack of success and feelings of failure. Decreases in participation may cause them to fall behind in their skills, thereby continuing the failure cycle. Therefore, it is plausible that studies regarding perceptions of competence in individuals with MR are needed, because the study of construct of perceived competence in individuals with MR has not resulted in similar applications as in children without disabilities (Kozub & Porretta, 1999; Ulrich & Collier, 1990).

Significance of Problem

Based on Harter's developmental model of competence motivation (1978, 1982), perceptions of competence and actual competence are basic variables contributing to development of achievement motivation. As perceived competence refers to judgments of individuals about their ability in a specific area such as academic or physical activity (Weiss, 2000), perceived competence in each domain becomes the important mediating factor in determining whether a person continues to participate in specific activities within that domain. Weiss and Ebbeck (1996) provided evidence that youth who report stronger beliefs about their physical competence are more likely to enjoy activity and sustain interest in continuing involvement than youth who report lower levels of physical competence. Whereas actual competence is a precursor to perceived competence, it also affects levels of motivation. Harter (1978) stated that if individuals are not aware of actual physical competence, they may overestimate or underestimate their abilities.

Recently, much research dealing with the relationship between perceived and actual competence in the domain of physical activity or sport has been undertaken for individuals without disabilities (Goodway & Rudisill, 1997; Feltz & Brown; 1984; Harter, 1982; Rudisill, Mahar, & Meaney, 1993; Ulrich, 1987), and the results of the research supported Harter's theoretical view of the positive relationship between perceived competence and actual competence. However, there has been little research pertaining to the relationship between perceived and actual competence in individuals with MMR, and the research failed to generalize the theoretical relationship between these two variables (Shapiro & Dummer, 1998; Yun & Ulrich, 1997). More specifically, Yun and Ulrich (1997) demonstrated that the theoretical relationship between these two variables in 7- to 12-year-old children with MMR is not well established. They concluded that the rationales for the lack of a significant relationship between these two variables might be related to the insufficient cognitive functioning for making self-evaluations. However, the study of Shapiro and Dummer (1998) provided moderate support for the theoretical positive relationship between perceived and actual basketball competence for adolescent males with MMR.

Previous studies reported that age and gender of children (including those with MR) have both been found to relate to perceived and actual competences in sport or physical activity. Generally, perceived competence and actual competence seem to change with increasing age. Horn and Weiss (1991) found that older children (10- to 13-year-olds) had significantly more accuracy in their perceived physical competence than younger (7- to 8-year-olds). Rudisill, Mahar, and Meaney (1993) found that among 9-, 10-, and 11-year-old children, older children demonstrated higher levels of actual motor competence than younger children. Similar results concerning age differences on perceived and actual competence have been found in the study of Yun and Ulrich (1997) involving children with MMR. Evidence is accumulating that there are gender differences in self-perceptions of competence in the domain of physical activity or sport (Jolly, 1997; Rudisill, Mahar, & Meaney, 1993; Ulrich, 1987), although some studies involving children without disabilities reported no gender differences on perceived competence in the physical domains (Goodway & Rudisill, 1997; Horn & Hasbrook, 1986). Past studies found that males show higher perceived physical competence (Feltz

& Brown; 1984; Jolly, 1997; Rudisill, Mahar, & Meaney, 1993; Ulrich, 1987) and actual motor skill competence (Rudisill, Mahar, & Meaney, 1993; Ulrich, 1987; Yun & Ulrich, 1997) than females.

In addition to individual difference factors (e.g., age and gender), researchers are interested in focusing on a wide range of sources of information (e.g., significant others, mastery success, etc.) available in physical activity or sport that children could use to judge their performance and their competence (Stipek & Mac Iver, 1989; Weiss, 2000; Weiss, Ebbeck, & Horn, 1997). There are studies which have emphasized the role of significant others (such as parents, peers, coaches, and teachers) as a critical source of information during the childhood and adolescent years. Harter's competence motivation model (1978, 1981) assigned a central role to significant others as influences on self-perceptions of competence. Especially, during the childhood years, parents appear to be the chief individuals in academic, physical, and social domains for judging ability and making decisions about future participatory behaviors (Brustad, 1992; Weiss, Ebbeck, & Horn, 1997).

Several studies have emphasized that parental expectations, beliefs, and behaviors play a crucial role in the nature and extent of their children's physical activities or sport opportunities (Brustad, 1993; Kim, 1995; Lewko & Greendorfer, 1988), and parental patterns toward exercise or physical activity is one of the major influences on health-related behavior patterns that are formed in their children (Chang, 1993; Freedson & Evenson, 1991). However, despite the role of socializing agents assumed by parents in shaping children's developing perspectives on sport/physical activity and self, there currently exists only limited research focusing on the relevance of parental socialization influences on the understanding of children's psychological processes (e.g., children's self-perceptions and achievement orientation) (Brustad, 1992). No research addressing this issue in regard to children with MR has been found.

In this study, although a large amount of the variability (e.g., involvement, type, frequency, and duration of parental physical activity) can be explained by parental socialization, the investigator looks at the leisure time physical activity of parents as a source of information to judge children's exposure to activity and, therefore, parental competence in activity. A few recently designed questionnaires which deal with levels of physical activity, include the frequency, duration, and intensity of both leisure and occupational activities; however, since in the majority of industrialized countries the levels of employment-related physical activity has continued to decline, it is frequently assumed that an assessment of leisure oriented physical activity is the most accurate measure of physical activity in a population (Kriska & Caspersen, 1997).

In summary, to date, there is little research regarding how perceived physical competence and actual motor competence are related in children with MMR, and whether perceived physical competence and actual motor competence change in terms of age and gender of children with MMR and their parents' physical activity. In addition, as the participants of most studies dealing with self-concept or self-perception are predominantly African or Caucasian American, there is limited study of other race populations. This study, therefore, proposes to examine the relationship between perceived physical competence and actual motor competence in Korean children with MMR, and to research perceived physical competence and actual motor competence by age, gender, and parental physical activity using Korean participants so as to expand the field of research into Asian race populations.

Statement of Problem

The purposes of this study are to examine (a) the relationship between perceived physical competence and actual motor competence in Korean children with MMR; (b) the influences of age and gender on perceived physical competence and actual motor competence in Korean children with MMR; (c) the differences in perceived physical competence and actual motor competence between Korean children with MMR whose parents have high physical activity and those whose parents have low physical activity; and (d) the influence of the interaction of age, gender, and parental physical activity on perceived physical competence and actual motor competence in Korean children with MMR.

Need for the Study

This study is unique in that it is a study of children with MR, and a study relying exclusively on a Korean population. As mentioned above, most of the reported studies regarding the relationship between perceived competence and actual competence have been completed with children without disabilities, and there is a lack of evidence to generalize Harter's theory of competence motivation to children with disabilities, especially MR, in the physical domain. Therefore, studying children with MR could be beneficial for researchers who are interested in expanding the generalizability of Harter's theoretical view of the relationship between perceived competence and actual competence.

Despite the legal mandate of the past decade for including children with disabilities in public school physical education in both America and Korea, Korean special education services for children with MR are still mainly provided in the special schools in full-time, self-contained special classes (Hong, 1996). Children with MR in Korea often participate in a physical education program on a limited basis, because of lack of facilities or lack of scheduling priority. Further, many teachers in most special schools have only received general training for special education or have received special training for adapted physical education in short-term courses (Hong, 1996), and teach the physical education classes without adapted physical educators. Therefore, these limitations may negatively affect perceived and actual physical competence of children with MR. In addition, the Korean people's low perception of children with MR, including stigmatization and superstition, can lead to lower expectations of children with MR, and, in turn, low perceptions of competence for the children.

To date, no studies have investigated the perceived physical competence of Korean children (i.e., Asian population) with MR. Thus, this study proposes to investigate a population (young children with MMR) in Korea that is largely ignored in much of that educational system. If a theory (e.g., competence motivation theory dealing with perceived physical competence) does not generalize to certain subsamples of the general population, it will have less explanatory power (Agnew & Pyke, 1994). Therefore, the application of Korean children with MR in this study could also provide additional incentives for researchers to recognize the physical self-perceptions of these populations.

Researchers and educators should understand the processes by which children with MMR evaluate their abilities, because perceived competence powerfully influences emotion and subsequent behavior for sustaining involvement in physical activity (Weiss & Ebbeck, 1996). For example, if children with MMR perceive themselves to be highly competent at an activity (e.g., the fundamental motor skill of throwing), the children may be more likely to continue mastering the throwing skill or participating in a sport (e.g., baseball) which uses that skill. Therefore, higher levels of perceived competence may be expected to contribute to increased motivation in that children who are confident will choose to be more active, display greater effort, and most likely persist in sport and physical activities. On the other hand, if children with MMR perceive themselves as incompetent in an activity or sport, children may be expected to experience anxiety in mastery situations, and may be more likely to withdraw or drop out of participating in sport and physical activities (Rudisill, Mahar, & Meaney, 1993; Weiss, 1993).

In elementary physical education settings, classroom teachers or physical educators need to understand perceived competence and motor competence in relation to the area of FMS. The development of FMS not only is an integral part of children's lives, but Korean elementary schools, including special schools, have also included the development of FMS in a teaching curriculum for physical education classes. Therefore, this study may have some implications for appropriate guidelines for instruction in basic motor skills for children with MMR.

For children with MR who live at home and attend a special school rather than a residential school, parents would potentially play a very significant positive or negative role in the children's sport or physical activity involvement. If there are potential psychological and developmental benefits of physical activity for children with MR, then it seems important to examine the relevance of parental influence (particularly parental physical activity) on children's physical perceptions and behaviors. Thus, this study can potentially enable researchers and practitioners to understand the influence of parents' physical activity on perceived physical competence and actual motor competence, and then eventually provide the basis upon which instructional programs/curricula and further research can be developed.

Hypotheses

The general hypotheses of this study are framed according to the purposes of the study. Specific research hypotheses in each general area are described below:

Relationship between Perceived and Actual Competence

Hypothesis #1 addresses the relationship between perceived physical competence and actual motor competence in children with MMR.

1. There would be a positive relationship between perceived physical competence and actual motor competence in children with MMR.

Age and Gender

Hypotheses #2 through #7 address potential age and gender differences in perceived physical competence and actual motor competence.

2. Boys with mild mental retardation would score higher than girls with MMR on perceived physical competence.

3. Boys with mild mental retardation would score higher than girls with MMR on actual motor competence.

4. Younger children (8-9 years old) with MMR would score higher than older children (10-11 years old) with MMR on perceived physical competence.

5. Older children (10-11 years old) with MMR would score higher than younger children (8-9 years old) with MMR on actual motor competence.

6. There would not be a significant interaction effect of age and gender in children with MMR on perceived physical competence.

7. There would not be a significant interaction effect of age and gender in children with MMR on actual motor competence.

Parental Physical Activity

Hypotheses #8 and #9 address differences between a high parental activity group and a low parental activity group in perceived physical competence and actual motor competence.

8. Children with MMR whose parents have high total leisure activity scores (at or above 67th percentile for total participants) would score higher on perceived physical competence than children with MMR whose parents have low total leisure activity scores (at or below the 33rd percentile for total participants).

9. Children with MMR whose parents have high total leisure activity scores (at or above 67th percentile for total participants) would score higher on actual motor competence than children with MMR whose parents have low total leisure activity scores (at or below the 33rd percentile for total participants).

Research Questions

Because the following research questions about the interaction effects (using parents' leisure time behavior) have never been examined, there was not enough evidence available to make any predictions in the form of a hypothesis. However, the following research questions about the interaction effects were examined when the data were analyzed. The research questions of this study were based on the last purpose of this study.

1. Is there a significant interaction effect of gender, age, and parental physical activity level on physical perceived competence?

2. Is there a significant interaction effect of gender, age, and parental physical activity level on actual motor competence?

Limitations

1. The sample selected for this study was not a random sample. Subjects came from five special schools for students with MR in Korea. Subject selection was limited to primary school children with MMR, ranging in age from 8 to 11 years old.

2. Including the teacher in the testing may have served to provide an element of familiarity to the student. This factor of familiarity may have influenced individual performance and perceived competence. However, it was not always possible to consistently include the teachers in the testing, due to scheduling conflicts or limited availability. Therefore, to control for this factor, the investigator observed physical activity classes of each participant the preceding one or two weeks before the test administration, so that the participants were familiar with the investigator.

3. Due to the schedule limitations of each school, both the perceived physical competence and actual motor competence tests were administered in the gymnasium or empty classrooms of each participating school, according to the school's schedule.

Conditions such as time of day and testing conditions varied depending on the school's schedule.

4. Not all participant children were involved to the same extent in learning FMS in the program. Although all programs for elementary schools included development of FMS as one of the objectives for physical education, the time required for learning varied from school to school.

5. Because of time limitations and students' absences, several separate testing sessions for each school were conducted.

6. The testing portion of this study was confined to the duration of the spring term in the school calendar.

Assumptions

It is assumed that:

1. The responses of participant children with MMR reflected their true perceptions of physical competence as honestly and correctly as possible.

2. The performances of participant children with MMR reflected their true motor skill competence as honestly and correctly as possible.

3. Participant parents filled out the survey as honestly and accurately as possible.

Definition of Terms

1. Perceived competence – individuals' judgments about their ability in a particular area such as school, peer relationships, or physical performance (Weiss, 2000). Perceived competence is also based on individuals' desire to produce an effect on the environment. This study was interested in perceived physical competence that focused

on how children with MMR evaluate how adequate they are in physical performance (fundamental motor skills) as measured by the Pictorial Scale for Perceived Physical Competence for Children with Mental Retardation (PSPPCCMR; Ulrich & Collier, 1990).

2. Actual competence – individuals' ability or capability in a particular area such as sports or physical performance. The interest of this study was in actual motor competence, which focuses on the ability of children's fundamental motor skills as measured by the Test of Gross Motor Development (TGMD; Ulrich, 2000).

3. Mental retardation (MR) – MR refers to substantial limitations in present functioning. An individual to be diagnosed as having MR must meet three criteria as follows: a) significantly subaverage intellectual functioning; b) concurrent deficits or impairments in present adaptive abilities; c) onset before 18 years of age (Krebs, 2000).

4. Mild mental retardation (MMR) – Based on degree of severity reflecting level of intellectual impairment in the Korean educational system, MMR refers to individuals with IQ ranges from 50 to 70. It is related to limitations in two or more of the following applicable adaptive skill areas: communication, self-care, home living, social skills, community use, self-direction, health and safety, functional academics, leisure, and work. Individuals with MMR can learn academic skills up to the equivalent of sixth grade and often achieve social and vocational skills equivalent to the average adult in society (Choi, Park, & Kim, 2001).

5. Fundamental motor skills (FMS) – skills such as running, jumping, throwing, striking, or kicking that involve two or more bodily segments and result in the transfer or reception of the body or some external object. FMS also refer to basic movement skills

that form the foundation for more advanced, specific movements used in individual and team sports and activities.

6. Significant others – adults or peers responsible for maintaining the students' rights and acting in their best interests in order to help students who have difficulty with making decisions and expressing themselves, such as those with mental retardation.

CHAPTER TWO

REVIEW OF LITERATURE

The literature reviewed in this chapter is divided into five major sections. First, the importance of fundamental motor skills for elementary aged children is reviewed. The second section deals with competence motivation theory that provides a grounded model for researching the relationship of perceived physical competence and actual motor competence relative to age, gender, and parental physical activity. The third section contains the information regarding the relationship between perceived competence and actual competence in individuals with and without mental retardation. The fourth section is reviewed with regard to the characteristics of mental retardation on perceived competence and actual competence. The final section deals with the factors affecting the perceived competence and actual competence.

The Importance of Fundamental Motor Skills for Elementary Aged Children

Children's motor patterns greatly expand during childhood. During this time children are actively involved in exploring and experimenting with the movement capabilities of their bodies. Children thus begin to develop and use basic movement skills generally called fundamental motor skills (FMS), which are classified into two categories: (a) locomotor skills, such as walking, running, jumping, hopping, sliding, leaping, and skipping, and (b) object control skills including catching, throwing, striking, kicking, and bouncing (Gallahue, 1989). Therefore, there should be considerable support for the inclusion of FMS instruction in physical education programs for elementary aged children.

Researchers have stated several reasons why the development of FMS is an integral part of children's lives. First of all, the development of FMS may contribute to the primary school child's ability to interact with the environment. Riggs (1980) indicated that children spend many hours actively exploring and examining both their bodies and the physical environment that surrounds them. Such activities necessarily involve and rely on the use of FMS. Therefore, he advocated that FMS are necessary for children to function effectively in the environment. Also, Wickstrom (1983) proposed that the development of FMS is an underlying factor critical to the success of more complex movement. Development of these skills provides added insight into other body actions and is the foundation to successful performance of more complex movements.

Similarly, Haubenstricker and Seefeldt (1986) referred to FMS as the "building blocks" for transitional motor skills, which in turn should lead to advanced skills such as sports, games, and other leisure activities to be developed in later childhood. It can be assumed that if children with MR are to experience success in sports, such as a basketball game, they need to acquire some proficiency in FMS such as running, jumping, throwing, and dribbling. However, if children have not acquired any proficiency in these FMS, their games could very easily turn into failures that lead to a frustrated state of mind and a reluctance to continue participating. Therefore, acquiring these fundamental motor skills can increase a child's potential for learning more advanced sports and lifetime physical activity skills, and can lead to an improvement in the ability to interact with others through games and sports in a socially acceptable manner (Lavay, 1985; Rimmer & Kelly, 1989). Olrich (2002) reported that to help ensure that children learn to appreciate and enjoy a lifetime of movement, they must have assistance in mastering FMS in their early years.

Regardless of the presence or lack of disability, the development of FMS should be an integral part of all children's lives. The learning of FMS in children with MR also can have the powerful effect of positively influencing physical, social and cognitive domains. Although it is true that FMS are specific in nature and uniquely different from the skills used in physical fitness activities, the two often directly affect one another. That is, children with MR seem to be able to improve significantly in movement components such as strength, coordination, speed, agility, balance, and endurance due to a correlated improvement in FMS performance (Connolly & Michael, 1986). In addition, once children with MR learn FMS, they are more involved in various games and sports either as a participant or as a spectator. Through games and sports, they can develop many social skills such as leadership skills, independence, and confidence, and they are prepared to learn the rules and strategies involved in various games and sports (Eichstaedt & Lavay, 1992). In other words, participation in sports and games requiring FMS ability may contribute to social and cognitive development.

For these reasons American governmental guidelines established FMS development as a major component of physical activity programs for children in special education (Individuals with Disabilities Education Act, 1997; Gallahue, 2000). Likewise, Korean elementary schools, including special schools, have included the development of FMS in a teaching curriculum for physical education class. Therefore, research regarding perceived and actual competence in relation to the FMS would provide useful information in a physical education setting of elementary aged children with disabilities to improve program and performance objectives, and would be adequate to carefully investigate the purposes of this study.

Competence Motivation Theory

The concept of competence as a psychological construct mediating intrinsically motivated behavior was first introduced by White (1959). Harter (1978, 1981, 1982, 1990) expanded White's effectance motivation theory, proposing a motivational framework which refined the central mediators of competence motivation. In Harter's (1978) competence motivation model, competence motivation is a multidimensional construct that is influenced by the development of characteristic achievement behaviors such as perceived competence, perceived control, motivational orientation, and affective outcome. Ulrich and Collier (1990) stated that perceived competence is viewed as self-evaluations of domain-specific skills. Perceived control is explained as an understanding of the elements responsible for competence domain success or failure. Motivational orientation is characterized by either an intrinsic or extrinsic position. Affective outcomes are represented by a continuum from enjoyment to anxiety. Although perceived competence took a central role in Harter's model, the importance of perceived competence within the motivational process is not unique. Other motivational theorists have supported this idea (Bandura, 1977, 1989; Nicholls, 1984).

The diagram in Figure 1 illustrates Harter's (1978) competence motivation model which consists of several components to interact to maintain, increase, or decrease competence motivation. There are two primary aspects to this diagram. One aspect of the model states that children with high competence motivation would perceive themselves as having high competence and control of outcomes, positively influenced by significant others, intrinsically motivated, and optimally challenged; this aspect would result in intrinsically motivated children who use internal criteria to evaluate success resulting in more mastery attempts. On the other hand, the other aspect of the model states that children with low competence motivation would perceive themselves to possess low competence and an external perception of control of outcome, negatively influenced by significant others, and extrinsically motivated; all of which would result in their anxiety and lead to failure.

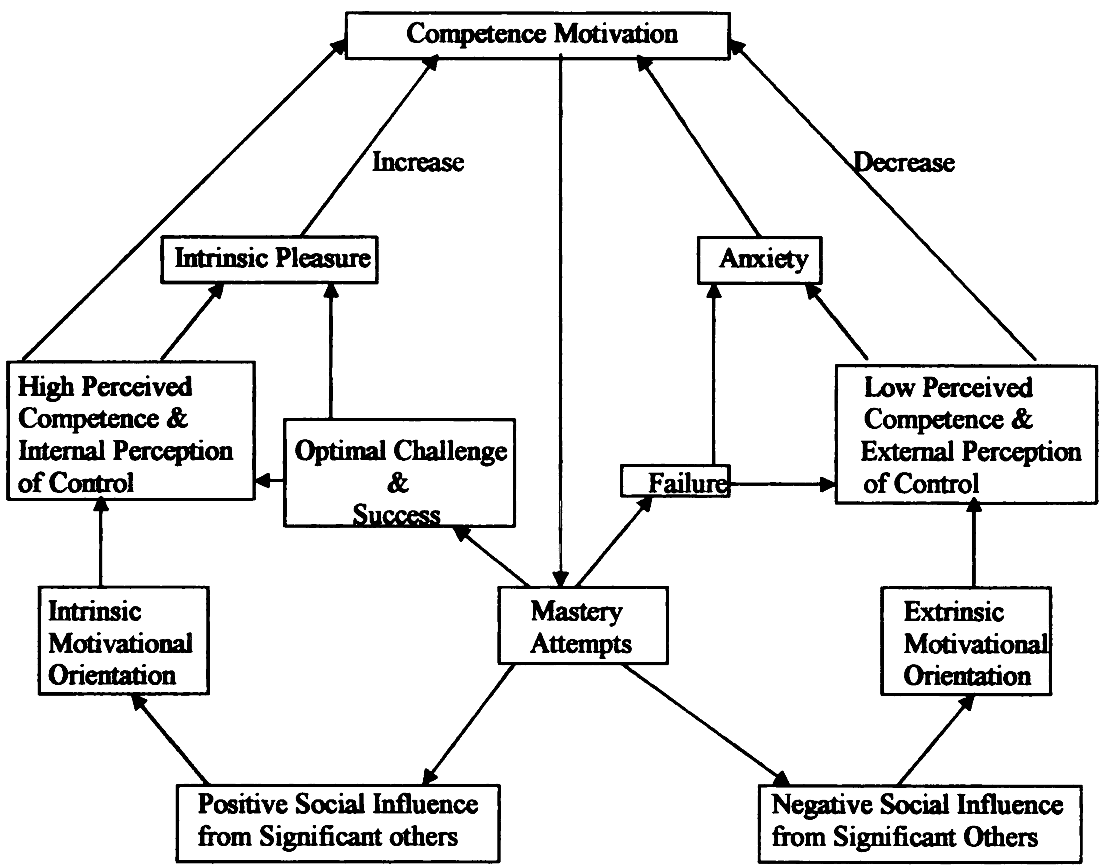


Figure 1. Harter's Model of Competence Motivation

Harter's original model (1978) of competence motivation for children ages 8 to 11 years was viewed as identifying the specific domains (e.g., cognitive, physical, and social) in which competence may be measured. Harter (1978) found that children could differentiate between these domains by about 8 years of age. In 1981, Harter also identified three competence domains and a general area termed self-worth. She explained that each domain must be assessed independently rather than all domains assessed at once with a total score of self-worth. She suggested that general self-concept (i.e., self-worth) may or may not be related to any of the specific domains. For example, although children can have a positive feeling of self-worth in a specific area, they may feel positive about the physical and social domains but not the cognitive domain. McAuley and Gill (1983) suggested narrow measurement to general areas of behavior is a more viable proposition than a measure of general self-perception.

Although Harter's competence motivation theory was constructed for use in the academic domain, Weiss and Chaumeton (1992) pointed out that there has been a marked increase of empirical testing of Harter's competence motivation theory in physical and sport domain. In particular, as perceived competence has taken a central role in Harter's model of competence motivation, much research has explored the hypothesized relationships among several of the components of the model, such as relationships of perceived competence to participant motives, achievement-related characteristics, and motivational orientations (Klint & Weiss, 1987; Weiss, Ebbeck, & Horn, 1997; Weiss & Horn, 1990; Wong & Bridges, 1995). Thus, whereas this study focused on the relationship between perceived physical competence and actual motor competence, to better understand Harter's theory, the investigator reviewed some studies dealing with such relationships.

Intrinsically motivated children will strive to demonstrate ability in the specific achievement areas in which they feel most competent (Weiss & Chaumeton, 1992). Klint and Weiss (1987) examined the relationship between perceptions of competence and particular motives for participation by using 27 boys and 40 girls, ages 8 to 16, in a non-school gymnastics program in the Pacific Northwest. All participants completed the physical, social, and cognitive subscales of Harter's (1982) Perceived Competence Scale and the motives for gymnastic participation questionnaires. The results indicated that children high in perceived physical competence rated skill development (e.g., learn new skills, improve skills, and compete at higher levels) as a more important reason for participating, while those high in perceived social competence indicated that the motives for affiliation aspects of sport were most salient. Therefore, the findings of this study demonstrate support for competence motivation theory which can explain the relationship between participant motives and self-perceptions of competence.

According to Harter's model of competence motivation, intimate relationships should exist among some or all of the constructs such as actual success/failure, perception of competence, control, affect, and motivation orientation. Roberts, Kleiber, and Duda (1981) and Weiss and Horn (1990) found that regarding the relationship between the accuracy of children's perceived competence and their achievement-related characteristics, children with high perceived physical competence had higher perceptions of perceived control, intrinsic motivation, and levels of participation, while children with low perceived physical competence had a less adaptive pattern of motivation response.

Wong and Bridges (1995) examined 108 youth soccer players and their coaches to measure the relationships among perceived competence, perceived control, trait anxiety, and motivation, as well as various coaching behaviors. They found that trait anxiety and coaching behaviors predicted perceived competence and control, which in turn were related to the players' motivation level. More recently, Weiss, Ebbeck, and Horn (1997) examined the relationship between children's perceived physical competence, competitive trait anxiety, general self-esteem, and the sources of information children use to judge their physical competency. Using a cluster analysis technique, the authors found that the children showed four distinct profiles. The results indicated that 45% of the children were represented by the third cluster which perhaps reflected the most adaptive profile, in that the children in the third cluster had higher scores on physical competence and self-esteem, had moderate scores on competitive trait anxiety, and a preference for self-referenced and parental evaluation criteria. Reviewing the other three clusters, children reported lower physical competence and less-desirable characteristics such as high competitive trait anxiety, low self-esteem, and a preference for social comparison/evaluation criteria in judging their competence.

Further, in order to examine motivation for youth sport involvement in the People's Republic of China, Wang and Wiese (1995) adapted Harter's competence motivation theory as the framework. The purpose of the study was to investigate the relationship between perceived competence and school type. The participants consisted of 465 Chinese youths aged 7 to 17 years from two types of schools (sports schools and normal schools). The results revealed that participants in sport school had higher levels of perceived physical competence than normal school students, while normal school students were significantly higher in perceived competence in the cognitive domain. Therefore, this study supported Harter's model in that contextual factors (e.g., sport type and structure) are intimately tied to this developmental process.

The Relationship between Perceived and Actual Competence in Physical Domains

According to Harter's model of competence motivation, although actual competence has a less direct influence on competence motivation than perceived competence, actual competence also affects the level of motivation by influencing one's perceptions (Harter, 1978; 1981). Actual competence has been viewed as an indirect mediator of motivated behavior because of its effect on self-perceptions of ability (Harter, 1981; Ulrich & Collier, 1990). Harter (1978) suggested that as actual competence is a precursor to perceived competence, understanding the relationship between actual and perceived competence is critical from a theoretical view. If a child inaccurately perceives the child's skills in the physical domain, the abilities of physical skills (i.e., the actual competence of the child) may be overestimated or underestimated. Overestimation might lead to unsuccessful outcomes because of unrealistic expectations. Low perceived competence may be the result of failure experienced in a task that was not perceived as difficult. In the same way, the underestimation of actual competence may result in a child having low expectations for future competence, which may have a negative influence on persistence motivation and performance outcomes (Goodway & Rudisill, 1997).

As actual competence and perceived competence interact to influence individuals' motivation to participate in physical activity or sport, in physical domains there have been several studies investigating the relationship between perceived and actual competence, and the accuracy with which individuals judge their abilities (Feltz & Brown, 1984; Goodway & Rudisill, 1997; Harter, 1982; Rudisill, Mahar, & Meaney, 1993; Ulrich, 1987). These studies usually dealt with the preschool- to elementary-aged children without disabilities, and have found low to moderate correlations between perceived physical competence and actual physical competence. The studies also suggested that, with an increase of age, children's perceptions remain relatively constant or decrease while their actual competence improves, resulting in more accurate perception.

When examining the relationship between perceived competence and actual competence, the methods for assessing actual competence, such as teacher rating and direct assessment, should be an issue for establishing the theoretical relationship between these two variables. Harter (1982) examined the relationship between perceived competence in physical ability (i.e., perceived physical competence) and ratings of the motor ability (i.e., actual motor competence) of elementary aged children. For assessing perceived competence and actual competence, she used the Perceived Competence Scale and teachers' perceptions of children's competence. Correlations between perceived and actual physical competence were moderate (.62) for the third through sixth grade children, suggesting that these children were moderately accurate in judging their own motor ability. Ulrich (1987) examined the interrelationship among perceived physical competence, motor competence, and participation in organized sport in 250 children from kindergarten to fourth grade. The results of this study revealed that perceived physical competence for the children is not significantly related to their participation in organized sport, but is related to their actual motor competence. Ulrich's results supported the study of Harter (1982) reporting a moderate correlation between perceived competence and actual competence. Unlike Harter's measure of actual performance which was not directly performed and was substituted by teacher ratings, the study of Ulrich (1987) measured direct assessment of actual performance (i.e., motor skills) so that it seems to provide a more empirical database in order to demonstrate the theoretical relationship between these two variables.

The older children's perceptions would be more congruent with their actual physical competence, so that the older children become increasingly better able to make realistic judgments about their competence. Feltz and Brown (1984) assessed perceived competence of young soccer players, age 8 to 13, using the physical subscale from Harter's (1982) Perceived Competence Scale and a sport-specific modified version. The children's actual competence was measured by practical soccer skill tasks. Statistical analysis of the relationship between actual and perceived competence revealed that accuracy with which these children rated their soccer competence increased linearly from ages 9 to 13. This study thus supported the suggestion of Roberts (1984) which indicated that the correlation of children's perceived physical competence and their actual motor competence increases positively as children get older.

Individual variables such as age, gender, and cognitive-developmental levels are related to evaluating perceived and actual competence accurately (Goodway & Rudisill, 1997; Rudisill, Mahar, & Meaney, 1993; Shapiro & Dummer, 1998; Yun & Ulrich, 1997). Rudisill, Mahar, and Meaney (1993) studied the relationship between perceived and actual motor competence of typically developing 9 to 11 year old children.

Regression analysis reveled that the relationship between actual and perceived motor competence was moderately correlated. Adding age to the multiple regression models significantly increased the multiple correlations, whereas adding gender to the model did not increase the correlation. Results from the multiple regression indicated that with an increase in age of children, actual motor competence increases, and perceived competence remains the same or decreases. They also concluded that both boys and girls tended to overestimate their motor competence. Similarly, Goodway and Rudisill (1997) found that there were correlations between perceived physical competence and actual competence scores in preschool children, although it is low, and found that adding gender to the regression model was not significantly predictive of perceived physical competence. In other words, one sex did not over- or underestimate their actual motor skill competence more than another. These findings also suggested that it would not be possible to predict perceptions of the physical competence of these age groups, because, according to Piaget's cognitive developmental theory, the preschool children would not be able to synthesize and evaluate information until the stage of concrete operations, and they were in the preoperational stage of cognitive development.

Relationship between the Two Variables in Individuals with Mental Retardation

Studies regarding the relationship between perceived competence and actual competence in individuals with MR have not resulted in similar applications as in individuals without disabilities, and the theoretical relationship between these two variables in individuals with MR is not well established (Ulrich & Collier, 1990; Yun & Ulrich, 1997). Yun and Ulrich (1997) tested the generalization of Harter's theory of competence motivation to children with MMR in the physical domain. One purpose of their study was to investigate the relationship between perceived and actual physical competence in children with MMR. Participants consisted of 109 children with MMR (54 boys and 55 girls), aged 7 to 12 years. Pearson correlation coefficients indicated that there was no significant relationship between perceived and actual physical competence in children with MMR ($r = .00$, $p > .05$). However, when controlling for the effects of age (i.e., using partial correlation by controlling for the effects of age), the result showed a significant but low relationship between perceived and actual motor competence ($r = .25$, $p < .05$).

As another purpose, to determine whether specific ages of participant children influenced the relationship between perceived and actual competence, age subtests were deleted sequentially when calculating the partial correlation between the two variables. The results revealed that the substantial correlations between perceived competence and actual competence were significant for 95 children of 8 to 12 years ($r = .27$, $p < .01$), for 74 children of 9 to 12 years ($r = .33$, $p < .01$), for 52 children of 10 to 12 years ($r = .33$, $p < .05$), and for 32 children of 11 to 12 years ($r = .55$, $p < .01$). The authors concluded that the cognitive functioning needed to make self-evaluations may be related to the lack of a significant relationship between perceived and actual competence. It may be that the level of cognitive functioning necessary to make such assessments is not present in these children, ages 7 to 12, with MMR.

Unlike the study of Yun and Ulrich (1998), Shapiro and Dummer (1997) showed an agreement with the adaptation of individuals with MMR to the theoretical view of the relationship between perceived competence and actual competence. They examined the relationship between perceived and actual basketball competence for 12- to 15-year-old adolescent males with MMR. The Pictorial Scale of Perceived Basketball Competence and the modified version of the AAHPER Basketball Skill Test for Boys, which consisted of four basketball skills (i.e., the push pass for accuracy, jump and reach, speed dribble, and free-throw shooting), were used to assess the perceived and actual competence. The results of the Pearson correlation indicated that a statistically significant relationship was found between perceived and actual basketball competence on the push pass for accuracy ($r = .38$, $p < .05$), jump and reach ($r = .42$, $p < .05$), free-throw shooting ($r = .37$, $p < .05$), and the combined battery of four skills ($r = .46$, $p < .05$). These findings supported the theoretical relationship between actual and perceived competence in adolescents with MMR, in the age range of 12 to 15 years. However, the relationship between perceived and actual competence on the speed dribble ($r = .21$, $p > .05$) was not statistically significant. This may be explained by the disagreement between the pictorial scale for measuring perceived dribbling competence and the task for measuring actual dribbling ability. The authors, thus, suggested that for future study researchers will continue to be challenged by the need to design a reliable and valid perceived competence scale for individuals with MR.

In order to get a more precise measurement of the relationship between perceived competence and actual competence, Yun and Ulrich (1997) and Shapiro and Dummer (1998) attempted to pair the motor competence and perceived competence items. Yun and Ulrich (1997) especially adapted the approach of Ulrich (1987) who noted the motor activities in which the sample participants were commonly involved, and chose the motor items related to those activities. This investigator, then, adapted this approach of Ulrich (1987) for the purpose of this study.

Characteristics of Mental Retardation on Perceived Competence and Actual Competence

Mental retardation (MR) is a varied group of disorders with multiple causations, and is characterized by functional and cognitive limitations (Krebs, 2000). In recent years the definition of MR and criteria used to classify individuals as mentally retarded has changed. In 1992, the American Association on Mental Retardation (AAMR) changed its classification from four levels (i.e., mild, moderate, severe, and profound) based on IQ scores to two levels (i.e., mild and severe) based on the intensity of supports needed in adaptive skills and levels of functioning. The focus of this study is on MR, with an emphasis on MMR. Therefore, the review of literature includes studies involving children with MR, recognizing that the results are generalized to the included individuals with MMR. Reference to these studies will be in terms of MR. When studies are reviewed that refer specifically to individuals with MMR, the designation MMR will be used to indicate the specificity of the study.

Children with MR generally demonstrate delays in motor/physical and learning/cognitive areas, although not all children with MR display the same characteristics. Research reveals that the levels of motor and physical performance of children with MR tend to be significantly lower than those of children without disabilities. Children with MMR lag on the average from one to four years behind their peers without disabilities in motor development (Bouffard, 1990; DiRocco, Clark, & Phillips, 1987; Rarick, Dobbins, & Broadhead, 1976). Much of research being conducted today in the field of MR deals with weaknesses in cognitive processes (e.g., attention, memory, retention, and generalization) due to limited cognitive ability, and concluded that children with MR learn tasks or skills more slowly and inefficiently than those without disabilities (Gearheart, Weishahn, & Gearheart, 1996; Hoover & Horgan, 1990; Nugent & Mosley, 1987). Hickson, Blackman, and Reis (1995) stated that although individuals with MR usually follow the same cognitive developmental sequences as children without disabilities, individuals with MR acquire skills at a slower rate, and may not reach all levels of development. Thus, individuals with MR may typically experience more failure than those without disabilities, and consequently they meet new situations with a low expectation of success. This in turn may predict that in children with cognitive deficits (including MR), there would likely be a different level of self-perception and motivation for future participation.

The delays in physical/motor and learning/cognitive areas may influence how children with MR form judgments about their competence in a specific domain, such as academic or physical activity. For example, deficits in motor/physical performance and weaknesses in learning processes may cause children with MR to refrain from participation in a physical activity due to lack of success and feelings of failure. Decreases in participation may cause them to fall behind in their skills, thereby continuing the failure cycle. Therefore, it is plausible that studies regarding perceptions of competence in individuals with MR are needed.

Perceived Competence and Mental Retardation

There has been little systematic research dealing with the self-perceptions of physical competence in children with MR and the effect on achievement motivation in this domain (Ulrich & Collier, 1990). However, several studies (Kozub & Porretta, 1999; Silon & Harter, 1985; Ulrich & Collier, 1990; Yun & Ulrich, 1997) focusing on children with MMR reported that study of perceived competence in children with MMR did not result in similar applications as in children without disabilities, because of cognitive-developmental levels, unique environmental experiences encountered in a transactional manner, or attributional statements of the subjects.

The self-perceptions of individuals with MMR are not structured with the same level of cognitive complexity as are the self-perceptions of children without disabilities. Silon and Harter (1985) examined the level of perceived competence in 126 children with MMR aged 9 to 12 years in both regular and special education classroom settings. The authors found that children with MMR who are in the chronological age range of 9 to 12 years do not make distinctions about specific domains. Although the perceived competence scale produced a four-factor solution among children aged 9 to 12 years without disabilities (i.e., scholastic competence, athletic competence, social competence, and general self-worth), the same-aged children with MMR only produced a two-factor solution (i.e., cognitive/physical competence and social acceptance). The potential reason why their limited factor pattern emerged to evaluate self-perceptions may be due to cognitive development levels of the subjects related to age appropriateness. By the age of 8 years, children can view themselves with a global self-worth (Silon & Harter, 1985). Prior to the age of 8 years, children do not understand the self-worth items or produce unreliable estimates. Because the mental ages of the children with MMR in the study by Silon and Harter (1985) were below the age of 8 years, they suggested that the children aged 9 to 12 with MMR are not able to reliably construct the type of abstract evaluations about global self-worth. In addition, the findings showed that the factor pattern for 9- to 12-year-old children with MMR resembled the pattern for young children without disabilities, aged 4 to 7, which emerged on the pictorial version in the form of a two-factor solution, competence and social acceptance (Harter & Pike, 1984). These findings support the possibility that the construct of the perceived competence is qualitatively different depending on cognitive-developmental level.

A unique environmental experience such as the reference group employed in social comparisons may also affect the judgments about self-perceptions. Silon and Harter (1985) argued that children with MMR most likely employ various reference groups depending on the context of questioning. For example, if asked to self-evaluate their performance by referencing either people who are familiar with them or with their peers with disabilities, their response is more likely to be positive than if they were to make a comparison to other children at play. Thus, they suggested that it is necessary to establish what reference group is being employed when attempting to measure the self-perception of children with MMR.

Individuals, including children, with MR have been found to display a different attributional profile from individuals without disabilities (Wehmeyer, 1994). Kozub and Porretta (1999) examined whether 86 children with MMR (ages 8 to 15) related internal or external attributes to their perceived physical competence. All children with MMR completed a survey for measuring perceived physical competence and attributional statements. The results suggested that, as with children without disabilities, internal attributions of children with MMR increase with age (e.g., viewing success as a result of ability and failure to poor effort). However, this study showed that children with MMR displayed a large proportion of external attributions (e.g., viewing success as a result of luck) for competent outcomes that may potentially interfere with achievement of physical activity.

In considering the selection of suitable instrumentation to measure self-perceptions in the physical domain, the pictorial approach to assessing perceived competence was expected to be more engaging and understandable, and better at sustaining attention for young children and individuals with MR. Because the pictorial version did not require reading ability for children to respond, it thereby facilitated more meaningful responses for young children and individuals with MR (Harter & Pike, 1984). The design of a valid and reliable perceived competence scale for children with MMR was presented by Ulrich and Collier (1990). They (1990) developed the Pictorial Scale for Perceived Physical Competence for Children with Mental Retardation (PSPPCCMR) by modifying the physical domain of the Pictorial Scale for Young Children (Harter & Pike, 1984). The content of the instrument is modified for age-appropriateness and does not require any specific level of reading ability. The number of items represented 10 fundamental motor skills appropriate for 7- to 12-year-old children with MMR. The results showed that a coefficient alpha of .82 was calculated to determine internal consistency of the items on the modified scale, and the test-retest stability of estimate of 10 item responses was adequate. Thus, this finding suggested that the PSPPCCMR should provide a mechanism to learn more about students with MMR and learning disabilities, and that the selection of an instrument would be based on the cognitive developmental level of the subjects, including age-appropriate content. It is important to note that to help facilitate understanding and increase reliability of measures, pictorial representations are recommended in testing individuals with MMR (Wadsworth & Harper, 1991).

Actual Motor Competence and Mental Retardation

In the present study, the levels of FMS of children with MR were dealt with as the standard for testing the mentally retarded children's actual competence in the physical domain, and it is called actual motor competence. Thus, this section will briefly explain the characteristics of motor ability and performance of children with MR.

Over the past decades several studies have found that the motor ability and performance of children with MR are generally deficient when compared with their peers without disabilities. Rarick, Dobbins, and Broadhead (1976) provided the most comprehensive comparisons of 406 children with and without MR. The participants were divided into three groups: young non-disabled children aged 6 to 9, young children with MR aged 6 to 9, and older children with MR aged 10 to 13. Children with MR in the study were identified as educable mentally retarded. Data were collected on 39 movement tasks and seven physical measures for all children. The results demonstrated that the children with MR lag behind their non-disabled peers of the same chronological age on mean performance. Similarly, Holland (1987) studied qualitative fundamental motor skill performances of children with MMR and those without disabilities, ages 6 to 9 years. Seven fundamental motor skills including run, vertical jump, overhand throw, catch, ball bounce, kick, and two-hand sidearm strike were tested. The results showed that the qualitative fundamental motor skills of children with MMR were significantly lower than those of children without disabilities.

As for the demonstration that children with MR display inferior motor performance scores (i.e., FMS) to their peers without disabilities, some researchers have explained the reasons why children with MR exhibit inferior motor performance scores. DiRocco, Clark, and Phillips (1987) investigated the developmental sequence of coordination for the propulsive phase of the standing long jump with 39 children with MMR and 90 children without disabilities, ages 4 to 7 years. The authors determined that the patterns of leg and arm coordination were similar, but the distances jumped by children with MMR were similar to the distances jumped by children who were 2 to 3 years younger without disabilities, rather than the same distances jumped by children of the same chronological ages without disabilities. The authors then offered the poor coordination of the two synergies (i.e., the arm and leg action) as a possible explanation for these differences. Both coordination of the arms and legs and timing of movement together are important for success in jumping. Decreased takeoff velocity, increased projection angles, or both could be caused by poor coordination, resulting in shorter distances jumped. The authors also stated that the distance-jumped differences may be due to difference in control mechanisms.

The developmental delays demonstrated by children with MR are associated with their cognitive ability, with the more severe the intellectual deficit, the greater the deficit in motor performance (Krebs, 2000). Bankhead and MacKay (1982) found the prevalence of fine motor problems to be inversely proportional to intelligence. They also reported that the performance levels of individuals with "subnormal" intelligence were inferior to those of "normal" intelligence in the areas of task complexity and reaction time. A study of Eichstaedt, Wang, Polacek, and Dohrmann (1991) supported the idea that as the degree of disability of MR increases, children exhibit deficiency in motor performance.

Bouffard (1990) demonstrated that educable mentally handicapped children lag well behind their peers without disabilities in the development of both fine and gross movement skills, and that their lack of proficiency is related to their inability to solve problems. Citing research conducted mainly in cognitive developmental psychology, Bouffard (1990) reviewed the five sources of this lag in movement skill development for those with MR: (a) deficiencies in the knowledge base, such as a lack in the amount of knowledge a person has; (b) deficiencies of spontaneous use of strategies, for example, lack of technique to overcome problems; (c) inadequate metacognitive knowledge and understanding, such as the lack of the person's ability to consider the requirements of the task, the environmental conditions, and the resources available to cope with the situation; (d) lack of executive control, including the lack of strategic processing to solve the problem; and (e) inadequate motivation and practice. Based on these problem areas, it is important to understand that the overall poor movement performance of this population (children with MR) can not be attributed solely to one single factor, but rather a combination of factors must be considered. General factors (e.g., body size and physique, socio-economic levels, a lack of movement experience, and quality of instruction) may affect FMS performance of children with MR (Eichstaedt & Lavay, 1992). More research is needed to understand why they display inferior levels of FMS when compared to their peers without disabilities.

Factors Influencing Perceived Competence and Actual Competence

Harter's competence motivation model is developmental in nature because there are variations across age and gender in perceived competence, actual competence, and motivation to participate in sport and physical activity. Researchers have found that age and gender differences provide essential information for understanding the mechanisms by which children come to evaluate their perceptions of physical competence and actual competence. The factors assist in providing understanding of interventions that may be effective for improving perceived competence and actual competence in children (Weiss, 2000; Weiss, Ebbeck, & Horn, 1997).

In addition to individual difference factors such as age and gender, researchers are interested in the sources of information (e.g., significant others, mastery success, etc.) available in a specific domain and environment that children use to judge their ability (i.e., actual competence), and their perceived competence (Stipek & Mac Iver, 1989; Weiss, Ebbeck, & Horn, 1997). In the physical activity and the sport environment, Weiss (2000) stated three available sources of information: outcome, social, and internal source. Outcome sources involve performance scores, fitness testing standards, and event outcome. Social sources not only include evaluation and comparison by peers, but also feedback and reinforcement from parents, teachers, and coaches. Internal sources consist of self-referencing such as enjoyment of activity, effort exerted, and achievement of personal goals.

Although there are a wide range of sources of information available in any particular achievement domain that children could use to judge their performance and their competence in that context, during the early through late childhood years, parents especially appear to be the chief individuals in academic, physical, and social domains for judging competence and making decisions about future participatory behaviors (Brustad, 1992, Weiss, Ebbeck, & Horn, 1997). Therefore, in this study, the investigator was interested in focusing on the role of parents (i. e., parental physical activity) as a source of information. The following review of literature encompasses three factors, age, gender, and parents' role that could influence one's perceived competence and actual competence.

Age

Influence of age on perceived competence. Children's perceptions of the degree of competence (i.e., perceived competence) decline with age. Children also appear to become more accurate in estimating perceived competence with age, because they become cognitively more capable of analyzing the causes of performance outcomes (Horn & Weiss, 1991; Shapiro & Dummer, 1998). Xiang and Lee (1998) stated that children's understanding of what ability means (i.e., perceived ability) seems to change as they increase in age, and reported that both the accuracy and criteria used to assess perceived ability are age-dependent. Studies concerning age differences on perceived competence in physical domains have typically found that older children without disabilities demonstrate lower levels of perceived physical competence than young children without disabilities (Horn & Hasbrook, 1986; Ulrich, 1987), though there is evidence of no decline when children aged 9 to 11 years were asked to judge their competence (Rudisill, Mahar, & Meanney, 1993).

Similar results regarding age differences on perceived physical competence have been found in children with MMR. Ulrich and Collier (1990) and Yun and Ulrich

(1997) demonstrated that children with MMR, aged 7 to 12 years, tend to feel less competent with increased age. They thus supported the suggestion of Horn and Hasbrook (1987) which indicated that older children may understand that they do not have good ability in all skill areas, and thus use social comparison during task achievement, which is unlike younger children who assume that they are highly skilled at everything, with no concern for the level of performance of other children. Additionally, older children may develop more realistic perceptions and possess adequate perceptual functioning needed to use the scale for self-perception measurement in a meaningful way (Ulrich & Yun, 1997).

Age is related to the accuracy of perceived competence and to preference for informational sources of competence. Horn and Hasbrook (1986) investigated a relationship between age and the sources of information used to judge children's physical competence. Participants in the study were children in three age groups (i.e., 8-9, 10-11 and 12-14 years) in a soccer camp. Through factor analysis, 12 information sources included in the survey were reduced to six factors: social comparison, social evaluation I (i.e., coaches, peers), social evaluation II (i.e., parents, spectators), internal information, game outcome, and affect. The results indicated that children 8 and 9 years of age more frequently used game outcome and social evaluation II (e.g., parent/spectator feedback) as sources of information than did children 10 to 14 years of age. However, these older children rated social comparison as a more salient source of information than did the younger children. Horn and Hasbrook (1987), by using the same sample of their 1986 research, also determined whether particular self-perceptions, as measured by perceived competence and perceived information control, were linked to the sources of information used to judge personal ability. The results revealed that 8- to 9-year-old children did not show a significant relationship between self-perceptions and sources of competence information but 10-11 and 12-14 year old children did. Therefore, from the two studies of Horn and Hasbrook (1986, 1987) it can be implied that a certain level of sophistication in cognitive development related to age is necessary for accuracy in the hypothesized relationships in a motivational model.

Children become more accurate in their perceived competence with age, with children of 8- to 9-years less accurate than children of 10- to 13-years (Horn & Weiss, 1991). This supported an earlier study by Feltz and Brown (1984) which showed a linear increase of the accuracy with which children evaluated their soccer competence from age 9 to 13, and Nicholls (1978) who reported little correlation between perceived ability and actual performance before age 8. The results may be based on developmental theory indicating that children's accuracy levels of judging their physical competence are related to their cognitive development and age. As age increases, children's ability to differentiate between competence, effort, and luck as performance outcome determiners also increases (Horn & Weiss, 1991). Ages 8 to 12 years are the critical mental ages for development of the cognitive skills required for analyzing performance outcome causes, establishing individual goals in regard to mastery, internalizing personal success standards, and for making comparisons with peers (Harter, 1982).

Some studies extended these results which show a relationship between age and the accuracy of perceived competence, and the source of information used to judge physical ability, with older aged participants. McKiddie and Maynard (1997) examined perceived competence of British 7th and 10th grade students in physical education. They found that 10th grade students were more accurate in judging their physical ability than were 7th grade students. Horn, Glen, and Wentzell (1993) reported age differences in the sources of information used by 14- to 18-year-old male and female athletes in high school to judge their competence. They found that older athletes (11th-12th graders) were likely to judge their sport ability based on self-comparison and internal information. In contrast, the younger athletes (9th-10th graders) showed lower accuracy in judging their perceptions of competence than older athletes, and they preferred information that was external in nature, such as feedback and evaluation from parents and teachers.

Influence of age on actual competence. There are a number of factors (e.g., environmental or biological influences) other than aging that contribute to the improvement in performance (Branta, Haubenstricker, & Seefeldt, 1984). However, in general, a child's motor performance naturally improves with age because the child gradually becomes taller, broader, and stronger, so that age-related differences play a greater role in skill development (Walkley, Holland, Treloar, & Probyn-Smith, 1993). Rudisill, Mahar, and Meaney (1993) completed a series of gross motor tests to assess actual motor competence of 218 children between the ages 9 and 11 years. They found that among 9-, 10-, and 11-year-old children, older children demonstrated higher levels of actual motor competence than younger children. Yun and Ulrich (1997) also examined actual motor competence in children with MMR, aged 7 to 12 years, by measuring quantitatively the 10 gross motor skills, standing long jump, running, batting a tossed ball, shooting a basketball, kicking, throwing, skipping, catching, jumping rope, and dribbling. The results indicated that 12-year-old children performed better than the other age groups, and that 7-year-old children performed significantly less well than the other age groups. Their results support a study by Holland (1987) indicating that FMS performances of elementary-aged students with educable mental impairment (i.e., MMR) improved with age.

Gender

Influence of gender on perceived competence. Gender plays an important role on perceptions of competence during childhood. Previous studies investigating gender differences in perceived competence have shown that males report higher perceived competence than females for their physical performance and their physical appearance (Brustad, 1993; Feltz & Brown, 1984; Rudisill, Mahar, & Meaney, 1993; Ulrich, 1987); whereas, females are more invested in social and relational domains (Crocker & Ellsworth, 1990). Jolly (1997) conducted a study investigating a comparison of perceived physical competence between fourth-grade boys and girls towards fundamental gross motor skills as well as the goal setting tendencies of these boys and girls. The Pictorial Perceived Physical Competence Scale was used to measure perceived physical competence, and goal setting was analyzed by using a penny-pitching task. The findings showed that not only did girls have a significantly lower perceived physical competence than the boys, but the girls also set their goals significantly lower more often than the boys.

Gender difference also has been found to relate to preference for information sources to judge people's competence or ability. Gender comparisons with competence information sources begin to show differences in the adolescent period. Females prefer the use of self-comparison information and evaluation from peers and coaches, whereas males prefer the use of peer comparison to judge their abilities (Horn, Glenn, & Wentzell, 1993). Horn and Harris (1996) indicated gender differences provide essential information for understanding the mechanisms by which children and adolescents come to evaluate their self-competencies in physical activity. During young childhood, girls have higher perceived competence in play-oriented and locomotor skills, but boys have higher perceived competence in fundamental motor skills and sport-specific skill. In addition, adolescent females indicate greater use of internal sources (e.g., attraction toward physical activity and achievement of goals) and social sources (e.g., feedback and evaluation by adults and peers) than adolescent males do, whereas adolescent males cite competitive outcomes and speed and ease of learning new skills as more important than adolescent females do. Thus, they suggested that these trends in information sources by adolescent females and males are likely the result of differential socialization experiences.

Gender role beliefs and stereotypes affect the development of children's perceptions of competence. Lirgg (1991) examined gender differences in self-confidence with regard to the orientation of physical activity tasks. The author found that if a task is evaluated as being more masculine than another task, it will result in gender differences in self-confidence. In other words, the more masculine the task is considered, the greater the confidence difference between males and females. The author suggested that when sport activities are gender-linked, males display more confidence in masculine type tasks and females display more confidence in feminine type tasks. The relationship between females' evaluation of their sport ability and their beliefs about gender-role stereotyping of sports is a positive relationship. Girls estimate their physical competence higher when they perceive sports as appropriate for girls, or as gender-neutral. In the same way, girls demonstrate less confidence when the task is perceived as masculine. To the same extent, boys perceive themselves as having more sports ability when they see sports as being male gender-role stereotyped (Lirgg, 1992, Lee, 2002). According to suggestions of Yun and Ulrich (1997), the stereotypic gender-role in the culture should be possible reasons why 12-year-old males with MMR demonstrated significantly higher perceived physical competence than the same aged females. Males may get more reinforcement for participating in physical activities than females, and males may have more opportunities to participate in sports than females, and thereby these opportunities in sport participation may affect on having higher perceived physical competence.

Influence of gender on actual competence. Gender differences in children's motor performance is one of the most frequently studied characteristics influencing performance (Thomas, 2000). According to the review of Toole and Kretzschmar (1993), many studies have been reported for gender differences in motor performance and in activity level during childhood. They concluded that boys have generally been considered to be superior to girls in power/force tasks as well as in running speed and agility; whereas, girls usually perform better on balance and flexibility tasks. Thomas and Thomas (1988) stated that gender differences in motor performance/activity were related to age at least through adolescence. Patterns of small differences in early childhood increased during the elementary school years.

With reference to actual motor competence in gross motor skills, several studies have shown gender differences in actual motor competence. Rudisill, Mahar, and

Meaney (1993) examined gender differences among children for actual motor competence which measured five motor skills including the standing long jump, 50-yard dash, shuttle run, and ball throw from two different distances. They concluded that the five skills for actual motor competence of the boys exceeded those of the girls. Similarly, Goodway and Rudisill (1997) found that 4-year-old preschool boys at risk of school failure and/or developmental delays had higher object-control component of actual motor skill competence (e.g., throw, catch, strike, kick, and bounce) than the same aged girls, while boys and girls did not significantly differ on the locomotor component of actual skill competence (e.g., run, leap, jump, hop, gallop, slide, and skip). The boys in this sample showed more familiarity with object-control skills than girls, because it appeared that the boys had more practice in object-control skills than the girls.

In addition, gender differences in actual motor competence are supported by a study of Yun and Ulrich (1997) conducted to examine actual motor competence in children with MMR (54 boys and 55 girls). Actual motor competence was quantitatively measured by 10 gross motor skills. The results indicated that boys performed better than girls on the total actual competence scores. More specifically, the performance of boys was significantly better than the performance of girls on the standing long jump, batting a tossed ball, shooting a basketball, kicking a ball, catching a ball, and dribbling a ball. Only on jumping rope did girls outperform boys. On running and skipping, no significant gender differences were found. The results supported the prediction that for male children activity is rewarded, and involvement in motor skill activities that are physically challenging leads to positive reinforcement (Greendorfer, 1983).

Role of Parents

Influence of parents on perceived competence. Harter's (1978, 1981) theory directly addresses the emphasis on the role of significant others (such as parents, peers, coaches, and teachers) in the socialization process. Especially among significant others, parents appear to be the chief individuals who are used as sources of information by children and adolescents in academic, physical, and social domains for judging ability and making decisions about future participatory behavior (Brustad, 1992; Weiss & Chaumeton, 1992; Weiss, Ebbeck, & Horn, 1997). The role of parents as the major initial socializing influence upon children's physical activity or sport seems indisputable. Because children with MR have more difficulty with judging ability and making decisions about future participating behavior than their peers without disabilities, research on the interaction between children with MR and their parents is needed.

Several studies have emphasized that parental expectations, beliefs, and behaviors play a crucial role in the nature and extent of their children's physical activities or sport opportunities (Brustad, 1993; Lewko & Greendorfer, 1988), and parental patterns toward exercise or physical activity is one of the major influences on health-related behavior patterns that formed in their children (Chang, 1993; Freedson & Evenson, 1991). However, despite the role of parents assumed by socializing agents in shaping children's developing perspectives on sport/physical activity and self, there currently exists only limited research focusing on the relevance of parental socialization influences on the understanding of children's psychological processes (Brustad, 1992).

Children may imitate and adopt the behavior and performance of their parents. Weitzer (1989) tried to examine the parents' role in the emergence of children's ability perceptions by investigating the relationships among fourth-grade children's perceptions of parental influence in their sport involvement, children's self-perceptions of sport competence, and their level of sport involvement. For girls, the findings showed that greater parental influence was associated with higher perceptions of personal competence in sport. Additionally, greater parental influence was related with higher levels of involvement in sport for both boys and girls. A study conducted by Brustad and Weigand (1989) examined the link between parental socialization behaviors and children's motivational patterns in sport/physical domain within the framework of Harter's theory. They found that children who reported that their parents consistently responded with support and encouragement for their sport-related efforts displayed greater intrinsic motivation (e.g., a higher preference for challenge) than did children who received less favorable parental support. From these two studies, it could be implied that by observing the behavior of parents, perceptions of children's ability may be shaped through parental role modeling.

Children's self-perceptions may be influenced by a variety of parental socialization processes, including role modeling and expectancy socialization effects. The following two studies of Brustad (1993, 1996) provide support for a theory which links parental socialization processes to children's motivational characteristics based on Eccles's expectancy socialization approach (cited in Brustad, 1992), which focuses on parental belief systems rather than parental behaviors (i.e., role modeling) as the key influence in children's achievement motivation. In 1993, Brustad tested a conceptual model that links parental physical activity orientation (e.g., parental enjoyment of physical activity, parental fitness, and belief about the importance of physical activity) and the child's gender, parental socialization practices (e.g., parental encouragement), and children's self-perceptions with children's attraction to physical activity. Participants consisted of fourth-grade children (39 boys and 42 girls) receiving physical education instruction from a specialist everyday for 30 minutes, and their parents. The results revealed that children' gender and parental enjoyment of physical activity was related to parents' encouraging their children's involvement in it and, in turn, that the encouragement influenced children's perceived physical competence and attraction to physical activity.

In addition, Brustad (1996) used Eccles' expectancy-value model of motivation in an effort to better understand the contribution of gender and parental socialization processes to children's interest in physical activity. Forty-eight boys and 59 girls in fourth- through sixth-grade participated in this study and completed questionnaires assessing attraction to physical activity, perceived physical competence, and parental socialization scale. The results of the study indicated that significant relationships between children's perceptions of their parents' physical activity socialization processes and their own physical activity orientation (i.e., children's perceived competence and attraction to physical activity) was present. Gender differences were also related to their own physical activity orientation.

Brustad's two studies (1993, 1996) provide partial support for Eccles' expectancy-value model of motivation proposing that parental belief systems are more instrumental to the socialization process than parental role modeling. However, the findings of these studies suggested that a large amount of the variability among children remains unexplained by parental socialization processes. This should encourage researchers to look at other contributors to variability in children's physical activity interests.

Influence of parents on actual competence. Parental behaviors in physical activity or sport (e.g., sport involvement and physical fitness) are significant variables for improving the behaviors of their children. Freedson and Evenson (1991) conducted a study in 30 families investigating the relationship between parents' behaviors and their 5- to 9-year-old children's physical activity level. Their analysis indicated that active parents are likely to have an active child, while low active parents are more likely to have a low active child. Similarly, Moore et al. (1991) investigated the influence of parents' level of physical activity (99 mothers and 92 fathers) on those of their 4-to 7-year-old children. They used the Caltrac accelerometer (i.e., an electronic motion sensor) to assess the activity levels of the children and their parents. Parents and children were classified as active or inactive in terms of whether they were above or below the median activity level for their reference group. The results showed that parents who are more physically active are more likely to have children who are physically active. Kim (1995) also stated that parents who are regularly involved in physical activity express more interest toward their disabled children's physical activity than parents who are not involved, and suggested parental patterns toward physical activity or sport are likely to encourage their children with disabilities (including MR) to have active and physical behavior patterns.

Other research, though, indicates that the exercise patterns and attitudes of parents had little effect on children's activity patterns, but showed some effect on children's fitness. McMurray, et al. (1993) explored the relationship between parental exercise patterns and attitudes toward exercise and their children's aerobic fitness and activity patterns. Healthy children and parents (from each of 1,253 families) from 18 elementary schools served as participants for this study. The findings indicated that parental exercise patterns and attitudes are not associated with the child's activity patterns. However, there is a partial association between parental patterns and attitudes toward exercise and their children's aerobic fitness. Therefore, this may support the idea that parental leisure activity affects their children's actual competence with regard to physical domains.

Summary

The literature presented provides information on how Harter's theory of competence motivation can help understand the framework of perceived physical competence and actual motor competence. Perceptions of competence, including perceived and actual competence, contribute to one's level of motivation to initiate and persist in sport (Fry, 2001). The study reviewed the relationship between perceived competence and actual competence in children with and without MR. An understanding of the relationship between perceived competence and actual competence in children with MR may help the researcher to generalize these relationships. Because disabilities can interfere with educational situations, the literature in this study also briefly describes the relationship between limitation and deficits of children with MR and perceptions of competence. Finally, as Harter' model is sensitive to developmental differences, the variations across age, gender, parental behaviors in perceived competence and actual competence were mentioned.

CHAPTER THREE

METHODS

Participants

The focus of this study was a population of elementary-aged Korean children with mild mental retardation (MMR) and their parents. The participants in this study were 112 students (61 boys and 51 girls) with MMR who attended five special schools for the mentally retarded and their parents. In the Korean educational system, there is a classification system comprising 3 classes for students with MR (Class I: below IQ 34, Class II: IQ 35-49, and Class III: IQ 50-70). Students with Class III are identified as those with MMR (Choi, Park, & Kim, 2001). They usually receive education at the special schools for MR, though it is possible to receive education through others sources, such as home schooling, residential facilities, or clinical centers (Kim & Hong, 1992).

Prior to data collection, a power analysis was conducted to determine the optimal number of participants for the study. The power analysis indicated a sample size of 80 participants (10 participants in each group which are broken down by age, gender, and parental physical activity level) would be appropriate for determining significance of the hypotheses (Shavelson, 1996). Therefore, the 112 proposed participants seemed to be an appropriate number for determining significance in this study, because the larger sample size used in this study would protect against attrition and should increase the power of the study (Shavelson, 1996).

Sample of Children with MMR

One group of participants in this study consisted of a total of 112 children (61 boys and 51 girls) with MMR between 8 and 11 years of age ($\underline{M}$ = 10 years, 2 months;

SD = 14.54 months). A breakdown of participant children by age and gender is provided in Table 1. The participants were attending five special education schools for children with MR in Seoul, Korea, which are located in urban school districts. Participants attended Grades 1-6. Generally, in regular schools children's age and grade are almost correlated; however, in special schools for children with MR, the participants attended various grades without relating to age. Therefore, this study focused on participants' ages rather than their grades.

Table 1

Number of Participants by Age and Gender

Group	Younger (Age 8-9) n	Older (Age 10-11) n
Boys	31	30
Girls	24	37

Age calculations differ between Korea and the United States. In Korea, a child is considered to be one year old at birth, and at the first birth anniversary is considered to be two years old, and so on. In the United States, a child's age is calculated in months for the first year until the first birthday anniversary. By way of comparison, an eight-year-old child in Korea would be considered to be seven-years-old in the United States. Thus, as protocol of the Test of Gross Motor Development – Second Edition (Ulrich, 2000), the child's exact age was determined by subtracting the birth date from the date on which the child was tested. For purposes of this study, all references to participant ages use American age calculation.

All participant children in the study qualified for special education services according to the Korean government's educational policy for students with MR, and were selected from special education school settings to participate in this study. In other words, only children who attended special schools were included in this study. According to Kim and Hong (1992), Korean special education for elementary school age children is not only free but also compulsory. As well, Korean special education services are provided mainly in the special schools in full-time, self-contained special classes, though residential facilities, clinical centers, and home schooling are provided as an alternative for children with disabilities. The Korean special education service in the special schools provided by the government is the most commonly used educational alternative for students with MMR, and the easiest to access.

Participant children were classified in school files as having a Class III (i.e., MMR) designation based on school administered IQ test scores. Because the investigator did not access files, special education teachers in the classrooms of each school helped to identify students with MMR who qualified for this study. Children from each school did not have any other identifiable physical, emotional, visual/hearing, or behavioral disability that would restrict the assessment of their perceived competence, and their performance on FMS tests (the measure of actual competence). Children whose parents responded positively to the informed consent forms were eligible to participate in this study, and children were asked to give verbal assent to participation.

Therefore, if a child asked not to be tested, the child would not be required to participate. In this study, no children refused to participate.

Sample of Parents

The other group of participants in this study was 112 parents of the participant children in special education schools. One parent for each participant child made up this participant group. The study had an inclusion criterion which controlled for parents/children participants, so that only parent/child groupings were tested, and no legal guardian/child groupings were used. Therefore, of the 115 guardians who consented to be involved in the study, three guardians (two grandparents and one relative) were excluded. Participant parents lived in the greater Seoul metropolis area. The parents consisted of 40 males and 72 females ranging in age between 33 and 52 years. Parents' educational level ranged from elementary school to doctoral degree. Among 112 parents, 53 parents regularly participated in physical activities or sports (less than 1 year = 13, 1 year to less than 3 years = 27, and more than 3 years = 13 parents). The three most frequent locations for physical activity of participant parents were club/gym (28.6%), park/ground (20.5%), and home (17%).

Informed Consent

Before any part of this study was conducted, permission was obtained from the University Committee on Research Involving Human Subject (UCRIHS) (Appendix A). Permission also was received directly from principals in each school, after discussing the nature of a school's involvement and purposes of the study (Appendix B). With the assistance of each principal, the investigator contacted classroom teachers and physical education teachers in a meeting which was usually conducted everyday in each school.

At that time, based on each school's schedule, the testing period, testing place, and testing date were decided. In addition, a letter describing the study (e.g., an explanation of the tests, the testing procedures, and the subject's rights as a participant in this study) and an informed consent for parental and child involvement was sent home, via the students, to the parents of the children who would participate in this study (Appendix B). There were no anticipated psychological risks as a result of participation in this study. There was minor physical risk of injury in the actual motor competence testing, but this was tightly controlled and conformed to standard protocols. These risks were carefully explained in the informed consent. Only students whose parents signed the consent form were allowed to participate in the study. Also, students whose parents consented to the study were told briefly about the program and asked to give verbal assent to participation.

Instrumentation

This study used three instruments to obtain data plus a parent demographic survey. These instruments were selected in adherence with the following criteria: (a) the instruments would be valid and reliable, (b) the time necessary to administer the instruments would not exceed the attention span of the participants who take the tests, and (c) the instruments' directions would not be too difficult for the comprehension level of the participants.

Perceived Physical Competence

The Pictorial Scale for Perceived Physical Competence for Children with Mental Retardation (PSPPCCMR), which was developed by Ulrich (Ulrich & Collier, 1990), was used to assess perceived physical competence. The PSPPCCMR was a modified version of Harter and Pike's (1984) Pictorial Scale of Perceived Competence for Young Children. The content of the instrument was modified for age-appropriateness, and the instrument was designed for children with MMR, aged seven to 12 years. However, it was noted that the African American and White children's versions of this scale were not considered to be appropriate and reliable for the participants in this study because the participants would tend to identify better with children of the same ethnic group rather than of another ethnic group (Goodway & Rudisill, 1997). Thus, in this study, the children depicted in the picture plates were slightly modified to represent Asian children rather than another race. Further, pictorial plates portrayed male and female versions, respectively.

PSPPCCMR is represented by pictures to assist the child's understanding of the content, and it has 10 appropriate test items (standing long jump, running, skipping, catching, throwing a ball, kicking a ball, batting a tossed ball, shooting a basketball, jumping rope, and dribbling a ball) for not only young children but also for students who have mental retardation and learning disability (Ulrich & Collier, 1990). Each item contains two pictures placed side by side; one picture depicts a child successfully performing each skill item, and the other shows a child who is not so competent or skillful. Under each pair of pictures, there are two circles (Appendix C). A big circle indicates that a child feels a lot like the child in the picture, and a small circle indicates that the participant feels a little like the child in the picture. The scores for each item are based on a 4-point scale: 4 points representing a successfully performing child "a lot like him/her", 3 points representing a successfully performing child " a little like him/her", 2 points representing an unsuccessfully performing child "a little like him/her", and 1 point representing an unsuccessfully performing child "a lot like him/her." Therefore, the lowest possible scores for each item and for total items are, respectively, 1 and 10. The highest possible scores for each item and for total items are, respectively, 4 and 40. For this study, the scores for total items (i.e., the sum of 10 items) was used. Figure 2 shows the example of the running test of perceived physical competence for girls.

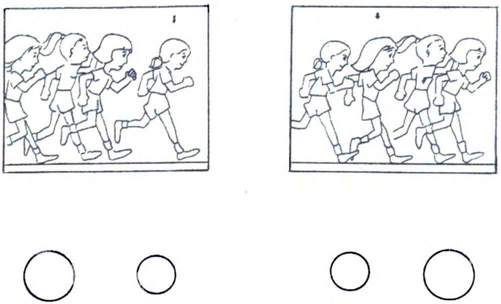


Figure 2. An Example Item from the Pictorial Scale of Perceived Physical Competence Taken from the Female Plates

Results of test-retest reliability for the 10 motor skill items of the PSPPCCMR with a sample of children with MMR indicated that all coefficients were statistically significant at the .05 levels and the overall test-retest reliability coefficient score was .77 ($p < .01$) (Ulrich & Collier, 1990). Factor analysis was conducted to determine the validity of PSPPCCMR. Results of maximum likelihood factor analysis with oblique rotation suggested the presence of two factors accounting for 93.5 % of the total variance (Ulrich & Collier, 1990). Thus, Yun and Ulrich (1997) reported that each PSPPCCMR item is assumed to measure the domain of perceived physical competence, and the total score for a child represents the domain of perceived physical competence in FMS.

Actual Motor Competence

The Test of Gross Motor Development – Second Edition (TGMD-2) (Ulrich, 2000) was used to assess actual motor competence. The TGMD-2 is composed of two subtests that measure six locomotor skills (run, gallop, hop, leap, horizontal jump, slide) and six object-control skills (striking a stationary ball, stationary dribble, catch, kick, overhand throw, and underhand rolling) that may be taught to children in preschool, elementary, and special education classes. Like the first edition (Ulrich, 1985), TGMD-2 is both a criterion and norm referenced test. The test is concerned with the observation of form in fundamental movement skill that produces process data (i.e., portions of the tasks the child is able to do) rather than product data (i.e., how far or how fast the child can move).

For this study, two subtest standard scores and an overall Gross Motor Development Quotient (GMDQ) were calculated to determine a child's actual competence scores (Appendix D). In the TGMD-2, each locomotor or object-control skill includes three to five behavioral components to qualitatively describe performance as performance criteria. If the child performs a behavioral component correctly (in the subtest items), a score of "1" is given; if the child shows the absence of that component in the subtest items, a score of "0" is given. Each test item is administered for two trials, and then the scores of two trials add up to a raw subtest score. Locomotor and object-control skills are recorded in raw scores and then converted to standard scores. The standard scores in the TGMD-2 locomotor and object-control subtest range from 1 to 20. Then, subtest standard scores are combined and converted to an overall Gross Motor Development Quotient (GMDQ) with a range of scores from 46 to 160.

The evidence of the reliability for the TGMD-2 has been reported in the test manual (Ulrich, 2000). Content sampling reliability coefficients for TMMD-2 scores at eight age intervals for children ages 3 to 10 years are reported to be .85 for locomotor items, .88 for object-control items, and .91 for GMDQ. Test-retest reliability coefficients (locomotor items = .88, object-control items = .93, and GMDQ = .96) and interrater reliability coefficients (locomotor items = .98, object-control items = .98, and GMDQ = .98) are also reported. In addition, validity for the TGMD-2 has been established including content and construct related evidence for validity (Ulrich, 2000). Content validity has been established by having three motor development experts judge whether the selected motor skills are appropriate items for preschool- and elementary-aged children, and construct validity is established by factor analysis.

Demographic Questionnaire

For this study, the questionnaire (see Appendix E) about parents' demographic information such as sex, age, educational level, parents' physical activity experiences/behaviors, and parents' perceptions of their child's motor skills was composed by the investigator. The primary reason for having the participant parents complete these questions was to obtain the selected demographic variables for the basis of comparison.

Parental Physical Activity

The Godin Leisure-Time Exercise Questionnaire (GLTEQ), developed by Godin and Shephard (1985), was used to assess leisure time physical activity of participant parents. The questionnaire consists of two questions (including a brief four-item query of usual leisure-time exercise habits) (Appendix E). The first question includes three intensity levels (i.e., strenuous, moderate, and mild exercise) and shows examples of sport in each of three intensity levels. The first question asks the weekly frequencies of strenuous, moderate, and mild exercise activities. The second question asks the intensity of weekly leisure-time activity, e.g., "long enough to work up a sweat."

According to a study of Godin and Shephard (1985), in 53 healthy adults, the total coefficient of a two week test-retest reliability for light, moderate, strenuous exercise, and sweat question was .74. Also, in 28 males and 50 females between the ages of 20 and 59 years, the total coefficient of a month test-retest reliability for activity categories, and sweat question was .62 (Jacobs, Ainsworth, Hartman, & Leon, 1993). Criterion validity was determined by the relationships with maximum oxygen consumption (VO_2 max) and body fat (BF). The strongest correlation was between VO_2 max (percentile) and reported strenuous exercise ($r = .35$). Also, criterion validity was determined by discriminant analysis to classify individuals by VO_2 max and BF with activity data (Godin & Shephard, 1985).

Data Collection Procedures

There were two procedures of data collection for participant children with MMR and their parents.

Measures for Participant Children

The measures for the perceived physical competence (PSPPCCMR) and actual motor competence (TGMD-2) were administered by the investigator during two months at the schools of each participant child. Participant children were assessed on each measure in a quiet room (e.g., empty gym and classroom) or an open hallway outside the classroom of each participating school away from distraction and interruptions. Based on the schedules of each school's classroom teachers, adapted physical educators, and students, two or three children were asked to come to the testing location at the same time. The investigator assisted participant children by walking them from the classroom to the testing place. Both measures were administered on the same or the next day for each participant, because perceived competence in specific domains can change within a period of days or weeks (Harter, 1990).

After entering the testing place at each school, the participant children (i.e., two or three children) listened to the brief explanation of the testing environment and standardized procedures. Then, the pictorial scales were individually administered first to each participant child. When one of the children was tested on the pictorial scales, the other children were supervised by an assistant, so that these children were occupied in play. This process minimized distraction and assured the safety of participant children. The pictorial scales were followed by a series of motor performance tests to measure the actual motor competence. The children in each motor performance test group took turns being the first one to perform test items. Each test item for motor performance was administered individually to each participant child. The time to administer both the PSPPCCMR and the TGMD-2 took approximately 35-40 minutes per child.

In order to complete the pictorial scale, the participant children sat at a desk with the investigator, and were told to look at the two pictures for each of 10 test items of PSPPCCMR. At that time, the investigator gave the description of the two pictures of each test item to the participant children based on gender. Pictorial scales showing male and female performers were used for male and female participants, respectively. For example, the investigator pointed to one of two pictures and explained that the child in the picture is pretty good or not very good. Then, the child selected one of two pictures which s/he felt most represented her/his competence level. After the selection was made, the investigator explained the two circles below the picture selected and asked the participant child to make an "X" in the appropriate circle (see Appendix C). If a child selected the larger circle, the investigator knew that the participant child felt a lot like the child in the picture selected; if a child selected the smaller circle, the participant child felt a little like the child in the picture.

In an effort to minimize response bias, the investigator would not use specific verbal or body language cues that would draw attention to one picture or the other in the PSPPCCMR. The pictures were presented in pairs and, in the presentation or questioning, inclusive questioning (e.g., "Which picture best represents you?) was used rather than exclusive questioning (e.g., "Is this picture or that picture the best representation of your ability?) that might contribute to response bias. It was also noted that there are no right or wrong responses. After data collection, the investigator converted the pictorial circle data to a number between one and four, with one being lowest score (representing low perceived physical competence) to four being the highest score (representing high perceived physical competence). Then, the scores of each 10 items were added to create a final perceived physical competence score which could range from a minimum score of 10 to a maximum score of 40.

After completing the pictorial scales, the TGMD-2 was undertaken at the same testing place (gym, empty classroom, or open hallway outside the classroom) as the pictorial scale by the investigator. TGMD-2 protocol was followed, and standardized testing procedures were used. Verbal directions and physical demonstration of each of 12 items in the TGMD-2 were provided by the investigator prior to testing. Each participant child then performed two trials of each item, as per the TGMD-2 protocol. Verbal feedback was given to a participant child if the child had some difficulty in understanding the task, or to encourage the participant to perform well on the next trial.

To get a careful and correct judgment of performance scores, all TGMD-2 measures were videotaped. A colleague who studies Kinesiology at Yonsei University in Seoul, Korea, assisted in videotaping the TGMD-2 test. Participants wore stickers marked with identification numbers to protect participant confidentiality. Only the investigator has a list of the children's names correlated to their identification numbers. The investigator watched the videotape from the actual study, and recorded raw scores of each participant child's performance for each of the 12 items, and then converted to standard scores, according to the criteria of the TGMD-2 (see Appendix D). Only the investigator was the rater of the videotape.

To become qualified to administer and score PSPPCCMR and TGMD-2, the investigator read instructional manuals of the PSPPCCMR and TGMD-2. The investigator not only successfully completed practice in using the PSPPCCMR, but also completed coursework in administering and assessing the TGMD-2. In addition, the investigator has experience using the TGMD-2 in previous research.

Measures for Participant Parents

After obtaining informed consent (see Appendix B) from parents, the parents of the participant children completed a survey which consisted of two parts. The first part included the parents' demographic information and the second part was the GLTEQ (see Appendix E). The survey was translated into Korean by the investigator, and was reviewed and edited by a Korean professor teaching at an American university. Each classroom teacher assisted by sending the survey, including the parents' demographic questionnaire and GLTEQ, via the children to the parents. After completion of the survey, the parents returned them to the teacher who retained them for the investigator. Because the questionnaire was concise and easy to understand, it took approximately five minutes to complete. It is noted that all participant parents returned the survey within two weeks after the investigator distributed the survey, so that the entire data collection spanned two months.

To ensure that questions were answered as honestly as possible, the purpose of the study and procedures were briefly described on a separate piece of paper again. All participant parents first filled out the demographic information such as sex, age, and education level, and then completed the GLTEQ. The participant parents were assured that results would be kept confidential.

After collecting the data, the investigator calculated the total weekly leisure activity scores from the first question's three items by summing the reported weekly frequency of participation at each of three intensity levels multiplied by the corresponding anticipated MET value (9, 5, or 3 METS). Then, participant parents were divided into three categories for levels of parental physical activity. Participant parents (N = 37) who have total leisure activity scores at or above the 67^{th} percentile (i.e., the top 33%) were assigned as the high activity group, and parents (N = 38) who have total leisure activity scores at or below the 33^{rd} percentile (i.e., the bottom 33%) were assigned to low activity group. The 37 parents whose scores ranged from the 34^{th} to the 67^{th} percentiles on parental physical activity level were not included in this study. The data for parental physical activity times (i.e., parents' total weekly leisure activity scores) were visually examined with a frequency distribution to determine cut off scores for the top 33 % (i.e., parents who have scores from 65 to 128) and the bottom 33 % (i.e., parents who have scores from 0 to 26), since it would not be meaningful to divide parents who have scores around a middle point (Median = 40.5) into two arbitrary categories, such as a high or low activity group. Table 2 shows the frequency, percent, and cumulative percent for parental leisure activity scores. The scores highlighted in gray were excluded.

Table 2

Frequency, Percent, and Cumulative Percent for the Parental Leisure Activity Scores

Parental Scores	Frequency	Percent	Cumulative Percent
0	6	5.4	5.4
6	5	4.5	9.8
9	1	.9	10.7
11	3	2.7	13.4
12	1	.9	14.3
13	1	.9	15.2
14	3	2.7	17.9
15	1	.9	18.7
17	1	.9	19.6
18	1	.9	20.5
19	4	3.6	24.1
20	2	1.8	25.9
21	1	.9	26.8
23	2	1.8	28.6
24	1	.9	29.5
25	1	.9	30.4
26	3	2.7	33.0
28	2	1.8	34.8
29	2	1.8	36.6
31	1	.9	37.5
33	2	1.8	39.3
34	3	2.7	42.0
35	2	1.8	43.7
36	1	.9	44.6
37	1	.9	45.5
39	1	.9	46.4
40	4	3.6	50.0
41	3	2.7	52.7
43	1	.9	53.6
44	1	.9	54.5
45	1	.9	55.4
47	1	.9	56.3
48	1	.9	57.1

Table 2 – Continued

Parental Scores	Frequency	Percent	Cumulative Percent
50	1	.9	58.0
52	1	.9	58.9
53	1	.9	59.8
58	1	.9	61.6
60	1	.9	62.5
61	1	.9	63.4
62	1	.9	64.3
63	2	1.8	66.1
65	1	.9	67.0
66	1	.9	67.9
68	3	2.7	70.5
69	1	.9	71.4
70	1	.9	72.3
71	1	.9	73.2
74	2	1.8	75.0
75	1	.9	75.9
76	2	1.8	77.7
77	3	2.7	80.4
78	1	.9	81.3
79	1	.9	82.1
82	1	.9	83.0
84	1	.9	83.9
86	2	1.8	85.7
88	1	.9	86.6
90	1	.9	87.5
92	1	.9	88.4
97	1	.9	89.3
99	1	.9	90.2
101	2	1.8	92.0
102	1	.9	92.9
103	2	1.8	94.6
109	1	.9	95.5
114	1	.9	96.4
119	2	1.8	98.2
122	1	.9	99.1
128	1	.9	100.0
Total	112	100.0	

Data Analyses

The collected data were coded to SPSS. First, overall descriptive statistics were used to summarize the means and standard deviations of the scores on the instruments for perceived physical competence and actual motor competence. Then, data analyses were designed to address the hypotheses and research questions (see Table 3). An alpha level of .05 was used for all statistical tests. Statistical procedures used in analysis of the hypotheses and research questions are as below:

1. To examine hypothesis #1, Pearson product-moment correlation was conducted to determine the relationship between perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ) in children with MMR.

2. To examine hypotheses #2 to #7, a 2 (gender = boys, girls) x 2 (age = 8-9 years, 10-11 years) multivariate analysis of variance (MANOVA) was conducted to determine potential gender and age differences in the combined dependent variables for both perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ). Because four dependent variable scores (i.e., PSPPCCMR, locomotor, object-control, and GMDQ) were correlated with one another, a MANOVA was performed instead of four separate ANOVAs to test for significant age and gender differences in PSPPCCMR, locomotor, object-control, and GMDQ.

3. To examine hypothesis #8 to #9, independent sample t-tests were conducted to determine differences between the high parental activity group and the low parental activity group in perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ).

4. To examine research questions #1 and #2, four separate 2 (gender = boys, girls) x 2 (age = 8-9 years, 10-11 years) x 2 (parental physical activity = high level, low level) ANOVAs were conducted to determine whether there is an interaction effect of gender, age, and parents' physical activity level on each of the dependent variables (PSPPCCMR, locomotor, object-control, and GMDQ) for perceived physical competence and actual motor competence.

Table 3

Data Analyses

Hypothesis/ Research Question	Independent Variable (IV)	Dependent Variable (DV)	Statistical Analysis
H1. There would be a positive relationship between perceived physical competence and actual motor competence in children with MMR.			
		PSPPCCMR Locomotor Object-control GMDQ	Pearson correlation
H2. Boys with MMR would score higher than girls with MMR on perceived physical competence.			
	Gender Age	PSPPCCMR Locomotor Object-control GMDQ	2x2 MANOVA & Follow-up univariate analysis for PSPPCCMR (focusing on the effect of gender)

Table 3 – continued

Hypothesis/ Research Question	Independent Variable (IV)	Dependent Variable (DV)	Statistical Analysis
H3. Boys with MMR would score higher than girls with MMR on actual motor competence.			
	Gender Age	PSPPCCMR Locomotor Object-control GMDQ	2x2 MANOVA & Follow-up univariate analysis for Locomotor, Object-control, and GMDQ (focusing on the effect of gender)
H4. Younger children with MMR would score higher than older children with MMR on perceived physical competence.			
	Gender Age	PSPPCCMR Locomotor Object-control GMDQ	2x2 MANOVA & Follow-up univariate analysis for PSPPCCMR (focusing on the effect of age)
H5. Older children with MMR would score higher than younger children with MMR on actual motor competence.			
	Gender Age	PSPPCCMR Locomotor Object-control GMDQ	2x2 MANOVA & Follow-up univariate analysis for Locomotor, Object-control, and GMDQ (focusing on the effect of age)
H6. There would not be a significant interaction effect of age and gender in children with MMR on perceived physical competence.			
	Gender Age	PSPPCCMR Locomotor Object-control GMDQ	2x2 MANOVA & Follow-up univariate analysis for PSPPCCMR (focusing on the effect of interaction)

Table 3 – continued

Hypothesis/ Research Question	Independent Variable (IV)	Dependent Variable (DV)	Statistical Analysis
H7. There would not be a significant interaction effect of age and gender in children with MMR on actual motor competence.			
	Gender Age	PSPPCCMR Locomotor Object-control GMDQ	2x2 MANOVA & Follow-up univariate analysis for Locomotor, Object-control, and GMDQ (focusing on the effect of interaction)
H8. Children with MMR whose parents have high total leisure time scores would score higher on perceived physical competence than children with MMR whose parents have low total leisure time scores.			
	Parental level	PSPPCCMR	Independent sample t-test
H9. Children with MMR whose parents have high total leisure time scores would score higher on actual motor competence than children with MMR whose parents have low total leisure time scores.			
	Parental level	Locomotor Object-control GMDQ	Independent sample t-tests
RQ1. Is there a significant interaction effect of gender, age, and parental physical activity level on perceived physical competence?			
	Gender Age Parental level	PSPPCCMR	2x2x2 ANOVA
RQ2. Is there a significant interaction effect of gender, age, and parental physical activity level on actual motor competence?			
	Gender Age Parental level	Locomotor Object-control GMDQ	2x2x2 ANOVAs

CHAPTER FOUR

RESULTS

The results of this study are presented in two parts: descriptive and inferential statistics. The first part of this study reports the overall descriptive data of the perceived physical competence (PSPPCCMR) and actual motor competence (Locomotor, Object-Control, and GMDQ in the TGMD-2) for the participant children (N = 112). These descriptive data allow visual examination of the levels of perceived physical competence and actual motor competence in children with MMR. Then, the second part of this study reported inferential statistics, including Pearson product-moment correlation, MANOVA, t-test, and ANOVA, by order of hypotheses and research questions. These inferential statistics allow examining the relationship of perceived physical competence and actual motor competence relative to age, gender, and parental physical activity.

Overall Descriptive Statistics

To examine perceived physical competence of children with MMR, the means and standard deviations on the items of the PSPPCCMR for the participant children (N = 112) are presented in Table 4. The highest mean score for participant children with MMR was 3.02 (SD = .94) on the running item of the PSPPCCMR. The lowest mean score for the participant children was 2.54 (SD = .99) on the jumping rope item of the PSPPCCMR. The total scores of perceived physical competence (PSPPCCMR) for participant children ranged from 16 to 38, with the mean of 27.80 (SD = 4.53). In this study, total scores of the PSPPCCMR were used in conducting future inferential analyses, because the total score of the PSPPCCMR could represent the domain of perceived physical competence in FMS.

Table 4

Mean and Standard Deviation Scores on the Items of the PSPPCCMR for Participant Children

Item	n	M	SD
Jumping	112	2.71	.94
Running	112	3.02	.94
Batting	112	2.55	.98
Shooting	112	2.69	1.03
Kicking	112	2.88	.95
Throwing	112	2.88	.94
Skipping	112	2.82	.88
Catching	112	2.94	.89
Jumping Rope	112	2.54	.99
Dribbling	112	2.75	.86
Total-PSPPCMR	112	27.80	4.53

To examine actual motor competence of the participant children with MMR (N = 112), the means and standard deviations of the raw, percentile, and standard scores on the locomotor and object-control subtests, and those of the GMDQ scores from the TGMD-2 are reported in Table 5. The mean percentiles of 7.40 and 2.87 for both subtests indicate that the locomotor mean scores of participant children are, on average, at or below the 7.40th percentile, and the object-control mean scores of the participant children are, on average, at or below the 2.87th percentile. According to descriptive ratings for subtest standard scores and the gross motor quotient in the TGMD-2 manual (2000, p. 15), the stan

MM

cate

part

GM

bec

ov

Ta

M

an

M

L

standard scores of 4.46 and 3.04 for both subtests indicate that participant children with MMR fall within the "poor" category for the locomotor subtest and the "very poor" category for the object-control subtest. Also, the GMDQ mean score of 62.55 for participant children is in the "very poor" range. In this study, two standard scores and GMDQ scores of the TGMD-2 were used in conducting future inferential analyses, because two standard scores allow comparisons across subtests, and GMDQ represents overall gross motor ability (i.e., the domain of actual motor competence in FMS).

Table 5

Means and Standard Deviations of Raw, Percentile, and Standard Scores on Two Subtests and Those of GMDQ Scores

Measure	Score	n	M	SD
Locomotor				
	Raw	112	30.79	7.25
	Percentile	112	7.40	11.18
	Standard	112	4.46	2.38
Object-Control				
	Raw	112	26.42	7.39
	Percentile	112	2.87	7.22
	Standard	112	3.04	1.94
GMDQ		112	62.55	11.33

Inferential Statistics

Nine hypotheses were tested and two research questions were explored via statistical analyses. The results yielded full, partial, or no support for the hypotheses and research questions, as summarized in Table 6.

Table 6

Summary of the Support of the Evidence for Each Hypothesis and Research Question

Hypotheses (H)/ Research Questions (RQ)	Prediction/Topic	Supported?
H #1	Positive relationship between perceived and actual competence	yes
H #2	Boys > girls on perceived competence	yes
H #3	Boys > girls on actual competence	partially
H #4	Younger > older on perceived competence	no
H #5	Older > younger on actual competence	no
H #6	No interaction effect of age and gender on perceived competence	yes
H #7	No interaction effect of age and gender on actual competence	partially
H #8	High parental activity > low parental activity on perceived competence	yes
H #9	High parental activity > low parental activity on actual competence	yes
RQ #1	Is there an interaction effect of gender, age, and parental activity on perceived competence?	no
RQ #2	Is there an interaction effect of gender, age, and parental activity on actual competence?	no

Hypothesis 1

"There would be a positive relationship between perceived physical competence and actual motor competence in children with MMR." Pearson product-moment correlation was used to determine the relationship between perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ) in children with MMR (see Table 7). The results indicated moderate positive correlations between PSPPCCMR and locomotor ($r = .39$, $p < .05$), object-control ($r = 40$, $p < .05$), and GMDQ ($r = .45$, $p < .05$). Therefore, there was significant evidence to support Hypothesis 1.

Table 7

Correlation Matrix of the PSPPCCMR, Locomotor, Object-Control, and GMDQ

	PSPPCCMR	Locomotor	Object-Control	GMDQ
PSPPCCMR	1.00	.39*	.40*	.45*
Locomotor		1.00	.52*	.90*
Object-Control			1.00	.84*
GMDQ				1.00

Note: * Significance at $p < .05$

Hypothesis 2

"Boys with MMR would score higher than girls with MMR on perceived physical competence." According to the correlation matrix for PSPPCCMR, locomotor, object-control, and GMDQ scores (see Table 7), the four dependent variable scores were statistically correlated with one another. Thus, instead of using four separate ANOVAs, a 2 x 2 (Gender x Age) MANOVA was performed on the combined variables of PSPPCCMR, locomotor, object-control, and GMDQ. The results of the MANOVA showed that there was a significant multivariate effect for gender, Wilks' Lambda = .70, $F(4, 105) = 11.42$, $p = .00$, $\eta^2 = .30$. Effect size (η^2) of .30 indicated that 30 % of the total variability was explained by gender difference.

The results of the follow-up univariate analyses for perceived physical competence showed that there was a significant main effect of gender, $F(1, 108) = 12.25$, $p = .001$ (see Table 8). These results were similar to those obtained in the ANOVA analysis. Table 9, which contains the means and standard deviations of perceived physical competence measures (PSPPCCMR) for each gender group, indicates that the mean of the PSPPCCMR scores for boys with MMR ($M = 29.11$, $SD = 4.80$) was higher than the mean of the PSPPCCMR scores for girls with MMR ($M = 26.24$, $SD = 3.64$). Therefore, there was significant evidence to support Hypothesis 2.

Hypothesis 3

"Boys with MMR would score higher than girls with MMR on actual motor competence." A 2 x 2 (Gender x Age) MANOVA revealed a significant multivariate main effect for gender, Wilks' Lambda = .70, $F(4, 105) = 11.42$, $p = .00$, $\eta^2 = .30$. The results of the follow-up univariate analyses for actual motor competence (locomotor, object-control, and GMDQ) (see Table 8) showed that there was a significant main effect of gender for locomotor, $\underline{F}(1, 108) = 33.83$, $\underline{p} = .00$, and for GMDQ, $\underline{F}(1, 108) = 18.30$, $\underline{p} = .00$. Boys with MMR performed better than girls with MMR on the locomotor and GMDQ. However, for object control, there was no significant main effect of gender, $\underline{F}(1, 108) = 2.56$, $\underline{p} = .11$, though the mean of the object-control scores for boys with MMR ($\underline{M} = 3.30$, $\underline{SD} = 2.17$) was marginally higher than that for girls with MMR ($\underline{M} = 2.75$, $\underline{SD} = 1.60$) (see Table 9). Therefore, partial support was evident for the hypothesis that boys with MMR would score higher than girls with MMR on actual motor competence.

Table 8

Follow-Up Univariate Analyses for Gender, Age, and Gender by Age Interactions on Measures of Perceived Physical Competence and Actual Motor Competence

Measure	Variable	df	F	p
PSPPCCMR				
	Gender (A)	1	12.25	.001*
	Age (B)	1	.24	.625
	A x B	1	.18	.669
Locomotor				
	Gender (A)	1	33.83	.000*
	Age (B)	1	3.34	.070
	A x B	1	.04	.840
Object-Control				
	Gender (A)	1	2.56	.113
	Age (B)	1	.79	.376
	A x B	1	4.54	.035*
GMDQ				
	Gender (A)	1	18.30	.000*
	Age (B)	1	2.47	.119
	A x B	1	1.08	.302

Note: * Significance at $p < .05$

Table 9

Mean and Standard Deviation Scores on the Dependent Variable Measures by Gender

	Boys			Girls		
Measure	n	M	SD	n	M	SD
PSPPCCMR	61	29.11	4.80	51	26.24	3.64
Locomotor	61	5.49	2.31	51	3.22	1.80
Object-Control	61	3.30	2.17	51	2.75	1.60
GMDQ	61	66.36	11.67	51	58.00	9.02

Hypothesis 4

"Younger children with MMR would score higher than older children with MMR on perceived physical competence." A 2 x 2 (Gender x Age) MANOVA was performed on the combined variables of PSPPCCMR, locomotor, object-control, and GMDQ. The results of the MANOVA showed that there was not a significant multivariate effect for age, Wilks' Lambda = .97, $F(4, 105) = .82$, $p = .52$, $\eta^2 = .03$. Effect size (η^2) of .03 indicated that 3 % of the total variability was explained by age difference.

The follow-up univariate analyses for perceived physical competence showed that there was no significant main effect of age, $F(1, 108) = .24$, $p = .63$ (see Table 8). The mean of the PSPPCCMR scores for older children with MMR was 27.96 (SD = 4.44); whereas, the mean of the PSPPCCMR for younger children with MMR was 27.64 (SD =

4.65). For the PSPPCCMR scores, the difference of means between two groups is only .32 (see Table 10). Therefore, this result did not support Hypothesis 4, since there was no significant age difference.

Hypothesis 5

"Older children with MMR would score higher than younger children with MMR on actual motor competence." Similar to Hypothesis #4, a 2 x 2 (Gender x Age) MANOVA did not reveal a significant multivariate main effect for age, Wilks' Lambda = .97, $F(4, 105) = .82$, $p = .52$, $\eta^2 = .03$. Means and standard deviations of three actual motor competence measures by age are also reported in Table 10. The results of the follow-up univariate analyses for actual motor competence (locomotor, object-control, and GMDQ) (see Table 8) also showed that there was not a significant main effect of age for locomotor, $F(1, 108) = 3.34$, $p = .07$, for object control, $F(1, 108) = .79$, $p = .38$, and for GMDQ, $F(1, 108) = 2.47$, $p = .12$. Therefore, these results did not support Hypothesis 5.

Table 10

Mean and Standard Deviation Scores on the Dependent Variable Measures by Age

	Younger			Older		
Measure	n	M	SD	n	M	SD
PSPPCCMR	55	27.64	4.65	57	27.96	4.44
Locomotor	55	4.13	2.26	57	4.77	2.46
Object-Control	55	2.93	2.18	57	3.16	1.94
GMDQ	55	61.22	11.76	57	63.84	10.79

Hypothesis 6

"There would not be a significant interaction effect of age and gender in children with MMR on perceived physical competence." A 2 x 2 (Gender x Age) MANOVA was performed on the combined variables of PSPPCCMR, locomotor, object-control, and GMDQ. The results of the MANOVA showed that there was not a significant multivariate effect for interaction of gender and age, Wilks' Lambda = .93, $F(4, 105) = 2.11$, $p = .09$, $\eta^2 = .07$. Effect size (η^2) of .07 indicated that 7 % of the total variability was explained by the interaction difference of gender and age.

Means and standard deviations of perceived physical competence measures (PSPPCCMR) by the interaction of gender and age are reported in Table 11. Follow-up univariate analyses for perceived physical competence showed that there was no significant gender by age interaction effect, $F(1, 108) = .18$, $p = .67$ (see Table 8). Therefore, Hypothesis 6 was supported.

Hypothesis 7

"There would not be a significant interaction effect of age and gender in children with MMR on actual motor competence." As same as Hypothesis #6, a 2 x 2 (Gender x Age) MANOVA did not reveal a significant multivariate effect for interaction of gender and age, Wilks' Lambda = .93, $F(4, 105) = 2.11$, $p = .09$, $\eta^2 = .07$. Means and standard deviations of three actual motor competence measures (locomotor, object-control, and GMDQ) by the interaction of age and gender are also reported in Table 11. The results of the follow-up univariate analyses for actual motor competence (see Table 8) showed that there was no significant gender by age interaction effect for locomotor, $F(1, 108) = .04$, $p = .84$, and for GMDQ, $F(1, 108) = 1.08$, $p = .30$. However, for object control, there was a significant gender by age interaction effect, $F(1, 108) = 4.54$, $p = .04$. Thus, these results partially support Hypothesis 7. The mean object-control scores of girls with MMR increased between a younger group ($M = 2.17$, $SD = 1.34$) and an older group ($M = 3.26$, $SD = 1.65$) while the mean object-control scores of boys with MMR decreased (Table 11). Figure 3 depicts the mean object-control scores of younger and older groups by gender difference. The Schefee tests for post hoc comparisons showed that the differences between the means of the young boy group and the young girl group ($|t_{observed}| = 2.55$) and those of the young girl group and the old girl group ($|t_{observed}| = 2.60$) exceed a critical range of 1.99. Therefore, these differences were statistically significant.

Table 11

Mean and Standard Deviation Scores of Perceived Physical Competence and Actual Motor Competence Measures by the Interaction of Gender and Age

Measure	Gender	Age	n	M	SD
PSPPCCMR					
	Boys	Younger	31	28.74	4.95
		Older	30	29.50	4.70
	Girls	Younger	24	26.21	3.88
		Older	27	26.26	3.48
Locomotor					
	Boys	Younger	31	5.10	2.29
		Older	30	5.90	2.31
	Girls	Younger	24	2.88	1.51
		Older	27	3.52	2.01
Object-Control					
	Boys	Younger	31	3.52	2.53
		Older	30	3.07	1.74
	Girls	Younger	24	2.17	1.34
		Older	27	3.26	1.65
GMDQ					
	Boys	Younger	25	65.84	12.55
		Older	20	66.90	10.87
	Girls	Younger	12	55.25	7.29
		Older	18	60.44	9.81

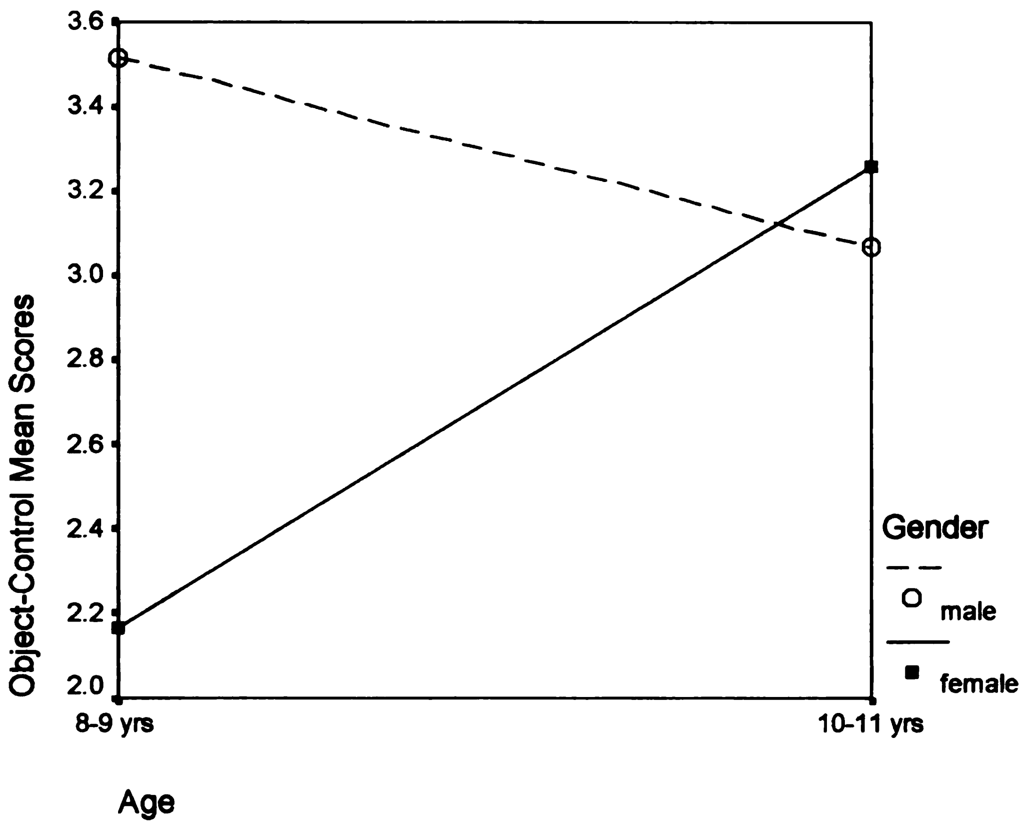


Figure 3. Mean values of object-control test for gender-by-age comparison.

Hypothesis 8

"Children with MMR whose parents have high total leisure activity scores (at or above 67th percentile for total participants) would score higher on perceived physical competence than children with MMR whose parents have low total leisure activity scores (at or below the 33rd percentile for total participants)." An independent sample t-test was used to determine the effect of parental physical activity on PSPPCCMR. The mean of the PSPPCCMR scores for the children whose parents have high total leisure activity scores was 28.89 (SD = 4.56); whereas, the mean of the PSPPCCMR scores for the children whose parents have low physical activity levels was 25.59 (SD = 4.34) (see Table 12). The t-test results showed that the PSPPCCMR scores were significantly different between high parental group and low parental group, t (73) = -3.21, p = .00, two-tailed. Therefore, Hypothesis 8 was supported.

Hypothesis 9

"Children with MMR whose parents have high total leisure activity scores would score higher on actual motor competence than children with MMR whose parents have low total leisure activity scores." Three separate independent sample t-tests were used. Table 12 indicated that the means of the locomotor, object-control, and GMDQ scores for children whose parents have high physical activity level were, respectively, 6.13 (SD = 2.16), 3.95 (SD = 2.10), and 70.32 (SD = 10.32); whereas, the means of the locomotor, object-control, and GMDQ scores for children whose parents have low physical activity level were 3.30 (SD = 1.90), 2.05 (SD = 1.18), and 56.14 (SD = 7.56). The t-test results showed that the children in both groups did have significant difference in locomotor scores, t (73) = -6.03, p = .00, in object-control, t (73) = -4.79, p = .00, and in GMDQ, t (73) = -6.77, p = .00, two-tailed. Therefore, there was significant evidence to support Hypothesis 9.

Table 12

Mean and Standard Deviation Scores on the Dependent Variable Measures by Parental Activity Level

	Low Level			High Level		
Measure	n	M	SD	n	M	SD
PSPPCCMR	37	25.59	4.34	38	28.89	4.56
Locomotor	37	3.30	1.90	38	6.13	2.16
Object-Control	37	2.05	1.18	38	3.95	2.10
GMDQ	37	56.14	7.56	38	70.32	10.32

Research Question 1

"Is there a significant interaction effect of gender, age, and parental physical activity level on perceived physical competence?" A 2 x 2 x 2 (Gender x Age x Parental Activity Level) ANOVA was used to determine potential gender, age, and parental physical activity level difference in perceived physical competence (PSPPCCMR). Means and standard deviations of the scores for perceived physical competence by the interaction of gender, age, and parental physical activity level are reported in Table 13. The results of the three-way ANOVA showed that there was a significant main effect for gender, $F(1, 67) = 4.67$, $p = .03$, and for parental level, $F(1, 67) = 4.92$, $p = .03$. However, no significant interaction effect of gender, age, and parental physical activity level, $F(1, 67) = .30$, $p = .59$, was found in the PSPPCCMR (see Table 14). Therefore, Research Question 1 can be explored as there would not be a significant interaction effect of gender, age, and parental physical activity level on perceived physical competence.

Table 13

Mean and Standard Deviation Scores on the PSPPCCMR by the Interaction of Gender, Age and Parental Physical Activity Level

Gender	Age	Parents' Level	n	M	SD
Boys	Younger	Low	9	25.00	4.74
		High	16	29.56	4.57
	Older	Low	8	26.38	4.50
		High	12	30.67	4.75
Girls	Younger	Low	8	24.25	3.96
		High	4	26.00	3.74
	Older	Low	12	26.42	4.44
		High	6	25.50	1.87

Table 14

Three-Way Analysis of Variance with Gender, Age, and Parents' Level as Independent Variables on Measures of Perceived Physical Competence

Measure	Variable	df	F	p
PSPPCCMR				
	Gender (A)	1	4.67	.034*
	Age (B)	1	.90	.346
	Parents' Level (C)	1	4.92	.030*
	A x B	1	.04	.853
	A x C	1	3.37	.071
	B x C	1	.45	.504
	A x B x C	1	.30	.585
	Error	67		
	Total	75		

Note: * Significance at $p < .05$

Research Question 2

"Is there a significant interaction effect of gender, age, and parental physical activity level on perceived physical competence?" Three separate 2 x 2 x 2 (Gender x Age x Parental Activity Level) ANOVAs were used to determine potential gender, age, and parental physical activity level difference in actual motor competence (locomotor, object-control, GMDQ scores). Means and standard deviations of these three measures for actual motor competence by the interaction of gender, age, parental physical activity level are reported in Table 15. The results of three separate ANOVAs showed that there was no significant interaction effect of gender, age, and parental physical activity level for locomotor, $F(1, 67) = .19$, $p = .68$, for object-control, $F(1, 67) = .10$, $p = .75$, and for GMDQ, $F(1, 67) = .00$, $p = .98$ (see Table 16). Therefore, Research Question 2 can be explored as there would not be a significant interaction effect of gender, age, and parental physical activity level on perceived physical competence.

Table 15

Mean and Standard Deviation Scores of Actual Motor Competence Measures by the Interaction of Gender, Age and Parental Physical Activity Level

Measure	Gender	Age	Parents' Level	n	M	SD
Locomotor						
	Boys	Younger	Low	9	3.89	2.20
			High	16	6.06	1.77
		Older	Low	8	4.63	1.19
			High	12	7.58	2.23
	Girls	Younger	Low	8	2.25	1.16
			High	4	4.25	.96
		Older	Low	12	2.67	1.92
			High	6	4.67	1.75
Object-Control						
	Boys	Younger	Low	9	1.78	1.20
			High	16	4.25	2.41
		Older	Low	8	2.00	.93
			High	12	4.08	1.98
	Girls	Younger	Low	8	1.75	1.04
			High	4	2.75	1.71
		Older	Low	12	2.50	1.38
			High	6	3.67	1.86

Table 15 – Continued

Measure	Gender	Age	Parents' Level	n	M	SD
GMDQ						
	Boys	Younger	Low	9	57.00	8.62
			High	16	70.94	10.02
		Older	Low	8	59.88	3.91
			High	12	75.00	10.50
	Girls	Younger	Low	8	52.38	5.66
			High	4	61.00	5.48
		Older	Low	12	55.50	9.03
			High	6	65.50	8.64

Table 16

Three-Way Analysis of Variance with Gender, Age, and Parents' Level as Independent Variables on Measures of Actual Motor Competence

Measure	Variable	df	F	p
Locomotor				
	Gender (A)	1	21.08	.000*
	Age (B)	1	2.90	.093
	Parents' Level (C)	1	25.35	.000*
	A x B	1	.62	.435
	A x C	1	.39	.535
	B x C	1	.19	.667
	A x B x C	1	.19	.667
	Error	67		
	Total	75		
Object-Control				
	Gender (A)	1	.69	.410
	Age (B)	1	.98	.327
	Parents' Level (C)	1	14.88	.000*
	A x B	1	.86	.359
	A x C	1	1.88	.175
	B x C	1	.02	.899
	A x B x C	1	.10	.751
	Error	67		
	Total	75		

Note: * Significance at $p < .05$

Table 16 – continued

Measure	Variable	df	F	p
GMDQ				
	Gender (A)	1	10.75	.002*
	Age (B)	1	2.82	.098
	Parents' Level (C)	1	30.24	.000*
	A x B	1	.01	.937
	A x C	1	1.45	.233
	B x C	1	.09	.769
	A x B x C	1	.00	.983
	Error	67		
	Total	75		

Note: * Significance at $p < .05$

CHAPTER FIVE

DISCUSSION

This study examined the relationship between perceived physical competence and actual motor competence in Korean children with MMR and the effects of age, gender, and parental physical activity on perceived physical competence and actual motor competence. Nine hypotheses and two research questions, consisting of four groups, were proposed in the study: (a) one hypothesis investigating the relationship between perceived physical competence and actual motor competence; (b) six hypotheses with respect to the influences of age and gender of the participant children on perceived physical competence and actual motor competence; (c) two hypotheses investigating the differences in perceived physical competence and actual motor competence between the children whose parents have high physical activity and those whose parents have low physical activity; and (d) two research questions relating to the influence of the interaction of age, gender, and parental physical activity on perceived physical competence and actual motor competence. This chapter will be organized by the three hypothesis groups and the research question group presented above. The descriptive data of perceived physical competence and actual motor competence for participant children will be included with the discussion of the hypotheses and research questions where appropriate.

Relationship between Perceived Physical Competence and Actual Motor Competence

The first hypothesis is based on the first purpose of this study which was to determine whether there was a relationship between perceived physical competence and actual motor competence in Korean children with MMR. The results of this study showed that there was a statistically significant relationship between the two variables in Korean children with MMR. The results of this study are in agreement with the study of Shapiro and Dummer (1998) which found this relationship for older subjects with MMR (i.e., adolescent males ages 12 to 15). However, the results of this study are not consistent with some parts of the study of Yun and Ulrich (1997) which found that there was no significant correlation between perceived physical competence and actual motor competence for children with MMR from 7 to 12 years. Yun and Ulrich (1997) indicated that the theoretical relationship between perceived physical competence and actual motor competence in children with MMR is not well-established.

A possible reason as to why there are different results regarding the relationship between perceived physical competence and actual motor competence in children with MMR can be explained by the participants' age (e.g., grouping/range of age). Yun and Ulrich (1997) indicated that although there was no significant correlation between perceived physical competence and actual motor competence for children (7 to 12 years) with MMR, the partial correlation which was used for controlling the age factor showed a significant relationship ($\underline{r} = .25$, $\underline{p} < .05$) between perceived physical competence and actual motor competence. Further, to determine the relationship between the two variables in the specific age groups, the participant children in specific age groups were sequentially partialed out. The substantial correlations between perceived competence and actual competence were significant for 95 children of 8 to 12 years ($\underline{r} = .27$, $\underline{p} < .01$), for 74 children of 9 to 12 years ($\underline{r} = .33$, $\underline{p} < .01$), for 52 children of 10 to 12 years ($\underline{r} = .33$, $\underline{p} < .05$), and for 32 children of 11 to 12 years ($\underline{r} = .55$, $\underline{p} < .01$). The present study, which examined the children with MMR from ages 8 to 11, agrees in part with the study of Yun and Ulrich (1997) which provided partial correlations on the similar age group (i.e., 8-12 years) and the older age groups (i.e., 9-12, 10-12, 11-12 years), and could support the study of Shapiro and Dummer (1998) which found this relationship for older subjects with MMR (i.e., adolescents with MMR from ages 12 to 15). Considering the comparisons between studies, the findings suggest that the strength of this relationship should increase with age and cognitive functioning. With increasing age, children with MMR may reach a certain cognitive functioning to evaluate the perceived and actual competence. Thus, more research pertaining to the relationship between perceived and actual competence on the various age/cognitive functioning groups and each age/cognitive functioning group is needed.

In this study, unlike the studies of Yun and Ulrich (1997) and Shapiro and Dummer (1998), the motor competence tasks (i.e., the items of TGMD-2) were not perfectly paired with the perceived competence items (i.e., the items of PSPPCCMR). This may influence the degree of the relationship between perceived physical competence and actual motor competence of these participants. However, this study was adapted from a recommendation of Ulrich (1987), who suggested that motor activities be chosen in which the sample participants were commonly involved, and that the motor items be related to those activities. In the present study, the motor items for measuring perceived physical competence and actual motor competence focused on FMS in which the Korean children with MMR were commonly involved in physical education classes. Therefore, children with MMR seem to be much more accurate with their self-perceptions of physical competence related to FMS than to sport-specific skills which may be most relevant to participation in organized sport (Ulrich & Ulrich, 1997). In this study, children with MMR showed low mean scores on the PSPPCCMR test possibly because lack of cognitive functioning may make it difficult to form adequate perceptions (Eichstaedt & Lavay, 1992). They also had lower mean scores than children without disabilities on the TGMD-2 tests. Their physical/cognitive abilities and lack of movement experiences could influence results on the motor items (Eichastaedt & Lavay, 1992; Krebs, 2000). However, both the PSPPCCMR and TGMD-2 have been validated on elementary aged children (including those with MMR). Therefore, they were believed to be an effective means by which to assess the relationship between perceived physical competence and actual motor competence in elementary aged children with MMR.

By including a special population of Korean participants with MMR in this study, the generalizability of the knowledge base regarding the theoretical relationship between perceived physical competence and actual motor competence might be enhanced. Much research (Feltz & Brown, 1984; Poole, Mathias, & Stratton, 1996; Rudisill, Mahar, & Meaney, 1993; Ulrich, 1987) has shown that perceived physical competence is related to actual motor competence in children with disabilities. Therefore, the findings of this study could support the generalization of Harter's (1978) hypothesized relationship between perceived and actual competence to children with MMR in the age range of 8 to 11 years. As the participants with MMR of most studies dealing with the relationship between perceived and actual competence in physical domains are predominantly African and Caucasian American (Shapiro & Dummer, 1998; Yun & Ulrich, 1997), these findings would contribute to the generalizability of the theoretical relationship between these two variables in children with MMR. Because, culturally or educationally, children with MMR in Korea often participate in a physical education program on a limited basis, due to lack of facilities, lack of scheduling priority, or Korean people's low perception of children with MMR (Hong, 1996), these results would be of benefit for understanding possible cultural or educational differences regarding the relationship between perceived physical and actual motor competence in children with MMR. Further research including other race populations will be needed.

Influences of Age and Gender

The second and third hypotheses investigated whether there were significant gender differences for perceived physical competence and actual motor competence in children with MMR. Overall, the result which shows a significant multivariate main effect of gender for the combined dependent variables (i.e., PSPPCCMR, locomotor, object-control, and GMDQ) in children with MMR provided support for the second and third hypotheses. According to the follow-up univariate analyses, the results for perceived physical competence showed a significant gender difference on PSPPCCMR and, thus, supported the second hypothesis. However, the results for actual motor competence provided partial support for the third hypothesis; that is, there were significant gender differences for the locomotor and GMDQ components, but not a significant difference for the object-control component. Therefore, the results for actual motor competence showed that boys with MMR had more developed mobility skills (i.e., locomotor) that helped them move from place to place in an efficient manner than girls with MMR. Boys with MMR had similar object manipulation, grasping, and visual-motor integration skills (i.e., object-control) to girls with MMR.

With regard to gender differences on perceived physical competence, the results of this study are in agreement with other studies (Feltz & Brown, 1984; Horn & Harris, 1996; Rudisill, Mahar, & Meaney, 1993; Ulrich, 1987) involving elementary aged children without disabilities and the study of Yun and Ulrich (1997) involving the age group of 7 to12 years, in which differences were found in the 12-year-old children with MMR. Therefore, the results of this study suggested that 8- to 11-year-old males with MMR had higher perceived physical competence than 8- to 11-year-old females with MMR. Similarly, these results also are consistent with other studies investigating the gender differences for actual competence within physical domains (Goodway & Rudisill, 1997; Rudisill, Mahar, & Meaney, 1993, Yun & Ulrich, 1997), although some discrepancy is apparent between the present results showing the gender difference for the locomotor component of actual motor competence and those found by Goodway and Rudisill (1997) which showed significant differences for only the object-control component of actual motor competence.

The discrepancy may have occurred because children with MMR may have had minimal experience and practice in object-control skills compared to locomotor skills due to the perceived difficulty of controlling children with MMR when using equipment such as balls. A possible reason for minimal experience and practice in object-control skills is that four of five schools from which participants were studied did not have physical education teachers. Classroom teachers, who have only received general training for special education, were required to teach physical education without adapted physical education training. Because of increased classroom management problems, these teachers were reluctant to use physical education equipment that may have contributed to increased object-control ability. As a result, children with MMR may demonstrate more familiarity with locomotor skills than with object-control skills. For a further study, it would be appropriate to compare the performances of children who learn FMS from adapted physical educators to those of children who learn FMS from classroom teachers without adapted physical education training.

A possible reason as to why gender differences for perceived physical competence and actual motor competence were found in this study could be social and cultural differences. In Korea, stereotypic beliefs or thoughts that boys, with or without disabilities, are more naturally gifted in sports or physical activities and culturally based reservations about women participating in sport may influence the participation of boys and girls in sports or physical activities (Lee, 2002). Thus, boys may have more opportunities to participate in sports or physical activities than girls, and it is expected that these opportunities in sport participations may provide higher perceived physical competence and actual motor competence for boys. Yun and Ulrich (1997) suggested that in North American culture, male children receive increased social reinforcement for participating in physical activities. Further research may be directed to examining whether such stereotypic beliefs exist in other cultures, and how those beliefs may affect gender differences in perceived physical competence and actual motor competence.

The fourth and fifth hypotheses were not supported by the data, with no significant multivariate main effect of age for the combined dependent variables (i.e., PSPPCCMR, locomotor, object-control, and GMDQ) in children with MMR. The univariate analyses showed no significant differences for perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ) for the two age groups. The results of this study do not agree with some studies concerning age differences on perceived competence in physical domains which typically found that older children without disabilities demonstrate lower levels of perceived physical competence than younger children without disabilities (Horn & Hasbrook, 1986; Ulrich, 1987), and that children with MMR, aged 7 to 12 years, tend to feel less competent with increased age (Ulrich & Collier, 1990; Yun & Ulrich, 1997). The results of this study also do not agree with the findings of previous studies (Rudisill, Mahar, & Meaney, 1993; Yun & Ulrich, 1997) showing that older children outperformed younger children on several motor performances, and did not support a study of Holland (1987) indicating that FMS performances of elementary-aged students with educable mental impairment (i.e., MMR) improved with age.

There are some possible explanations why age differences did not exist for perceived physical competence and actual motor competence. At first, age grouping could provide an explanation for no significant age differences for both perceived physical and actual motor competence. In the present study, two age groups comprised of the younger group (8 to 9 year old) and the older group (10 to 11 year old) were used to determine differences in perceived physical and actual motor competence. In contrast, previous studies (Rudisill, Mahar, & Meaney, 1993; Ulrich & Collier, 1990; Yun & Ulrich, 1997) examining age differences for actual and perceived competence generally focused on each age level rather than age grouping. Therefore, it appeared that children with MMR did not demonstrate differences in perceived physical and actual motor competence between the ages of 8 to 9 and the ages of 10 to 11.

Similarities in cognitive functioning between the ages of 8 to 11 for children with MMR could be a possible reason why age differences do not exist for perceived physical competence. To explain typical and atypical cognitive development, Piaget divided the process into four sequential stages: the sensorimotor stage (birth to approximately 18 months), the preoperational stage (approximately 2-7 years of age), the stage of concrete operations (approximately ages 7-12 years), and the stage of formal operations (after 12 years of age) (Krebs, 2000; Piaget, 1952). However, because of weaknesses in learning processes such as attention, memory, or generalization, children with MMR usually have delays in cognitive functioning (Nugent & Mosley, 1987; Hoover & Horgan, 1990; Krebs, 2000), and in elementary years, they may have similar cognitive functioning. In the present study, it is difficult to discern the stage of cognitive development of children with MMR aged 8 to 11 years because they seemed to demonstrate processes in both the preoperational stage (e.g., use of language, and the ability to acknowledge personal and situational experiences) and the concrete operational stage (e.g., better able to order and classify numbers, and understanding of the pictorial scales). Thus, this may suggest that when studying the perceptions of children with MMR, not only chronological age but also mental age/cognitive stage should be considered. The present study supports the findings of Silon and Harter (1985) who indicated that the construct of perceived competence is qualitatively different depending on cognitive-developmental level.

Environmental factors, such as experiences of practice and instruction, may be another contributing influence as to why age differences did not exist for actual motor competence. Due to lack of facilities or lack of scheduling priority, children with MMR in Korea often participate in a physical education program on a limited basis, so that they do not have enough experiences with and opportunities for various physical activities (Hong, 1996). This may support the suggestion of Branta, Haubenstricker, and Seefeldt (1984) which indicated that although age is a factor for change in performance in a basic motor skill (standing long jump), the differences of performance may be due to environmental influence (e.g., opportunity for practice, interest, and motivation) more than to chronological age.

According to the data analyses of the sixth and seventh hypotheses, the result for the combined dependent variables (i.e., PSPPCCMR, locomotor, object-control, and GMDQ) indicated no multivariate interaction of gender and age in children with MMR. Overall, this result suggested that the effect of gender did not depend on age. In other words, age and gender would be independently effective for the combined dependent variables of perceived physical competence and actual motor competence. At the follow-up univariate analyses, like the result for overall variables of perceived physical and actual motor competence (i.e., MANOVA), the results for the PSPPCCMR of perceived physical competence (PSPPCCMR) and the locomotor and GMDQ components of actual motor competence did not show significant differences between boys and girls across the children's age. However, for the object-control component of actual motor competence, there was significant difference between boys' and girls' mean scores across age levels.

Younger boys and younger girls with MMR have respectively 3.52 and 2.17 mean scores for object-control component of actual motor competence. They have a mean difference of 1.35 (Table 10, Figure 3). However, as age increases, the mean of older boys decreases to 3.07; whereas, that for older girls increases to 3.26, so that only a small difference of .19 remains. The Scheffe tests for examining the comparison of the means for boys and girls in each of the age groups indicated that there were significant differences between means of younger boys and younger girls, and between means of older girls and younger girls. These data suggest that at a relatively young age, object-control skills are regarded as more gender-appropriate for boys with MMR than for girls with MMR, because young boys with MMR might have more opportunities for interaction in the environmental situation with object-control equipment items (e.g., balls) than do young girls with MMR. As age increases, object-control interaction opportunities might equalize. Therefore, it may be implied that adapted physical education curriculum for younger age groups should place more emphasis on object-control skills for young girls than for young boys, in an effort to address the significant skill differences. As age increases, the curriculum should reflect a more equalized approach to object-control skill interaction.

Influences of Parental Physical Activity

Although Harter (1978, 1981) and Weiss and Chaumeton (1992) have placed a great deal of emphasis on the role of significant others (e.g., parents, peers, and coaches) upon children's emerging self-related perceptions, this aspect of the developmental competence motivation model has only received modest attention in the sport-related research in terms of coaching influences (Black & Weiss, 1992; Wong & Bridges, 1995). Furthermore, there has been limited research in sport or physical domains on parental influence, although such research is ongoing within academic contexts. Therefore, the value of the finding of the eighth hypothesis lies in the empirical research in the sport or physical domain which dealt with the influence of parental physical behavior (i.e., leisure activity time) on perceived physical competence in children with MMR. For children with special needs, parents also play an integral role in the development within academic, social, and physical domains. The use of special populations, such as children with MMR, seems to provide strong evidence of parental influence on children's perceived and actual competence, which can be generalized to the physical domain, and may have direct application to research in adapted physical areas.

According to the data analysis of the eighth hypothesis, children with MMR whose parents have high leisure activity time scores (i.e., the top 33 % of GLTEQ scores) had significantly higher mean scores of perceived physical competence (PSPPCCMR) than those whose parents have low leisure activity time scores (i.e., the bottom 33 % of GLTEQ scores). Thus, the finding of this hypothesis revealed that parents' physical behavior (i.e., parental leisure activity time) is linked to the differences of perceived physical competence in children with MMR. Consequently, the finding of this hypothesis provides support for the developmental competence motivation model (Harter, 1978; Weiss & Chaumeton; 1992) which addressed the influence of significant others, especially parents, upon children's physical activity and sport environment for judging ability and making decisions about future participatory behavior.

The finding of this study could be explained by two possible mechanisms which are useful for understanding the socializing role of parents; role model/social learning (Bandura, 1977) and the expectancy socialization model (Eccles & Harold, 1991). At first, parents serve as role models for activity. By observing the behaviors (i.e., physical activity) of parents, children may imitate and adopt the physical behavior or activity, and they may come to value physical activity as well. In other words, children's self-perceptions may be shaped through role modeling of parental behaviors. Second, children may be influenced to adopt particular self-perception characteristics through the expectational standards conveyed by parents. Parental enjoyment, attitudes, and encouragement may give children reason to want to do well and to believe they can do well. Some studies (Brustad, 1993, 1996; Kimiecik, Horn, & Shurin, 1996) provided support of the Eccles' expectancy socialization model which links parental physical activity orientations to children's perceived physical competence.

Like the finding of the eighth hypothesis, the ninth hypothesis was also supported by data, with differences in the mean scores of actual motor competence (locomotor, object-control, and GMDQ) between children with MMR with high parents' physical activity level (i.e., the top 33 % of GLTEQ scores) and those with low parents' physical activity level (i.e., the bottom 33 % of GLTEQ scores). This finding was consistent with the finding of Freedson and Evenson (1991) showing that active parents are likely to have active children, while low active parents are more likely to have low active children. This finding agreed with the study conducted by Moore et al. (1991) suggesting that there are positive correlations between parental physical activity behaviors and their children's physical behaviors. Therefore, considering the similarities between studies, it was found that parental physical activity affects children's actual motor competence.

In the methodological processes for analyzing the influence of parental physical activity on perceived physical competence and actual motor competence, there are several points of discussion. First, recently designed questionnaires dealing with levels of physical activity include the frequency, duration, and intensity of both leisure and occupational activities. However, this study has been limited in only focusing on parental leisure activities as measuring the levels of parental physical activity. Since in the majority of industrialized countries the levels of employment-related physical activity has continued to decline, it is frequently assumed that an assessment of leisure oriented physical activity, such as the Godin Leisure Time Exercise Questionnaire (GLTEQ), is the most common and practical measure of physical activity for adults in a population (Kriska & Caspersen, 1997).

Second, although 112 children with MMR and their parents participated in this study, only 75 children and parents were used for the analyses of the parental influence (i.e., the eighth and ninth hypotheses) because the investigator attempted to determine the difference between a high parental activity group and a low parental activity group. Therefore, the parents' scores of GLTEQ between the 33rd and the 67th percentile were eliminated for these analyses. Third, one parent of each participant child (mother or father) completed the questionnaire (GLTEQ). In other words, this study did not consider the gender of parents in analyzing the data. In future studies, data should be collected from both parents, so that an examination of the relative influence of mothers and fathers on perceived physical competence and actual motor competence can be made.

Influence of the Interaction of Age, Gender, and Parental Physical Activity

The first and second research questions were posed for this study to determine whether there was an interaction effect of gender, age, and parents' physical activity level on perceived physical competence and actual motor competence on children with MMR. As mentioned above, because the parental groups only focused on two groups (i.e., the top 33% of high activity group and the bottom 33% of low activity group), only 75 parents and their children among the total of 112 parents and children were used for data analyses of the research questions. Thus, since the sample size seemed to be insufficient to allow including multivariate procedure on the combined dependent variables of perceived physical competence (i.e., PSPPCCMR) and actual motor competence (i.e., locomotor, object-control, and GMDQ), four separate 3-way ANOVAs were used for each dependent variable.

The findings of the first and second research questions were explored as there were no significant interaction effects of gender, age, and parental physical activity level for PSPPCCMR, locomotor, object-control, and GMDQ. The findings suggest no significant age-related difference between boys' and girls' mean scores of perceived physical competence and actual motor competence across the level of parental physical activity. Because these research questions about the interaction effects (using parental physical behavior) have never been examined, there is no evidence to support these findings conclusively. However, this study may represent a pioneer attempt to begin a statistical experimental database demonstrating the values of parents' physical activity level and the interaction effects of parents' physical activity level and children's individual information such as age and gender on perceived physical competence and actual motor competence children with MMR.

CHAPTER SIX

SUMMARY AND RECOMMENDATIONS

The purposes of this study were to examine: (a) the relationship between perceived physical competence and actual motor competence in Korean children with MMR, (b) the influences of age and gender on perceived physical competence and actual motor competence in Korean children with MMR, (c) the differences in perceived physical competence and actual motor competence between Korean children with MMR whose parents have high physical activity and those whose parents have low physical activity, and (d) the influence of the interaction of age, gender, and parental physical activity on perceived physical competence and actual motor competence in Korean children with MMR.

This study consisted of two groups of participants: children with MMR and their parents. One group of participants in this study was 112 children from 8 to 11 years of age with MMR who attend five special schools for the mentally retarded in Seoul, Korea. In the Korean educational system, there is a classification system comprising 3 classes for students with MMR (Class I: below IQ 34, Class II: IQ 35-49, and Class III: IQ 50-70). Participant children were classified in school files as being Class III (i.e., MMR). Therefore, special education teachers in classrooms of each school helped to identify students with MMR who qualified for this study. Children from each school did not have any other identifiable physical, emotional, visual/hearing, or behavioral disability that would restrict the assessment of their perceived competence, and their performance on FMS tests (the measure of actual competence). The other group of participants in this study was 112 parents of the participant children in special education schools. One parent for each participant child made up this participant group.

For this study, the Test of Gross Motor Development, Second Edition (TGMD-2; Ulrich, 2000) and the Pictorial Scale for Perceived Physical Competence for Children with Mental Retardation (PSPPCCMR; Ulrich & Collier, 1990) were the instruments used to assess the perceived physical competence and actual motor competence of participant children. A survey including the demographic questionnaire and the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985) was used to assess demographic information and leisure time physical activity of participant parents.

The measures of the perceived physical competence and actual motor competence among children with MMR were administered in a quiet room (e.g., empty gym and classroom) or an open hallway outside the classroom of each participating school. Based on the schedules of each school's classroom teachers and students, two or three children were asked to come to the testing location at the same time. The pictorial scales (i.e., PSPPCCMR) were administered first to each participant child. When one of the children was tested on the pictorial scales, the other children were supervised by an assistant, so that these children were occupied in play. This process minimized distraction and assured the safety of participant children. The pictorial scales were followed by a series of motor performance tests (i.e., TGMD-2) to measure the actual motor competence. The children in each motor performance test group took turns being the first one to perform test items. Each test item for motor performance was administered individually to each participant child. The time to administer both the PSPPCCMR and the TGMD-2 took approximately 35-40 minutes per child.

A survey measuring parents' demographic information and parents' leisure time physical activity (GLTEQ) was administered to the parents of the participant children with MMR. Each classroom teacher assisted by sending and receiving the survey, including the parents' demographic questionnaire and GLTEQ, via the children to the parents. Because the questionnaire was concise and easy to understand, it took approximately five minute to complete.

Overall, four statistical tests (Pearson product-moment correlation, MANOVA, t-tests, and ANOVAs) were used to analyze the hypotheses and research questions in this study. First, the Pearson product-moment correlation was conducted to determine the relationship between perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ) in children with MMR. Second, a 2 (gender = boys, girls) x 2 (age = 8-9 years, 10-11 years) MANOVA (including follow-up univariate analyses) was conducted to determine potential gender and age differences in perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ). Third, independent sample t tests were conducted to determine between high parental activity group and low parental activity group in perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ). Last, four separate 2 (gender = boys, girls) x 2 (age = 8-9 years, 10-11 years) x 2 (parental activity level = high, low) ANOVAs were conducted to determine whether there is an interaction effect of gender, age, and parents' physical activity level on perceived physical competence (PSPPCCMR) and on actual motor competence (locomotor, object-control, and GMDQ).

Summary of Findings

Based on the statistical analyses of four purposes of this study the following findings were reached:

1. Analysis of the Pearson product-moment correlation revealed moderate positive correlations between PSPPCCMR and locomotor ($r = .38$, $p < .05$), object-control ($r = 40$, $p < .05$), and GMDQ ($r = .45$, $p < .05$). Therefore, the finding of the Pearson product-moment correlation indicated that there would be a positive relationship between perceived physical competence and actual motor competence in Korean children with MMR. Further, the finding could support the generalization of Harter's (1978) hypothesized relationship between perceived and actual competence to children with MMR in the age range of 8 to 11 years.

2. The initial 2 x 2 (Gender x Age) MANOVA revealed that the combined dependent variables for both perceived physical competence (PSPPCCMR) and actual motor competence (locomotor, object-control, and GMDQ) were significantly affected by gender, $F(4, 105) = 11.42$, $p < .05$. However, there was no significant multivariate main effect for age, and no significant multivariate interaction effect for gender by age. The subsequent univariate analyses for each of four dependent variables revealed that boys with MMR scored significantly higher than girls with MMR on the PSPPCCMR for perceived physical competence, $F(1, 108) = 12.26$, $p < .05$, and the locomotor and GMDQ components for actual motor competence, respectively $F(1, 108) = 33.83$, $p < .05$ and $F(1, 108) = 18.29$, $p < .05$. These findings could suggest the effect of gender on perceived physical competence and actual motor competence.

3. The independent sample t-tests revealed that between children with MMR whose parents have a high physical activity level and those whose parents have a low physical activity level, there were significantly different scores on PSPPCCMR, t (73) = -3.21, $p < .05$, on locomotor, t (73) = -6.03, $p < .05$, on object-control, t (73) = -4.79, $p < .05$, and on GMDQ, t (73) = -6.77, $p < .05$. Children with MMR with high parental physical activity scored higher on perceived physical competence and actual motor competence than children with MMR with low parental physical activity. Therefore, these findings indicated the effect of parental physical activity on perceived physical competence and actual motor competence.

4. Four separate 2 x 2 x 2 (Gender x Age x Parental Activity Level) ANOVAs revealed no significant interaction effect of gender, age, and parental physical activity level for PSPPCCMR, for locomotor, for object-control, and for GMDQ. Therefore, these findings suggest that there would not be a significant interaction of gender, age, and parental physical activity level on perceived physical competence and actual motor competence.

Implications for Education

The findings of this study have implications for researchers (i.e., those who are studying Harter's theory of competence motivation), for practitioners such as adapted physical education teachers/special education teachers, and for school administrators.

The researchers should know that, as in children without disabilities, there was the positive relationship between perceived physical competence and actual motor competence in Korean children with MMR. The inclusion of Korean children with MMR should help the researchers to expand the generalization of Harter's theoretical view of the relationship between perceived competence and actual competence. Also, gender and parental physical activity have influences on changing perceived physical competence and actual motor competence of Korean children with MMR.

As the development of FMS is an integral part of all children's lives, American governmental guidelines established FMS development as a major component of physical activity programs for children in special education (Individuals with Disabilities Education Act, 1997; Gallahue, 2000). Likewise, Korean elementary schools, including special schools, have included the development of FMS in a teaching curriculum for physical education class. Though this study may not directly address or develop a teaching curriculum or the pedagogical methods that can be utilized in teaching such a curriculum, understanding perceived competence and actual competence pertaining to the area of FMS in children with MMR should help adapted physical educators or special education teachers develop a more effective physical education program or curriculum for instruction in basic motor skills.

Elementary aged children with MMR in Korea are not much involved in sports or physical leisure activities out of special schools. Thus, physical education programs in the schools should have a crucial role, since the physical education programs in schools must be provided to children with MMR in order to meet their needs with respect to health and well-being. When studying perceived physical competence and actual motor competence in a specific domain, such as FMS, it can be implied that school administrators or principals need to connect children's preferences to content taught in elementary physical education classes. This should enhance the value of the appropriate evaluation for perceived and actual competence. They should encourage parents to play an important role in children's perceived physical competence and actual motor competence by modeling regular physical activity, and that parents should collaborate as partners in the education of children with MMR.

Recommendations for Further Research

The findings of this study showed that there was a positive relationship between perceived physical competence and actual motor competence in Korean children with MMR. Subject selection in this study was limited to primary school children with MMR in Seoul, Korea. Further studies could investigate children with different types of disabilities or children with MMR in other countries to determine the relationship of perceived physical competence and actual motor competence relative to age, gender, and parental physical activity. By expanding a theory (e.g., competence motivation theory dealing with the relationship between perceived and actual competence) to certain other populations such as children with different types of disabilities or children with MMR in other countries, it might be of benefit to improve the validation and generalizability of the theory.

To measure the perceived physical competence (PSPPCCMR) and actual motor competence (TGMD-2), only one rater (i.e., the investigator) assessed all these tests. Further studies should examine two possible types of the reliability coefficients. First, the scores of the investigator (primary rater) would be compared to the scores of other raters who specialize in rate checking in order to determine an intra-rater reliability. Second, to determine the objectivity of the investigator, the inter-rater reliability statistics for second trial scores using the PSPPCCMR and TGMD-2 tests would be established.

In addition, if further studies assess the perceived physical competence and actual motor competence by using different types of instruments, it may yield more precise results.

In the present study, two age groups consisting of the younger group (8 to 9 year old) and the older group (10 to 11 year old) were used to determine differences in perceived physical competence and actual motor competence. Further studies should examine the possible difference in each age group (8, 9, 10, 11 year old) to find more precise age differences in perceived physical competence and actual motor competence. It might be helpful to indicate exactly how the children with MMR perceive and perform the FMS in each age group, so that accurate levels regarding their competence can be known. Studies should also examine participants older than 11 years of age, so that more various comparisons of age, such as elementary aged children with MMR vs. middle school aged children with MMR, could be found.

The findings of this study provided significant evidence that parental physical activity has an influence on perceived physical competence and actual motor competence in children with MMR. However, to gain a more complete understanding of the influence of parents on perceived physical competence and actual motor competence, there is the need to examine more parental mechanisms such as attitudes, encouragement, and expectation. It might be helpful to better understand parent-child interactions and the rationale of parental influences. Social learning (Bandura, 1977) and the expectancy socialization model (Eccles & Harold, 1991) can be used to drive and design further research about parental influences on perceived physical competence and actual motor competence.

Further studies should examine these research questions in different educational settings. Children with MMR in the present study are attending public special schools for students with MR. However, they can attend residential facilities, clinical centers, and home schooling as an alternative for children with disabilities (Kim & Hong, 1992). Moreover, recently some children with MMR are attending the regular classrooms and schools in Korea. Therefore, a study of the comparison of perceived physical competence and actual motor competence between the children with MMR in the special schools and those in other alternative schools should be of benefit for understanding difference of school settings.

Finally, further studies should examine dynamic relationships between the elements in the model of competence motivation (e.g., perceived physical competence, actual competence, perceived control, motivational orientation, and affect) with application to children with MMR. According to Ulrich (1989), the dynamical systems perspective proposed that observed human behavior might be explained by multiple factors in the human system.

APPENDIX A

HUMAN SUBJECTS APPROVAL

MICHIGAN STATE
UNIVERSITY

June 4, 2002

TO: Crystal F. BRANTA
130 I.M. Sports Circle

RE: **IRB# 02-277** CATEGORY: FULL REVIEW

APPROVAL DATE: June 3, 2002

TITLE: PERCEIVED PHYSICAL AND ACTUAL MOTOR COMPETENCE IN KOREAN CHILDREN WITH MILD MENTAL RETARDATION: RELATIONSHIP TO AGE, GENDER, AND PARENTAL ACTIVITY

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS approved this project.**

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at (517) 355-2180 or via email: UCRIHS@msu.edu. Please note that all UCRIHS forms are located on the web: http://www.msu.edu/user/ucrihs

Sincerely,

Ashir Kumar, M.D.
UCRIHS Chair

AK: br

cc: Ji Tae Kim
133 Rampart Way #304
East Lansing, MI 48823

OFFICE OF
RESEARCH ETHICS AND STANDARDS

University Committee on Research Involving Human Subjects

Michigan State University
202 Olds Hall
East Lansing, MI
48824

517/355-2180
FAX: 517/432-4503
www.msu.edu/user/ucrihs
E-Mail: ucrihs@msu.edu

APPENDIX B

INFORMED CONSENT FORMS

INFORMED CONSENT

Dear Principal or Teacher:

My name is Ji-Tae Kim. I am a doctoral student at Michigan State University, USA, specializing in the development of motor ability in children. In my dissertation project, I am conducting a study to investigate the difference in mentally retarded children's perceptions of ability in motor skills (i.e., perceived physical competence) and actual ability in basic motor skills (i.e., actual motor competence). I am also interested in how activity level of parents influences mentally retarded children's abilities.

For this project, principals and teachers in each special school will help to identify students from 8 to 11 years of age with mild mental retardation who qualify for this study, according to classification of disability level in school files. Also, with classroom teachers' assistance, children who meet the criteria will be provided envelopes containing an informed consent document for parent's and child's participation, and will encourage the children and parents to return them to their classroom. Only those parents and children who return approved consent forms will participate in the project.

The measures of perceived physical competence and actual motor competence among children with mild mental retardation will be administered by the investigator (Mr. Kim) in a quiet room of each participating school (e.g., empty gym and classroom). Children will be videotaped during the test for basic motor skills. The videotape will be used by the investigator (Mr. Kim) to assess and score children's basic motor skills. The videotape will be transcribed and stored in the investigator's locked cabinet to maintain security of the information. The videotape will be retained for no more than 2 years by the researcher and will be used only by the researcher for purposes of this study. After two years, the videotape will be erased. The tests will be administered at your child's school, and the time to administer both tests will take approximately 30 minutes.

A request by any subject to withdraw his/her (children or parents') consent and to discontinue participation in the investigation shall be honored promptly and unconditionally. Participation for children and their parents is voluntary, and they will be free to withdraw from participation at any time without penalty. Also, all of the information collected during this study will be kept strictly confidential.

A copy of the results of the study will be made available at the conclusion of the study to each participating school.

There are no foreseeable risks or discomforts to a child if s/he participates in this study. If a slight minor injury such as scrapes, bruises, or small cuts occurs, child's school medical staff, as normal, will take care of any such minor injuries. If a child sustains a minor or serious injury as a result of his/her participation in this research project, the child's school will provide emergency medical care if necessary. In other words, the child's school will pay in the event of a medical emergency during the testing.

If you agree to you or your school participating in this study of children with mild mental retardation and their parents, please sign below and return the form to Mr. Kim. You will be asked to allow access to relevant school records for the purpose of identifying children qualified for this study. In addition, you will be asked to help identify and help Mr. Kim test the children. You may cease to participate in the project at any time during the study. If you have any questions regarding this study, please feel free to contact Ji-Tae Kim by phone *in Korea*: 02-532-5390 or e-mail: kimjitae@msu.edu or Dr. Crystal F. Branta, the project supervisor, by phone: 001-1-517-353-9467 or e-mail: cbranta@msu.edu. Also, if you have questions or concerns regarding your rights as a study participant, you may contact Dr. Ashir Kumar, Chair of the University Committee on Research Involving Human Subject, by phone: 001-1-517-353-2976 or e-mail: ucrihs@msu.edu.

Thank you for your help.

Kim Ji-Tae

Consent Form for Principals and Teachers

Title: Perceived physical and actual motor competence in Korean children with mild mental retardation: Relationship to age, gender, and parental activity.

1. I agree to participate in this study by providing access to relevant school records.
2. I also will help identify children who qualify for this study.
3. I will assist Mr. Kim in the assessment of the children.

Principal's signature: ____________________________ Date: _________________

Teacher's signature: ____________________________ Date: _________________

School: ____

UCRIHS APPROVAL FOR
THIS project EXPIRES:

JUN - 3 2003

SUBMIT RENEWAL APPLICATION
ONE MONTH PRIOR TO
ABOVE DATE TO CONTINUE

참 가 안 내 문

교장 선생님 혹은 담임 선생님께:

안녕하세요. 제 이름은 김 지태 입니다. 저는 미국 미시간 주립대학에서 특수체육 및 신체동작 발달을 전공하고 있는 박사과정 학생으로, 부모의 체육활동 수준이 정신장애 아동들의 동작 발달과 신체 인지능력에 어떠한 영향을 주는가에 관한 박사논문을 준비 중 입니다.

이 연구를 위해, 각 특수학교의 교장 선생님과 담임 선생님들은 8세에서 11세 사이의 지체 3급 장애를 가진 아동을 선별해 주실 것 입니다. 더우기 선별된 아동들의 담임 선생님들은 아동들의 부모님께 이 연구의 참가 동의서를 얻기 위하여 도와 주실 것 입니다. 이 연구는 참가에 동의한 부모님과 자녀에 한하여 이루질 것 입니다.

신체의 인지적 능력과 동작발달 능력에 관한 측정은 각 학교의 빈 공간 (예, 체육관 혹은 교실)에서 이루어 지며, 아동들의 동작발달 능력은 비디오로 촬영 될 것 입니다. 이 비디오 테이프는 아동의 동작능력을 기록하고 측정하는 연구의 목적으로 될 것 이며, 절대로 다른 용도로 사용되지 않을 것 입니다. 두가지 테스트를 위하여 걸리는 시간은 한 학생 당 약 30분 정도가 소요될 것 입니다.

부모님과 그들 자녀의 참여는 자발적이며, 그들은 어떠한 경우에도 테스트의 참여를 철회할 수있으며, 어떠한 불이익이나 처벌을 받지 않을 것 입니다. 이 연구에 수집된 모든 정보는 엄격하게 비밀로 지켜 질 것입니다.

이 연구는 당신 자녀에게 어떠한 위험과 불편함을 주지 않을 것입니다. 만약 찰과상 같은 경미한 상처가 일어나면, 자녀의 학교에 있는 간호 직원은 평소와 같이 자녀의 상처를 치료하기 위한 응급조치를 취할 것 입니다. 만약 이 연구를 하는 도중에 상처를 입었다면, 학교에서 모든 상처에 대한 치료 비용을 보상 할 것 입니다.

만약 당신의 학교에 있는 정신 지체아동들과 그들의 부모님의 참여를 허락하신다면, 뒷장에 있는 동의서에 싸인해 주셨으면 합니다. 만약 연구에 관한 질문이 있으면, 김 지태 (전화:02-532-5390 혹은 전자메일:kimjitae@msu.edu) 혹은 Dr. Crystal F. Branta에게 (전화:001-1-517-353-9467 혹은 전자메일:cbranta@msu.edu) 연락 주시길 바랍니다. 또한, 만약 연구의 참가자로서 당신의 권리들에 관한 질문이 있으시면, Dr. Ashir Kumar에게 (전화:001-1-517-353-2976 혹은 전자메일:ucrihs@msu.edu) 연락 주시길 바랍니다. - 감사합니다. -

참 가 동 의 서

제목: 단순 정신지체 아동의 신체 인지능력과 동작발달 능력: 나이, 성별, 과 부모의 체육활동에 대한 관계.

교장 선생님과 담임 선생님께서는:

1. 이 연구에 필요한 학교의 모든 정보를 제공하며, 연구의 참여를 허락한다.
2. 이 연구를 위한 아동을 선별하도록 도울 것이다.
3. 이 연구를 위해 아동들의 테스트 과정을 도울 것이다.

교장 선생님 싸인: ____________________ 날짜: ____________________

담임 선생님 싸인: ____________________ 날짜: ____________________

학교: ________________________________

INFORMED CONSENT LETTER

Dear Parent:

My name is Ji-Tae Kim. I am a doctoral student at Michigan State University, USA, specializing in the development of motor ability in children. As a researcher for adapted physical education in Korea, I have a strong interest in research that has practical application for Korean children with mild mental retardation. In my dissertation project I am conducting a study to investigate the difference in children's perceptions of ability in motor skills (i.e., perceived physical competence) and actual ability in basic motor skills (i.e., actual motor competence). I am also interested in how activity level of parents influences children's abilities.

For this study, you and your child's participation are being requested. Your child will be asked to complete a test for perceived physical competence and participate in a test for basic motor skills. Your child will be videotaped during the test for basic motor skills. The videotape will be used by the researcher (Mr. Kim) to assess and score your child's basic motor skills. The videotape will be transcribed and stored in the researcher's cabinet to maintain security of the information. The videotape will be retained for no more than 2 years by the researcher and will used only by the researcher for purposes of this study. After two years, the videotape will be erased. The tests will be administered at your child's school, and the time to administer both tests will take approximately 30 minutes. In addition to your child's participation, you will be asked to fill out a questionnaire, which includes personal demographic questions and questions about your physical activity levels.

Participation for you and your child is voluntary, and you and your child will be free to withdraw from participation at any time without penalty. The testing procedures will be carefully explained to your child before testing. Your child will be asked to give verbal assent to participation. Your child will not be required to participate if s/he asks not to be tested. Also, you do not need to answer any questions that make you uncomfortable.

There are no foreseeable risks or discomforts to your child if he/she participates in this study. If a slight minor injury such as scrapes, bruises, or small cuts occurs, your child's school medical staff, as normal, will take care of any such minor injuries. If your child sustains a minor or serious injury as a result of his/her participation in this research project, the child's school will provide emergency medical care if necessary. In order words, the child's school will pay in the event of a medical emergency during the testing.

All of the information collected during this study will be kept strictly confidential. The names of all participants (including you and your child) will be replaced with identification numbers as soon as all testing is completed. It is possible that the results of this study will be published or presented, but participants' names and identities will not be revealed. Only group information will be referred to in any publication/presentation of the results of this study. Your privacy will be protected to the maximum extent allowable by law.

The principal of your child's school has reviewed the procedures of this study and has approved this study. I (The researcher) believes that participation in this study will provide information to understand and enhance the motivation of children to participate in sport and/or physical activity, and the knowledge gathered will be valuable to all educators and parents, and most importantly will help improve children's program. Also, each child will receive a copy of the results of his/her actual motor skill competence for 10 basic motor skill areas.

If you will approve the participation of you and your child, please sign and return the attached consent form. If you have any questions regarding this study, please feel free to contact Ji-Tae Kim by phone: 02-532-5390 or e-mail: kimjitae@msu.edu or Dr. Crystal F. Branta, the project supervisor, by phone: 011-1-

517-353-9467 or e-mail: cbranta@msu.edu. Also, if you have questions or concerns regarding your rights as a study participant, you may contact Dr. Ashir Kumar, Chair of the University Committee on Research Involving Human Subject, by phone: 011-1-517-353-2976 or e-mail: ucrihs@msu.edu. Upon my return to the USA in July 2002 to complete my doctoral degree, you may contact Dr. Kim, Jong-Hun (Professor at Yonsei University) in Korea at phone number 001-798-5390 if you have any questions regarding this research. The questions will be relayed to me and I will respond promptly. Or, if you wish, you may use the e-mail address provided above.

Please sign the consent form below, and return the form to the school by __/__/2002.

CUT HERE

CONSENT FORM FOR THIS PROJECT

1. Your signature below indicates your voluntary agreement for your child to participate in this study regarding perceived and actual motor competence in relation to parental physical activity levels, to be conducted by Mr. Kim.

2. Your signature below indicates your voluntary agreement for your child to be videotaped for the purposes of this study, as outlined in the Informed Consent Letter.

3. Your signature below indicates your voluntary agreement to participate in this study regarding perceived and actual motor competence in relation to parental physical activity levels, to be conducted by Mr. Kim.

Child' name: ______________________________

Parent's name: ______________________________

Parent's signature: ________________________

Date: ____________________________________

* If you do not wish to consent to participation, please fill in your child's name and draw lines in the space given for your name and signature and return the form unsigned.

Thank you for your help.

참 가 안 내 문

부모님께:

안녕하세요. 제 이름은 김 지태 입니다. 저는 미국 미시간 주립대학에서 특수체육 및 신체동작 발달을 전공하고 있는 박사과정 학생으로서, 한국의 정신장애 아동에 대한 연구에 상당한 관심을 가지고 있습니다. 특히, 박사과정 논문을 위해, 저는 지금 부모의 체육활동 수준이 정신장애 아동들의 실제적 동작 발달과 동작 인지능력에 어떠한 영향을 주는지를 조사 중 입니다.

이 연구의 실제적인 적용을 위해, 부모님과 부모님 자녀의 참여가 요구됩니다. 자녀들은 이 연구에서 신체 인지능력과 기초적인 신체동작에 관한 테스트를 가질 것입니다. 특히, 정확한 측정을 위하여 신체동작을 테스트 할 때는 자녀들의 동작을 촬영 할 것입니다. 이 테스트는 자녀의 학교에서 이루어지며, 약 30분 정도가 소요 될 것입니다. 한편, 부모님은 이 연구를 위해서, 부모님의 개인적 정보와 체육활동 수준에 관한 설문지를 작성할 것입니다.

부모님과 자녀의 참여는 자발적이며, 그들은 어떠한 벌칙이나 불이익 없이 언제라도 연구의 참여를 철회할 자유가 있습니다. 테스트 절차는 자녀들이 테스트하기 전에 자세히 설명될 것이다. 만약 당신의 자녀가 테스트를 원하지 않는다면, 당신의 자녀는 테스트의 참여가 요구되지 않을 것 입니다.

이 연구는 당신 자녀에게 어떠한 위험과 불편함을 주지 않을 것입니다. 만약 조그만 찰과상 같은 경미한 상처가 일어나면, 자녀의 학교에 있는 간호 직원은 평소와 같이 자녀의 상처를 치료하기 위한 응급조치를 취할 것 입니다. 또한, 만약 테스트 도중에 자녀가 상처를 입었다면, 학교는 모든 상처에 대한 치료 비용을 보상 할 것 입니다..

이 연구에 수집된 모든 정보는 엄격하게 비밀로 지켜 질 것입니다. 모든 참가자의 이름은 테스트가 이루어지면, ID 번호로 대체 될 것입니다. 또한 이 연구의 결과는 출판되거나 발표될 수 있으나, 참가자의 이름은 누설되지 않을 것입니다. 이 연구에 관한 어떠한 출판 혹은 발표에도 개인적 정보가 아니라, 단지 그룹에 의한 정보로서 결과를 언급할 것입니다. 또한 법적으로도 최대한 개인적의 프라이버시를 보호 받을 수 있을 것입니다.

자녀의 학교 교장선생님은 연구의 절차를 검토하였으며, 이 연구를 학교에서 할 수 있도록 허락 하셨습니다. 이 연구는 체육활동에 참여하기 위한 아동들의 동기를 이해하고 증가하기 위한 정보를 제공하며, 부모와 모든 교육자들에게 아동들의 체육 프로그램을 향상시키기 위한 귀중한 정보를 제공할 것입니다. 또한 이 연구를 통하여, 각 자녀들은 테스트된 동작에 관한 실제적 능력을 이해하는 이익이 있을 것입니다. 연구가 마무리될 때, 자녀들의 동작 결과에 관한 점수는 부모의 요구에 의하여 얻어 질 수 있습니다.

만약 부모님과 자녀의 참여를 허락한다면, 아래에 있는 동의서에 싸인해 주셨으면 합니다. 만약 연구에 관한 질문이 있으면, 김 지태 (전화:02-532-5390 혹은 전자메일:kimjitae@msu.edu) 혹은 Dr. Crystal F. Branta에게 (전화:001-1-517-353-9467 혹은 전자메일:cbranta@msu.edu) 연락 주시길 바랍니다. 또한, 만약 연구의 참가자로서 당신의 권리들에 관한 질문이 있으시면, Dr. Ashir Kumar에게 (전화:001-1-517-353-2976 혹은 전자메일:ucrihs@msu.edu) 연락 주시길 바랍니다.

아래에 있는 참가동의서에 싸인을 하시고, 월/ 일/2002까지 학교에 제출하여 주십시오.

--(절단선)--

참 가 동 의 서

1. 본인은 자신의 자녀가 김 지태에 의해서 실행된 신체인지 능력과 실제적 신체능력이 부모들의 신체적 능력과 관계하는 것에 관한 연구에 참여하기 위한 동의를 준다.
2. 본인은 자녀의 신체 동작 테스트를 위한 비디오 촬영을 허락한다.
3. 본인은 김 지태에 의해서 실행된 신체인지 능력과 실제적 신체능력이 부모들의 신체적 능력과 관계하는 것에 관한 연구에 참여하는 것을 동의한다.

자녀의 이름: ____________________________________

부모의 이름: ____________________________________

부모의 싸인 혹은 도장: ____________________________

날짜: ______________________________________

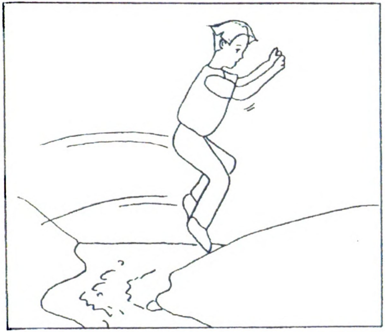
* 만약 이 연구에 참가를 동의하지 않는다면, 당신 자녀의 이름만 적어 보내 주십시오.

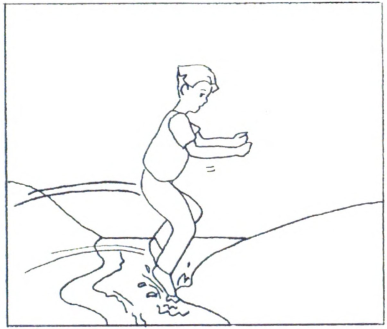
- 감사합니다. -

APPENDIX C

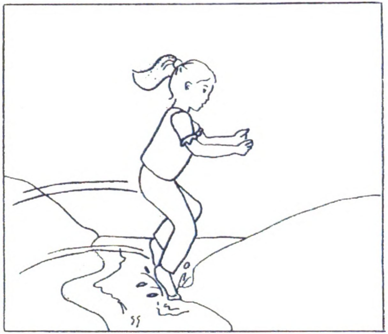
PICTORIAL SCALES FOR ASIAN BOYS AND GIRLS

Item 1: Jumping (Male)

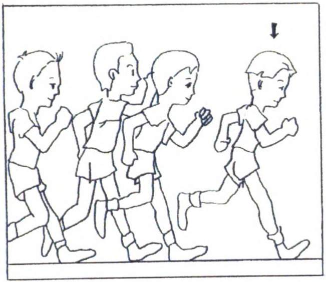


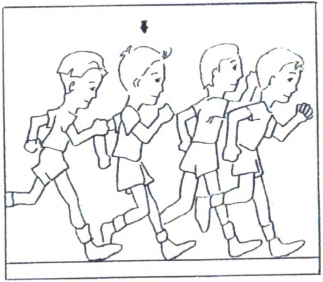


Item 1: Jumping (Female)

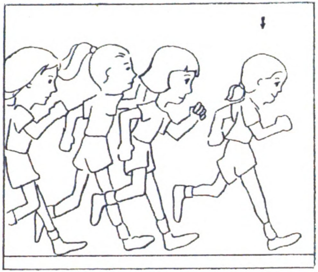


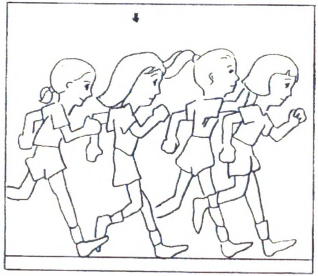
Item 2: Running (Male)



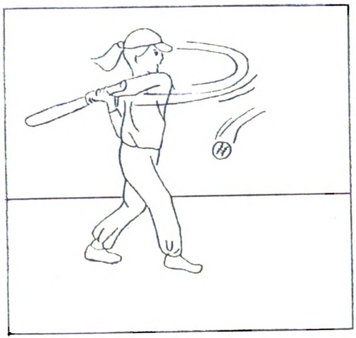


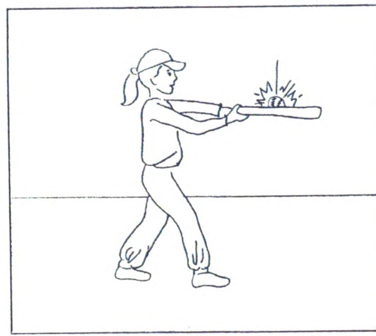
Item 2: Running (Female)



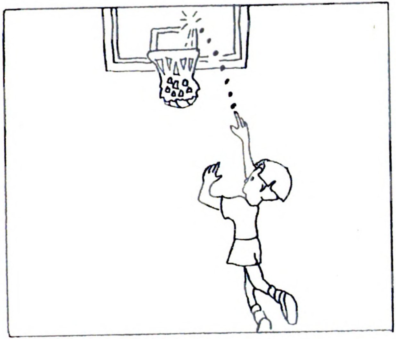


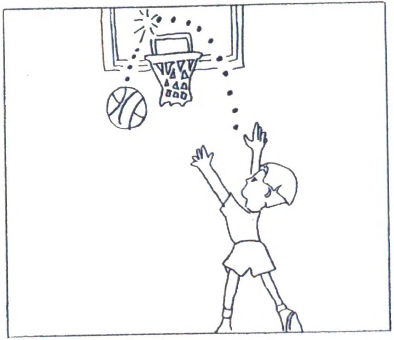
Item 3: Batting a Ball (Female)



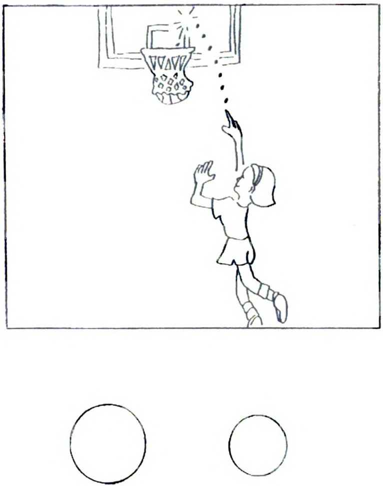


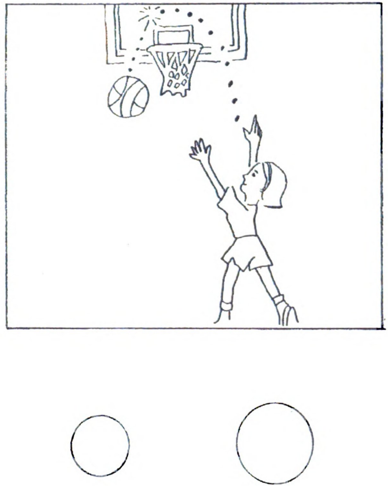
Item 4: Shooting a Basketball (Male)



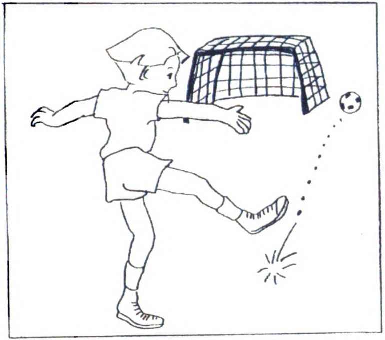


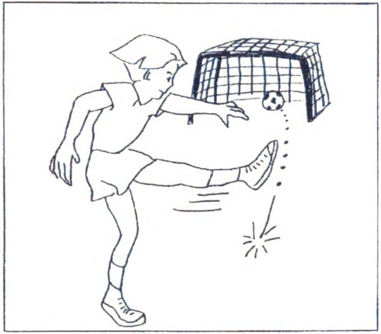
Item 4: Shooting a Basketball (Female)



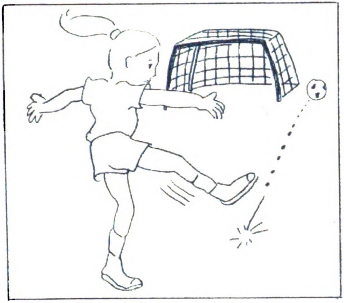


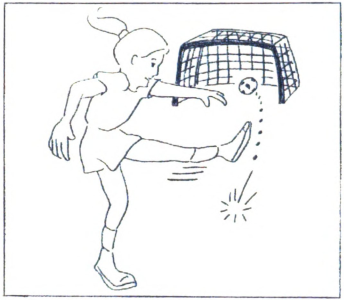
Item 5: Kicking a Ball (Male)



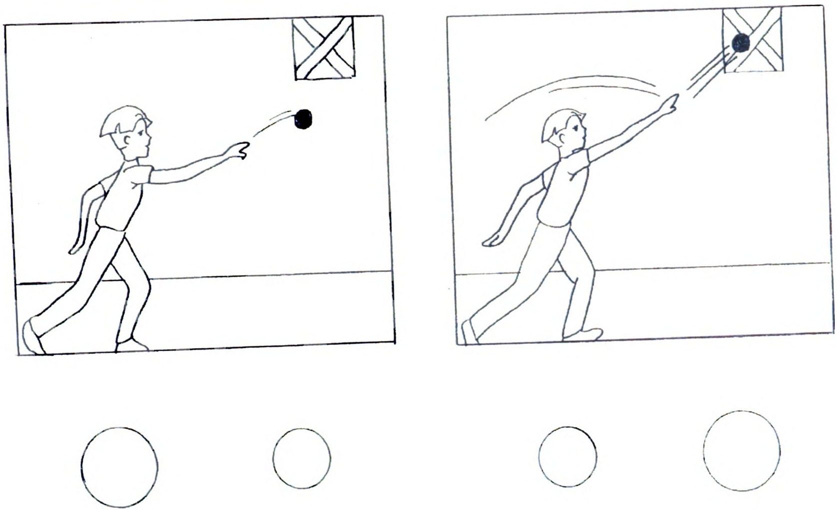


Item 5: Kicking a Ball (Female)

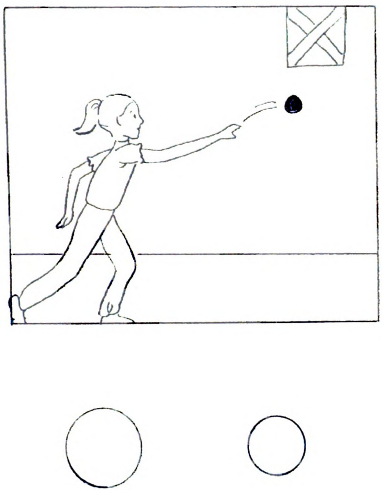


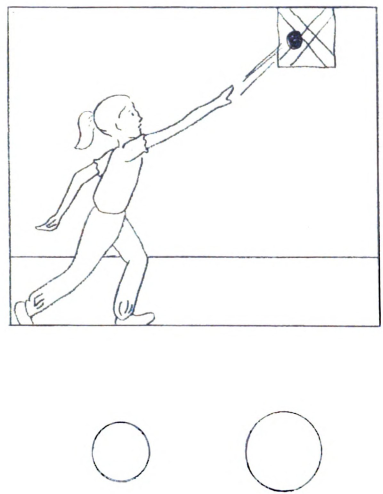


Item 6: Throwing a Ball (Male)

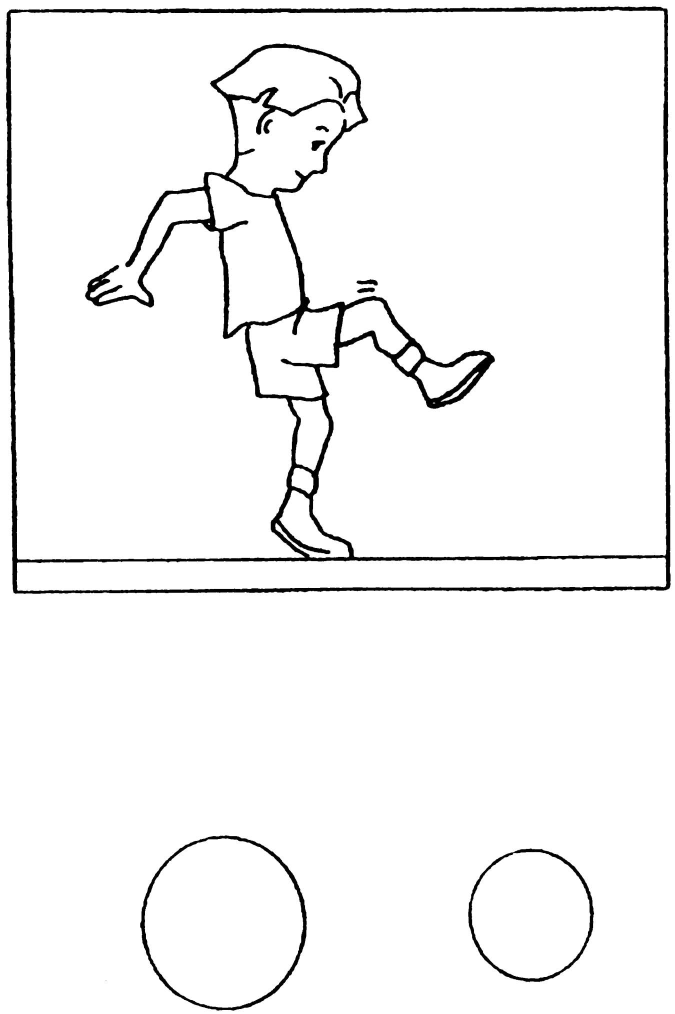


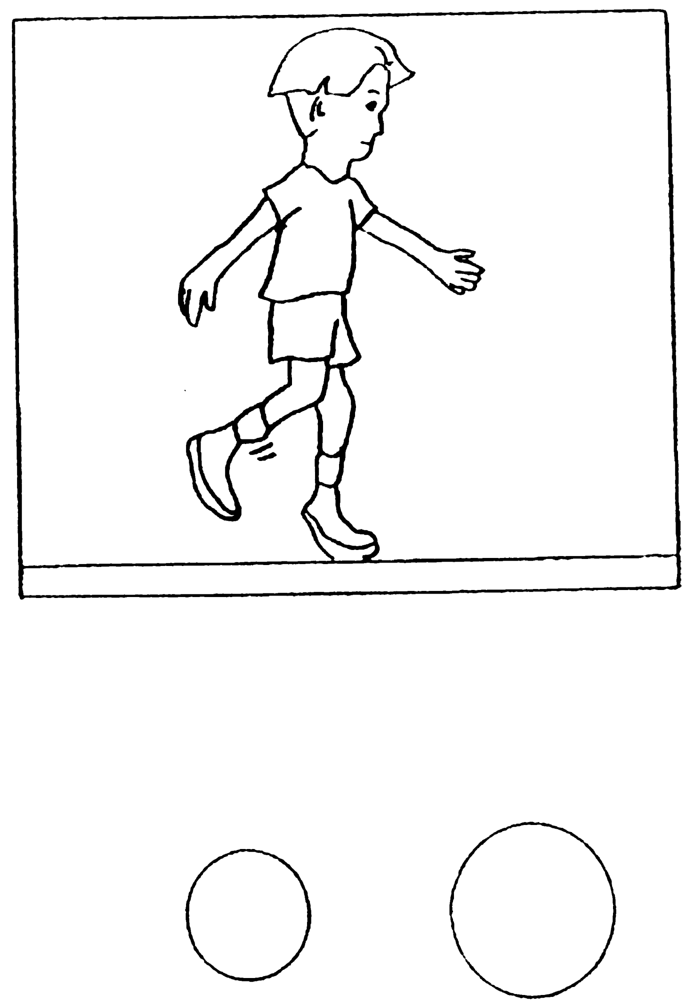
Item 6: Throwing a Ball (Female)



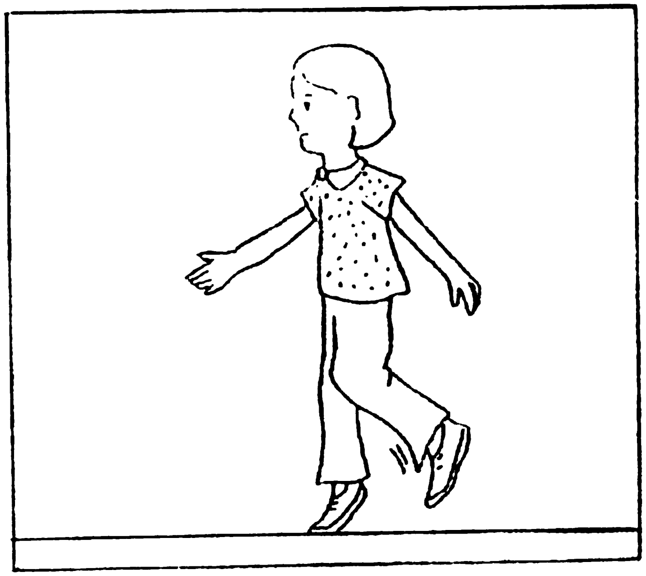


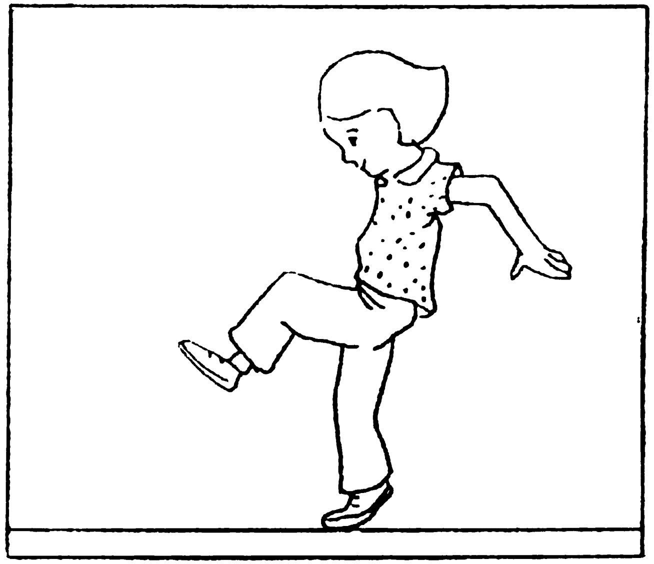
Item 7: Skipping (Male)



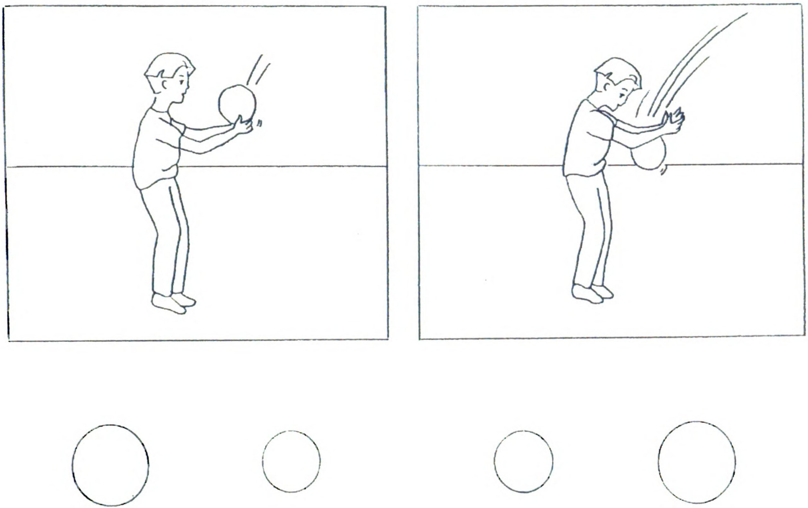


Item 7: Skipping (Female)

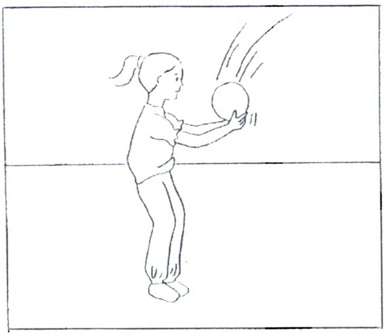


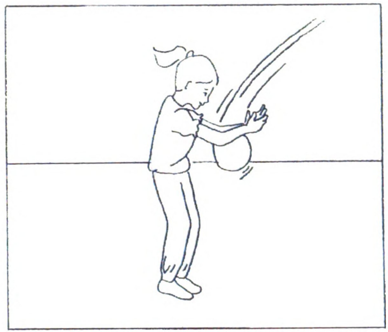


Item 8: Catching a Ball (Male)

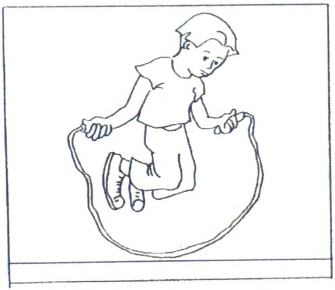


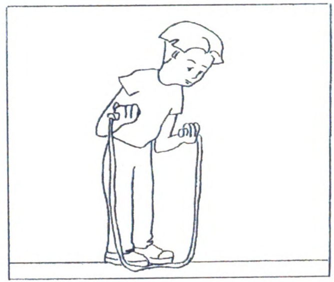
Item 8: Catching a Ball (Female)



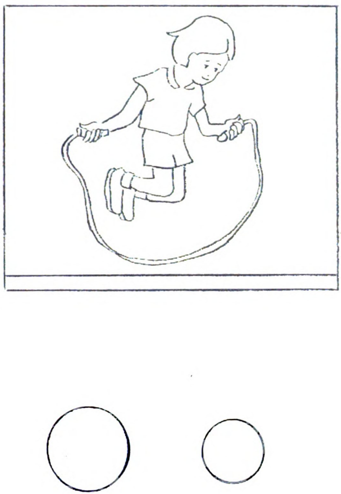


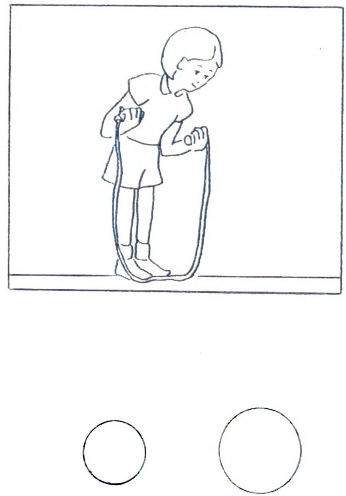
Item 9: Jumping Rope (Male)



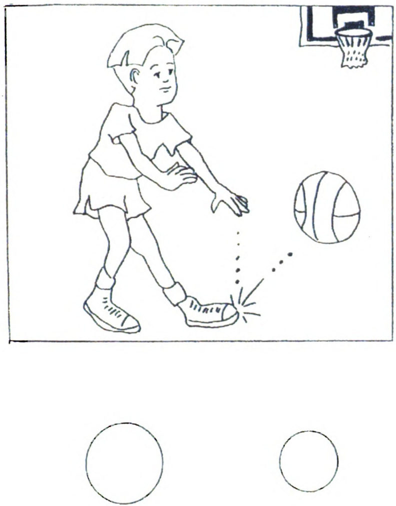


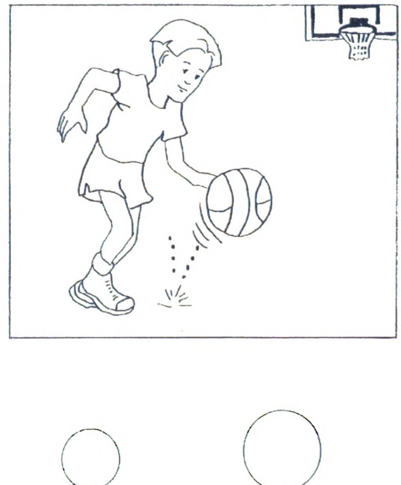
Item 9: Jumping Rope (Female)



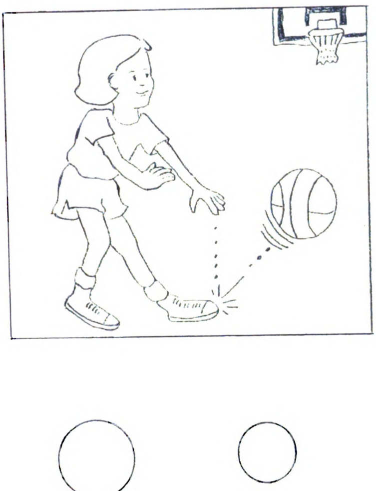


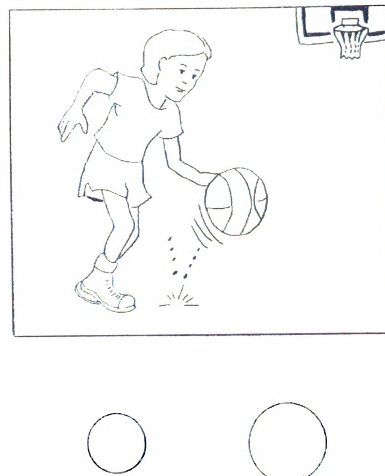
Item 10: Dribbling a Ball (Male)





Item 10: Dribbling a Ball (Female)





APPENDIX D

TGMD-2 SCORE SHEETS

Profile/Examiner
Record Form

Test of Gross Motor Development-Second Edition
TGMD-2

Section I: Identifying Information

Name ______________________________ School ____________________________

Male □ Female □ Grade __________ Referred by ________________________

Date of Testing ______ ______ _______ Reason for Referral ________________

Date of Birth ______ ______ _______ Examiner __________________________

Age ______ ______ _______ Examiner's Title __________________

Section II: Record of Scores

	Raw Score	Standard Score	Percentile	Age Equivalent
Locomotor	______	______	______	______
Object Control	______	______	______	______
Sum of Standard Scores		______		
Gross Motor Quotient		______		

Section III: Testing Conditions

A. Place of Tested ____

____

	Interfering				Not interfering
B. Noise Level	1	2	3	4	5
C. Interruptions	1	2	3	4	5
D. Distractions	1	2	3	4	5
E. Light	1	2	3	4	5
F. Temperature	1	2	3	4	5

G. Notes and other considerations __________________________________

____

____

Section IV: Other Test Data

Name of Test	Date	Standard Score	TGMD-2 Equivalent
______________________	__________	_________	___________

Section V: Profile of Standard Scores

Standard Scores	Locomotor	Object Control	Standard Scores	Quotients	Gross Motor Quotient	Quotients
20	-	-	20	150	-	150
19	-	-	19	145	-	145
18	-	-	18	140	-	140
17	-	-	17	135	-	135
16	-	-	16	130	-	130
15	-	-	15	125	-	125
14	-	-	14	120	-	120
13	-	-	13	115	-	115
12	-	-	12	110	-	110
11	-	-	11	105	-	105
10	—	—	10	100	—	100
9	-	-	9	95	-	95
8	-	-	8	90	-	90
7	-	-	7	85	-	85
6	-	-	6	80	-	80
5	-	-	5	75	-	75
4	-	-	4	70	-	70
3	-	-	3	65	-	65
2	-	-	2	60	-	60
1	-	-	1	55	-	55

Section VI. Subtest Performance Record

Preferred Hand: Right [ ] Left [ ] Not Established [ ]
Preferred Foot: Right [ ] Left [ ] Not Established [ ]

Locomotor Subtest

Skill	Materials	Directions	Performance Criteria	Trial 1	Trial 2	Score
1. Run	60 feet of clear space, and two cones	Place two cones 50 feet apart. Make sure there is at least 8 to 10 feet of space beyond the second cone for a safe stopping distance. Tell the child to run as fast as he or she can from one cone to the other when you say "Go." Repeat a second trial.	1. Arms move in opposition to legs, elbows bent			
			2. Brief period where both feet are off the ground			
			3. Narrow foot placement landing on heel or toe (i.e., not flat footed)			
			4. Nonsupport leg bent approximately 90 degrees (i.e., close to buttocks)			
					Skill Score	
2. Gallop	25 feet of clear space, and tape or two cones	Mark off a distance of 25 feet with two cones or tape. Tell the child to gallop from one cone to the other. Repeat a second trial by galloping back to the original cone.	1. Arms bent and lifted to waist level at takeoff			
			2. A step forward with the lead foot followed by a step with the trailing foot to a position adjacent to or behind the lead foot			
			3. Brief period when both feet are off the floor			
			4. Maintains a rhythmic pattern for four consecutive gallops			
					Skill Score	
3. Hop	A minimum of 15 feet of clear space	Tell the child to hop three times on his or her preferred foot (established before testing) and then three times on the other foot. Repeat a second trial.	1. Nonsupport leg swings forward in pendular fashion to produce force			
			2. Foot of nonsupport leg remains behind body			
			3. Arms flexed and swing forward to produce force			
			4. Takes off and lands three consecutive times on preferred foot			
			5. Takes off and lands three consecutive times on nonpreferred foot			
					Skill Score	
4. Leap	A minimum of 20 feet of clear space, a beanbag, and tape	Place a beanbag on the floor. Attach a piece of tape on the floor so it is parallel to and 10 feet away from the beanbag. Have the child stand on the tape and run up and leap over the beanbag. Repeat a second trial.	1. Take off on one foot and land on the opposite foot			
			2. A period where both feet are off the ground longer than running			
			3. Forward reach with the arm opposite the lead foot			
					Skill Score	

Skill	Materials	Directions	Performance Criteria	Trial 1	Trial 2	Score
5. Horizontal Jump	A minimum of 10 feet of clear space and tape	Mark off a starting line on the floor. Have the child start behind the line. Tell the child to jump as far as he or she can. Repeat a second trial.	1. Preparatory movement includes flexion of both knees with arms extended behind body			
			2. Arms extend forcefully forward and upward reaching full extension above the head			
			3. Take off and land on both feet simultaneously			
			4. Arms are thrust downward during landing			
					Skill Score	
6. Slide	A minimum of 25 feet of clear space, a straight line, and two cones	Place the cones 25 feet apart on top of a line on the floor. Tell the child to slide from one cone to the other and back. Repeat a second trial.	1. Body turned sideways so shoulders are aligned with the line on the floor			
			2. A step sideways with lead foot followed by a slide of the trailing foot to a point next to the lead foot			
			3. A minimum of four continuous step–slide cycles to the right			
			4. A minimum of four continuous step–slide cycles to the left			
					Skill Score	
			Locomotor Subtest Raw Score (sum of the 6 skill scores)			

Object Control Subtest

Skill	Materials	Directions	Performance Criteria	Trial 1	Trial 2	Score
1. Striking a Stationary Ball	A 4-inch lightweight ball, a plastic bat, and a batting tee	Place the ball on the batting tee at the child's belt level. Tell the child to hit the ball hard. Repeat a second trial.	1. Dominant hand grips bat above nondominant hand			
			2. Nonpreferred side of body faces the imaginary tosser with feet parallel			
			3. Hip and shoulder rotation during swing			
			4. Transfers body weight to front foot			
			5. Bat contacts ball			
					Skill Score	
2. Stationary Dribble	An 8- to 10-inch playground ball for children ages 3 to 5; a basketball for children ages 6 to 10; and a flat, hard surface	Tell the child to dribble the ball four times without moving his or her feet, using one hand, and then stop by catching the ball. Repeat a second trial.	1. Contacts ball with one hand at about belt level			
			2. Pushes ball with fingertips (not a slap)			
			3. Ball contacts surface in front of or to the outside of foot on the preferred side			
			4. Maintains control of ball for four consecutive bounces without having to move the feet to retrieve it			
					Skill Score	

Skill	Materials	Directions	Performance Criteria	Trial 1	Trial 2	Score
3. Catch	A 4-inch plastic ball, 15 feet of clear space, and tape	Mark off two lines 15 feet apart. The child stands on one line and the tosser on the other. Toss the ball underhand directly to the child with a slight arc aiming for his or her chest. Tell the child to catch the ball with both hands. Only count those tosses that are between the child's shoulders and belt. Repeat a second trial.	1. Preparation phase where hands are in front of the body and elbows are flexed			
			2. Arms extend while reaching for the ball as it arrives			
			3. Ball is caught by hands only			
					Skill Score	
4. Kick	An 8- to 10-inch plastic, playground, or soccer ball; a beanbag; 30 feet of clear space; and tape	Mark off one line 30 feet away from a wall and another line 20 feet from the wall. Place the ball on top of the beanbag on the line nearest the wall. Tell the child to stand on the other line. Tell the child to run up and kick the ball hard toward the wall. Repeat a second trial.	1. Rapid continuous approach to the ball			
			2. An elongated stride or leap immediately prior to ball contact			
			3. Nonkicking foot placed even with or slightly in back of the ball			
			4. Kicks ball with instep of preferred foot (shoelaces) or toe			
					Skill Score	
5. Overhand Throw	A tennis ball, a wall, tape, and 20 feet of clear space	Attach a piece of tape on the floor 20 feet from a wall. Have the child stand behind the 20-foot line facing the wall. Tell the child to throw the ball hard at the wall. Repeat a second trial.	1. Windup is initiated with downward movement of hand/arm			
			2. Rotates hip and shoulders to a point where the nonthrowing side faces the wall			
			3. Weight is transferred by stepping with the foot opposite the throwing hand			
			4. Follow-through beyond ball release diagonally across the body toward the nonpreferred side			
					Skill Score	
6. Underhand Roll	A tennis ball for children ages 3 to 6; a softball for children ages 7 to 10; two cones; tape; and 25 feet of clear space	Place the two cones against a wall so they are 4 feet apart. Attach a piece of tape on the floor 20 feet from the wall. Tell the child to roll the ball hard so that it goes between the cones. Repeat a second trial.	1. Preferred hand swings down and back, reaching behind the trunk while chest faces cones			
			2. Strides forward with foot opposite the preferred hand toward the cones			
			3. Bends knees to lower body			
			4. Releases ball close to the floor so ball does not bounce more than 4 inches high			
					Skill Score	
			Object Control Subtest Raw Score (sum of the 6 skill scores)			

APPENDIX E

PARENTAL QUESTIONNAIRE

PARENT QUESTIONNAIRE

Parent's Name:________________
Your Child's Name:____________

Directions: Please answer the following questions about yourself by filling in the blank, or placing a check mark next to the correct choice.

Part I: Demographic Background

1. What sex are you? Male ________ Female ________

2. What is your age? __________

3. What is the highest level of education you have completed?

   (a) Elementary school _____ (b) Middle school _____ (c) High school _____
   (d) Junior college _____ (e) Bachelor's degree _____ (f) Master's degree _____
   (g) Doctoral degree _____ (h) Post-doctoral _____

4. Do you regularly participate in physical activities/sports?

   (a) Yes ______ (If your answer is yes, please go to **question 4-1**)
   (b) No ______

   4-1. How long have you participated in physical activities/sports?

   (a) Less than 1 year _____ (b) 1-3 years _____ (c) More than 3 years _____

5. Where do you usually participate in physical activities/sports? (Check **all** that apply)

   (a) In home ______ (b) Health club or gym ______
   (c) Park or playground ______ (d) Country side park or hiking area ______
   (e) Swimming pool ______ (e) Instructional physical activity class _____
   (f) Other ______________________

6. On a scale of 1 (Not Very Competent) to 5 (Extremely Competent), rate how well your child can do motor skills. Mark only **one** line.

1. _______	2. _______	3. _______	4. _______	5. _______
Not Very Competent	Fairly Incompetent	Average Competence	Fairly Competent	Extremely Competent

Part II: Godin Leisure-Time Exercise Questionnaire

1. Considering a **7-day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your **free time** (write in each line the appropriate number).

	TIME PER WEEK
a) **STRENUOUS EXERCISE (HEART BEATS RAPIDLY)**	
(i.e., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming vigorous long distance bicycling)	______
b) **MODERATE EXERCISE (NOT EXHAUSTING)**	
(i.e., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	______
c) **MILD EXERCISE (MINIMAL EFFORT)**	
(i.e., yoga, archery, fishing form river band, bowling, horseshoes, golf, snow-mobiling, easy walking)	______

2. Considering a **7-day period** (a week), during your **leisure-time**, how often do you engage in any regular activity long enough to **work up a sweat** (heart beats rapidly)?

OFTEN	SOMETIMES	NEVER/RARELY
1. ☐	2. ☐	3. ☐

설 문 지

부모님 성함:______________
자녀 성함:______________

지도: 귀하 자신에 관한 다음 질문들에 대하여 옳다고 선택한 부분에 O 혹은 X 표를 하여 주시기 바랍니다.

I. 다음은 부모님에 관한 일반적 문항입니다.

1. 귀하와 자녀의 관계는? 부: _________ 모: _________

2. 귀하의 나이는? (만)_________세

3. 귀하의 최종학력은?
   (ㄱ) 국졸 __________ (ㄴ) 중졸 _________ (ㄷ) 고졸 _________
   (ㄹ) 전문대졸 ________ (ㅁ) 대졸 _________ (ㅂ) 석사졸 _______
   (ㅅ) 박사졸 _________ (ㅇ) 포스트 박사_______

4. 귀하는 정기적으로 스포츠 활동에 참여하고 계십니까?
   (ㄱ) 네 _________ ('네' 라고 답하신 분은 4-1번 문항을 기입해 주십시오)
   (ㄴ) 아니오 ______

   4-1. 귀하는 정기적으로 스포츠 활동을 하신지 얼마나 됩니까?
   (ㄱ) 1년 미만 ______ (ㄴ) 1년-3년 미만 ______ (ㄷ) 3년 이상 ______

5. 귀하는 주로 어느 장소에서 운동을 하십니까?
   (ㄱ) 집안 __________ (ㄴ) 스포츠 센타나 체육관 ________
   (ㄷ) 공원 혹은 놀이터 _________ (ㄹ) 외각이나 산 ________
   (ㅁ) 수영장 _________ (ㅂ) 체육 교육 프로그램의 참가 ________
   (ㅅ) 기타 ___________

6. 1에서 5점으로 점수를 준다면, 당신 자녀의 운동기술 능력은 몇 점이라고 생각하십니까?

1. ______	2. ______	3. ______	4. ______	5. ______
아주 능력이 없음.	능력이 없음	보통	능력이 있음	아주 능력이 있음

II. 다음은 귀하의 레저 체육활동에 관한 질문입니다.

1. 일주일 동안에, 귀하는 평균적으로 귀하의 자유시간동안 15분 이상 밑에 나와 있는 운동을 몇번 정도하고 계십니까? (적당한 숫자를 각 밑줄 위에 적어 주세요)

일주일동안 횟수

ㄱ) 강한 운동 (심장 박동을 빠르게 하는 운동) __________번____

(예: 장거리 달리기, 하키, 럭비, 축구, 스쿼시, 농구, 크로스 컨트리 스키, 유도, 롤러 스케이트, 강렬한 수영, 장거리 자전거 타기)

ㄴ) 적당한 운동 (몸이 지치지 않는 운동) __________번___

(예: 빨리 걷기, 야구, 테니스, 가볍게 자전거 타기, 배구, 배드민튼, 알파인 스키, 가벼운 수영, 포크댄싱)

ㄷ) 가벼운 운동 (최소의 노력을 발휘하는 운동) __________번___

(예: 요가, 양궁, 낚시, 볼링, 골프, 스노우 모빌, 천천히 걷기)

2. 7일 (일주일) 동안 레저 활동을 하는 기간에, 귀하는 얼마 만큼 '땀'을 내면서 운동을 하고 계십니까?

ㄱ) 자주 한다 ________ ㄴ) 가끔 한다 ________ ㄷ) 전혀 하지 않는다 _______

REFERENCES

References

Agnew, N. M., & Pyke, S. W. (1994). The science game: An introduction to research in the social sciences. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of personality change. Psychological Review, 84, 191-215.

Bandura, A. (1989). Human agency in social cognitive theory. American Psychologist, 44, 1175-1184.

Bankhead, I., & MacKay, D. N. (1982). Fine motor performance in subjects of subnormal, normal, and superior intelligence: Reaction time and task complexity. Journal of Mental Deficiency Research, 26(2), 73-89.

Black, S. J., & Weiss, M. R. (1992). The relationship among perceived coaching behaviors, perceptions of ability, and motivation in competitive age-group swimmers. Journal of Sport and Exercise Psychology, 14, 309-325.

Bouffard, M. (1990). Movement problem solutions by educable mentally handicapped individuals. Adapted Physical Activity Quarterly, 7, 183-197.

Branta, C., Haubenstricker, J., & Seefeldt, V. (1984). Age changes in motor skill during childhood and adolescences. Exercise and Sport Science Reviews, 12, 467-520.

Brustad, R. J. (1992). Integrating socialization influences into the study of children's motivation in sport. Journal of Sport & Exercise Psychology, 14, 59-77.

Brustad, R. J. (1993). Who will go out and play? Parental and psychological influences on children's attraction to physical activity. Pediatric Exercise Science, 5, 210-223.

Brustad, R. J. (1996). Attraction to physical activity in urban schoolchildren: Parental socialization and gender influences. Research Quarterly in Exercise and Sport, 67(3), 316-324.

Brustad, R. J., & Weigand, D. A. (1989). Relationship of parental attitudes and affective patterns to levels of intrinsic motivation in young male and female athletes. Paper presented at the meeting of the North American Society for the Psychology of Sport and Physical Activity, Kent, OH.

Buschner, C, A. (1994). Teaching children movement concepts and skills: Becoming a master teacher. Champaign, IL: Human Kinetics.

Chang, K. H. (1993). Parental factors of participation in adapted physical programs, The Korean Journal of Adapted Physical Education, 1, 1-10.

Choi, J. O., Park, H, C., & Kim, J. H. (2001). Education for children with mental retardation. Seoul, Korea: Yangseowon.

Connolly, B. H., & Michael, B. T. (1986). Performance of retarded, with and without Down Syndrome, on the Bruininks Oseretsky Test of Motor Proficiency. Physical Therapy, 66(3), 344-348.

Crocker, P. R. E., & Ellsworth, J. P. (1990). Perceptions of competence in physical education students. Canadian Journal of Sport Sciences, 4, 262-266.

DiRocco, P. J., Clark, J. E., & Phillips, S. J. (1987). Jumping coordination patterns of mildly mentally retarded children. Adapted Physical Activity Quarterly, 4, 178-191.

Eccles, J. S., & Harold, R. D. (1991). Gender differences in sport involvement: Applying the Eccles expectancy-value model. Journal of Applied Sport Psychology, 3, 7-35.

Eichstaedt, C. B., & Lavay, B. W. (1992). Physical activity for individuals with mental retardation. Champaign, IL: Human Kinetics.

Eichstaedt, C. B., Wang, P., Polacek, J., & Dohrmann, P. (1991). Physical fitness and motor skill levels of individuals with mental retardation. Normal, IL: Illinois State University.

Feltz. D. L., & Brown, E. (1984). Perceived competence in soccer skills among young soccer players. Journal of Sport Psychology, 6, 385-395.

Fowler, J. S. (1981). Movement education. Philadelphia: Saunders College.

Freedson, P. S., & Evenson, S. (1991). Familial aggregation in physical activity. Research Quarterly for Exercise and Sport, 62, 384-389.

Fry, M. D. (2001). The development of motivation in children. In G. C. Roberts (Ed.), Advances in motivation in sport and exercise (pp. 51-70). Champaign, IL: Human Kinetics.

Gallahue, D. L. (1989). Understanding motor development. Indianapolis: Benchmark.

Gallahue, D. L. (2000). Motor development. In J. P. Winnick (Ed.), Adapted physical education and sport (pp.265-279). Champaign, IL: Human Kinetics.

Gearheart, B. R., Weishahn, M. W., & Gearheart, C. (1996). The exceptional student in the regular classroom. Englewood Cliffs, NJ: Prentice-Hall.

Godin, G., & Shephard, R. J. (1985). A sample method to assess exercise behavior in the community. Canadian Journal of Applied Sport Science, 10, 141-146.

Goodway, J. D., & Rudisill, M. E. (1997). Perceived physical competence and actual motor skill competence of African American preschool children. Adapted Physical Activity Quarterly, 14, 314-326.

Greendorfer, S. L. (1983). A challenge for sociocultural sport studies. Journal of Physical Education, Recreation, and Dance, 54, 18-20.

Harter, S. (1978). Effectance motivation reconsidered: Toward a developmental mode. Human Development, 21, 34-64.

Harter, S. (1981). The development of competence motivation in the mastery of cognitive and physical skills: Is there still a place for joy? In G. C. Roberts & D. M. Landers (Eds.), Psychology of motor behavior and sport-1980 (pp. 3-29). Champaign, IL: Human Kinetics.

Harter, S. (1982). The perceived competence scale for children. Child Development, 53, 87-97.

Harter, S. (1990). Causes, correlates and the functional role of global self-worth: A life-span perspective. In R. J. Sternberg & J. Kolligan (Eds.), Competence considered (pp. 67-97). New Haven, CT: Yale University.

Harter, S., & Pike, R. (1984). The perceived competence scale for young children. Child Development, 55, 1969-1982.

Haubenstricker, J., & Seefeldt, V. (1986). Acquisition of motor skills during childhood. In V. Seefeldt (Ed.), Physical activity & well-being (pp. 42-102). Reston, VA: American Alliance for Health, Physical Education, Recreation & Dance.

Hickson, L., Blackman, L. S., & Reis, E. M. (1995). Mental retardation: Foundations of educational programming. Needham Heights, MA: Simon & Schuster.

Holland, B. V. (1987). Fundamental motor skill performance of non-handicapped and educable mentally impaired students. Education and Training in Mental Retardation, 22, 197-204.

Hong, Y. J. (1996). Adapted physical education. Seoul, Korea: Tae-Keen.

Hoover, J. H., & Horgan, J. S. (1990). Short-term memory for motor skills in mentally retarded persons: Training and research issues. In G. Reid (Ed.), Problems in movement control (pp. 217-239). Amsterdam: North Holland.

Horn, T. S., Glen, S. D., & Wentzell, A. B. (1993). Sources of information underlying personal ability judgments in high school athletes. Pediatric Exercise Science, 5, 263-274.

Horn, T. S., & Harris, A. (1996). Perceived competence in young athletes: Research findings and recommendations for coaches and parents. In F. L. Smoll & R. E. Smith (Eds.), Children and youth in sport: A biopsychosocial perspective (pp. 309-329). Dubuque, IA: Brown & Benchmark.

Horn, T. S., & Hasbrook, C. (1986). Informational components influencing children's perceptions of their physical competence. In M. R. Weiss & D. Gould (Eds.), Sport for children and youths: Proceedings of the 1984 Olympic Scientific Congress (pp. 81-88). Champaign, IL: Human Kinetics.

Horn, T. S., & Hasbrook, C. (1987). Psychological characteristics and the criteria children use for self-evaluation. Journal of Sport Psychology, 9, 208-221.

Horn, T. S., & Weiss, M. R. (1991). A developmental analysis of children's self-ability judgments in the physical domain. Pediatric Exercise Science, 3, 310-326.

Ignico, A. (1994). Early childhood physical education: Providing the foundation. Journal of Physical Education, Recreation and Dance, 65(6), 28-30.

Individuals with Disabilities Education Act. (1997). Individuals with Disabilities Education Act Amendments of 1997. Washington, DC: U.S. Government Printing Office.

Jacobs, D. R., Ainsworth, B. E., Hartman, T. J., & Leon, A. S. (1993). A simultaneous evaluation of 10 commonly used physical activity questionnaires, Medicine and Science in Sports and Exercise, 25, 81-91.

Jolly, J. A. (1997). Effects of failure on goal setting: Perceived physical competence and gender comparison of fourth graders (Doctoral dissertation, Texas woman's university, 1997). Dissertation Abstracts International, 57, 5098.

Kim, J. T. (1995). The analysis of influential factors in handicapped child's physical activities. Unpublised master's thesis, Yonsei University, Seoul, Korea.

Kim, Y. S., & Hong, Y. J. (1992). Special physical education: Adapted, corrective developmental. Seoul, Korea: Rok-Won.

Kimiecik, J. C., Horn, T. S., & Shurin, C. S. (1996). Relationships among children's beliefs, perceptions of their parents' beliefs, and their moderate-to-vigorous physical activity. Research Quarterly for Exercise and Sport, 67(3), 324-336.

Klint, K. A., Weiss, M. R. (1987). Perceived competence and motives for participating in youth sports: A test of Harter's competence motivation theory. Journal of Sport Psychology, 9, 55-65.

Kozub, F. M., & Porretta, D. L. (1999). Internal and external attributions for levels of perceived physical competence in children with mental retardation. Education and Training in Mental Retardation and Developmental Disabilities, 34(1), 35-42.

Krebs, P. L. (2000). Mental retardation. In J. P. Winnick (Ed.), Adapted physical education and sport (pp. 111-126). Champaign, IL: Human Kinetics.

Kriska, A. M. & Caspersen, C. J. (1997). Introduction to a collection of physical activity questionnaires, Medicine & Science in Sports & Exercise, 29(6), 5-9.

Lavay, B (1985). Instruction of team sport strategies for the mild/moderate mentally handicapped. Palaestra, 2(1), 10-13.

Lee, C. W. (2002). Modern leisure. Seoul, Korea: Daehanmedia

Lewko, J. H., & Greendorfer, S. L. (1988). Family influences in sport socialization of children and adolescents. In F. L. Smoll, R. A. Magill, & M. J. Ash (Eds.), Children in sport (pp. 287-300). Champaign, IL: Human Kinetics.

Lirgg, C. D. (1991). Gender differences in self-confidence in physical activity: A meta-analysis of recent studies. Journal of Sport and Exercise Psychology, 13(3), 294-310.

Lirgg, C. D. (1992). Girls and women, sport, and self-confidence. Quest, 44, 158-178.

McAuley, E., & Gill, D. L. (1983). Reliability and validity of the physical self-efficacy scale in a competitive sport setting. Journal of Sport Psychology, 5, 410-418.

McKiddie, B., & Maynard, I. W. (1997). Perceived competence of schoolchildren in physical education. Journal of Teaching in Physical Education, 16, 324-339.

McMurray, R. G., Bradley, C. B., Harrell, J. S., Bernthal, P. R., Frauman, A. C., & Bangdiwala, S. I. (1993). Parental influences on childhood fitness and activity patterns. Research Quarterly for Exercise and Sport, 64(3), 249-255.

Moore, L. L., Lombardi, D. A., White, M. J., Campbell, J. L., Oliveria, S. A., & Ellison, R. C. (1991). Influence of parents' physical activity levels on activity levels of young children. Journal of Pediatrics, 118, 215-219.

Nicholls, J. G. (1978). The development of the concepts of effort and ability, perceptions of own attainment, and the understanding that difficult tasks require more ability. Child Development, 49, 800-814.

Nugent, P. M., & Mosley, J. L. (1987). Mentally retarded and nonretarded individuals' attention allocation and capacity. American Journal on Mental Retardation, 91(6), 598-605.

Olrich, T. W. (2002). Assessing fundamental motor skills in the elementary school setting: Issues and solutions, Journal of Physical Education, Recreation and Dance, 73(7), 26-28.

Pangrazi, R. P. (1998). Dynamic physical education for elementary school children. Needham Heights, MA: Allyn and Bacon.

Piaget, J. (1952). The origins of intelligence in children. New York: International Universities Press.

Poole, J. R., Mathias, K., & Stratton, R. K. (1996). Higher-skilled and lower-skilled children's perceived ability and actual performance with kicking and striking tasks. Physical Educator, 53(4), 214-221.

Rarick, G. L. (1973). Motor performance of mentally retarded children. In G. L. Rarick (Ed.), Physical activity: Human growth and development (pp. 225-256). New York: Academic Press.

Rarick, G. L., Dobbins, D. A., & Broadhead, G. D. (1976). The motor domain and its correlates in educationally handicapped children. Englewood Cliffs, NJ: Prentice-Hall.

Riggs, M. L. (Ed.). (1980). Movement education for preschool children. Reston, VA: Association of the American Alliance for Health, Physical Education, Recreation & Dance.

Rimmer, J. H., & Kelly, L. E. (1989). Gross motor development in preschool children with learning disabilities. Adapted Physical Activity Quarterly, 6, 266-279.

Roberts, G. C. (1984). Toward a new theory of motivation in sport: The role of perceived ability. In J.M. Silva & R.S. Weinberg (Eds.), Psychological foundations in sport (pp. 214-228). Champaign, IL: Human Kinetics.

Roberts, G. C., Kleiber, D. A., & Duda, J. L. (1981). An analysis of motivation in children's sport: The role of perceived competence in participation. Journal of Sport Psychology, 3, 206-216.

Rudisill, M. E., Mahar, M. T., & Meaney, K. S. (1993). The relationship between children's perceived and actual motor competence. Perceptional and Motor Skills, 76(3), 895-906.

Seefeldt, V., & Haubenstricker, J. (1982). Patterns, phases, or stages: An analytical model for the study of developmental movement. In J. A. S. Kelso & J. E. Clark (Eds.), The development of movement control and coordination (pp. 309-318). New York: John Wiley & Sons.

Shapiro, D. R., & Dummer, G. M. (1998). Perceived and actual basketball competence of adolescent males with mild mental retardation. Adapted Physical Activity Quarterly, 15, 179-190.

Shavelson, R. J. (1996). Statistical reasoning for the behavioral sciences. Needham Height, MA: Allyn & Bacon.

Silon, E. L., & Harter, S. (1985). Assessment of perceived competence, motivational orientation, and anxiety in segregated and mainstreamed educable mentally retarded children. Journal of Educational Psychology, 77, 217-230.

Stipek, D., & Mac Iver, D. (1989). Developmental change in children's assessment of intellectual competence. Child Development, 60, 521-538.

Thomas, J. R. (2000). Children's control, learning, and performance of motor skills. Research Quarterly for Exercise and Sport, 71(1), 1-9.

Thomas, J. R., & Thomas, K. T. (1988). Development of gender differences in physical activity. Quest, 40, 219-229.

Toole, T., & Kretzschmar, J. C. (1993). Gender differences in motor performance in early childhood and later childhood. Women in Sport and Physical Activity Journal, 2(1), 41-71.

Ulrich, B. D. (1987). Perceptions of physical competence, motor competence, and participation in organized sport: Their interrelationships in young children. Research Quarterly for Exercise and Sport, 58(1), 56-67.

Ulrich, B. D. (1989). Development of stepping patterns in human infants: A dynamical systems perspective. Journal of Motor Behavior, 21, 392-408.

Ulrich, D. A. (1985). Test of gross motor development. Austin, TX: Pro-Ed.

Ulrich, D. A. (2000). Test of gross motor development (2nd ed.). Austin, TX: Pro-Ed.

Ulrich, D. A., & Collier, D. H. (1990). Perceived physical competence in children with mental retardation: Modification of a pictorial scale. Adapted Physical Activity Quarterly, 7, 338-354.

Walkley, J., Holland, B., Treloar, R., & Probyn-Smith, H. (1993). Fundamental motor skill proficiency of children. ACHPER National Journal, 40, 11-14.

Wadsworth, J. S., & Harper, D. C. (1991). Increasing the reliability of self-report by adults with moderate mental retardation. The Journal of the Association for Persons with Severe Handicaps, 16, 228-232.

Wang, J., & Wiese, D. M. (1995). Test of Harter's competence motivation theory in the people's Republic of China. Journal of the International Council for Health, Physical Education, Recreation, Sport, and Dance, 31(3), 34-39.

Wehmeyer, M. L. (1994). Perceptions of self-determination and psychological empowerment of adolescents with mental retardation. Education and Training in Mental Retardation and Developmental Disabilities, 29, 9-21.

Weiss, M. R. (1993). Social-psychological factors influencing children's physical activity. Pediatric Exercise Science, 5(3), 34-39.

Weiss, M. R. (2000). Motivating kids in physical activity. President's Council on Physical Fitness and Sports Research Disgest [On-line]. Available Internet: http://www.fitness.gov/activity/activity2/digest_sept2000/digest_sept2000.html

Weiss, M. R., & Chaumeton, N. (1992). Motivational orientations in sport. In T. S. Horn (Ed.), Advances in sport psychology (pp. 66-99). Champaign, IL: Human Kinetics.

Weiss, M. R., & Ebbeck, V. (1996). Self-esteem and perceptions of competence in youth sport: Theory, research and enhancement strategies. In O. Bar-Or (Ed.), The child and adolescent athlete (pp. 364-382). Oxford: Blackwell Scientific.

Weiss, M. R., Ebbeck, V., & Horn, T. S. (1997). Children' self-perceptions and sources of physical competence information: A cluster analysis. Journal of Sport and Exercise Psychology, 19, 52-70.

Weiss, M. R., & Horn, T. S. (1990). The relation between children's accuracy estimates of their physical competence and achievement-related characteristics. Research Quarterly for Exercise and Sport, 61, 250-258.

Weitzer, J. E. (1989). Childhood socialization into physical activity: Parental roles in perceptions of competence and goal orientations. Unpublished master's thesis, University of Wisconsin-Milwaukee.

White, R. W. (1959). Motivation reconsidered: The concept of competence. Psychological Review, 66(5), 297-333.

Wickstrom, R. (1983). Fundamental motor patterns. Philadelphia: Lea & Febiger.

Williams, H. G. (1983). Perceptual and motor development. Englewood Cliffs, NJ: Prentice-Hall.

Wong, E. H., & Bridges, L. J. (1995). A model of motivational orientation for youth sport: Some pereliminary work. Adolescence, 30, 437-452.

Yun, J., & Ulrich, D. A. (1997). Perceived and actual physical competence in children with mild mental retardation. Adapted Physical Activity Quarterly, 14, 285-297.

Xiang, P., & Lee, A. (1998). The development of self-perceptions of ability and achievement goals and their relations in physical education. Research Quarterly for Exercise and Sport, 69(3), 231-241.