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A COMPARISON OF MOTOR PERFORMANCE RELATIVE TO THE PHYSICAL GROWTH, PERCEIVED COMPETENCE AND SOCIAL ACCEPTANCE BETWEEN KOREAN-AMERICAN AND AMERICAN CHILDREN

By
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ABSTRACT

A COMPARISON OF MOTOR PERFORMANCE RELATIVE TO THE PHYSICAL GROWTH, PERCEIVED COMPETENCE AND SOCIAL ACCEPTANCE BETWEEN KOREAN-AMERICAN AND AMERICAN CHILDREN

BY

A-Ran Chong

This study compared the physical growth, motor performance perceived competence and social acceptance of Korean-American (N=24) and American (N=25) boys. The hypotheses suggested that Korean-American boys weigh less and are smaller in lengths, breadths, skinfolds and circumferences than the American boys. Additionally, the hypotheses proposed that Korean-American boys are less proficient in locomotor and object control skills. Also hypothesized were that Korean-American boys score lower in physical competence and peer acceptance but higher in cognitive competence and maternal acceptance. Finally, it was hypothesized that the variance in locomotor and object control skills is accounted for partially by physical growth, perceived competence and social acceptance in both groups.

Only the hypotheses related to weight, biacromial breadth and length of the upper arm were supported. Locomotor and object control skills were partially explained by the contribution of arm circumference. Object control skills were partially explained by peer acceptance for Korean-American boys and calf circumference in the American boys.

A COMPARISON OF MOTOR PERFORMANCE RELATIVE TO THE PHYSICAL SIZE, PERCEIVED COMPETENCE AND SOCIAL ACCEPTANCE BETWEEN KOREAN-AMERICAN AND AMERICAN CHILDREN

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DEDICATION

This thesis is dedicated to my parents, Hae Chin Chong and Won Ho Nam and my brother, Chae Yu Chong, for all of their support.

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CHAPTER I
INTRODUCTION

Nature of the Problem

Fundamental movement skills provide the basis for the combination of skills that constitute the games, dances and sports of adult leisure and recreation (Seefeldt, 1980). As infants and children develop, they learn fundamental movement patterns such as walking, running, hopping, jumping, kicking, throwing, catching and striking. These fundamental movement patterns may be thought of as the building blocks for more specific, advanced skills that are developed in later childhood. If children develop a good basis of fundamental movement skills, they are more likely to remain active during later childhood and adolescence and to become involved in a lifetime of physical activity (French & Thomas, 1987). French & Thomas (1987) illustrated this relationship in an investigation of the association between a sport-specific knowledge base and athletic success in basketball. The results indicated that children with good fundamental movement skills practiced longer, had more years of basketball experience and participated in more sports than did the novices. In other words, good fundamental movement skills in childhood may have a positive influence on continuing to participate in sports in later years. French & Thomas indicated that children should learn fundamental movement skills before they attempt to participate in sports.

Changing fundamental movement skills might be influenced by many factors such as physical growth, environmental variables and ethnic background. Haubenstricker and Seefeldt (1986) suggested changes in motor achievement are influenced by physical growth, environmental factors and cognitive style. For example, a child's physical stature, exposure to physical activity and perceived competence may affect his/her motor performance. Children who are of different races and ethnic backgrounds may have different motor performance abilities even though they live in similar environments (Malina, 1973; Haywood, 1986). For instance, Thompson (1944) studied the entire male population of the Las Cruces, New Mexico, junior high school. This school population was composed of 213 boys, 100 Caucasian and 113 Mexican-American boys. The Mexican-American boys outperformed the Caucasian boys on a battery of six quantitative motor tasks (baseball throw, base running, chin-ups, sixty-yard dash, jump-and-reach and shot-put).

The studies mentioned previously did not investigate the difference in the motor performance skills relative to physical growth, perceived competence and social acceptance or different ethnicity. The study of Thompson would have provided much more useful information if the investigator had studied fundamental movement skills relative to physical growth, perceived competence and social acceptance between two ethnic groups.

Some researchers have studied the difference in motor performance between children of different race and ethnic groups. These studies did not indicate why children differ in motor performance relative to their physical growth and environmental factors (Malina & Bouchard, 1991). Malina and Bouchard reported that many researchers have studied the differences between the motor performance of African-American and Caucasian

children. They indicated that African-American children and youth, particularly boys, performed consistently better than Caucasian children and youth in running speed (dashes) and the vertical jump. The results for the standing long jump were more equivocal. However, Malina and Bouchard did not report why children differed in motor performance relative to their physical growth and perceived competence and social acceptance.

The following studies suggest that different races appear to have different levels of fundamental motor skills or motor behavior even as young children. Different races appear to have more or less proficiency in selected fundamental motor skills despite experiencing similar environmental factors (Malina & Bouchard, 1991). Malina and Bouchard reported that Mexican-American children did not perform as well as African-American children in running and jumping tasks. Green (1969) studied temperamental differences of Chinese-American and European-American nursery-school children at three and four years of age. European-American children spent significantly more time in approach and interaction behavior; Chinese-American children spent more time quietly concentrating on individual projects and showed little intense emotional behavior. This study provided evidence that European-American and Chinese-American children have differences in approach, interaction and emotional behavior. The differences in temperament were supported by Freedman (1974) who found differences between 41 middle-class, Japanese-American newborns and 65 middle-class, European-American newborns, in terms of less activity and excitability for the Japanese-American children.

The literature suggests that Chinese-American and European-American or Japanese-American and European-American children exhibit different behaviors. Are these differences due to genetics or to parental and environmental factors? Differences between

Chinese-American and European-American or Japanese-American and European-American children suggest that differences between Korean-American and American children may also exist. Do differences in growth and temperament between children of different ethnic origins influence their motor performance during infancy and early childhood?

To the author's knowledge there are no published reports that related motor performance to the combination of factors that include physical growth, perceived competence and social acceptance between Korean-American and American preschool children. Thus, this study compared the physical size, and perceived competence and social acceptance of Korean-American preschool children with American preschool children to determine the association of such variables with fundamental movement skills.

Need for the Study

America is a multi-cultural nation. People who come to America from different countries may keep their own cultures or become assimilated into American culture. Aversion to becoming assimilated into a foreign culture and actual acculturization both have implications for the educational opportunities of children. There is limited evidence concerning the influence of variables such as physical growth and children's perceived competence on the motor performance of different ethnic groups. Preschool teachers and parents must understand motor performance relative to physical growth, the children's perceived competence in physical activities and the association of these variables to the children's formal and informal education. If this knowledge was available, teachers could instruct children from diverse backgrounds in a manner that is consistent with their preferred style of learning.

Educators of young children must understand that cultural differences are well established in young children (Loridas, 1988). Loridas explained that the American classroom, unlike the home, has successfully weathered a variety of changes in education climate. Loridas identified that it is the teacher who creates an atmosphere for children to respect individual differences in themselves and others in order to create a productive learning community in the classroom. Loridas also suggested that to meet this challenge, professionals must develop or widen their sensitivity to nonverbal and verbal cross-communication. As societies continue to be more mobile, demographics indicate that cross-cultural contact and communication will become more frequent in educational settings of the United States (Loridas, 1988). West (1986) suggested that teachers be encouraged to see children both as individuals and as individuals from different cultures and to provide a model of respecting cultural differences.

With an increasing Asian population in the United States, parents and teachers need to understand Asian cultures and their potential influences on children's motor skills. Lee (1986) reported that Koreans rank as the second fastest-growing group of new Americans. According to the 1980 census, the U.S. Korean community is made up of 354,543 people. Also, Park, Fawcett, Arnold and Gardner (1990) reported that the total number of Korean-immigrants from 1966 to 1988 was 563,015.

This study was conducted for several reasons. First, it was important to determine the variables that influence the motor performance of Korean-American and American children because identification of the relative importance of these variables to motor skill acquisition will enable parents and educators to better educate their children. For instance, a teacher with greater knowledge of the motor performance capabilities of Asian-American

children could develop more effective physical education programs and curricula. Teachers who understand the learning styles of various cultures will be more effective in meeting the needs of children who learn more efficiently in specific models. Secondly, Korean-American children appear to be typically lean and small with a more ectomorphic body type. Thus, physical growth patterns between Korean-American and American children may be different. These differences may at any point in time influence the child's ability to successfully acquire motor skills. Therefore, this study measured specific parameters of physical growth of Korean-American and American children. If the teacher understands the impact of a child's physical growth on motor performance and perceived competence, he/she can adjust the environment to meet the child's needs. Thirdly, teachers and parents must also understand that culturally different children have different environmental contexts at home. For example, although many Korean-Americans have been in the United States for several generations, many members of this group still reflect their cultural heritage; therefore, it is necessary to understand the heritage in order to understand this population (Lee, 1978). Preschool teachers need to know the variances of different ethnic cultures in order to help children benefit from their education (Lee, 1978). Kalton (1988) indicated that education is among the highest of Korean values.

Teachers can help the child's parents realize the importance of physical activities during childhood and perhaps influence the parents' perceptions of the role that motor skills have in the physical and social development of their children. The teacher may also explain that different environmental factors influence motor skill acquisition so that the parents understand their child's status in motor performance and how environmental variables may influence motor performance among the child's peers.

Even though Korean people live in the United States, Korean and American parents typically educate their children differently (Patterson & Kim, 1977). Patterson and Kim found that Koreans traditionally place high values on education and learning. Following immigration to the United States, Koreans did not forsake their basic values, but continued to set and attain educational goals. The supposition for some of the hypotheses to be answered by this investigation was that the home environments for Korean-American and American children were different. Thus, children in these homes may develop different perceptions regarding physical competence, cognitive competence, peer acceptance and maternal acceptance. Therefore, this investigation measured perceived competence and social acceptance between Korean-American and American children.

There is a gap in our current knowledge because basic information about motor skills, physical growth, perceived competence and social acceptance between Korean-American and American children is not available. This study's results provide information about the relationship between motor skills, physical growth, perceived competence and social acceptance between Korean-American and American children.

Purpose of the Study

The purpose of this study was four-fold. First, to compare measures of physical growth such as weight, standing height, sitting height, biacromial and biiliac breadth, acromradial and radiostylion length and total skinfold (tricep, subscapular and umbilical), upper arm and calf circumferences between Korean-American and American children. Secondly, to determine the comparison between Korean-American and American children in selected measures of fundamental motor skills such as running, galloping, hopping, leaping, jumping, skipping, sliding, two-hand striking, bouncing, catching, kicking and

throwing. The third area of this study investigated the comparison between Korean-American and American children in measures of perceived competence and social acceptance, including physical competence, cognitive competence, peer acceptance and maternal acceptance. Finally, this study determined the relative contribution of physical growth, perceived competence and social acceptance to the motor proficiency of Korean-American and American children.

Research Hypotheses

The author hypothesized that:

1. Korean-American children are shorter in stature than American children.
2. Korean-American children weigh less than American children.
3. Korean-American children are shorter in sitting height than American children.
4. Korean-American children have a lower total skinfold than American children.
5. Korean-American children have less biacromial breadth than American children.
6. Korean-American children have less biiliac breadth than American children.
7. Korean-American children have shorter forearms than American children.
8. Korean-American children have shorter upper arms than American children.
9. Korean-American children have smaller circumferences of the upper arm than American children.
10. Korean-American children have smaller circumferences of the calf than American children.
11. Korean-American children have a lower level of proficiency in selected locomotor skills than American children.
12. Korean-American children have a lower level of proficiency in selected object control skills than American children.
13. Korean-American children have lower scores in perceived physical competence than American children.

14. Korean-American children have higher scores in perceived cognitive competence than American children.
15. Korean-American children have lower scores in perceived peer acceptance than American children.
16. Korean-American children have higher scores in perceived maternal acceptance than American children.
17. Variance in locomotor skills and object control skills will be accounted for in part by physical growth and perceived competence and social acceptance in both racial groups.

Scope of the Study

The scope of this investigation was to compare the relationship of fundamental movement skills relative to physical growth, perceived competence and social acceptance between Korean-American and American children residing in the Lansing, Michigan, metropolitan area. The sample of Korean-American and American children were volunteers obtained from an advertisement in local newspapers and from references by acquaintances, parents and teachers of local preschool programs. Subjects were also obtained through Korean associations such as Korean churches, Korean temples and Korean language schools in Lansing, Michigan. The sample included forty-nine boys (N=24 Korean-American boys and N=25 American boys). The age range of the sample was from 36 months to 71 months and included some children who had participated for several months in a formal kindergarten program.

Delimitations of the Study

This study was delimited to a group of Korean-American and American male preschool-aged children residing in the greater Lansing, Michigan, metropolitan area. The sample of Korean-American male children consisted of children born in the United States

or who were brought to the United States before they were 24 months old. The parents of the Korean-American children were Korean. The American preschool-age children were Caucasian children born in the United States with Caucasian parents who were also born in America. The results of this study can be generalized only to populations having characteristics similar to those of the children who were subjects in this study.

Limitations of the Study

The results of this investigation are subject to the following limitations:

1. There were not many Korean-American male children in Michigan who were born in the United States or brought to the United States before they were 24 months old, who were within the specified age group. Therefore, the number of subjects was limited to 24 Korean and 25 American male children. Before testing each child, the investigator called the parents to ensure that their children were born in the United State or were brought to the United States before the age of 24 months.
2. Environmental influences such as daily variations in temperature and humidity, time of day, and the presence of other individuals during the testing may have influenced individual performances.
3. Korean-American and American children were tested with the Pictorial Scale of Perceived Competence and Social Acceptance. Because the models consisted mostly of Caucasian children, the models to which the Korean-American children related were redrawn to depict Korean children. The influence of redrawing the models is not known.
4. There were eight testers for assessing physical growth, fundamental movement skills and perceived competence and social acceptance. Seven testers were needed for each of the two sessions. Therefore, even though the testers had standard techniques and

criteria on how to measure the children, individual differences may have influenced the scores.

5. Korean-American male and American male children were tested because there were not many females of preschool age among the Korean-American children.

Definition of Terms

The following definitions will aid the understanding of this study:

1. General Terms

   a. American children - - Caucasian children born in the United States and of Caucasian American parents.

   b. Chronological age -- time since birth, in months.

   c. Development -- used interchangeably with growth and maturation; usually denotes a combination of the two (Payne & Isaacs, 1991).

   d. Kindergarten -- a school or class for young children, usually four to six years old. Kindergarten is designed to prepare them for first grade and is designed to develop basic and social behavior through games, exercise, music, simple handicraft, etc.

   e. Korean-American children -- children who were born in the United States or who were born in Korea and later brought to the United States before the age of 24 months. The Korean-American children's parents were born in Korea.

2. Physical Growth

   a. Acromradial length -- upper arm length.

   b. Biacromial breadth -- shoulder width.

   c. Biiliac breadth -- hip width.

d. Physical growth -- an increase in the size of the body or its parts as the child progresses toward maturity, e. g. height and weight.

e. Radiostylon length -- forearm length.

f. Skinfold -- measure of subcutaneous fat.

g. Circumferences -- the girth of a specific body segment, in this investigation the upper and lower extremities.

3. Fundamental movement skills -- a skill that involves two or more bodily segments and results in the transfer or reception of the body or some external object, e. g. walking, running, leaping, striking, kicking or catching.

CHAPTER II

REVIEW OF LITERATURE

A comparison of Korean-American and American children regarding their motor performance relative to their physical growth, perceived competence and social acceptance has not been reported in the available literature. Therefore, in order to construct a framework for exploring this topic it was necessary to draw upon literature from related research areas and then synthesize the relevant findings into hypotheses that were subject to examination. Initially, the relative influence of developmental motor skills in childhood was reviewed. Important findings of the interrelationships of motor performance relative to physical growth, perceived competence and social acceptance were summarized and integrated with pertinent research on the importance of fundamental movements in early childhood. Secondly, this review examined the dynamical systems theory as a possible explanation for racial and ethnic differences between children of similar chronological age and gender. Thirdly, the parental influence of Korean and American cultures relative to physical activities was reviewed. Finally, perceived competence and social acceptance among children of different races were examined.

Importance of Developmental Movement Skills in Childhood

The development of fundamental movement skills in childhood is important for several reasons. When a child learns fundamental movement skills, he/she can apply these basic elements as the foundation to the sports, dances and games of his/her culture.

Movement skills can be an avenue to a healthy lifestyle, enhanced self-esteem, and a source of enjoyment. This literature examines why fundamental movement skills are important in childhood and how physical activities or fundamental movement skills are beneficial for childhood development no matter what the child's race and ethnicity.

Readiness periods in motor skill development. The word "readiness" implies that an organism has reached a certain point in an ongoing process (Seefeldt, 1976). In other words, a person has reached a certain point in an ongoing process that has enabled the establishment of the minimum characteristics necessary for a particular movement skill or other human behavior to be acquired (Payne & Isaacs, 1991). Readiness depends on an adequate level of physical growth, the requisite neurological patterns and sufficient internal and external motivation (Payne & Isaacs, 1991). Bruner (1965) indicated that children are usually ready for some types of experience, but electing and providing the stimuli that elicit the desired responses are the responsibility of teachers or parents in charge of the child's physical activity. Therefore, physical education teachers and parents must understand that there is a readiness period for developing fundamental movement skills. In other words, if the child who walks well is ready to learn running skills, he or she will learn very quickly because the readiness period for the emerging skill has been attained. However, if a child is to learn a fundamental movement skill, the environment must also support the child; thus it is important for parents and teachers to recognize the readiness period for specific skills and the antecedent movements that indicate a readiness for the next level of proficiency (Seefeldt, 1980).

Acquisition of motor skills. Motor development refers to progressive changes in motor behavior that reflect the interaction of environmental and maturational processes

(Payne & Isaacs, 1991). The study of motor development in children incorporates the impact of environmental variables and/or instruction on the acquisition of skill (Haubenstricker & Seefeldt, 1974). In other words, practicing new skills in childhood is important for the continual acquisition of additional skills. Seefeldt (1980) developed a model that contains four levels in the progression of achieving motor proficiency (see Figure. 1). This model indicates that in early childhood, a child needs to master fundamental motor skills. If children do not acquire a certain level of proficiency in fundamental movement skills, a barrier to additional proficiency is present. Thus, a necessary level of skill in fundamental movements is a prerequisite in order to get from the second to the third levels of the model.

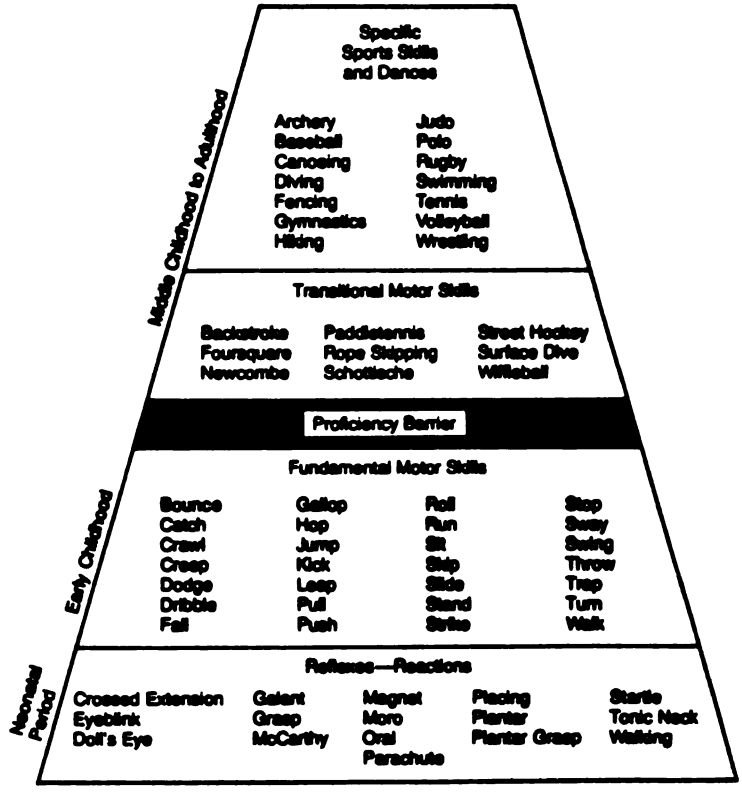


Figure 1. Progression of motor proficiency skill levels (from Seefeldt, 1980, p. 317).

This sequence of skill acquisition indicates the importance of fundamental motor skills to later skill development. Once a child performs well in fundamental motor skills, the child has the potential to perform well in subsequent sports and dance skills. Therefore, appropriate physical activity in childhood may result in developing good sports or dance skills in the future. Moreover, proficiency in motor skills increases children's enjoyment and interest in sports, thus, increasing the possibility that they will engage in an active and healthy lifestyle (Corbin and Lindsey, 1983).

Influence of Physical Activities on Psychomotor, Cognitive and Affective Development in Childhood

The compartmentalized view of human development consists of psychomotor, affective and cognitive domains (Gallahue, 1989). Learning fundamental movement skills in childhood has been associated with enhanced capacities in cognitive, affective and fitness functions (Seefeldt & Vogel, 1986). In order to be physically active a child must have certain levels of competency in fundamental movement skills. Development of childhood fundamental movements also provides an opportunity to increase the effectiveness of psychomotor, affective and cognitive domains (Haywood, 1986).

Influence of physical activities on psychomotor development. The psychomotor domain is influenced positively by physical activities and fundamental movement skills (Malina, 1986). Iliev (1978) reported that compared to children of equal height, weight and age, physically competent children at any age have a greater lean body mass (less fat), a greater maximal oxygen uptake (greater aerobic fitness), greater maximal cardiac output and thus greater physical health (more efficient heart) as compared to those who did not train. Exercising in childhood increases bone width and mineralization, while

inactivity has the reverse effect; the end result is that demineralized bones are weaker, more brittle and may become a problem in old age (Malina & Bouchard, 1991). Malina (1969) indicated that certain minimum physical exercise is necessary to support normal human growth and maintain the integrity of osseous and muscular tissue. As many researchers have supported, physical activity in childhood is necessary to healthy development for individuals of any race or ethnic background.

Payne and Isaacs (1991) listed the components that contribute to fitness and well-being, namely, endurance, body composition, flexibility and muscular strength. Acceptable levels of fitness in each area are believed, by some, to lead to a better quality of life for both children and adults (Astrand, 1992). Also, a sedentary lifestyle corresponds to an increase in the number of overweight people and may have serious health consequences in later life (Croce & Lavay, 1985). A child's physical activity may affect his/her present and future body composition.

Learning fundamental movement skills in childhood also provides biomechanical benefits to a child. When a child masters fundamental movement skills or participates in physical activity, his/her movements become more refined and efficient than a child who does not practice and learn movements. Biomechanical efficiency is related to the degree of over-learning (Gallahue, 1989). Also, Lamb (1984) reported that efficient movement may decrease the amount of injury to muscles, bones and joints. A child must practice fundamental motor skills and this practice helps the child become more biomechanically efficient. Physical activity in childhood is important because mechanical efficiency does not naturally occur; it requires practice.

By participating in physical activity, a child may develop strong legs and arms that help him or her perform movement skills efficiently. Therefore, participating in physical activity for any child, regardless of race or ethnic background, has many benefits relative to the physiological, physical and biomechanical aspects of human movement.

Influence of physical activities on cognitive development. The cognitive domain includes factors that involve psychological health such as positive self-concept and perceived competence. Physical activity may also be useful in reducing levels of stress when coping with common problems. Hoerr (1987) indicated that exercise helps improve self-esteem because young bodies respond quickly to exercise by showing improved strength, flexibility and cardiovascular fitness; these exercise-induced improvements can enhance self-esteem. Moreover, when the child masters performance and is successful, the child feels inherent pleasure and happiness; these feelings in turn maintain intrinsic and perceived competence (Harter, 1978). In other words, when a child participates in a physical activity or learns fundamental movements, he or she enjoys performing and achieves a stronger self-esteem and positive self competence than a child who is not physically active.

Many Korean-American children whose parents were not interested in physical activities may not have had a chance to participate in physical activity. Because of this potential cultural bias against physical activity (Lee, 1977), Korean children may not do as well in physical performance, compared to American children, and therefore may lack a strong perceived competence in physical performance.

Coaches, parents and peers are able to influence positive or negative psychological feelings (Weiss & Chaumeton, 1992). Therefore, a coach's behavior or the parents' behavior may also influence a child's psychological well-being. Physical activity and exercise may have beneficial psychological outcomes and positively influence levels of depression and anxiety (Seefeldt, Haubenstricker & Reuschlein, 1974).

This review suggests that children of any race who participate in physical activities may benefit in cognitive development, such as perceived competence and social acceptance. This review also suggests that competence in movement skills is helpful to any child's life, regardless of race or ethnic background.

Influence of physical activities on affective development. The affective domain, which includes factors involving social health such as being happy, good peer relationships and good parental and leadership skills, is influenced by physical activities and fundamental movement skills (Payne & Isaacs, 1991). Seefeldt, Haubenstricker and Reuschlein (1974) suggested that control of emotions gained through movement experiences may extend to other situations in daily life. For example, effective leadership, which guides children through a progression of emotionally charged situations, may be instrumental in fostering socially acceptable affective behavior in other settings. Cratty (1979) indicated that even at the age of five or six years, group leaders are likely to be those who are superior in motor performance of such skills as running, throwing and balancing.

The arena of games, dance and sports provides an ideal setting for children to experience a variety of social situations. Researchers (Corbin & Lindsey, 1983) reported that although the research is ambiguous, participation in games and sports may allow

children to interact with others in a positive manner, by learning cooperative skills such as taking turns, sharing equipment and accepting the outcome of a game. If children are to successfully engage in various activities in a socially appropriate manner, they must learn to cooperate and accept the outcomes of experiences based on previously agreed-upon rules.

Social development in large and small groups may occur through movement experiences. Moreover, if a child participates in sports or games, he or she may learn good as well as bad sportsmanship. The context of the experience determines whether or not the experience contributes to positive affective development (Bredemeier, et al., 1986). This review suggests that physical activity for any child, regardless of race or ethnic background, may result in positive psychological and social outcomes.

Application. When children are young they easily and quickly learn the sports and dance skills of their cultures. Preschool teachers and parents must recognize the readiness period for learning movement skills and the avenues to skill acquisition in childhood. They should also understand that physical activities and fundamental movements skills have psychomotor, cognitive and affective benefits. Regardless of race or ethnic background, a child's physical activities offer the same potential benefits. This study suggests that children who learn fundamental movement skills and who participate in physical activities have a good opportunity to learn the concomitant skills that constitute a healthy, affective identity.

Relative Influences of Physical Growth, Physical Activities and Environmental Factors on Race/ Ethnic Background

This investigation reviewed the dynamical systems theory because it provided a framework for explaining theoretical differences in motor performance in children of different ethnic groups. The theory postulates that there are many subsystems that interact to influence the development of movement skills, including environmental factors and genetically-controlled variables such as physical growth.

Dynamical systems theory. Many motor developmentalists have adopted a dynamical systems approach, derived from contemporary theories of motor control, to view skills as a multidimensional, emergent phenomena (Kelso, Holt, Kugler & Turvey, 1980; Kelso & Tuller, 1984). The theory is considered a systems approach that states movement is an emergent phenomenon, which at any point along the developmental continuum is a result not only of the cognitive status or neural maturation of an individual, but is a unique product of all the system's contributing elements (Thelen & Ulrich, 1991). However, due to differences in cultural backgrounds this study postulated that the motor performances of Korean-American and American children will be different because of the varying influences of physical growth, the child's physical competence and his/her perceived social competence.

Motor developmentalists using the dynamical systems theory view motor development from a theoretical perspective of a complex dynamical system (Thelen & Ulrich, 1991). The dynamical systems theory was inspired by the work of Soviet movement physiologist, N. Bernstein (1967). The dynamical systems theory emphasizes the contribution of all subsystems including neurological, biological, psychological, and

environmental, with no one single element containing the engram for a behavior pattern (Thelen & Ulrich, 1991).

Many terms, such as self-organization, rate-limiting factors, degrees of freedom, behavioral attractors and phase shift characterize the substance of the dynamical systems theory, (Thelen & Ulrich, 1991). The following section describes rate-limiters and behavioral attractors in order to explain the potential differences in motor behavior between Korean-American and American children.

One characteristic of a dynamical system is rate-limiting factors. Certain factors can be rate-limiting factors for particular skills and persons. Each human being has a different body type, a different environment, and a differently maturing nervous system. Thus, there are a variety of rate-limiting factors that may influence motor skill acquisition.

However, although many components contribute to a behavior, one or more may be rate-limiting factors (Thelen, 1986; Thelen & Fogel, 1989). That is, when most contributing subsystems are developed, a specific behavior may wait for the development of one additional subsystem in order to emerge (Thelen, 1986). As an example of a rate-limiting factor, an American child has many experiences of catching a ball. The American child might add to his/her experiences such factors as sufficient arm strength to catch the ball, a mature nervous system that enables the child to track a ball with the eyes, eye-hand coordination and sufficient experience watching other people in the act of catching. A Korean-American child of the same age as the American child may not be able to catch the ball because he/she has had fewer experiences with catching and fewer physical attributes than the American child. Thus, both experience and growth may be rate-limiters for the Korean-American child. Also, the Korean-American child may be affected by factors

such a lack of arm strength to catch the ball because he/she has had fewer physical activities at this time of life.

Preschool teachers and parents should know what differences in skill acquisition and why children have differences in fundamental skills levels even though the children are of the same age. The teacher must understand each child and provide an environment that is conducive to learning fundamental movements skills.

The dynamical systems theory postulates that new forms of behavior emerge from the cooperative interactions of multiple components within a task context (Wolff, 1987). The dynamical systems theory explains that motor behavior in general or particular develops from many components and that emergent forms may result from changes in a nonspecific component. This theory is useful in understanding the ontogenetic process in learning motor skills and the acquisition of motor behavior throughout life. This theory may also be able to account for the differences in motor behavior between races and ethnic groups, such as Korean-American and American children.

Another characteristic of a dynamical system is behavioral attractor states, which can be both stable and unstable. Attractor states make probable statements about the preferred performance of an organism under specified conditions (Thelen & Ulrich, 1991). For instance, when an American infant tries to stand, this is an attractor state for him or her. Initially, the American infant might have a problem with balance, but will eventually stand alone as a result of the physical, emotional and environmental subsystems such as leg-muscle strength, motivation and practice. The American infant may be encouraged to stand by his/ her parents. The attractor state, which is standing, may occur later in Korean-American children than in American children. The Korean-

American infant may lack leg-strength or encouraging parents, because Korean-American parents may not place much importance on the early acquisition of movement skills. However, the age in months when children learn to assume an upright posture is not the critical issue. Rather, it is the difference attached to the acquisition of the motor skill that preschool teachers and parents need to understand if they are to provide the proper guidance for the child's development.

Application of the dynamical systems theory. The dynamical systems theory suggests that developing motor behavior emerges from a contribution that accumulates from various sub-systems such as neurological, biomechanical and psychological. The dynamical systems theory explains how changes in motor behavior may occur and the principles that lead to an operational strategy for developmental processes (Thelen & Ulrich, 1991). The dynamical systems theory takes into account the impact of the context and the performer on the emerging motor behavior, but it does not explain how and on which part of the interacting subsystem its components influence behavior the most (Thelen & Ulrich, 1991).

This investigation undertook the racial/ethnic comparison of fundamental movement skills relative to variables such as physical growth, perceived competence and social acceptance, and then proposed that a dynamical systems framework may provide a partial explanation for any differences between Korean-American and American children. This approach provided information about the potential influence of physical growth, perceived competence and social acceptance on the motor performance of Korean-American and American children.

Racial/ethnic comparison of physical growth. Differences in physical growth of children from different racial and ethnic backgrounds have been reported by numerous

investigators (Barr, Allen & Shinefield, 1972). Many researchers studied physical growth and found that physical growth is influenced more by genetic factors than environmental factors, but that both environmental and genetic factors influence growth, depending on the status of the environment and the stage of growth. The environment has a greater influence during periods of time when the child is destined to grow most rapidly (Owen & Lippman. 1977).

Genetic influence on physical growth. Ashcroft and Desai (1976) studied community surveys of infants and children of African, Indian, Chinese and European origin in Guyana and Jamaica in order to compare the influence of ethnic origin and environment, including nutrition, on anthropometric measurements used to assess nutritional status. The mean height and weight of African and European children was greater than those of Indian and Chinese children. The results from the surveys in Guyana and Jamaica demonstrate the existence of ethnic differences that were not explained by environmental causes. The greater height and weight potentials of African over Indian children were also recorded by Kark and Steuart (1962) in Surinam. Barr, Allen and Shinefield (1972), working in California, found that children aged 5 to 14 years of "yellow skin color" were markedly shorter than Caucasian and African-American children, a difference that they did not attribute to nutritional or socio-economic status.

Influence of environment on physical growth. Physical growth is influenced by environmental factors, especially if the environment is unfavorable and occurs at a time when the child is destined to grow rapidly. Owen and Lippman (1977) reported that a systematic relationship exists between small body size and low socioeconomic status,

and between intake of nutrients and calories and socioeconomic level of the family within specific ethnic groups.

Meany (1978) considered ethnic and socio-economic variation in 23 anthropometric dimensions of African-American, Mexican American and Caucasian children in Tuscon, Arizona, at seven and eleven years of age. Linear dimensions of the upper or lower extremities and sitting height did not appear among the important dimensions for Caucasian children. They did appear as discriminatory variables in comparisons of African-American and Caucasian children. In contrast, circumferences tended to be the more important discriminators among socioeconomic categories, along with overall body size.

Influence of environment and genetic factors on physical growth. The growth status of 845 Korean school children between the ages of 6 and 11 years who were born and raised in Japan was investigated by Kim (1982). Height, weight, weight/height and sitting height/weight of Korean schoolchildren in Japan were compared with those of Japanese children in Japan, and Korean children in Korea. Korean schoolchildren in Japan were taller, heavier and relatively longer-legged at most ages than Korean children in Korea of the same gender and age. In comparison with the Japanese children, Korean school children in Japan were slightly taller at every age. In early adolescence, the Korean children were lighter and more slender for a given height. These results provide evidence of a more favorable environment of Korean children in Japan as compared with Korean children in Korea. This study of growth and development of Korean school children in Japan compared with the Japanese and native Korean children provides

valuable information on the biological variations that may result from different environmental conditions.

Comparisons of the growth status of immigrant offspring were made on American-born Japanese children (Greulich, 1957, 1976). Greulich, Crismon and Turner (1953) investigated children of Japanese ancestry living in California and found the children were somewhat larger, (at least during younger ages) and relatively longer-legged than children of the same gender and age who resided in Japan.

Greulich (1957) compared the physical growth and development of American-born and native Japanese children. This investigator studied 898 children in the San Francisco Bay area during 1956 and 1957. Greulich found that the children's growth was most likely influenced by their environmental conditions. The results of the study suggested that (a) at every age the American-born Japanese children exceeded the native Japanese children in standing height, sitting height, weight and leg length; (b) in general, American-born Japanese children resembled Caucasian children in weight more closely than they did in height; (c) the skeletal development of Japanese boys and girls was less advanced than that of Caucasian children at every age included in Sutow's (1953) study for standards of Japanese-born children; and (d) the relatively longer legs of American-born Japanese children up to about the time of puberty illustrated how good nutrition and other favorable environmental factors may affect a feature that is usually considered a racial characteristic and, therefore, genetically determined and controlled.

In 1976 Eveleth and Tanner summarized well-known studies of Japanese growth and stated that: (a) a secular trend in the stature of Japanese children in the United States occurred up to the late 1950s; (b) this trend has stopped, because Japanese-American

children in 1971 were no taller than those measured in 1957; (c) the Japanese-American median values for height remained slightly lower than the 'Caucasian' median values of the United States; and (d) a marked secular trend occurred in Japan, so that the median values for 'Japanese in Japan' and 'Japanese in the United States' were very close.

In a more recent analysis of Japanese growth trends, Tanner, Hayashi, Preece and Cameron (1982) showed that while leg length has increased and now has values similar to those of North Europeans, sitting height has changed very little. In 1977 the trunk-to-leg -length ratios of Japanese adults were similar to those of Europeans, but total height was somewhat less.

Additionally, Mexican-American adults of upper socioeconomic status, although taller than Mexican-Americans of lower socioeconomic status, were nevertheless shorter than other Caucasian adults of the same social background (Malina, 1983). Tanner, et al. (1982) found that Japanese adults had trunk-leg proportions that were more similar to those of northern Europeans than was the case twenty years ago, but their adult height remained about one standard deviation lower than that of adult Europeans.

The European, European-Japanese and European-Chinese differences in growth followed a different course throughout growth than that of European-Africans (Eveleth & Tanner, 1976). The European-Chinese had the same proportions as the Europeans when both groups were very young. Differences developed during the growing period. European-Africans differed from Europeans from birth onwards. Most of the differences in proportion between European-Japanese and Europeans seemed to decrease as living conditions changed. An absolute size difference, however, seemed to persist; what was

near-optimal growth for European-Japanese resulted in a stature that was some 5-6 cm (1 SD) shorter than the final stature of north Europeans.

This review indicates that both genetic and environmental factors are able to influence physical growth. Studies of different races such as those of Korean, Japanese-American and Asian-American children, both American-and foreign-born, suggest that environmental contexts within the limits established by genetics have important influences on physical growth. The results of this review suggest that if Korean children lived in the United States, their growth may be influenced by the American environment. Therefore, one could speculate that the longer Korean-American children live in America the more likely they would be to exceed their Korean counterparts in height, but they would probably be shorter in stature and weigh less than American children. As a result, this investigator developed several hypotheses suggesting that Korean-American boys will be smaller and weigh less than Caucasian boys of the same age. However, the difference, if detected, cannot be attributed to genetics or to environmental conditions because the study was cross-sectional rather than longitudinal in nature.

Racial and ethnic comparison of physical performance. Some researchers suggested that there was evidence of differences in physical ability and motor performance between individuals of different races. The most predominant differences in age of attaining motor milestones in a population of healthy infants may be attributed to race (Capute, Shapiro, Palmer, Ross & Wachel, 1985; Allen & Alexander, 1990). Lindhal (1987) indicated that considerable differences in motor development were detected among early school-age children of different ethnic origins who belonged to the same racial group.

Allen and Alexander (1990) indicated that comparisons between Caucasian and African-American children of the same gender showed that African-American children reached milestones such as rolling from a prone to supine position, sitting with support, sitting, unsupported, creeping, pulling to a standing position and walking at a relatively earlier age than their Caucasian peers. African-American children achieved motor milestones earlier, on average, for all comparisons except rolling from a prone to a supine position. Regarding 'rolls to prone', African-American children were 0.05 months ahead of Caucasian children; this increased to 1.1 months for "Walk." The mean age of attaining the motor milestones do not appear to be meaningful. However, the study did not identify environmental factors that may have influenced motor performance. Although motor performance may be influenced by genetic factors, it is also influenced by environmental contexts, as suggested by the dynamical systems theory.

Some studies (Bayley, 1965; Knobloch & Pasamanick, 1953; Williams & Scott, 1953) compared samples of African-American and Caucasian children directly, or compared African-American children to standards established for Caucasian children. The available data indicated, in general, that motor advancement of the African-American infants, compared to Caucasian infants, was influenced by genetic factors. The advancement, sometimes termed "motor precocity" was already apparent in the newborn and persisted during the first two or three years of life. In an earlier study, Van Alstyne and Osborne (1937) also noted better rhythmic patterns in regulated and free-rhythm situations among African-American children who were two to six years of age.

Sessoms (1942) compared a sample of low-income African-American preschool children with a sample of Caucasian children from Iowa on some fine and gross motor

tasks. African-American boys and girls at three years of age were more advanced than Caucasian children in hopping, skipping, walking and step and ladder climbing.

These reviews indicate that children of different races differ in the age at which they reach various levels of motor performance. Therefore, differences in motor performance between Korean-American and American children are postulated. Moreover, studying differences in motor performance relative to different races has not established why different races reach motor milestones at different ages or if and how these assessments were influenced by genetic or environmental factors. Therefore, this study examined motor performance relative to different variables such as physical growth, perceived competence and social acceptance between Korean-American and American children.

Application. Two major explanations for differences in motor development and growth among same-aged children of different racial and ethnic backgrounds have been proposed; namely, the influences of environmental and genetic factors. In the former category, changes in nutrition, sanitation, medical care and psycho-physiology have been proposed. The genetic theory suggested "latter heterosis," a phenomenon resulting from hybridization in which offspring display greater vigor, size and resistance than the parents (Damon, 1965), as accounting for the differences. However, the literature was uncertain about the cause for the secular trend (Kimura, 1967). Broman, Dahlberg and Lichtenstein (1942) have suggested that acceleration of the growth process of children represented a response to environmental agents, while the adult increase was genetic in origin.

Many researchers mentioned that different races have different physical growth patterns within the same environment. Some researchers emphasized genetic or environmental factors; others emphasized both genetic and environmental factors. If the causes of motor superiority or delay are known, then teachers and parents are able to react in one of two ways: (1) they will realize that if the causes are genetic, nothing can be done to influence the rate of acquisition, but that teaching to accommodate individual differences becomes increasingly important or (2) if the rate of growth is influenced by the environment, then the associated variables can be identified and manipulated.

This investigation hypothesized that physical growth is influenced by genetic and environmental factors and thereby examined any differences of physical growth between Korean-American and American children. Many studies suggested that Asian-Americans, or Japanese-Americans were shorter, and weighed less than Caucasians. Thus, this investigator hypothesized that Korean-American children were smaller, leaner and had shorter arms than Caucasian children.

This investigation suggested that the dynamical system theory of motor skill acquisition may explain the differences in motor performance among Korean-American and American children. This investigator therefore hypothesized that fundamental movement skills were influenced by physical growth and the child's perceptions of his enviroment.

The Relative Importance of Physical Activity in the Korean and American Cultures

Any comparison of motor performance relative to physical growth, perceived competence and social acceptance between Korean-American and American children must consider the differences between Korean and American cultures. Korean-Americans may

be influenced by both the Korean and American cultures. The following section will identify differences between the Korean-American and American cultures.

The importance of physical activity in the Korean culture. Limited research is available for comparing whether Korean immigrants in the United States maintain their Korean culture. Unlike previous immigrants from different countries, many of today's immigrants to the United States are accustomed to American culture because it has permeated the world and has settled into many international cities (Golden, 1988). Many immigrants have personalized adaptations to the process; much of this involves becoming bicultural (Golden, 1988).

Biculturalism seems to produce less stress than acculturation for immigrants (Golden, 1988). The process is exemplified by a study of Korean-American high school students who were high achievers and had many friends among their American counterparts, but who remained deeply interested in their native language and history. They had positive outlooks and were interested in pursuing higher education. In the opinion of the author, biculturalism was a better approach than acculturation because it led to more positive outcomes and a stronger self-concept.

Korean culture is an example of a culture that may have been slow to assimilate to the American culture. First, Confucianism places special importance on the family as both the basic unit of society and the fundamental social structure within which individuals live. It also emphasizes tradition and authority as guides to social behavior (Smith, 1958). Western society, on the other hand, typically emphasizes the importance of the individual and personal freedom (Moon & Pearl, 1991). Lee (1977) reported that Koreans have historically had a strong sense of family loyalty. The author gave as an

example of the Korean attitude toward the centrality of family (versus the centrality of the individual) the fact that Koreans speak of "our home" and "our father." Given their value system, Koreans may sacrifice themselves for their family's honor even when they would not do the same for their country.

Korean people strongly emphasize education and learning as a valued part of their lifestyle. Even though Korean people immigrated to the United States, the emphasis on higher education was still strong (Patterson & Kim, 1977). For example, early Korean immigrants in Hawaii considered it important that their children be educated so that they could be successful in their new country. These immigrant parents did not have money to leave to their children, but they were willing to work hard to give them an education-something that no one could take away (Patterson & Kim, 1977). Koreans have traditionally placed a high value on education and learning. Even after immigration to the United States, they have not changed their basic values and have continued to attain high educational goals. In this respect, as in many others, Koreans in America have put their values to use in their adopted land (Patterson & Kim, 1977).

Koreans started to emphasize physical activities only recently when Korea hosted the Asian games and Olympic games (Coakley, 1990). A spokesperson for the South Korean government said that its sponsorship of the 1988 Summer Olympic games was an announcement to the world of its emergence as a developing nation; and these events made sports valuable in Korea (Coakley, 1990).

Aforementioned literature suggests that the Korean culture and its values differ from American culture and, hence, may potentially influence children differently. Korean-American children are influenced differently than American children by their

parents regarding their general education. Thus, this writer hypothesized that there would be differences in cognitive and physical competence, and peer and maternal acceptance between Korean-American and American children.

The importance of physical activity in the American culture. In the United States sports are used to promote the connection between success and hard work; there are frequent references to individuals achieving excellence through competition (Coakley, 1990). The focus of popular literature in American sports is on unique success stories that illustrate how individuals have reached personal goals and achieved self-fulfillment. Robinson (1988) insisted that the Confucian tradition that strongly emphasized education in Korea could be said to produce a "study ethic." The ""study ethic" conflicted with the American ethic. In Korea, parents believe that if their children succeed in school, they will succeed in life. Americans believe that if their children work hard they will succeed in life. This contrast does not mean that Koreans do not work hard or that Americans do not study hard -- it is a difference in emphasis.

Young American boys are routinely provided with organized sports activities in America (Coakley, 1990). The general framework for most organized youth sport programs developed after Word War II in North America (Coakley, 1990). Through the 1950s and 1960s those programs grew dramatically with the help of powerful public, private and commercial sponsors (Berryman, 1982). At the same time, parents became involved in the programs. Fathers eagerly became coaches, managers and league administrators and mothers became chauffeurs and short-order cooks to meet the demands of practice and game schedules (Coakley, 1990). Coakley (1990) reported that it was hoped that sports, especially team sports, would teach boys from lower-class backgrounds how to cooperate and work together peacefully; conversely, strenuous sport

activities for middle-class boys would turn them into strong, assertive, competitive men. The greater association of American children with organized sports, either as active participants or as residents in a culture in which sports are highly valued, led this investigator to hypothesize that American boys would have a higher perceived peer acceptance than Korean-American children who do not participate as frequently in team-oriented activities at young ages.

In addition, from this review, the investigator hypothesized that American children were taught to emphasize hard work, physical activity and education; Korean parents emphasized educational development to their children. Thus, there seem to be different environmental influences on the acquisition of motor skills of Korean-American and American children.

Application. The Korean-American and American cultures suggest that Korean-American and American children are influenced by different environmental factors. From a review of the literature, Korean-American children are highly involved in cognitive education by their parents. In contrast, the environment of American children involves hard work that includes cognitive and physical activity. Therefore, this investigator hypothesized that there may be differences in motor performance between Korean-American and Americans, favoring the American children who probably had more exposure to physical activity. This investigation examined a comparison of motor performance relative to the physical growth, perceived competence and social acceptance between Korean-American and American boys.

Perceived Competence and Social Acceptance

This section will examine whether perceived competence and social acceptance are really important to young children. What factors influence young children's competence? Are differences in competence based on racial differences, especially between Korean-American and American children?

Importance of perceived competence and social acceptance. The review of literature suggested that a high level of perceived competence is a positive attribute for children. Paguio and Hollett (1991) insisted if young children have positive perceived self-competence, they will develop positive social skills. In other words, having a positive perceived competence is important to children because it also develops social acceptance. Paguio and Hollett (1991) examined the relations between self-perceived and actual peer acceptance among preschool children aged three to five years. Self-perceived competence and social acceptance were measured using a pictorial scale of perceived competence and social acceptance; a sociometric scale was used to assess actual peer acceptance. The result was that children who perceived themselves as well-accepted by peers also received higher nomination scores from their peers.

Children with learning disabilities were less accepted and less liked than low-achieving or high-achieving childrenIa (Greca and Stone, 1990). Children with learning disorders perceived their self-worth and social acceptance to be lower than either the low-achieving or high-achieving child. Anderson and Adams (1985) also found that there was a positive and significant correlation between preschoolers' and kindergartners' perception of their cognitive competence and their actual performance on a test of academic readiness. Many investigators (Anderson & Adams, 1985; Paguio & Hollett,

1991) suggested that developing a positive perceived competence at the preschool age also develops social acceptance and furthers the positive learning of other skills.

What factors influence children's competence? When young children develop a positive perceived competence, they are usually influenced by themselves, their parents and/or their teachers (Vandell, 1977; Harter & Pike, 1984). The following subsections will review self-development of perceived competence, parental involvement in their children's perceived competence and teachers' involvement in their students' perceived competence.

Self-development of perceived competence. Nicholls (1978) found that not until sixth grade do children's perceptions of their abilities closely reflect their actual performance. Young children have an exaggerated perception of their own abilities (Stipek, 1981). Stipek (1981) concluded that preoperational children may confuse the desire to be competent with reality. Because most children do not receive feedback regarding their competence that is either all good or all bad, they are left with mixed messages regarding their actual performance.

Parental influence on their childrens' perceived competence. While it is clear that the direction of affect in the reported relationships remains unspecified, earlier studies (Vandell, 1977) suggest that parents contribute to their children's competence and social skills. Bullock & Pennington (1988) indicated that "these factors were characteristic of harmonious family environments (such as emphasizing expression, communication and exchange of ideas) and were important to children's perceptions of feeling competent in the cognitive domain."

Teachers' influence on perceived competence. Children's perceptions of their cognitive competence correlate significantly with tests of achievement (Anderson & Adams, 1985) and teachers' ratings of children's achievement (Harter & Pike, 1984). Also, many studies examined different populations of children using different objective criteria with a similar finding that teachers' ratings of academic achievement were positively correlated with children's performance on achievement tests (Gullo & Clements, 1984; Hoge & Butcher, 1984).

Teachers must be more specific on their feedback to children regarding cognitive and academic behaviors. When teachers say, "Good job!" the child is left on his or her own to determine what is "good" about it. More specific feedback regarding their performance on cognitive and academic tasks would help children detect what was 'good' about the performance (Gullo & Ambrose, 1987). Piaget's developmental theory (Piaget, 1967) suggests that social cognitive abilities (reflecting communication skills) were important for teachers' ratings of interpersonal competence and were correlated significantly with the child's verbal abilities.

As a result, when children are young, teachers and parents are important people for developing competence and social acceptance. Bullock and Pennington (1988) found that parental perceptions of the family environment and children's perceptions of competence during early childhood were important indicators of competence. Also, perceptions of general competence and social acceptance were established by the children and their teachers.

Importance of perceived competence and social acceptance among races. Differences in the perceived competence and social acceptance of different races, as well as parents' and teachers' perception of the importance for developing perceived competence was found. Spencer (1982) demonstrated that minority-group children were affected by the majority group's values. The white-biased choice-behavior of young children has been termed "eurocentrism." The effect of eurocentrism on young, minority-group children is referred to as race dissonance. Spencer and Horowitz (1973) reported that three-year-old children were as capable as five year-old children of stating the stereotype eurocentric connotations associated with concepts of color and race.

There has been considerable controversy over the relationship between self-concept and ethnic-group membership (Chang, 1975). For instance, Williams and Byars (1968) found that African-American children had significantly lower self-concepts than Caucasian children. Other studies found no significant differences between the self-concepts of the two groups (Douglas, 1970; Gibby & Gabler, 1967). Several studies even found that African-American children had a higher mean self-concept than Caucasian children (Soares & Soares, 1969; Soares & Soares, 1970; Trowbridge, 1970).

In another study comparing Mexican-American children and Caucasian children, Hishiki (1969) reported that Mexican-American children had significantly lower self-concepts than Caucasian children. Other researchers reported no significant difference between the two groups (Carter, 1968; De Blassie & Healy, 1970). These results suggest that the self-concept of different ethnic children could be influenced by the environment, including the influence of parents and teachers. This investigator assumed that there were some differences in maternal acceptance between Korean-American and

American children because Patterson and Kim (1977) mentioned that the parents of Korean-Americans emphasized cognitive development of their children more frequently than American parents.

Chang (1975) investigated whether there were differences in the self-concepts of African-American children and Korean-American children in the intermediate grades. Self-concept was defined as perceptions, feelings, attitudes and values that an individual had about him/herself. The results were that with significant cluster findings, Korean-American children had higher mean scores than African-American children on behavior, intellectual and school status. African-American children had higher scores on physical appearance and attributes, and popularity. Chang (1975) suggested that the higher self-concept score of Korean-American children on certain attributes might be explained by the parents' attitudes toward school, their desires for their child's future education and their child-rearing practices. This investigator suggested that parents of Korean-American children have more positive attitudes toward school and closer and warmer relationships with their children than parents of African-American children. Therefore, this study assumed that Korean-American children have higher perceived maternal acceptance and cognitive competence, but lower physical competence as compared to American children.

Caplin (1969) indicated that the school achievement of Korean-American children was higher than the achievement of African-American children and that the higher achievement resulted in higher self-concept. Chang (1975) reported that Korean-American children had low scores on popularity and physical appearance and attributes because they attended schools where there were few other Korean children. Korean-

American children may have felt that they were physically different from the majority of Anglo-American children and unpopular among their peers because of physical differences. African-American children attended schools where there were many other African-American children and may not have perceived physical differences because of their close association with children of similar characteristics. If the emphasis on African-American awareness is indeed responsible for the higher self-concept on physical appearance and attributes and popularity of the African-American children, it may become the responsibility of the elementary-school teacher to help instill a sense of pride in children from all ethnic groups. Furthermore, it may be desirable to use class activities such as group discussions or self-exploration to help children understand how people are similar and different (Chang, 1975). Chang (1975) further suggested that teachers' reinforcement of the child's strengths may result in a higher self-concept for the child.

Chang (1975) reported that self-concept is related to experience and to the intellectual process of abstracting and generalizing from experience. Teachers should be aware that they have a great impact on a child's concept of self. Ideas of success or failure, as communicated by the teachers' responses and the responses of other important people in the child's life, influence confidence. Teachers need to respond favorably to a child's efforts to learn and to cope with new situations. A child's potential for feeling adequate, worthy and competent should be nourished rather than inhibited. Korean-American and African-American children do not necessarily suffer from a lower self-concept or a lower sense of personal worth than children of majority groups. However, to prevent lower self-concepts as children progress from grade to grade, teachers need to

help their students maintain their positive self-concept. Teachers need to emphasize children's strengths and worth as human beings.

Application. The review of literature for perceived competence and social acceptance emphasized that developing perceived competence and social acceptance were important to children's futures for learning and achievement. On the basis of this review, this author speculated that Korean-American children and American children have differences in perceived competence and social acceptance. Therefore, this investigator speculated that Korean-American children have higher cognitive competence and lower physical competence than American children. Also, this investigator hypothesized that Korean-American children have higher maternal acceptance and lower peer acceptance as compared to American children.

Summary and Discussion

The research is equivocal about the influence of genetic and environmental factors on physical growth. No research was located that indicated the relative influence of physical growth and environmental factors on motor performance. Research indicated that Korean-American and American children have different environmental influences regarding physical activity. Parents of Korean-American children emphasized their educational activities, resulting in fewer experiences with physical activities and physical competence. American parents emphasized hard work, including cognitive and physical development. Thus, American children may be more involved in physical activities than the Korean-American children. Because Korean-American children have a different culture, and may have different experiences at home, they may also have different perceived competence and social acceptance.

Motor performance is influenced by and influences many other factors as illustrated by the dynamical system theory. Thus, this theory provides a good framework for the investigation of racial differences between Korean-American and American children.

CHAPTER III

METHODS AND PROCEDURES

The purpose of this study was to compare the physical growth, motor performance, and perceived competence and social acceptance of Korean-American and American children who were 36 to 71 months of age. More specifically, this study attempted to determine: (a) a comparison in physical size between Korean-American and American children on weight, height, sitting height, biacromial breadth, biiliac breadth, acromradial length, radistylon length, total skinfold (tricep, subscapular, umbilical), upper arm circumferences and calf circumferences; (b) a comparison in motor performance between Korean-American and American children including locomotor skills (gallop, hop, leap, jump, skip, slide) and object control skills (two-hand strike, bounce, catch, kick, throw); (c) a comparison in measures of perceived competence and social acceptance between Korean-American and American children including physical competence, cognitive competence, peer acceptance and maternal acceptance; and (d) the interrelationships of growth, perceived competence and social acceptance to the motor performance of Korean-American and American children.

Description of Subjects and Sampling Procedures

The sample (N=49) consisted of 24 Korean-American and 25 American male children. The subjects' ages ranged from 36 to 71 months. The Korean-American subjects' ages ranged from 38 to 68 months and the American subjects' ages ranged from

36 to 71 months. The mean age of Korean-American children was 51.25 months and the mean age of American children was 53.40 months. The standard deviation of age for the Korean-American children was 9.88 and for the American children it was 9.73. A t-test indicated that there were no significant differences of the mean ages between the Korean-American and the American children (2-tail p=0.45).

Subjects were recruited by using the following procedures:

1) Children whose parents responded to advertisements on the public board at Michigan State University.
2) Korean-American children whose parents responded to requests from the Korean Association, which was comprised of the Korean language school, Korean churches and Korean temples.
3) Children whose parents responded to letters that were distributed at preschools in the Lansing area.

Subjects were identified by using the following criteria:

1) The sample of American children were born in the United States with parents who were Caucasian-American.
2) The sample of Korean-American children were born in the United States or brought to the United States before the age of two years with parents who were Korean.
3) Children who had just enrolled in a formal kindergarten in September 1993 were included because the duration of attendance (less than one month) was not deemed to be of a significant influence on their social and motor development.
4) All subjects had two parents living in the home where the child resided.

Independent and Dependent Variables

For hypothesis 17 the dependent variables were the locomotor and object control scores on the Test of Gross Motor Development (TGMD). The independent variables were the data from physical growth measures and scores on the scale of perceived competence and social acceptance. This research investigated the multivariate relationship between a criterion, a dependent variable (the TGMD score) and predictor variables (independent variables), including data from physical growth measures, and scores from assessments of perceived competence and social acceptance.

Organization

Protocol for the measurements involved several steps. The investigator attained approval from the Michigan State University Committee on Research Involving Human Subjects (UCRIHS). After approval was granted, subjects were scheduled to come to the Michigan State University I.M. Sports Circle gymnasium. Prior to administration of the test battery, each parent and subject were provided with an explanation of the test battery, the testing procedure and the subjects' rights as a participant in this study (Appendix A). The Informed Consent Form was signed and returned to the investigator prior to the time that the child was admitted to the study. The battery of tests was administered to the subjects.

The total test battery required 40 minutes for its administration. The testing began with measuring the subjects' physical growth for a period of 10 minutes. A period of 20 minutes was required for testing motor skills. Motor skills testing was divided into two sessions: locomotor assessment for ten minutes and object control assessment for 10 minutes. The interview for assessing perceived competence and social acceptance was

conducted in a quiet room and also required 10 minutes. If the child wanted to stay with his or her parents during the interview, this request was granted.

Four subjects were tested simultaneously by using a station approach to the assessment (Table 1). Subjects were rotated so that all who began the assessment at an appointed time finished the four stations, simultaneously. However, one part of the gymnasium was prepared for the subjects who finished the measurements early where the children relaxed and ate snacks. Children who completed a test before the allocated time could relax and prepare for the next measurements. Korean-speaking and English-speaking investigators were on hand to talk to the subjects in their native language.

Table 1

A sample schedule for procuring the data

	Stations			
Time	1	2	3	4
8.00 - 8. 10	S1	S2	S3	S4
8.10 - 8. 20	S4	S1	S2	S3
8.20 - 8. 30	S3	S4	S1	S2
8.30 - 8. 40	S2	S3	S4	S1

Note. S1:subject one; S2:subject two; S3:subject three; S4:subject four.

Samples of the record sheets for physical growth data, TGMD data, and the subject's interview regarding perceived competence and social acceptance are provided in Appendix B. As subjects arrived their names, chronological ages, nationalities and the date of measurements were entered onto the log by the recorder. After the procedure of informed consent had been addressed and prior to involving the subjects in the battery of

tests the investigator acquainted the child(ren) and parents with the four stations. In addition, games of low organization were played to alleviate any fears that the children may have had about the environment, the test administrator or the test battery. When the subjects seemed comfortable in the environment, the testing commenced.

The investigation involved a battery of three tests for each subject. The test administrators of physical growth and TGMD were six graduate students and one professor of motor development from the Department of Physical Education and Exercise Science at Michigan State University, who were competent in administering the tests and assessments. The test administrator of perceived competence and social acceptance was an undergraduate student at Michigan State University who spoke English and Korean well and who was competent in administering the tests and assessments. Prior to administerting his/her portion of the test battery each tester demonstrated his/her proficiency by conducting the test with four subjects in a pilot phase. An expert in each of the test battery's subtests monitored the testing and offered corrective suggestions. Each expert observed the testers until he or she believed that the test administrators were competent in performing the assessments.

Instrumentation

Table 2 reports all of the measures that were assessed in the investigation and the content of the tests.

Physical growth. A description of each physical growth measurement used in this investigation is provided in Appendix C. All measures were taken on the left hand side of the body. A recorder recorded each measurement.

Fundamental movement skills. The TGMD was used to test fundamental movement skills. A description of the items in the TGMD and descriptions of their

Table 2.
Physical growth, fundamental movement skills, competence and acceptance measures.

Physical Growth	Fundamental Movement Skills (TGMD)	Perceived Competence and Social Acceptance
Weight	Locomotor Skills:	Physical Competence
Standing Height	Gallop	Cognitive Competence
Sitting Height	Hop	Peer Acceptance
Biacromial breadth	Leap	Maternal Acceptance
Biiliac breadth	Jump	
Acromradial length	Skip	
Radiostylon length	Slide	
Skinfold - Tricep	Object Control Skills:	
Subscapular	Two-hand strike	
Umbilical	Bounce	
Circumferences- Upper arm	Catch	
Calf	Kick	
	Throw	

administration is contained in Appendix C. The Test of Gross Motor Development provides quantitative and qualitative measures of fundamental motor skills in children aged three to ten years (Ulrich, 1985). Each test item was administered for three trials. The twelve-item test included seven locomotor skills and five object control skills. The test battery required approximately 20 minutes per child and provided norm-referenced and criterion-referenced data. The test was standardized on a normative sample of 908 children in eight states. Content validity was established by unanimous agreement among three experts. Split-half reliability coefficients of 0.85 and 0.78 were recorded for the locomotor and object control subtests, respectively. Equipment and assessment protocols were standardized for all children (Ulrich, 1985). This investigation reported separate standard scores and percentiles for the locomotor subscale and object control subscale.

Perceived competence and social acceptance. The pictorial scale of perceived competence, social acceptance and maternal acceptance was used in this study (Harter & Pike, 1984). A description of each item of perceived competence and social acceptance used in this investigation is recorded in Appendix C. The assessment of perceived competence and social acceptance measured four constructs. The Pictorial Scale determined the relative competence of the child for each area. Two subscales (physical competence and cognitive competence) formed a construct of perceived competence; the two other subscales (peer acceptance, and maternal acceptance) formed a construct of social acceptance. Each subscale consisted of six items (Table 3).

Table 3.
Description of items of perceived competence and social acceptance

Cognitive	Physical
Competence	
Good at puzzles	Good at swinging
Gets stars on paper	Good at climbing
Knows names of colors	Can tie shoes
Good at counting	Good at skipping
Knows alphabet	Good at running
Knows first letter of name	Good at hopping
Peer	**Maternal**
Acceptance	
Has lots of friends	Mom smiles
Stays overnight at friends'	Mom takes you places you like
Has friends to play with	Mom cooks favorite foods
Has friends on playground	Mom reads to you
Gets asked to play with others	Mom plays with you
Eats dinner at friends' houses	Mom talks to you

Note This table is for preschool to kindergarden aged children.

The version of the scale used for this investigation was the pictorial preschool-kindergarten scale. Scale items occurred in the following order: cognitive competence, peer acceptance, physical competence and maternal acceptance. The items repeated themselves in that order, as well. The pictorial preschool-kindergarten scale was previously tested on 90 preschool and 56 kindergarten children (Harter & Pike, 1984). The means of the data for individual scale items ranged from 3.0 to 3.6; standard deviations ranged from 0.60 to 1.12 (Harter & Pike, 1984). Reliability for internal consistencies of the individual subscales ranged from 0.65 to 0.89, with a reliability of 0.86 for the combined subscale measure. Total scale reliability was 0.89. Data on the scale's validity were obtained for the first- and second-grade version of the scale via an interview, but data on validity were not available for the preschool-kindergarten scale. The scale's rating was deemed valid because the child's self-perceptions were based on behavioral references; the scores on the subscale discriminated between a group of children predicted to differ in a domain (Harter & Pike, 1984).

Treatment of the Data

This section describes the statistical procedures that were used to test each of the hypotheses which are listed here under four categories or purposes. Statistical t-tests were implemented to determine differences between Korean-American and American samples for hypotheses 1 through 16 in this investigation. This investigator used a significance level $\alpha = 0.05$ for hypothesis 1 to hypothesis 16. Also, factor analysis and regression were implemented to test hypothesis 17. In this study, both samples were selected from volunteer populations with unknown population variances. The sample

size was 24 and 25, respectively drawing from two different populations; Korean-American children and American children. Each population was mutually independent.

Hypotheses 1-10. One of the primary purposes of this investigation was to compare differences between Korean-American and American children in measures of physical growth. Separate t-tests were used to test from hypothesis 1 to hypothesis 10. The results of physical growth variables in this study were also compared with data from the 26-year longitudinal Motor Performance Study (MPS) at Michigan State University. Comparisons of the data from MPS were made between Korean-American and American children at six month intervals, starting at 34 months for each age group. These comparisons were made to the data from MPS because the data from MPS represent a large sample of children from the Greater Lansing, Michigan area. To the degree that the MPS data represent a normal distribution of children, the samples for this study could be compared and evaluated regarding their relative position in relation to the MPS data. Finally, this investigator constructed a correlation matrix of physical variables for Korean-American and American children so that any differences in association between variables could be determined. The following hypotheses to be tested via t-test were:

(1) Korean-American children are shorter in stature than American children.

(2) Korean-American children weigh less than American children.

(3) Korean-American children are shorter in sitting height than American children.

(4) Korean-American children have a lower total skinfold than American children.

(5) Korean-American children have less biacromial breadth than American children.

(6) Korean-American children have less biiliac breadth than American children.

(7) Korean-American children have shorter forearms than American children.

(8) Korean-American children have shorter upper arms than American children.

(9) Korean-American children have smaller circumferences of the upper arm than American children.

(10) Korean-American children have smaller circumferences of the calf than American children.

Hypotheses 11 and 12. Hypotheses 11 and 12 were stated to determine differences in fundamental movement skills, including locomotor skills and object control skills between Korean-American and American children. A t-test was performed for each hypotheses to test for differences between Korean-American and American children. The locomotor skills and object control skills were treated separately. The following alternative hypotheses to be tested via t-test were:

(11) Korean-American children have a lower level of proficiency in selected locomotor skills than American children as reflected in a composite standard score of locomotor proficiency.

(12) Korean-American children have a lower level of proficiency in selected object control skills than American children as reflected in a composite standard score of proficiency in object control.

Hypotheses 13-16. Hypotheses 13 through 16 were stated to investigate differences of Korean-American and American children in perceived competence and social acceptance including physical competence, cognitive competence, peer acceptance, and maternal acceptance.

A t-test was implemented to test for comparisons between Korean-American and American children for physical competence, cognitive competence, peer acceptance, and

maternal acceptance. The following alternative hypotheses to be tested via t-test were:

(13) Korean-American children have lower scores in perceived physical competence than American children.

(14) Korean-American children have higher scores in perceived cognitive competence than American children.

(15) Korean-American children have lower scores in perceived peer acceptance than American children.

(16) Korean-American children have higher scores in perceived maternal acceptance than American children.

Hypothesis 17. Hypothesis 17 attempted to determine the independent variables that influenced the performance of locomotor skills and object control skills. The dependent variables were: the locomotor standard score; and object control standard score. The independent variables were: all physical growth variables identified in Table 2 and physical competence; cognitive competence; peer acceptance; and maternal acceptance. A two-step approach was used to investigate this hypothesis, namely, factor analysis and regression.

It may be argued that a factor analysis is unnecessary in this situation and the investigator should proceed directly to multiple-regression analysis. However, multiple-regression analysis does not account for collinearity between pairs of independent variables. If two independent variables are highly interrelated, they generally yield non-additive influences on the dependent variable. Therefore, it is necessary to test for this interrelatedness by carrying out tests for correlations between independent variables suspected of having a high interrelationship. High correlations among explanatory or

independent variables prevent accurate estimates of individual coefficients in a regression analysis. Given that the two main groups of independent variables are: all growth variables; and the 4 subscales of the perceived competence and social acceptance, it would be predicted that these variables would have high correlations with each other. Thus, it was considered necessary to undertake a factor analysis prior to regression analysis to account for the problem of collinearity in the data.

Factor analysis is an approach to reduce a set of measures to their basic structures. The goal of a factor analysis is to discover the principal factors that describe the relationship of each measure to the principal factor. If correlation coefficients are high between the independent variables, then this problem may be solved by either (a) eliminating the least important variables, or (b) combining the related variables (provided the new aggregate variable can be named and measured).

The statistical program (SPSS) provided the statistical output of eigenvalues and cumulative percentages used in determining whether and how many principle components should be used in the factor analysis. There were too many independent variables, therefore, this investigator used factor analysis to combine or eliminate independent variables and hence reduce the overall independent variables. By the process of factor analysis, independent variables were grouped into composite variables known as "factors." Variables were grouped into factors by the size of their factor loading score.

A certain number of factors (aggregate variables) were identified for both the Korean-American and American group, based on factor loadings scores. In this study, factors were identified for each group, five for the Korean-American group and six for the American group by using factor analysis. However, only three factors were selected for the regression analysis for each group because their factors were considered to be

correlated enough with the dependent variable to explain a significant amount of the variance of the dependent variable.

The next step in factor analysis was to select one variable of the many variables making up the factor to represent all variables in the factor. Thus, each factor was reduced to one variable that represented the other variables. Hence, three variables (representing three factors) were entered into the regression equation.

After acquiring a certain number of major independent variables for the Korean-American and American groups by using factor analysis, a regression model was built for each group to describe the primary contributors to locomotor and object control performance. This analysis answered the following question: What are the most important explanatory variables for locomotor skills and object control skills in each group? Therefore, three independent variables were used to build the multiple regression model. The stepwise regression method was used to find out which independent variables had linear relationships with standard scores of locomotor skills and standard scores of object control skills. If the regression coefficients were not of significant size, independent variables were not included in the regression equation. Hypothesis (17) stated that variance in locomotor skills and object control skills will be accounted for in part by physical growth and perceived competence and social acceptance in both racial groups.

CHAPTER IV

RESULTS

The purpose of this study was to compare the physical growth, motor performance, perceived competence and social acceptance of Korean-American and American children of 36 to 69 months of age. This study specifically attempted to determine: (a) the comparison in physical size between Korean-American and American children in weight, height, sitting height, biacromial breadth, biiliac breadth, upper arm length, forearm length, total skinfold (triceps, subscapular, umbilical), upper arm circumferences, and calf circumferences; (b) the comparison in motor performance between Korean-American and American children in the locomotor skills of galloping, hopping, leaping, jumping, skipping, sliding, and the object control skills such as two-handed striking, bouncing, catching, kicking and throwing; (c) the comparison in four measures of perceived competence and social acceptance between Korean-American and American children, namely physical competence, cognitive competence, peer acceptance and maternal acceptance; and (d) how the interrelationsip of growth, perceived competence and social acceptance to the motor performance of Korean-American and American children. Each comparison was tested via statistical analysis. Descriptive and inferential statistical procedures were applied to each respective hypothesis with the results reported in the following section.

Purpose 1

A t-test was implemented to test for differences between Korean-American and American children for each variable of physical growth. Also, the results of physical growth variables between Korean-American and American children in this study and the 26-year longitudinal Motor Performance Study at Michigan State University were compared at six-month intervals, starting at 34 months for each age group. This investigator also computed a correlation matrix of each physical variable for Korean-American and American children so that any differences in association between variables could be determined.

Hypothesis 1. **Korean-American children weigh less than American children.** The mean weight for Korean-American children was 37.29 pounds (SD = 5.25) whereas the mean weight for American children was 40.63 pounds (SD = 6.80) (Table 4). There was sufficient statistical evidence to show that the Korean-American children weighed less than the American children (one-tail $p < .03$). In addition, hypothesis 1 was supported by evidence in Table 4 which showed that in five of the six age categories the Korean-American children weighed less than American children.

Table 4.
Comparison, via t-test for weight (lbs) of Korean-American and American children

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	37.29	5.25	-1.92	0.03
American Children	25*	40.63	6.80		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	29	31	33	35	37	39
50%	32	34	36	39	41	44
80%	35	38	41	43	45	48
Korean-American	33.8(3)	31.8(4)	36.4(7)	39.8(3)	40.8(3)	42.5(4)
American children	35.5(2)	35.0(4)	38.3(4)	39.8(4)	44.5(7)	44.1(3)

Note: Percentiles are for weight of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 2. **Korean-American children are shorter in stature than American children.** The mean height for Korean-American children was 104.03 cm (SD = 7.00) whereas the mean height of American children was 106.85 cm (SD = 6.86) (Table 5). There was no statistical evidence to show that Korean-American children were shorter in stature than American children (one-tail p = .08). Despite no statistical significance, Table 5 showed that in five of the six age groups the Korean-American children were shorter in stature than American children. The lack of a statistically significant finding may have been due to the great variation within each group of the sample.

Table 5.
Comparisons, via t-test for height (cm) of Korean-American and American children.

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	104.03	7.00	-1.42	<0.08
American Children	25*	106.85	6.86		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	92.3	96.0	100.0	103.2	106.0	109.8
50%	95.6	99.8	103.2	106.6	110.1	113.7
80%	98.5	102.8	106.5	110.3	113.5	117.8
Korean-American	98.6(3)	96.0(4)	102.2(7)	107.8(3)	110.0(3)	112.0(4)
American children	101.2(2)	100.2(4)	102.4(4)	104.1(4)	111.4(7)	114.5(3)

Note: Percentiles are height of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 3. **Korean-American children are shorter in sitting height than American children.** The mean sitting height for Korean-American children was 58.93 cm (SD = 3.24) and the mean sitting height of American children was 61.68 cm (SD = 9.79) (Table 6). There was no sufficient statistical evidence to show that Korean-American children were shorter in sitting height than American children (one-tail p = .10). However, even though there was no statistical support for the hypothesis, Table 6 showed that in four of the six subgroups the Korean-American children were shorter in sitting height than American children.

Table 6.
Comparisons (t-test) for sitting height (cm) of Korean-American and American children.

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	58.93	3.24	-1.31	0.10
American Children	25*	61.68	9.79		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	53.8	54.9	56.7	58.1	59.7	61.1
50%	55.6	57.1	58.8	60.3	61.8	63.4
80%	57.3	59.1	61.0	62.6	63.9	65.6
Korean-American	57.0(3)	56.2(4)	57.3(7)	60.7(3)	61.7(3)	62.5(4)
American children	56.7(2)	56.4(4)	57.8(4)	58.6(4)	62.6(7)	64.5(3)

Note: Percentiles are for sitting height of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 4. **Korean-American children have a lower total skinfold (triceps, subscapular, umbilical) than American children.** The mean total skinfold for Korean-American children was 20.00 cm^2 (SD = 4.81) and the mean total skinfold for American children was 21.32 cm^2 (SD = 5.34) (Table 7). There was no sufficient statistical evidence to show that Korean-American children had a lower total skinfold than American children (one-tail $p = .18$). However, Table 7 shows that in four of the six age groups the Korean-American children had a lower total skinfold than American children.

Table 7.
Comparison (t-test) for total skinfold between Korean-American and American children.

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	20.00	4.18	-0.91	0.18
American Children	25*	21.32	5.34		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	16.0	16.5	15.5	15.0	15.5	15.0
50%	20.0	20.0	20.0	19.5	19.0	19.0
80%	25.0	25.0	24.5	23.5	23.5	24.0
Korean-American	20.2(3)	18.4(4)	21.8(7)	19.8(3)	21.0(3)	17.8(4)
American children	20.8(2)	21.0(4)	21.2(4)	23.8(4)	20.1(7)	22.3(3)

Note: Percentiles are for total skinfold of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 5. **Korean-American children have less biacromial breadth than American children.** The mean biacromial breadth for Korean-American children was 23.48 cm (SD = 1.44) and the mean biacromial breadth of American children was 24.60 cm (SD = 1.33) (Table 8). There was sufficient statistical evidence to show that Korean-American children had less biacromial breadth than American children (one-tail p = .00). In addition, Table 8 showed that in five of the six age groups the Korean-American children had less biacromial breadth than American children.

Table 8.
Comparison (t-test) in biacromial breadth for Korean-American and American children.

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	23.48	1.44	-2.82	0.00
American Children	25*	24.60	1.33		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	21.0	21.8	22.4	22.9	23.6	24.3
50%	21.9	22.6	23.3	24.1	24.6	25.3
80%	22.9	23.5	24.1	24.9	25.6	26.3
Korean-American	22.1(3)	21.8(4)	23.4(7)	23.4(3)	24.7(3)	25.5(4)
American children	23.6(2)	23.8(4)	23.8(4)	24.9(4)	25.2(7)	24.8(3)

Note: Percentiles are for biacromial breadth of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 6. **Korean-American children have less biiliac breadth than American children.** The mean biiliac breadth for Korean-American children was 17.09 cm (SD = 1.08) and the mean biiliac breadth of American children was 17.43 cm (SD = 1.22) (Table 9). There was insufficient statistical evidence to show that Korean-American children had less biiliac breadth than American children (one-tail p = .16). However, Table 9 shows that in three of the subgroups the Korean-American children had less biiliac breadth than American children.

Table 9.
Comparison (t-test) in biiliac breadth between Korean-American and American children.

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	17.09	1.08	-1.02	0.16
American Children	25*	17.43	1.22		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	15.2	15.6	16.4	16.3	16.7	17.2
50%	15.8	16.3	16.7	17.1	17.6	18.0
80%	16.5	17.0	17.4	17.9	18.5	18.9
Korean-American	16.9(3)	15.7(4)	16.8(7)	17.4(3)	17.6(3)	18.5(4)
American children	16.5(2)	16.5(4)	17.3(4)	17.1(4)	17.7(7)	18.4(3)

Note: Percentiles are for biiliac breadth of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 7. **Korean-American children have shorter forearms than American children.** The mean forearm length for Korean-American children was 16.54 cm (SD = 1.30) and the mean forearm length for American children was 17.15 cm (SD = 1.70) (Table 10). There was insufficient statistical evidence to show that Korean-American children had shorter forearms than American children (one-tail $p = .08$). However, Table 10 shows that in four of the six age groups the Korean-American children had shorter forearms than American children despite the absence of statistical significance.

Table 10.
Comparisons (t-test) in forearm length for Korean-American and American children.

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	16.54	1.30	-1.42	0.08
American Children	25	17.15	1.70		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	14.4	15	15.7	16.3	16.8	17.5
50%	15.1	15.8	16.4	17.1	17.6	18.3
80%	15.7	16.5	17.1	17.8	18.3	19.0
Korean-American	15.7(3)	15.0(4)	16.2(7)	17.2(3)	17.5(3)	18.1(4)
American children	16.6(2)	16.1(4)	16.5(4)	17.5(4)	17.3(7)	18.1(3)

Note: Percentiles are for forearm length of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 8. **Korean-American children have shorter upper arms than American children.** The mean upper arm length for Korean-American children was 19.12 cm (SD = 1.54) and the mean upper arm length for American children was 20.06 cm (SD = 1.79) (Table 11). There was sufficient statistical evidence to show that Korean-American children had shorter upper arms than American children (one-tail p = .03). Also, Table 11 shows that in five of the six age groups the Korean-American children had shorter upper arms than American children.

Table 11.
Comparison (t-test) in upper arm length for Korean-American and American children.

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	19.12	1.54	-1.96	0.03
American Children	25	20.06	1.79		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	16.9	17.6	18.8	19.1	19.6	20.4
50%	17.5	18.4	19.2	19.1	20.6	21.4
80%	18.9	19.1	20.0	20.7	21.4	22.3
Korean-American	18.5(3)	17.0(4)	19.0(7)	19.7(3)	20.3(3)	20.8(4)
American children	18.4(2)	18.6(4)	19.8(4)	20.2(4)	20.4(7)	21.6(3)

Note: Percentiles are for upper arm length of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 9. **Korean-American children have smaller upper-arm circumferences than American children.** The mean upper-arm circumferences for Korean-American children was 16.48 cm (SD = 1.08) and the mean upper-arm circumferences of American children was 17.08 cm (SD = 1.45) (Table 12). There was no statistical evidence to show that Korean-American children had smaller upper-arm circumferences than American children (one-tail $p = .06$). The trend toward a statistically significant finding was supported by Table 12 showing that in five of the six age groups the Korean-American children had smaller upper-arm circumferences than American children.

Table 12.
Comparison (t-test) in arm circumference for Korean-American and American children

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	16.48	1.08	-1.62	0.06
American Children	25*	17.08	1.45		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	15.0	15.5	15.6	15.8	15.9	16.1
50%	16.1	16.2	16.4	16.6	16.9	17.0
80%	16.9	17.1	17.5	17.5	17.9	18.2
Korean-American	16.5(3)	16.1(4)	16.4(7)	16.7(3)	16.7(3)	16.7(4)
American children	17.4(2)	16.0(4)	16.8(4)	17.2(4)	17.1(7)	18.0(3)

Note: Percentiles are for upper arm circumferences of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

Hypothesis 10. **Korean-American children have smaller calf circumferences than American children.** The mean calf circumferences for Korean-American children was 22.16 cm (SD = 1.49) and the mean calf circumferences of American children was 22.71 cm (SD = 1.62) (Table 13). There was insufficient statistical evidence to show that Korean-American children had smaller calf circumferences than American children (one-tail $p = .11$). However, Table 13 shows that in four of the six age groups the Korean-American children had smaller calf circumferences than American children.

Table 13.
Comparison (t-test) in calf circumferences for Korean-American and American children.

Nations	N	Mean	SD	t	One-tailed p
Korean-American Children	24	22.16	1.49	-1.22	0.11
American Children	25*	22.71	1.62		

	Age(months)					
	34 - 39	40 - 45	46 - 51	52 - 57	58 - 63	64-69
Age group	1	2	3	4	5	6
20%	20.0	20.4	20.7	21.0	21.1	21.8
50%	21.1	21.4	21.6	21.9	22.3	22.9
80%	22.2	22.5	22.9	23.2	23.7	24.3
Korean-American	21.1(3)	21.2(4)	22.2(7)	21.9(3)	23.5(3)	23.0(4)
American children	22.1(2)	21.7(4)	22.0(4)	23.0(4)	23.0(7)	24.0(3)

Note: Percentiles are for calf circumferences of American children in the Motor Performance Study, Michigan State University. Numbers in parentheses indicate the number of subjects within each six-month age group. * One subject was 71 months, and was not included in Age group 6 but was included in the overall mean.

The correlation matrix of measures of physical growth The correlation between each variable in physical growth for Korean-American children and American children is shown in Table 14. The following variables were highly correlated ($r > .90$) for Korean-American children: sitting height and height (0.92), height and weight (0.92), total skinfold and umbilical skinfold (0.93), acromradial length and height (0.94), and radiostylon length and height (0.95). The following variables were highly correlated ($r >$ 0.90) for American children: acromradial length and biiliac breadth (0.94) and total skinfold and triceps skinfold (0.98).

The following variables correlated from 0.86 to 0.90 for Korean-American children: biacromial breadth and height (0.86), sitting height and weight (0.87), radiostylon length and acromradial length (0.90) and radiostylon length and weight (0.90). The following variables correlated from 0.86 to 0.90 for American children;

Table 14.
Correlation matrix of physical growth variables.

Correlations for Korean-American children

	WT	HT	SITHT	BIAC	BIILI	ACRO	RADIO	TRICEP	SUBSC	UMBI	TTSKI	ARMC	CALFC
WT	1.00												
HT	0.92	1.00											
SITHT	0.87	0.92	1.00										
BIACRO	0.83	0.86	0.75	1.00									
BIILI	0.78	0.81	0.73	0.81	1.00								
ACRO	0.85	0.94	0.82	0.80	0.76	1.00							
RADIO	0.90	0.95	0.85	0.85	0.77	0.90	1.00						
TRICEPS	0.37	0.18	0.20	0.02	0.10	0.25	0.23	1.00					
SUBSCQ	0.53	0.36	0.30	0.27	0.25	0.26	0.40	0.53	1.00				
UMBI	0.35	0.12	0.07	-.03	0.11	0.17	0.17	0.73	0.65	1.00			
TTSKIN	0.42	0.21	0.19	0.04	0.16	0.25	0.25	0.82	0.79	0.93	1.00		
ARMC	0.69	0.41	0.42	0.35	0.41	0.38	0.44	0.67	0.72	0.71	0.77	1.00	
CALFC	0.78	0.66	0.71	0.59	0.59	0.56	0.61	0.60	0.50	0.42	0.49	0.79	1.00

Correlations for American children

	WT	HT	SITHT	BIAC	BIILI	ACRO	RADIO	TRICEP	SUBSC	UMBI	TTSKI	ARMC	CALFC
WT	1.00												
HT	0.82	1.00											
SITHT	0.52	0.66	1.00										
BIACRO	0.77	0.72	0.54	1.00									
BIILI	0.60	0.67	0.59	0.74	1.00								
ACRO	0.55	0.64	0.55	0.74	0.94	1.00							
RADIO	0.44	0.46	0.41	0.69	0.88	0.89	1.00						
TRICEPS	0.40	-.01	-.03	0.36	0.19	0.18	0.22	1.00					
SUBSCQ	0.33	-.08	-.10	0.19	-.07	-.09	0.00	0.67	1.00				
UMBI	0.69	0.41	0.17	0.46	0.27	0.25	0.20	0.60	0.41	1.00			
TTSKIN	0.57	0.15	0.04	0.42	0.20	0.18	0.20	0.93	0.74	0.83	1.00		
ARMC	0.75	0.48	0.34	0.59	0.34	0.29	0.32	0.61	0.49	0.75	0.74	1.00	
CALFC	0.77	0.58	0.31	0.60	0.42	0.34	0.31	0.52	0.47	0.72	0.68	0.88	1.00

Note: WT: Weight, HT: Height, SITHT: sitting height, BIACRO: biacromial breadth, BIILI: Biiliac breadth, ACRO: acromradial length, RADIO: radiostylon length, TRICEPS: triceps skinfold, SUBSCQ: subscapular skinfold, UMBI: umbilicus skinfold, TTSKN: total skinfold (triceps, subscapular, umbilicus), ARMC: upper arm circumference, CALFC: calf circumference.

radiostylon length and biiliac breadth (0.88), calf circumference and upper arm circumference (0.88) and radiostylon length and acromradial length (0.89).

The following variables correlated from 0.80 to 0.85 for Korean-American children: acromradial length and biacromial breadth (0.80), biiliac breadth and biacromial breadth (0.81), biiliac breadth and height (0.81), acromradial length and sitting height (0.82), total skinfold and triceps skinfold (0.82), and biacromial breadth and weight (0.83), radiostylon length and biacromial breadth (0.85), radiostylon length and sitting height (0.85) and acromradial length and weight (0.85). The following variables correlated from 0.80 to 0.85 for American children: height and weight (0.82) and total skinfold and umbilical skinfold (0.83).

The size of the correlations suggests that there was greater harmony in growth between the various bodily measures among the Korean-American boys than among the American boys. The correlations over .90 had a 5:2 ratio in favor of the Korean-American boys; those between .86 and .90 favored the Korean-American boys by 4:3, those between .80 and .85 favored the Korean-American boys by 9:2. In total, the higher correlations favored the Korean-American boys by a ratio of 18:7, indicating that symmetry of growth in length, weight and circumferences was greater in the Korean-American than in the American boys.

Purpose 2

A comparison was made of the locomotor skills and object-control skills between Korean-American and American children by applying a t-test.

Hypothesis 11. **Korean-American children have a lower level of proficiency in selected locomotor skills than American children as**

reflected by the standardized score of locomotor proficiency. The mean standard score for the locomotor skills of Korean-American children was 10.13 (SD = 3.48) and the mean standard score for the locomotor skills of American children was 11.00 (SD = 3.24). The t-test results show (See table 15) that there was insufficient evidence to suggest that Korean-American children had a lower level of proficiency in selected locomotor skills than American children (one-tail p = .18).

Table 15.
Locomotor skills t-test for Korean-American and American children.

Subjects	N	Mean	SD	t	One-tailed p
Korean-American Children	24	10.13	3.48	-0.91	0.18
American Children	25	11.00	3.24		

Hypothesis 12 **Korean-American children have a lower level of proficiency in selected object control skills than American children, as reflected by the standardized scores of an object control test.** The mean standard score for object control skills of Korean-American children was 11.96 (SD = 2.14) and the mean standard score for object control score of American children was 11.80 (SD = 2.87). The t-test results show (See table 16) that there was insufficient evidence to suggest that Korean-American children had a lower level of proficiency in selected object control skills than American children (one-tail p = .41). Although the mean score is in the opposite direction of the stated hypothesis, there is insufficient statistical evidence to suggest that the hypothesis should have been stated in the opposite direction.

Table 16.
Object control skills t-test for Korean-American and American children.

Subjects	N	Mean	SD	t	One-tailed p
Korean-American Children	24	11.96	2.13	0.22	0.14
American Children	25	11.80	2.87		

Purpose 3

A third purpose of this investigation was to undertake a comparison between Korean-American and American children in perceived competence and social acceptance, including physical competence, cognitive competence, peer acceptance, and maternal acceptance. Differences were determined by using the t- test.

Hypothesis 13. **Korean-American children have lower scores in perceived physical competence than American children.** The mean of perceived physical competence for Korean-American children was 3.22 (SD = .71) and the mean of perceived physical competence for American children was 3.23 (SD = .49). The t-test results showed that there was insufficient evidence to suggest that Korean-American children had lower scores in perceived physical competence than American children (one-tail p = .46) as reported in Table 17.

Table 17.
Perceived physical competence t-test for Korean-American and American children.

Subjects	N	Mean	SD	t	One-tailed p
Korean-American Children	24	3.22	0.71	-0.10	0.46
American Children	25	3.23	0.49		

Hypothesis 14. **Korean-American children have higher scores in perceived cognitive competence than American children.** The mean perceived cognitive competence for Korean-American children was 3.52 (SD = .53) and the mean perceived cognitive competence for American children was 3.39 (SD = .52). The t-test results show (See table 18) that there was insufficient evidence to suggest that Korean-American children had higher scores in perceived cognitive competence than American children (one-tail p = .18).

Table 18.
Perceived cognitive competence t-test for Korean-American and American children.

Subjects	N	Mean	SD	t	One-tailed p
Korean-American Children	24	3.52	0.53	0.90	0.19
American Children	25	3.39	0.52		

Hypothesis 15. **Korean-American children have lower scores in perceived peer acceptance than American children.** The mean of perceived peer acceptance for Korean-American children was 3.17 (SD = .66) and the mean of perceived competence for American children was 2.98 (SD = .52). The t-test results reported in Table 19 show that there was insufficient evidence to suggest that Korean-American children had lower scores in perceived peer acceptance than American children (one-tail p = .14).

Table 19.
Perceived peer acceptance t-test for Korean-American and American children.

Subjects	N	Mean	SD	t	One-tailed p
Korean-American Children	24	3.17	0.66	1.11	0.14
American Children	25	2.98	0.52		

Hypothesis 16. **Korean-American children have higher scores in perceived maternal acceptance than American children.** The mean of perceived maternal acceptance for Korean-American children was 3.32 (SD = .71) and the mean of perceived acceptance for American children was 3.31 (SD = .45). The t-test results show (See table 20) that there was insufficient evidence to suggest that Korean-American children had higher scores in perceived maternal acceptance than American children (one-tail $p = .48$).

Table 20.
Perceived maternal acceptance t-test for Korean-American and American children.

Subjects	N	Mean	SD	t	One-tailed p
Korean-American Children	24	3.32	0.71	0.04	0.48
American Children	25	3.31	0.45		

Purpose 4

The contributions of the various independent variables to the acquisition of locomotor and object control skills for Korean-American and American children were determined via a regression analysis, with separate regression equations being determined, respectively, for Korean-American and American children: To determine the

answers to hypothesis 17 a two-step approach was required, namely, a factor analysis and a multiple-regression analysis.

Hypothesis 17. **Variance in locomotor skills and object control skills will be accounted for in part by measure of physical growth and perceived competence and social acceptance.**

After performing factor analyses and rotating the Matrix using the VARIMAX method, the rotated factor matrices for Korean-American children and American children were listed in Tables 1 and 2 (Appendix E). A high coefficient (factor-loading) for a given variable indicates that there is a high correlation between that variable and the aggregate variables (factors).

For Korean-American children (Table 1, Appendix D), the high factor loadings in factor 1 were height (0.97), radiostylon length (0.94), biacromial breadth (0.93), acromradial length (0.92), sitting height (0.90), weight ((0.90), biiliac breadth (0.84), total score of locomotor and object control skills (0.66) and calf circumferences (0.61). In factor 2 the variables with high factor loadings were total skinfold (0.96), umbilical skinfold (0.91), triceps skinfold (0.88), arm circumferences (0.81) and subscapular skinfold (0.75). In factor 3 the variables with high factor loadings were the locomotor skill standard score (0.96), locomotor skill percentile rank (0.95), the total standard score of locomotor and object control skills (0.90) and locomotor skill total score (0.80). In factor 4 the variables with high factor loadings were the object control percentile rank (0.92), the object control standard score (0.91), the object control total score (0.71), and peer acceptance (0.61). In factor 5 the variables with high factor loadings were cognitive competence (0.91), physical competence (0.85) and maternal acceptance (0.82).

The results of the factor analysis on Korean-American children indicated that five relatively discrete factors emerged from the analysis. Factor 1 contained variables that represented primarily linear growth; factor 2 contained variables that represented circumferences and skinfolds. Factor 3 represented locomotor skills; Factor 4 was represented by variables of object control and Factor 5 by a combination of the three areas of perceived competence.

For American children (Table 2, Appendix D) the variables with high factor loadings in factor 1 were biiliac breadth (0.94), acromradial length (0.93), radiostylon length (0.84), biacromial breadth (0.81), height (0.72), sitting height (0.64), weight (0.61) and peer acceptance (0.52). In factor 2 the variables with high factor loadings were total skinfold (0.98), triceps skinfold (0.91), subscapular skinfold (0.83), umbilical skinfold (0.75), arm circumferences (0.74) and calf circumferences (0.68). In factor 3 the variables with high factor loadings were locomotor skill standard scores (0.94), locomotor skill percentile rank (0.93) and total standard score locomotor and object control skills (0.72). In factor 4 the variables with high factor loadings were object-control standard score (0.94), and object-control percentile rank (0.94). In factor 5 the variables with high factor loadings were cognitive competence (0.78), total score of locomotor and object control skills (0.67), object control total score (0.65), locomotor skill total score (0.63) and physical competence (0.58). In factor 6 only the maternal acceptance (0.85) variable offered a high factor loading. Thus, the factor analysis identified six aggregate variables (factors) in American children. Note that the variables within the factors for the American boys were not as discrete as those for the Korean-American boys, nor were the factors as easily identified as those that were isolated for the

Korean-American boys. However, an attempt at naming the factors resulted in the following labels: Factor one represented the breadths and lengths of body parts plus weight, thus representing the shape of the body. The inclusion of peer acceptance in this grouping of variables is difficult to explain unless one assumes that size is related to status within one's peer group. Factor two is clearly represented by skinfolds and circumferences, thus, a measure of overall adiposity is suggested. Factor three is clearly representative of locomotor skills. Factor four represents object control skills. Factor five contains the measures of skill and perceived competence and is the strongest indicator of total body coordination and self-confidence. Factor six isolated maternal competence as its only variable.

In factor analysis the specific aggregate variables (factors) are linear combinations of the original variables. Factors are assumed to be independent of one another. One measure of the amount of information conveyed by each aggregate variable is its variance. For this reason, the principle components are arranged in order of decreasing variance so that the most informative principle component is first and the least informative is last. For example, in the group of Korean-American children, the five factors explain approximately 88.3% of the total variance that is associated with the test battery (Table 21); 35.3 % of the total variance was explained by factor 1, 17.7% by factor 2, 15.6% by factor 3, 13.5 % by factor 4, and 6.2% by factor 5. In the groups of American children, the six factors explained about 85.2% of the total variance (Table 22). Note that 37.5% was explained by factor 1, 16.5% by factor 2, 14.2% by factor 3, 6.7% by factor 4, 5.8% by factor 5, and 4.4% by factor 6. In both groups by far the largest proportion of the variance was explained by factor 1.

Table 21

Varimax rotated factor loadings for Korean-American children

		Factor				
Subscale	Item	1	2	3	4	5
Linear Growth	HT	0.96453				
	RADIO	0.93590				
	BIACRO	0.92642				
	ACRO	0.91693				
	SITHT	0.89711				
	WT	0.89454				
	BILLI	0.84103				
	TTSCRE	0.65684				
	CALFC	0.61355				
Circumferences and Skinfolds	TTSKIN		0.95763			
	UMBI		0.90799			
	TRICEPS		0.87478			
	ARMC		0.81170			
	SUBSCQ		0.74568			
Locomotor Skills	LOCSS			0.96118		
	LOCPER			0.95345		
	TTSTSCRE			0.90319		
	LOCSS			0.79930		
Object Control Skills	OCPER				-.91853	
	OCSS				0.91249	
	OCST				0.70692	
	PEERACC				0.60817	
Perceived Competence	COGCMP					0.91236
	PHYCMP					0.84485
	MATACC					0.81917
Eigenvalue		8.8	4.4	3.9	3.4	1.6
% Variance		35.3	17.7	15.6	13.5	6.2
Cum. % variance		35.3	53.0	68.6	82.1	88.3

Note: WT: weight, HT: height, SITHT: sitting height, BIACRO: biacromial breadth, BIILI: Biiliac breadth, ACRO: acromradial length, RADIO: radiostylon length, TRICEPS: triceps skinfold, SUBSCQ: subscapular skinfold, UMBI: umbilicus skinfold, TTSKIN: total skinfold (triceps, subscapular, umbilicus), ARMC: upper arm circumference, CALFC: calf circumference, COGCM:Cognitive competence, PHYCM:Physical competence, PEERAC: Peer acceptance MATACC: Matenal acceptance, LOCSS: Locomotor skills standard score, OCSS: Object control skills standard scoreTTSTSCRE:Total Score of Locomotor Skills and Object Control Skills.

Table 22

Varimax rotated factor loadings for American children

		Factor					
Subscale	Item	1	2	3	4	5	6
Body Shape	BILLI	0.93520					
	ACRO	0.92993					
	RADIO	0.84301					
	BIACRO	0.81160					
	HT	0.71831					
	SITHT	0.63563					
	WT	0.60759					
	PEERACC	0.52125					
Skinfolds and Circumferences	TTSKIN		0.97678				
	TRICEPS		0.91206				
	SUBSCQ		0.82906				
	UMBI.		0.74709				
	ARMC0		0.73520				
	CALFC		0.67859				
Locomotor Skills	LOCSS			0.93847			
	LOCPER			0.93439			
	TTSTSCRE			0.72043			
Object Control Skills	OCSS				0.93806		
	OCPER				0.93592		
Perceived Competence	COGCMP					0.77683	
	TTSCRE					0.66777	
	OCST					0.64510	
	LOCST					0.62574	
	PHYCMP					0.57832	
Maternal	MATACC						0.85371
Eigenvalue		9.4	4.1	3.5	1.7	1.5	1.1
% Variance		37.5	16.5	14.2	6.7	5.8	4.4
Cum. % variance		37.5	54.0	68.2	74.9	80.7	85.2

Note: WT: weight, HT: height, SITHT: sitting height, BIACRO: biacromial breadth, BIILI: Biiliac breadth, ACRO: acromradial length, RADIO: radiostylon length, TRICEPS: triceps skinfold, SUBSCQ: subscapular skinfold, UMBI: umbilicus skinfold, TTSKIN: total skinfold (triceps, subscapular, umbilicus), ARMC: upper arm circumference, CALFC: calf circumference, COGCM:Cognitive competence, PHYCM:Physical competence, PEERACC: Peer acceptance MATAC: Matenal acceptance, LOCSS: Locomotor skills standard score, OCSS: Object control skills standard score.

The three independent variables were chosen from the first three factors except factors that had dependent variable because these three independent variables explained most of the percentage of variance. Factor 3 was a dependent variable for Korean-American children and factors 3 and 4 were dependent variables for American children. Therefore, this investigator could not choose independent variables from these factors. Therefore, three variables for Korean-American and American children were used in the regression model. Next a regression model was conducted as the second step in seeking an answer to hypothesis 17.

Because the aggregate variables (factors) are independent of one another, one can build the regression model without considering the collinearity problem for each aggregate variable. The dimensions (independent variables) were reduced to five or six aggregate variables without losing much of the information, which is the trait of factor analysis. In the group of Korean-American children, among the independent variables in factor 1, the independent variable with the highest correlation with a dependent variable- - the locomotor skill standard score - - is the calf circumferences (r=0.17). Arm circumferences (r = .25), peer acceptance (r = -.19), and maternal acceptance (r = .09) represent factors 1, 2, 4, and 5, respectively. (Refer to Table 23). However, for the locomotor standard score, peer acceptance (r=0.24) and arm circumferences (r = .49), physical competence (r = 0.20), and maternal acceptance (r = -.14) represent factors 1, 2, 5 and 6, respectively, within the group of American children.

For object control skills, calf circumferences (r=-.03) (Refer to Table 23), triceps skinfold (r = .00), peer acceptance (r= .56), and physical competence (r = .39) represent factors 1, 2, 4, and 5 respectively, within the group of Korean-American children. For

American children in reference to object control skills, height (r=.26), calf circumferences (r =.45), physical competence (r = .26), and maternal acceptance (r = .12) represent factors 1, 2, 5, and 6 respectively, within the group of American children. The remainder of the results are listed in Table 24. Note that the regression method is stepwise.

After performing stepwise multiple regression analysis (Table 24), this investigator found that, for the Korean-American children in the three independent variables chosen from the factor analysis, only arm circumference was included in the multiple regression model for the locomotor skills standard score (R^2 = 15%); peer acceptance was included in the multiple regression model for the object control standard score (R^2 = 31%); for the American children, arm circumferences was included in the multiple regression model for the standard score of locomotor skills (R^2 = 24%) and calf circumferences for the object control skills (R^2 = 20%). The stepwise regression method produced just one step for the standard score of locomotor skills and the standard score of object control skills because the other independent variables were not significant.

As a result, for Korean-American children, proficiency in locomotor skills can be explained by arm circumferences (R^2 = 15%) and object control skills can be explained by peer acceptance (R^2 = 31%). Also, for American children, locomotor skills can be explained by arm circumferences (R^2 = 24%) annd object control skills can be explained by calf circumferences (R^2 = 20%).

Table 23.
Correlation coefficient between Korean-American and American children.

Korean-American children		LOCSS	OCSS	American children		LOCSS	OCSS
Linear Growth	HT	0.040	-0.250	Body Shape	BILLI	-0.002	0.090
	RADIO	0.090	-0.330		ACRO	-0.087	0.045
	BIACRO	0.020	-0.190		RADIO	0.064	0.142
	ACRO	-0.090	-0.230		BIACRO	0.060	0.083
	SITHT	0.100	-0.220		HT	0.148	0.262*
	WT	0.070	-0.250		SITHT	0.141	0.192
	BILLI	0.120	-0.240		WT	0.227	0.195
	CALFC	0.170*	-0.030*		PEERAC	0.243*	0.088
Circumferences and Skinfolds	TTSKIN-	0.037	-0.222	Circumferences and Skinfolds	TTSKIN	0.100	0.105
	UMBI	-0.002	-0.262		TRICEP	-0.062	-0.016
	TRICEP	0.078	0.000*		SUBSCQ	0.035	0.154
	ARMC	0.247*	-0.400		UMBI	0.300	0.193
	SUBSCQ	0.171	-0.281		ARMC	0.486*	0.428
					CALFC	0.358	0.450*
Object Control Skills	PEERAC	-0.188*	0.559*				
	COGCM	0.054	0.046	Perceived Competence	COGCM	-0.096	-0.220
					PHYCM	0.198*	0.260*
Perceived Competence	PHYCM	0.015	0.386*				
	MATAC	0.091*	0.230	Maternal	MATAC	-0.137*	-0.116*

Note: WT: weight, HT: height, SITHT: sitting height, BIACRO: biacromial breadth, BIILI: Biiliac breadth, ACRO: acromradial length, RADIO: radiostylon length, TRICEPS: triceps skinfold, SUBSCQ: subscapular skinfold, UMBI: umbilicus skinfold, TTSKIN: total skinfold (triceps, subscapular, umbilicus), ARMC: upper arm circumference, CALFC: calf circumference, COGCM:Cognitive competence, PHYCM:Physical competence, PEERAC: Peer acceptance MATAC: Matenal acceptance, LOCSS: Locomotor skills standard score, OCSS: Object control skills standard score, *: higher correlation variables.

Table 24.
Multiple regression for locomotor and object control skills

Dependent variable	Independent variable	R^2	β	Regression model	Sig T
Korean-American children					
LOCSS	CALFC ARMC PEERACC	0.15	0.39	LOCSS = -6.43 + 1.01 ARMC	0.01
OCSS	CALFC TRICEPS PEERACC	0.31	0.56	OCSS =6.18 + 1.82 PEER ACC	0.01
American children					
LOCSS	PEERACCP ARMC PHYSCOM	0.24	0.49	LOCSS = -7.55 + 1.09 ARMC	0.01
OCSS	HEIGHT CALFC PHYCOM	0.20	0.45	OCSS= -6.36 + .80 CALFC	0.02

Note: LOST=: Locomotor skills standard score; OCSS: Object control standard score; ARMC:Arm circumference; PEERACC: Peer acceptance; PHYCMP: Physical competence; CALF: Calf circumference; HT: Height; TRICEPS: Triceps skinfold

CHAPTER V

DISCUSSION

Purpose 1

Several studies (Ashcroft & Desai, 1976; Barr, Allen & Shinefield, 1972) reported that Asian children were smaller and weighed less than European children and African children. This investigator did not locate any literature that compared the growth of Korean-American children and American children. However, this study provided 10 hypotheses on the basis of other reviews that reported Asian-American children are shorter and weight less than Caucasian and African-American children (Barr, Allen & Shinefield, 1972).

The ten hypotheses were that: (1) Korean-American children weigh less than American children; (2) Korean-American children are shorter in stature than American children; (3) Korean-American children are shorter in sitting height than American children; (4) Korean-American children have a lower total skinfold than American children; (5) Korean-American children have less biacromial breadth than American children; (6) Korean-American children have less biiliac breadth than American children; (7) Korean-American children have shorter forearms than American children; (8) Korean-American children have shorter upper arms than American children; (9) Korean-American children have smaller upper arm circumferences than American children; (10) Korean-American children have smaller calf circumferences than American children.

The results in the present study support only three of the ten hypotheses, namely, (1) Korean-American children have less weight than American children; (5) Korean-American children have less biacromial breadth than American children; and (8) Korean-American children have shorter upper arms than American children. The other seven hypotheses in this study were not supported; namely, that Korean-American children were shorter in height and sitting height, had lower total skinfold, had less biilac breadth, had shorter forearms, and smaller upper-arm circumferences and calf circumferences than American children. Even though this study did not support seven of the hypotheses, there are several possible explanations for these results. For the purpose of the present discussion, the following explanations are provided.

Explanations. The present study supports three hypotheses; that is Korean-American children weighed less and had less biacromial breadth and smaller upper arms than American children. However, the other physical variables may have also shown a statistically significant differences between Korean-American and American children if the sample size had been larger. The first explanation for not supporting the seven hypotheses in the present study is that the tabular data showed that more than half of the Korean-American children in the six month age groups (six groups) were shorter in average height and sitting height, lower in average total skinfold, shorter in average forearms, and smaller in average upper-arm circumferences and calf circumferences than the American children. The only exception to the differences in the means at six month intervals was the measure of average biiliac breadth. The second explanation, but perhaps not a plausible one for not supporting the seven hypotheses in the present study, is that the different anthropometrists may have obtained similar results when, in fact , the

differences were present. Even though all anthropometrists had the required expertise and experience in measuring physical size, they may have exhibited some individual differences in measuring physical size. As indicated, this explanation is not plausible given the expertise of the anthropometrists.

The third explanation for not supporting the seven hypotheses in the present study is that the sample size was too small and the age range within the samples was too large. Thus, this situation led to a large standard deviation within the groups that was not overcome by the differences between groups. In future studies a larger sample with a more restricted age range should be selected. The fourth explanation for not supporting the seven hypotheses in this study is that the sample of Korean-American children might have had a bias because the sample of Korean-American children was limited to the specific sub-culture of the Korean-American population. The Korean-American children who participated in this study had either their father or mother as a student or both as students living in a school environment. The American children may not have had a similar family environment. Therefore, further study should select samples which the investigator knows come from a similar socioeconomic group.

The above reasons may explain why the seven hypotheses have been rejected. However, even if all the extraneous variables could be controlled, comparing American and Korean-American children in a larger, more homogeneous sample may not have detected differences in physical size because the Korean-American children have been growing up in the United States as American children. Korean-American children might be influenced by American environmental factors. Therefore, their bodies may mature at a faster rate than that of their peers who have lived in Korea all of their lives. Kim (1982)

studied the growth status of 845 Korean school children between the ages of six and eleven years who were born and raised in Japan. Height, weight, weight/height and sitting height/weight of Korean schoolchildren in Japan were compared with those of Japanese children in Japan and Korean children in Korea. Korean schoolchildren in Japan were taller, heavier and relatively longer-legged at most ages than Korean children in Korea of the same gender and age. In comparison with the Japanese children, Korean children in Japan were slightly taller at every age group. In early adolescence, the Korean children were lighter and more slender for a given height. These results provide evidence of a more favorable environment for Korean children in Japan as compared with Korean children in Korea. Also, many researchers (Greulich, 1957, 1976; Greulich, Crismon & Turner 1953) have reported that physical size is influenced by genetic as well as by environmental factors.

The results of the present study suggest that the physical size of Korean-American children might be influenced as much by environmental factors as by genetic factors. It is also possible that Koreans who come to America are genetically larger than those who remain in Korea. More precise information would be gained if further study related the physical growth of Korean-American children, American children, and Korean children in Korea in a longitudinal study that controls for parents' height and socioeconomic environment.

Purpose 2

The dynamic systems theory emphasizes the contribution of all subsystems to the motor proficiency of children, including neurological, biological, psychological, physical and environmental factors, with no single element containing the engram for a behavior

pattern (Thelen & Ulrich, 1991). Because genetic and home environments are likely to be different between Korean-American and American children, this investigator assumed that the motor performance of Korean-American children and American children would be different in selected locomotor and object control skills. Moreover, Lindhal (1987) indicated that differences in motor development were detected among early school-age children of different ethnic origins who belonged to the same racial group. Many studies (Allen & Alexander, 1990; Bayley, 1965; Knobloch & Pasamanick, 1953; Williams & Scott, 1953; Alstyne & Osborne, 1937; Sessoms, 1942) reported that African-American children had more mature motor development than Caucasian children. However, because there was no available literature that addressed the comparison of Korean-American children and American children in motor performance, this investigation was used to test such a hypothesis. This investigator assumed that Korean-American children have a lower level of proficiency in selected locomotor skills and object control skills than American children in accord with the dynamic systems theory that indicates motor behavior is influenced by physical and environmental factors. Therefore, the investigator suggested the following hypotheses; (1) Korean-American children have a lower level of proficiency in selected locomotor skills than American children as reflected in the composite score of locomotor proficiency in the test of Gross Motor Proficiency. (2) Korean-American children have a lower level of proficiency in selected object control skills than American children, as reflected in the composite scores of object control in the test of Gross Motor Proficiency.

Although the differences were small, results of the present study indicated that Korean-American children had a lower mean proficiency in selected locomotor skills than American children. Korean-American children had a higher mean level of proficiency in

selected object control skills than American children. However, statistical analysis does not support these two hypotheses. There are several possible explanations for the lack of statistically significant differences. For the purpose of the present discussion, these explanations are as follows.

Explanations. One of the reasons that the present study does not support the two hypotheses concerning the motor proficiency of Korean-American and American children is that four testers may have had individual differences in assessing a qualitative test (Test of Gross Motor Performance). For instance, 24 Korean-American children and 9 American children were tested by the same two testers. The other 15 American children were tested by the other two testers. Even though these testers knew how to assess the motor skills and had much experience, their individual differences in the evaluation of qualitative motor performance skills may have influenced the results. Although this explanation may not be plausible, there is a strong recommendation that further research should begin by establishing the interrater reliabilities of the test administrators prior to procuring any data.

The second explanation for not supporting these two hypotheses is that the sample size was small. A large sample size might present better results because extreme scores would have a reduced likelihood of influencing the total score. Therefore, this investigator recommends that further study have a larger number of subjects.

The third possible explanation for not supporting these two hypotheses is that the Korean-American children were tested in the afternoon from 1:00 p.m. to 5:00 p.m. in moderate termperatures; Ten of the American children were tested in the morning from 10:00 a.m. to 1:00 p.m.in cooler weather. The other 15 American children were tested in

the afternoon in cooler weather. Therefore, all subjects did not have the same environment when they performed the motor tests. The different testing time schedules might have influenced the test result for both Korean-American and American children. Further research should test all samples in the same period of time or have similar environments when the tests are conducted.

The fourth explanation for not supporting these two hypotheses is that the chosen sample may have been biased. For example, 24 Korean-American children were from the same school apartments even though this investigator visited several organizations around the Lansing area in an attempt to locate subjects. Conversely, most American children and parents did not know each other because they were from different areas in Lansing. Many of the Korean-American children were friends because most of them lived in the same areas and played in the same play spaces within their community. Therefore, when testers tested motor performance, this investigator assumed that some of the Korean-American children might be more relaxed and regarded the tests as play, rather than regarding them as tests. Also, some of the Korean-American children played with each other when they had free time in the testing sessions. However, most of the American children did not play after finishing the motor performance skills. This investigator therefore assumed that most of the American children did not know each other. Therefore, the American children might have been more aware of an atmosphere of testing and thus tried to do their best rather than play through the test.

The fifth explanation for not supporting these two hypotheses is that many Korean-American children's parents came near their children's place and encouraged their children to do better in the motor performance tests even though their children performed

well. For instance, some of the Korean-American mothers spoke, "You can do it!" or "Your friend did it even though he is younger than you!" "I can do it so you can do it!" "Do you remember that you did this with your father!" "Good!". However, the American parents did not stay near the test site unless their children wanted them to stay near by. American parents also said that, "You did a good job!" after they finished the motor performance testing, but American parents did not encourage and motivate their children to do the motor tests as the Korean-American parents did. Further study should control the involvement of parents to eliminate the factor of parental motivation.

The above reasons possibly explain why these two hypotheses were rejected. Quite possibly the motor performance of Korean-American children and American children might be different although these two hypotheses were not supported in this study. Korean-American children in this sample may have had a similar environment for learning motor skills as their American counterparts because the equipment and play spaces were of an American orientation. Therefore, this investigation did not find Korean-American children to have a lower level of proficiency in selected locomotor skills and object control skills than American children. As the dynamic systems theory explained, the motor behavior of children is influenced by physical, psychological and environmental factors (Thelen & Ulrich, 1991). In other words, this investigator now assumes that the Korean-American children had good environmental influences to develop their motor performance skills. In order to know whether Korean-American children and American children have similar or different motor performances skill levels further study should involve a longitudinal design in which the Korean-American, and American children are tested in their native environments. Apparently, if there were

differences in motor performance between the two samples such differences were dissipated by a common environment.

The role of parental involvement in the everyday lives and goals of Korean-American boys may have been underestimated by the literature on parental influence on children. It is quite possible that parents of Korean-American boys were equally as concerned about their sons' motor development as were the parents of the American boys. If this is true, then there is every reason to believe that the Korean-American boys received just as much parental encouragement and support for physical acivities as the American boys. Hence, the lack of differences in locomotor and object control skills and perceived physical competence may have been caused by equal concern for motor development by Korean-American and American parents.

Purpose 3

When young children develop a positive perceived competence, they are usually influenced by themselves, their parents and/or their teachers (Vandell, 1977; Harter & Pike, 1984). Chang (1975) investigated whether there were differences in the self-conceptions of African-American and Korean-American children. The results suggested that Korean-American children had higher mean scores than African-American children on behavior, intellectual and school status. African-American children had higher scores on physical appearance and attributes, and popularity. Chang (1975) indicated that the higher self-concept score of Korean-American children on certain attributes might be explained by parents' attitudes toward school, their desires for their child's future education and child-rearing practices. Chang (1975) suggested that parents of Korean-American children have more positive attitudes toward school and closer and warmer relationship with their children than parents of African-American children. From this

review, this investigator hypothesized that Korean-American children have lower scores in perceived physical competence, but higher scores in perceived cognitive competence and maternal acceptance than American children. Moreover, Coakley (1990) reported that it was hoped that sports, especially team sports, would teach boys how to cooperate and work together peacefully and conversely to be strenuous, strong, assertive and competitive men. Coakley also reported that young American boys are routinely provided with organized sports activities (Coakley, 1990). On the other hand, physical activities influenced social health such as being happy, good peer relationship and good parents and leader skills (Payne & Isaacs, 1991). The literature review suggested to this investigator that Korean-American children had lower peer acceptance than American children; that Korean-American children have higher perceived intelligence, but lower perceived competence than American children.

Therefore, the four hypotheses in the present study stated that; (1) Korean-American children have lower scores in perceived physical competence than American children; (2) Korean-American children have higher scores in perceived cognitive competence than American children; (3) Korean-American children have lower scores in perceived peer acceptance than American children, and (4) Korean-American children have higher scores in perceived maternal acceptance than American children.

The results in the present study indicated that (1) the Korean-American children had lower scores (although not significantly so) in perceived physical competence than American children, but also they had a larger standard deviation than American children (Korean-American children is mean=3.22, SD = .71, American children is mean=3.23, SD = .49) ; (2) the Korean-American children had larger scores in perceived cognitive

competence (mean=3.52, SD=.55) than American children (mean=3.39, SD=.52); (3) the Korean-American children had larger scores in perceived peer acceptance than American children, but the standard deviation in perceived peer acceptance of Korean-American children was larger than that of the American children (Korean-American children is mean=3.17, SD = .66, American children is mean=2.98, SD = .52); (4) The Korean-American children had higher scores in perceived maternal acceptance than American children, but the standard deviation of Korean-American children was larger than that of American children (Korean-American children's mean=3.32, SD = .71, American children's mean=3.31, SD = .45).

The present study did not statistically support the four hypotheses; There are several possible explanations for these findings. For the purpose of the present discussion, these explanations are offered.

Explanation. One explanation for not supporting hypotheses 13 to 16 is that the sample size may have been too small to adequately represent the population for Korean-American children and American children. Therefore, any additional study should begin with a larger, more representative sample size. The second explanation for not supporting these four hypotheses is that the Korean-American samples were taken from a small area in which the population may have been homogeneous rather than representative. In other words, the sample of Korean-American and American children were taken from what this investigator perceived to be different environmental areas. Therefore, even though these four hypotheses were not supported, Korean-American children may actively have higher average perceived peer acceptance scores than American children. However, the statistical test results did not permit such a statement.

The reason for these results may be that the sample of 24 Korean-American children were taken from the same area where their parents were students; they lived in the Michigan State University (MSU) apartments. The MSU apartments had an outdoor play space where Korean-American children met and played together. Therefore, Korean-American children might have a higher perceived peer acceptance than American children who did not know each other. Hence, further study should ensure that the samples of Korean-American children and American children are from similar socioeconomic environments.

The third explanation for not supporting these four hypotheses is that the standard deviations of the Korean-American children were higher than those of the American children, especially in perceived physical competence, maternal acceptance and peer acceptance. This indicates that the variation within the sample may have been too great to result in actual differences between the groups. Therefore, further study should consider taking a large sample in order to reduce the extreme variation that may exist in a smaller sample. The fourth explanation for not supporting hypotheses 13 through 16 is that even though the same tester interviewed all Korean-American and American children, some of the Korean-American children were interviewed with their mother present. This may have caused the Korean-American children to answer differently than if their mothers had not been present. More specifically, in order to have more precise results for perceived competence and social acceptance for both Korean-American and American children, further study should ensure that the same testing environment for the interview was prescribed for both samples of children.

As mentioned previously, the lack of significant statistical differences between the Korean-American and American boys may be attributable to such similarities in the home

environments and aspirations of the Korean-American parents for their sons. Whatever cultural differences may at one time have existed may now be dissolved by common goals and desires.

Purpose 4

The dynamical systems theory suggests that developing motor behavior emerges from a contribution that accumulates from various sub-systems, including the neurological, biomechanical and psychological systems (Thelen & Ulrich, 1991). This investigation applied dynamical systems theory as an explanation for the motor performance of both Korean-American and American children. Therefore, this investigation attempted to learn how much of the variances in motor performance would be accounted for by physical growth, perceived competence, and social acceptance for Korean-American and American children.

For the American children, the combination of six factors that resulted from the factor analysis explained approximately 88% of the variance that was related to locomotor and object control via six factors. The variance related to locomotor and object control for the Korean-American children was represented by five factors, accounting for 85% of the variance. When the specific items within factors were isolated, the variables of arm circumference, calf circumference and peer acceptance were the most representative predictors of locomotor skills and object control.

As a result, for Korean-American children, locomotor skills can be partially attributable to arm circumferences, and object control skills can be partially attributable to scores on peer acceptance. Also, for American children, locomotor skills can be partially explained by arm circumferences and object control skills are associated with calf

circumferences. For the purpose of the present discussion, the following explanations are offered.

Explanation. The first explanation for the result of the present study is that the motor performance of Korean-American and American children is influenced by many different factors, as the dynamical systems theory suggested. The developing motor behavior emerges from a contribution that accumulates from various sub-systems. In this study, the standard score of locomotor skills for both Korean-American children and American children was closely related to arm circumferences (Korean-American children $R^2 = 15\%$, American children $R^2 = 24\%$). The standard score of object control skills for Korean-American children was most closely associated with peer acceptance ($R^2 = 31\%$), while the standard score of object control skills for American children received its largest contribution from calf circumference ($R^2 = 20\%$). The R^2 indicates the percent of the variance in locomotor skills and object control skills that is contributed by the respective variable. The association of arm and leg circumferences with motor performance is not surprising when one considers that Haubenstricker and Ewing (1985) reported that skinfolds were the best predictors of motor performance in a sample of children aged 8 to 14 years. The sample of Haubenstrucker and Ewing was for enrollees in the longitudinal motor performance study conducted at Michigan State University.

Reasons for the close relationship of arm and calf circumferences to motor skills relate to what is measured by these circumferences. Quite possibly the circumferences reflected the degree of muscularity of the individuals. Conversely, the high levels of subcutaneous tissue in the report of Haubenstrucker and Ewing were indicative of body fat and reflected negatively on motor performance.

Thelen and Ulrich (1991) also reported that the dynamical systems theory takes into account the impact of context and the performer on the emerging motor behavior, but it does not explain how and on which part of the interacting subsystem it influences behavior the most. This study concludes that measures of physical size, namely, arm and calf circumference along with perceived competence and social acceptance are associated with the motor performance of children. Therefore, further study needs to determine what kinds of variables might be powerful predictors of motor performance. This study did not investigate the home background, or parents' background, or the physical activity at home. Therefore, the significance of these contributions to the motor competence of the children is unknown.

CHAPTER VI

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to compare the physical growth, motor performance, and perceived competence and social acceptance between Korean-American and American children. The hypotheses relating to the physical growth of children in this study were that (1) Korean-American children weigh less than American children; (2) Korean-American children are shorter in stature than American children; (3) Korean-American children are shorter in sitting height than American children; (4) Korean-American children have a lower total skinfold than American children; (5) Korean-American children have less biacromial breadth than American children; (6) Korean-American children have less biiliac breadth than American children; (7) Korean-American children have shorter forearms than American children; (8) Korean-American children have shorter upper arms than American children; (9) Korean-American children have smaller upper arm circumferences than American children; (10) Korean-American children have smaller calf circumferences than American children.

The hypotheses relating to the motor performance skills of children in this study were that (11) Korean-American children have a lower level of proficiency in selected locomotor skills than American children as reflected in the composite score of locomotor proficiency. (12) Korean-American children have a lower level of proficiency in selected object control skills than American children, as reflected in the composite scores of object control.

The hypotheses of perceived competence and social acceptance in this study were that (13) Korean-American children have lower scores in perceived physical competence than American children; (14) Korean-American children have higher scores in perceived cognitive competence than American children; (15) Korean-American children have lower scores in perceived peer acceptance than American children and (16) Korean-American children have higher scores in perceived maternal acceptance than American children. The final set of hypotheses suggested that (17) variance in locomotor skills and object control skills will be accounted for in part by physical growth and perceived competence and social acceptance in both racial groups.

The sample size (N=49) consisted of Korean-American (N=24) and American boys (N =25). The Korean-American boys' age group ranged from 38 months to 68 months and the American boys' age group ranged from 36 months to 69 months. Korean-American boys were volunteers whose parents responded to advertisements on the public bulletin board at Michigan State University, from the Korean Association including the Korean language school, Korean churches and Korean temples, and from letters distributed at preschools in the Lansing area. The second sample consisted of native American boys who were born in the United States with parents who were Caucasian-American. The sample of Korean-American boys were born in the United States or brought to the United States before the age of two, who had Korean parents.

The total test time was 40 minutes for its administration. The test began with measuring the subjects' physical growth for a period of 10 minutes. A period of 20 minutes was required for testing motor skills. The motor skills test was divided into two sessions: locomotor assessment for 10 minutes and object control assessment for 10

minutes. The interview for assessing perceived competence and social acceptance also required 10 minutes and was performed in a quiet room.

A differences in physical size, motor performance skills and perceived competence and social acceptance between Korean-American and American children (from the hypothesis 1 to hypothesis 16) were tested via t-tests. Also, factor analysis and regression analysis were implemented to determine the relative influence of physical growth, perceived competence and social acceptance on motor skill performance (hypothesis 17).

The results of this study are that only three of the 10 hypotheses related to physical size were supported; (1) Korean-American children have less weight than American children; (5) Korean-American children have less biacromial breadth than American children; (8) Korean-American children have shorter upper arms than American children. The other seven hypotheses in this study pertaining to physical growth were not supported; namely, that Korean-American children were shorter in height and sitting height, lower total skinfold, less biilac breadth, shorter forearms, and smaller upper-arm circumferences and calf circumferences than American children.

The two hypotheses relating to motor performance were not supported. Korean-American children were not different in selected locomotor skills than American children, as reflected in the composite score of locomotor proficiency; and Korean-American children did not have a lower level of proficiency in selected object control skills than American children, as reflected in the composite scores of object control.

The four hypotheses relating to perceived competence and social acceptance were also not supported. The scores of Korean-American children in perceived physical

competence were similar to those of American children. Korean-American children had similar scores in perceived cognitive competence as American children. Korean-American children had similar scores in perceived peer acceptance as American children. Korean-American children had similar scores in perceived maternal acceptance as American children.

The results showed that standard scores of locomotor skills could be partially explained by the contribution of arm circumferences for both Korean-American (R^2 = .15), and American children (R^2=.24). The results showed that standard scores of object control skills could be partially explained by the contribution of scores relating to peer acceptance (R^2=.31) for Korean-American children, while standard scores of object control skills for the American children could be partially explained by the contribution of calf circumferences (R^2=.20).

Conclusions

Based upon the finding and within the limitations of this study the following conclusions were reached:

1. Korean-American children have less weight, less biacromial breadth, shorter upper arms than American children. Korean-American children are not shorter in stature and sitting height, lower total skinfold, less billiac breadth, shorter forearms, smaller upper-arm circumferences and calf circumferences than American children. However, there were some differences in physical size of Korean-American children but these differences did not reach statistical significance.

2. Korean-American children do not have a lower level of proficiency in selected locomotor skills and object control skills than American children as reflected in the

composite score of locomotor proficiency. However, these results may apply only to Korean-American children living in similar environments as American children.

3. There were no statistically significant differences in perceived physical competence, cognitive competence, peer acceptance and maternal acceptance between Korean-American and American children. This finding suggests that the hypothesized differences between foreign-born children and those born in the United States to foreign-born parents may become aculturized into their new environments at a rapid rate. Quite possibly, the bicultural environment is the lifestyle of choice of many Korean-American families.

4. The results of the present study suggested that arm circumferences and peer acceptance are the most important variables influencing motor performance skills for Korean-American children, while arm circumferences and calf circumferences are the most important variables influencing motor performance skills for American children. This result suggests that the variables of physical size and peer acceptance have an influence on locomotor and object control skills. Haubenstricker and Ewing (1985) reported that when various measures of physical size were correlated with measures of motor performance, it was the measures of skinfold that correlated most frequently with measures of motor performance. Skinfolds generally contributed from 10% to 20% of the variance in motor performance that was attributable to physical growth. Thus, a greater circumference of upper and lower extremites is likely to be positively related to motor performance to the degree that the measure represents muscle and bone and it will be negatively related to the degree that the measure represents subcutaneous fat. Also, many other variables such as family and economic background could have an influence

could have an influence on motor performance skills, but these variables were not assessed in this study.

Implications for Preschool Teachers, Educators and Parents

Preschool teachers should know that there are some differences in physical size between Korean-American and American children. The preschool teacher should recognize that American children have more weight, more biacromial breadth and longer upper arms than Korean-American children. Also, even though Korean-American children have a tendency to be shorter in stature and sitting height, lower total skinfold, less biiliac breadth, shorter forearms, smaller upper-arm circumferences and calf circumferences than American children, these variables were not statistically significant. The results in the present study should apply only to Korean-American and American boys who live in similar environments to those of this study.

Preschool teachers should know that there were no differences in the level of motor performance skills between Korean-American and American children. These results could apply to children who have been raised in similar environment to those of this study. However, preschool teachers need to be aware of where Korean-American children live and how parents positively help their children develop motor performance skills. For instance, if Korean-American children are from graduate school apartments as were the Korean-American children in this study, they might have more opportunities to play outside than is the situation in other communities. Quite possibly, the parents of the Korean-American boys may also have placed a high value on physical competence. The ability to prosper in a bicultural environment by selecting and retaining the best of both cultures may be a widely-practiced lifestyle of Korean-Americans. The findings of this

between children of different ethnic or cultural groups may be false. Teachers should base their instructional strategies on observable and valid differences on an individual basis, irrespective of gender, race or creed.

This study reported that there was no statistically significant difference between Korean-American children and American children in the parameters of perceived competence. In addition, because the boys came from different environments or home backgrounds, this study suggests that preschool teachers and educators should determine and nourish the perceived competence and social acceptance of children on an individual basis by taking into account the individual needs of the child and the context in which the learning takes place. This study suggest that there are far more similarities than differences between Korean-American and American boys with reference to their physical, motor and social development.

The results in the present study were that arm circumferences and peer acceptance are the most important variables influencing motor performance skills for Korean-American children, while arm circumferences and calf circumferences are the most important variables influencing motor performance skills for American children. Therefore, when the children do not perform well in specific motor tasks, preschool teachers and educators should consider such variables as physical size and perceived physical competence as contributing variables. This investigation suggests that motor performance skills are influenced by many factors; therefore, preschool teachers and educators should structure the learning environment to emphasize individual goals within a social setting that promotes acceptance of all individuals regardless of motor prowess, race or ethnic background. Educators should be aware that preconceptions of skills and

abilities may be groundless. Assessments of performance and prescriptions for change must be based on judgements that are unencumbered by opinion or supposition.

Recommendations for Future Research

Embedded within this study have been a series of suggestions for future research that are based on the experience and findings of the present study.

1. Further study should have the same person measure all of the physical growth. Similarly, one assessor should test all the motor performance skills. If this is not possible then acceptable interrator reliabilities hsould be established.

2. In order to represent the whole population, further study should enlist a stratified random sample of socioeconomic environments in order to obtain a large sample and simultaneously to reduce the standard deviations within a group.

3. Further study should measure similar socioeconomic conditions or environments for Korean-American children and American children .

4. More precise information could be obtained if further studies assessed the physical growth, motor performance skills and perceived competence and social acceptance of Korean-American children, and Korean children in Korea and compared these data to those of American children. For instance, investigating physical growth of Korean-American children and Korean children in Korea would permit the researcher to determine whether Korean-American children were influenced by American environmental factors and if these are differences between Korean-American children in the United States and Korean children in Korea.

5. Further research should test all samples in the same period of time or have similar environments for testing motor performance skills.

6. Further study should involve parents of both samples to a similar degree. Preferably there would be no involvement of parents during any of the tests.

7. In order to reduce the possibility of parental influence on perceived competence and social acceptance for both Korean-American and American children, additional studies should attempt to eliminate the presence of parents from the interview site.

8. Additional study should determine what kinds of variables may influence the motor performance of children. This study did not investigate such potentially important variables as home background, parents' background or physical activity in the home. A preconceived list of potentially important variables including an estimate of body mass index, biological age and assessment of free play activity would have reduced the speculation that resulted from incomplete data.

APPENDICES

APPENDIX A

INFORMED CONSENT FORM

Revised 8/23/93

INFORMED CONSENT FORM

I, _____ hereby agree to allow _____ _____ to participate as a volunteer in the study of motor performance relative to the physical size, perceived competence and social acceptance as an authorized part of the investigation at Michigan State University under the investigator of A-Ran Chong (Master's degree student, Department of Physical Education and Exercise Science, MSU).

The purpose of this study is to determine the influence of physical size, perceived competence and social acceptance on the motor performance of Korean-American and American children in the greater Lansing area. Your child's physical size, including height, weight, sitting height, arm length, skinfolds and arm and leg circumference will be measured. In addition, your child will be tested for the fundamental movement skills of running, catching, skipping, hopping and throwing. In addition, your child will be asked to respond to pictures that are designed to assess his/her perceived competence and social acceptance.

The study and my child's part in the study have been defined and fully explained to me and I understand this explanation. I have been given the opportunity to ask questions and my inquiries have been answered to my satisfaction. I understand that my child's participation in this study does not guarantee any beneficial results to me or my child.

I (we) understand that if I am injured as a result of my participation in this research project, Michigan State University will provide emergency medical care if necessary. I further understand that if the injury is not caused by the negligence of MSU, I am personally responsible for the expense of this emergency care and any other medical expenses incurred as a result of this injury.

I understand that any data or answers to questions will remain anonymous with regard to my child's identity in any publications or presentations related to this project. The investigator will ensure confidentiality of the data during its collection, storage and interpretation. Within these restrictions, results of this study will be made available to me at my request. I FURTHER UNDERSTAND THAT I AM FREE TO WITHDRAW MY CONSENT AND DISCONTINUE MY CHILD'S PARTICIPATION AT ANY TIME.

If I have any questions at any time during the testing or afterward regarding my child's participation in this study, I am to contact A-Ran Chong at 346 Owen Hall, Tel (517) 355-3865 or Vern Seefeldt at 213 IM Sports Circle, Tel (517) 353-6689.

_____ _____

Date Parent/ Guardian's Signature

APPENDIX B

A SAMPLE OF RECORDING MEASUREMENTS OF PHYSICAL GROWTH, FUNDAMENTAL MOVEMENT SKILLS, PERCEIVED COMPETENCE AND SOCIAL ACCEPTANCE

Record of Subjects

NO.	NAME (FIRST)	BIRTHDATE	NATIONALITY (K-A/A)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			

A Sample of the Recording of Physical Growth Data (A)

No.	Name (First)	Weight	Height	Sitting height	Biocromial breadth	Billiac breadth
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

A Sample of the Recording Physical Growth Data (B)

No.	Acromradio length	Radiostylon length	Skinfold			Total skinfold	Circumference		
			Triceps	Subscapular	Umbilicus		upper arm	leg	calf
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									

TEST OF GROSS MOTOR DEVELOPMENT - TGMD

Child's name _____ (first) Examiner's name _____

Birthdate _____ Age (yrs/mos) _____ Date of testing _____

Subject No. _____

T1	T2	T3	Score	Skill/Criteria	Age 60% master criterion
				LOCOMOTOR SKILLS	
				RUN (60% of all 6 year olds achieve all criteria)	
__	__	__	____	1. Brief period where both feet are off the ground	3
__	__	__	____	2. Arms in opposition to legs, elbows bent	4
__	__	__	____	3. Foot placement near or on a line, not flat footed	3
__	__	__	____	4. Non support leg bent about 90° close to buttocks	5
				GALLOP (60% of all 8 year olds achieve all criteria)	
__	__	__	____	1. A step forward with the lead foot followed by a step with trailing foot to a position adjacent to or behind the lead foot	4
__	__	__	____	2. Brief period where both feet are off the ground	3
__	__	__	____	3. Arms bent and lifted to waist level	8
__	__	__	____	4. Able to lead with the right and left foot	4
				HOP (60% of all 8 year olds achieve all criteria)	
__	__	__	____	1. Foot of nonsupport leg is bent and carried in back of body	5
__	__	__	____	2. Nonsupport leg swings in pendular fashion to produce force	7
__	__	__	____	3. Arms bent at elbows and swing forward on takeoff	7
__	__	__	____	4. Able to hop on the right and left foot	4
				LEAP (60% of all 9 year olds achieve all criteria)	
__	__	__	____	1. Take off on one foot and land on opposite foot	6
__	__	__	____	2. A period where both feet are off the ground (longer than running)	7
__	__	__	____	3. Forward reach with arm opposite the lead foot	8
				JUMP (60% of all 10 year olds achieve all criteria)	
__	__	__	____	1. Preparatory movement includes flexion of both knees with arms extended behind the body	5
__	__	__	____	2. Arms extend forcefully forward and upward reaching full extension above head	9
__	__	__	____	3. Take off and land on both feet simultaneously	3
__	__	__	____	4. Arms are brought downward during landing	6
				SKIP (60% of all 7 year olds achieve all criteria)	
__	__	__	____	1. A rhythmical step-hop on alternate feet	5
__	__	__	____	2. Foot of nonsupport leg is near surface on hop	6
__	__	__	____	3. Arms move in opposition to legs at waist level	7

SLIDE (60% of all 9 year olds achieve all criteria)

_ _ _ _____	1. Body turned sideways to direction of travel	5
_ _ _ _____	2. Sideways step followed by slide of trailing foot	4
_ _ _ _____	3. A short period where both feet are off the floor	3
_ _ _ _____	4. Able to slide to the right and to the left side	4

☐ TOTAL POINTS EARNED ON LOCOMOTOR SKILLS

(26 points maximum)

OBJECT CONTROL SKILLS

TWO-HAND STRIKE (60% of 10 year olds achieve all criteria)

_ _ _ _____	1. Dominant hand grips bat above nondominant hand	3
_ _ _ _____	2. Nondominant side of body faces the tosser	5
_ _ _ _____	3. Hip and spine rotation	8
_ _ _ _____	4. Weight is transferred by stepping with front foot	8

BOUNCE (60% of all 8 year olds achieve all criteria)

_ _ _ _____	1. Contacts ball with one hand at about hip height	7
_ _ _ _____	2. Pushes ball with fingers (not a slap)	6
_ _ _ _____	3. Ball contacts floor in front of (or outside of) foot on the side of the hand being used	7

CATCH (60% of all 8 year olds achieve all criteria)

_ _ _ _____	1. Preparation phase where elbows are flexed and hands are in front of body	4
_ _ _ _____	2. Arms extend in preparation for ball contact	4
_ _ _ _____	3. Ball is caught and controlled by hands only	7
_ _ _ _____	4. Elbows bend to absorb force	7

KICK (60% of all 10 year olds achieve all criteria)

_ _ _ _____	1. Rapid continuous approach to the ball	4
_ _ _ _____	2. Trunk is inclined backward during ball contact	8
_ _ _ _____	3. Forward swing of arm opposite kicking legl	8
_ _ _ _____	4. Follow-through by hopping on nonkicking foot	10

THROW (60% of all 10 year olds achieve all criteria)

_ _ _ _____	1. Downward arc of throwing arm initiates windup	6
_ _ _ _____	2. Rotation of hip and shoulder to a point where nondominant side faces an imaginary target	7
_ _ _ _____	3. Weight is transferred by stepping with foot opposite the throwing hand	6
_ _ _ _____	4. Follow-through beyond ball release diagonally toward the opposite throwing arm	8

☐ TOTAL POINTS EARNED ON LOCOMOTOR SKILLS

(19 points maximum)

TEST OF GROSS MOTOR DEVELOPMENT - TGMD

Child's name _____ Child's age _____
(first)

Subject No. _____

Subtests	Raw Scores	%iles	Standard Scores
Locomotor skills	_____	_____	_____
Object-control skills	_____	_____	_____
Explanation			

Standard Score	Description
17-20	Very Superior
15-16	Superior
13-14	Above Average
8-12	Average
6-7	Below Average
4-5	Poor
1-3	Very Poor

Child's strengths on this test:

Child's weaknesses on this test:

The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children*
Individual Recording and Scoring Sheet, Form P-K

Child's name (First) _____

Subject Number _____

Item	Order and Description	Cognitive Competence	Peer Acceptance	Physical Competence	Maternal Acceptance
1.	Good at puzzles	1 ___			
2.	Has lots of friends		2 ___		
3.	Good at swinging			3 ___	
4.	Mom smiles				4 ___
5.	Gets stars on papers	5 ___			
6.	Stays overnight at friends		6 ___		
7.	Good at climbing			7 ___	
8.	Mom takes you places				8 ___
9.	Knows names of colors	9 ___			
10.	Has friends to play with		10 ___		
11.	Can tie shoes			11 ___	
12.	Mom cooks favorite foods				12 ___
13.	Good at counting	13 ___			
14.	Has friends on playground		14 ___		
15.	Good at skipping			15 ___	
16.	Mom reads to you				16 ___
17.	Knows alphabet	17 ___			
18.	Gets asked to play by other		18 ___		
19.	Good at running			19 ___	
20.	Mom plays with you				20 ___
21.	Knows first letter of name	21 ___			
22.	Eats dinner at friends		22 ___		
23.	Good at hopping			23 ___	
24.	Mom talks to you				24 ___
	Column (Subscale) Total:	☐	☐	☐	☐
	Column (Subscale) Mean: (Total Divided by 6)	___	___	___	___

Comments:

APPENDIX C

DESCRIPTION OF MEASUREMENTS IN PHYSICAL GROWTH FUNDAMENTAL MOVEMENT SKILLS AND PERCEIVED COMPETENCE AND SOCIAL ACCEPTANCE

Physical Growth Measures

Purpose: To determine whether Korean-American and American boys have differences in physical growth, body physique and body fat.

Facilities and Equipment: A room or space at least eight feet by ten feet. Anthropometric equipment: (1) anthropometer or device for measuring linear growth; (2) scales for measuring weight; (3) skinfold caliper for measuring skinfold thicknesses; (4) spreading caliper for measuring biacromial and biiliac breadth, a tape measure for measuring segmental circumferences.

Preparation for Testing Subjects: To measure physical growth, each child wore a bathing suit and was barefoot.

Scoring: The measurements were read aloud to the nearest millimeter and recorded by a recorder.

Procedures and Measurements: Measurements were taken on the left side of the body, according to procedures listed by Weiner and Lourie (1981). All values were read to the nearest millimeter except weight, which was recorded to the nearest pound.

Weight: The measurement was corrected accordingly by adjusting the machine to read zero when a sample garment was placed on it. In all other circumstances, including when trousers were worn, the weight of a representative garment was entered on the form, for later subtraction.

Standing height: Height was measured in bare feet, with feet together, head in the Frankfort plane ("look straight ahead"), and standing erect ("stand up tall" or "stand up real straight" with some assistance and demonstration when necessary). However, no upward pressure was exerted by the examiner on the subjects' mastoids to purposely "stretch everyone in a standard manner."

Sitting height: The subjects sat on a 40mm bench with knees at a ninety-degree angle, also without upward pressure and a straightened back.

Biacromial breadth (shoulder width): To give maximum shoulder width, the subject stood with shoulders relaxed, but not slumping forward. Standing behind the subject, the measurer felt for the outside edge of the acromion process of the shoulder blade, which is felt just above the shoulder joint. Then placing the edge of one arm of the anthropometer along the later border of one acromion process and bringing the other arm of the anthropometer inward until its edge rested on the lateral border of the opposite acromion process, the breadth was read to the nearest millimeter (Weiner & Lourie, 1981).

Biiliac breadth (hip width): The subject stood with his heels together. The arms of the anthroprometer were brought into contact with the iliac crests and rested at the place that gave the maximum diameter. Strong pressure was applied to the anthropometer blade. Measurements were taken with the measurer standing behind the subject (Weiner & Lourie, 1981).

Acromradial length (upper arm): Taken horizontally at the maximum circumference

over the contracted biceps, with the elbow flexed (Weiner & Lourie, 1981).

Radiostylon length (forearm length): Measured from the marked head of the radius to the tip of the radial styloid (Weiner & Lourie, 1981).

Skinfold Thicknesses: The subject stood freely. Skinfold thickness was measured by placing a caliper over a fold of skin and the underlying fat tissue was lifted between the examiner's thumb and forefinger at clearly specified body sites (Haywood, 1986).
Triceps: The skinfold was picked up at the back of the arm about one cm above the level marked on the skin for the arm circumference and directly in line with the olecranon process (Weiner & Lourie, 1981).
Subscapular: The skinfold was picked up under the inferior angle of the left scapula. The fold was vertical or slightly inclined
downward and laterally, into the natural cleavage of the skin
(Weiner & Lourie, 1981).
Umbilicus: The skinfold was picked up at the level of the umbilicus, five cm to the left of it.

Circumferences

Upper arm circumference: The subject's left arm was placed in a natural, relaxed manner at the side. The circumference was measured midway between the shoulder and elbow joints.
Thigh circumference: The left foot of the subject was placed on a bench 30cm high. The circumference of the thigh was measured one-half way between the knee and the hip joints.
Calf circumference: The position described in the measurement of thigh circumference was maintained by the subject. The calf circumference was measured at its greatest circumference with the leg flexed at 90 degree.

Measurement of Fundamental Movements Skills

Purpose: To determine whether Korean-Americans and Americans demonstrate any differences of fundamental movement skills.

Facilities and Equipment: An isolated space in the gym. Small and large balls, bats, pins and tapes.

Preparing the Subjects for the Test: Each subject wore comfortable clothes for moving and sports shoes.

Instructions to the Subject: Instructions were those that were prescribed when administrating the test of gross motor development (Ulrich, 1985). Each motor skill was explained and demonstrated by the test administrators.

Scoring: The scores of the following locomotor skills was recorded: galloping, hoping, leaping, jumping, skipping, and sliding. The score of object control skills included: two-hand striking, bouncing, catching, kicking, throwing. Scoring was according to the test of gross motor development (Ulrich, 1985).

INSTRUCTIONS FOR ADMINISTERING THE TEST OF GROSS MOTOR DEVELOPMENT

Your scoresheet for the TGMD has spaces for three trials for each criterion for each skill. In those spaces, record a "√" if the skill was observed and a "0" if the skill was not observed. If the child demonstrates the skill on two or three trials, he/she receives a score of "1" for that skill. If not, he/she receives a score of "0".

LOCOMOTOR SKILLS

RUN	Mark a starting line and a finish line 50 feet apart. Instruct student to "run fast" from one line to the other.
GALLOP	Mark a starting line and a finish line 30 feet apart. Tell the student to gallop from one line to the other. Ask the student to gallop again. leading with the other foot.
HOP	Ask student to hop three times, first on one foot and then on the other. You will need a minimum of 15 feet of clear space.
LEAP	Ask the student to leap. Tell him/her to take large steps leaping from one foot to the other. You will need a minimum of 30 feet of clear space.
HORIZONTAL JUMP	Mark off a starting line on the floor. Have the student start behind the line and tell the student to "jump far." You will need 10 feet of clear space.
SKIP	Mark off a starting line and finish line 30 feet apart. Tell the student to skip from one line to the other. You will need 30 feet of clear space.
SLIDE	Mark off a starting line and a finish line 30 feet apart. Tell the student to slide from one line to the other. The student should demonstrate sliding leading with the left foot then the right. You will need 30 feet of clear space.

OBJECT CONTROL SKILLS

TWO-HAND STRIKE	Toss the ball softly to the student at about waist level and tell the student to hit hard. Only count tosses between the student's waist and shoulders. Use a 4 to 6" lightweight ball and a plastic bat.
BOUNCE	Tell the student to bounce the ball three times using one hand. Use a 8 to 10" playground ball and make sure the ball is not underinflated.
CATCH	Mark off two spots 15 feet apart. Student stands on one spot and the tosser on the other. Toss the ball underhand and ask the student to "catch it with your hands." Count tosses that are between the student's shoulders and waist. Use a 6-8" sponge ball.
KICK	Mark off two spots 20 feet and 30 feet from the wall. Place an 8-10" playground ball on the 20 foot spot and ask the student to stand on the 30 foot spot. Tell the student to kick the ball "hard" toward the wall.
OVERHAND THROW	Ask the student to stand about 25 feet from the wall and to throw a tennis ball "hard" at the wall.

Table B1
Standard scores and percentiles for locomotor subtest for different ages

Standard Score	Ages 3	4	5	6	7	8	9	10	Percentile Rank
1	0	0-3	0-3	0-4	0-5	0-8	0-9	0-13	
2	1	4	4-6	5-6	6-7	9-12	10-12	14-16	<1
3	2	5	7	7	8-10	13-15	13-16	17	1
4	3	–	8-9	8-10	11	16-17	17-18	18	2
5	–	6	10	11-12	12-15	18	19	19	5
6	4	7	11-12	13	16	19-20	20	20-21	9
7	5	8	13	14-15	17	21	21	22	16
8	6	9	14	16	18-19	22	22	23	25
9	7	10-11	15	17	20	23	23	24	37
10	8-9	12	16	18-19	21	23	25	25	50
11	–	13	17	20	22	–	–	–	63
12	10	14-15	18-19	21	23	25	25	26	75
13	11	16	20-21	22	23	24	–	–	84
14	12	17	22-23	–	25	26	26		91
15	13	18	24	24	26				95
16	14	19	25-26	25-26					98
17	–	20-26							99
18	15								>99
19	16-26								
20									

Table B2
Standard scores and percentiles for object control subtest for different ages

Standard Score	Ages 3	4	5	6	7	8	9	10	Percentile Rank
1				0-1	0-3	0-4	0-5	0-6	
2			0	2	4	5	6-7	7	≤1
3		0	1	3	5	6-9	8-9	8-12	1
4		1	–	–	–	10	10-11	13-14	2
5	0	2	2	4	6	11	–	15	5
6	–	–	3	5	7-8	12	12	16	9
7	1	3	4	6	9-10	13	13	–	16
8	–	–	5	7-8	11	14	14-15	17	25
9	2	4	6	9	12-13	15	16	–	37
10	–	–	7	10	14	16	17	18	50
11	3	5	8	11	15	17	–	–	63
12	–	6	9-11	12-13	16	–	18	–	75
13	4	7	12-13	14	17	18	–	19	84
14	5	–	14-15	15	18	–	19		91
15	6-8	8	24	24	26				95
16	9-10	9	18	18-19	19				98
17	11-12	10-12	19						99
18	13	13-15							>99
19	14-19	16-19							
20									

Perceived Competence and Social Acceptance Measures

Purpose: To learn whether Korean-American and American children demonstrated different levels of perceived competence. The results determined whether Korean-American and American children differed in relative physical competence, cognitive competence, peer acceptance and maternal acceptance.

Facilities and Equipment: The scale was administered by the investigator with the subject in a quiet room away from distractions. The assessment was determined via an interview with the subject. If the child did not want to leave his mother or father, the parent accompanied the child. Korean-American children who spoke Korean better than English were tested in the Korean language. Also, some items were changed slightly from the original version of the test so the children could understand each item (See test items on page 93).

Instructions to the Subject: Instructions were those suggested by the instructional manual: The pictorial scale of perceived competence and social acceptance for young children (Harter & Pike, 1983).

Changing Items for Preparing Test for Subject: Some items were changed because they were not familiar to the Korean-American and American children; other items were not familiar to the Korean-American children, only. The following table indicates which items were changed, via an underline.

Description of items with changes: items
(for Preschool-kindergarten)

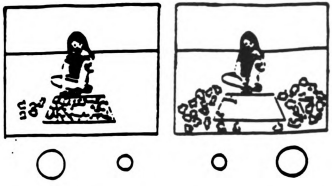
Cognitive Competence	Physical
Good at puzzles	Good at swinging
Gets stars on paper-hard work to have reward	Good at climbing
Knows names of colors	Can tie shoes
Good at counting	Good at skipping
Knows alphabet - Korean or American	Good at running
Knows first letter of name-Korean or American	Good at hopping

Peer Acceptance	Maternal
Has lots of friends	Mom smiles
Stays overnight at friends'	Mom takes you places you like
Has friends to play with	Mom cooks favorite foods
Has friends on playground	Mom reads to you
Gets asked to play with others	Mom plays with you
Eats dinner at friends' houses	Mom talks to you

Procedure: The items were represented by the pictorial scale of perceived competence and social acceptance: Plate-preschool and kindergarten, male) (Harter & Pike, 1980). Each item has a picture plate consisting of two pictures, one picture describing a child who was competent and accepted for that item, the other describing a child who was not competent and accepted. Items were counterbalanced with regard to the side on which the most competent and accepted

picture was placed. A brief statement about each child was read and the child was asked to indicate which of the two children he or she was most like. After making that decision the child was told to look only at the picture on that side of the page and indicate whether he or she was a lot like the child (point to a big circle) or a little like the child (point to a small circle).

Sample item



Scoring: Each item was scored on a four-point scale, with a score of four reflecting the most competent acceptance and a score of one being the least competent acceptance. Item scores were averaged across the six items for a given subscale. The four means provided the child's profile of perceived competence and social acceptance. However, specific information for scoring was provided by the "Procedural Annual to Accompany: The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1983).

APPENDIX D

DATA OF FACTOR ANALYSIS

Table D1
Korean-American children

SPSS/PC+

- - - -FACTOR ANALYSIS - - - -

Varimax Rotation 1, Extraction 1, Analysis 2 - Kaiser Normalization.

Varimax converged in 6 iterations.

Rotated Factor Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
HT	0.96453	0.13842	0.00558	-.04020	0.01419
RADIO	0.93590	0.17446	0.06897	-.09742	-.01484
BIACRO	0.92642	-.04113	0.04113	-.01997	0.19930
ACRO	0.91693	0.15417	-.12640	-.02318	-.05886
SITHT	0.89711	0.15473	0.08052	0.01920	-.08960
WT	0.89454	0.38619	0.02464	-.08973	0.06626
BILLI	0.84103	0.06018	0.08873	-.09795	0.21896
TTSCRE	0.65684	-.14419	0.62022	0.32794	0.06448
CALFC	0.61355	0.56565	0.18371	0.19228	0.14985
TTSKIN	0.06802	0.95763	-.11844	-.09765	0.09705
UMBI	-.01978	0.90799	-.10465	-.19549	0.06233
TRICEPS	0.09554	0.87478	-.07103	0.19714	0.04118
ARMC	0.35462	0.81170	0.18765	-.16930	0.03521
SUBSCQ	0.22562	0.74568	0.09514	-.17327	0.25376
LOCSS	-.00358	0.05404	0.96118	-.23949	0.02268
LOCPER	0.02847	0.03455	0.95345	-.25465	0.00781
TTSTSCRE	-.14519	-.03957	0.90319	0.31650	0.11574
LOCST	0.56653	-.07327	0.79930	0.01199	0.05154
OCPER	-.16298	-.12552	-.09316	-.91853	0.14017
OCSS	-.23376	-.15335	-.07557	0.91249	0.15406
OCST	0.58625	-.20684	0.14929	0.70692	0.06376
PEERCMP	0.12749	0.16464	-.10289	0.60817	0.54850
COGCMP	0.03609	0.12405	-.01572	-.12543	0.91236
PHYCMP	0.03826	0.13125	0.07424	0.31920	0.84485
MATACC	0.11328	0.10482	0.16344	0.27982	0.81917

Factor Transformation Matrix

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
FACTOR 1	0.87924	0.37907	0.23158	-.00446	0.17202
FACTOR 2	0.14772	-.68673	0.45904	0.52173	0.15380
FACTOR 3	-.17138	0.34189	-.33851	0.62115	0.59441
FACTOR 4	-.41586	0.37066	0.77211	-.15194	0.26539
FACTOR 5	-.05291	0.36115	0.15782	0.56468	-.72319

SPSS/PC+

- - - -FACTOR ANALYSIS - - - -

Factor Score Coefficient Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
WT	0.11366	0.04107	-.02872	-.01931	-.00687
HT	0.13982	-.02261	-.04159	-.01539	-.01315
SITHT	0.12558	0.00407	-.01131	0.02738	-.07430
BIACRO	0.14048	-.08731	-.04323	-.05269	0.08586
BILLI	0.11964	-.06073	-.02539	-.07373	0.09564
ACRO	0.13858	-.01052	-.07174	0.00172	-.04455
RADIO	0.13128	-.01102	-.02162	-.02706	-.02327
TRICEPS	-.03555	0.24800	0.00549	0.14098	-.10133
SUBSCQ	-.01456	0.15529	0.02363	-.04039	0.06021
UMBI	-.04959	0.22621	-.00702	-.00523	-.02865
TTSKIN	-.03984	0.23946	-.01279	0.02868	-.03421
ARMC	-.00044	0.19182	0.05472	0.00297	-.05262
CALFC	0.04850	0.12831	0.03682	0.09453	-.03642
COGCMP	-.01059	-.07323	-.04487	-.18430	0.42443
PEERCMP	0.00168	0.03198	-.03971	0.14840	0.13797
PHYCMP	-.01894	-.02254	-.00697	-.00518	0.31689
MATACC	-.00941	-.03231	0.01353	-.01682	0.30947
LOCST	0.05235	-.03289	0.18964	0.00149	-.01257
LOCSS	-.04712	0.02152	0.26105	-.06650	0.00166
LOCPER	-.04036	0.01421	0.25709	-.07197	-.00071
OCST	0.08644	-.03137	0.02004	0.23174	-.00071
OCSS	-.03502	0.03304	-.00075	0.30217	-.05550
OCPER	-.02485	0.03806	-.00738	0.30795	-.06577
TTSCRE	0.07528	-.03693	0.14020	0.10582	-.04380
TTSTSCRE	-.06774	0.04127	0.25728	0.11745	-.03200

Covariance Matrix for Estimated Regression Factor Scores:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5
FACTOR 1	1.00000				
FACTOR 2	0.00000	1.00000			
FACTOR 3	0.00000	0.00000	1.00000		
FACTOR 4	0.00000	0.00000	0.00000	1.00000	
FACTOR 5	0.00000	0.00000	0.00000	0.00000	1.00000

Table D2
American children

SPSS/PC+

- - - -FACTOR ANALYSIS - - - -

Varimax Rotation 1, Extraction 1, Analysis 2 - Kaiser Normalization.

Varimax converged in 10 iterations.

Rotated Factor Matrix:

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
BILLI	0.93520	0.08989	-.02854	0.05589	0.12888	0.02312
ACRO	0.92993	0.07316	-.09224	0.03296	0.15074	0.16660
RADIO	0.84301	0.10700	0.01711	0.14558	0.06978	0.31811
BIACRO	0.81160	0.379387	0.02425	0.00303	0.11261	-.10112
HT	0.71831	0.07541	0.12119	0.09326	0.45506	-.35105
SITHT	0.63563	-.04753	0.11670	0.10685	0.32738	-.02926
WT	0.60759	0.52641	0.20604	-.00673	0.33548	-.28581
PEERCMP	0.52125	-.07044	0.41794	-.06949	-.05555	0.44938
TTSKIN	0.10571	0.97678	0.03735	-.00378	0.02452	0.02312
TRICEPS	0.08169	0.91206	-.13399	-.04040	-.07995	0.07756
SUBSCQ	-.14079	0.82906	-.04463	0.11492	-.10602	0.16626
UMBI.	0.21648	0.74709	0.28270	-.01395	0.21320	-.18416
ARMC0	.26703	0.73520	0.35569	0.24624	0.29811	-.13201
CALFC	0.32943	0.67859	0.21136	0.28148	0.27616	-.35445
LOCSS	-.03520	0.07571	0.93847	0.26383	0.09594	-.03985
LOCPER	0.00984	0.11033	0.93439	0.26134	0.08890	-.01349
TTSTSCRE	0.00556	0.09677	0.72043	0.66876	0.09386	-.06653
OCSS	0.04999	0.09339	0.27242	0.93806	0.0619	-.07796
OCPER	0.10279	0.08153	0.25533	0.93592	0.07493	-.05225
COGCMP	0.16978	0.13551	-.13439	-.29166	0.77683	0.20265
TTSCRE	0.41492	0.00216	0.25002	0.41642	0.66777	-.23645
OCST	0.37717	0.05248	0.08523	0.59552	0.64510	-.17144
LOCST	0.32327	0.08600	0.61502	0.12952	0.62574	-.18205
PHYCMP	0.14415	0.03166	00.16658	0.20018	0.57832	0.09708
MATACC	0.11833	-.01354	-.08707	-.12661	0.08952	0.85371

Factor Transformation Matrix

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
FACTOR 1	0.60175	0.41944	0.37839	0.35364	0.42195	-.12524
FACTOR 2	0.55973	0.17824	-.56181	-.54701	0.04477	0.19515
FACTOR 3	-.37545	0.88382	-.05010	-.09456	-.24379	-.08373
FACTOR 4	0.21391	0.04168	0.40103	0.03478	-.52155	0.72004
FACTOR 5	-.20400	-.00417	0.53844	-.69266	0.42258	0.10050
FACTOR 6	-.31026	0.09699	-.29655	0.29289	0.55672	0.64083

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