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thesis entitled
THE DEVELOPMENTAL RELATIONSHIP BETWEEN PERCEIVED AND ACTUAL COMPETENCE IN MOTOR ABILITY AND THE RELATIONSHIP OF EACH TO MOTIVATION TO PARTICIPATE IN SPORT AND PHYSICAL ACTIVITY

presented by
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has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Health and Physical Education

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Date November 2, 1984

ABSTRACT

THE DEVELOPMENTAL RELATIONSHIP BETWEEN PERCEIVED AND ACTUAL COMPETENCE IN MOTOR ABILITY AND THE RELATIONSHIP OF EACH TO MOTIVATION TO PARTICIPATE IN SPORT AND PHYSICAL ACTIVITY

By

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Perceived competence has been theorized as having an important affect on one's level of motivation (Griffin & Keogh, 1982; Harter, 1981a; Nicholls, 1978). Actual competence purportedly indirectly affects level of motivation by influencing one's perceptions (Harter, 1981a; Bandura, 1977). Recently investigators have begun to examine the interrelationships among these variables within the motor domain. Critical years in the development of these interrelationships, however, have been virtually unexplored, (i.e., the childhood years). This investigation examined the developmental relationship between perceived and actual competence in motor ability and the relationship of each to motivation to participate in sport and physical activity.

Twenty-five males and 25 females at each grade level, kindergarten through fourth, participated as subjects in this study. Perceived competence in motor ability was measured via two psychometric scales, the Perceived Competence Scale for Children (Harter, 1979b) and the

Pictoral Scale of Perceived Competence and Social Acceptance for Young Children (Harter, Pike, Efron, Chao, & Bierer, 1983). Actual motor ability was measured by performance on a nine-item motor abilities/sport skills assessment battery. Participation motivation was reflected by the child's participation in organized sports.

Univariate and multivariate analyses suggested that for children in these grade levels, perceptions of competence in motor ability were not significantly related to participation in organized sports. Multivariate analysis indicated that actual ability was significantly related to participation in organized sports. Post hoc univariate F tests and discriminant function analysis indicated that the difference in favor of the participants was primarily due to performance on the sport skill items. Multivariate analysis and correlational procedures suggested a significant relationship between perceived competence and actual competence in the motor domain. Again, subjects' scores on the sport skill items were most important in distinguishing among subjects with high, average, and low perceptions of their competence. None of the major relationships examined changed significantly across these five grade levels. For young children, perceived competence may not be an important variable affecting participation in sport. Those who do participate, however, may develop greater levels of skill which, as age and accuracy of self perceptions increase may become important to one's choice to be involved in sport.

ACKNOWLEDGMENTS

My doctoral program has been a long one but certainly filled with constant stimulation and growth. I would like to acknowledge several individuals who, through their perseverance, encouragement, and assistance, were instrumental in helping me complete this stage of my career.

Dr. Vern Seefeldt, for his unwaivering faith in my capabilities and encouragement throughout my program. The high standards he sets for himself and his dedication to research and teaching will be standards of performance toward which I will strive.

Dr. Deb Feltz, whose research efforts and professional attitude I highly respect, and whose advice as a statistician and scholar was particularly helpful throughout my dissertation.

Dr. Joe Varro, for his valued feedback and interest in my program and dissertation.

Dr. Crystal Branta, whom I have known as a committee member, teacher, mentor, colleague, and friend. In each of these roles she has demonstrated the wisdom to know when to advise and when to respect my need to grow and learn on my own. I will always be grateful for her contribution to my years as a graduate student.

Crystal and Jack, for providing me with a home away from home, whenever needed. Their unconditional friendship throughout the last few years has enhanced a relationship which Dale and I will always treasure.

Joy Kiger, for her willingness to help in any way possible, no matter how busy she was.

The principals, teachers, and children of Carterville Elementary School, Carterville, Illinois and Winkler and Parrish Elementary Schools, Carbondale, Illinois, for their interest and participation in this study.

And Dale, for sharing this experience with me as a colleague and husband, for his support, patience, and love.

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CHAPTER 1

INTRODUCTION

Today more than ever, accountability is an issue in physical education, as in all educational programs. For years public school administrators, teachers, and coaches have promoted physical education and sport programs based on a variety of benefits such as physical fitness, motor skill development, positive self-concept, sportsmanship, leadership, cooperation, and moral development (Dauer, 1971; Martens & Seefeldt, 1979; Smoll & Lefebvre, 1979). Apparently the public has not been convinced of either the importance or the ability of the schools to produce such benefits within the school setting. In the past few decades community sponsored sport programs for youth and young children have continually expanded, while funding for physical education is in constant danger of being reduced or eliminated. In addition, the "accountability" era in education is forcing physical educators to produce empirical evidence to support the claims they have made. In Illinois for example, one of the few states which mandates physical education five days a week in the elementary schools, a strong lobby recently attempted to reduce the extent of this mandate. This specific effort was unsuccessful. The establishment of a committee to document justification for physical education, however, by two national associations (Seefeldt, 1984) accentuates the critical nature of this issue.

Several studies have demonstrated that significant changes can be made in the gymnasium, that is, attributes such as fitness (Shephard, Lavellée, Jequier, Rajic, & LaBarre, 1980), cooperation (Rogers, Miller, & Hennigan, 1981), and motor skills (Miller, 1978; Masche, 1970) can be affected. The importance of some of the objectives listed above and the fact that the gymnasium is the most appropriate place in which to promote them seems obvious. For others, their value as specific attributes to be developed via physical activity is not so clear. Should cooperation, development of positive self-concept, and leadership qualities apply more to physical education than to any other academic discipline, or do conditions unique to the gymnasium hold special promise for nurturing such attributes?

Of these attributes, the development of a positive self-concept has recently been a popular source of investigation by researchers in many educational disciplines (Carlson, 1970; Davis, 1981; Pate, 1978). Results of experimental studies have been equivocal. Studies involving physical education and physical activity have resulted in as many supportive as non-supportive conclusions regarding the affectance of a positive change in self-concept (Hughes, 1973; Martinek, Zaichkowsky, & Cheffers, 1977; Schempp, Cheffers, & Zaichkowsky, 1983; Smith, 1982).

The inconsistency in the results of self-perception studies may be attributed to several sources. Byrne (1983) conducted a thorough review of the literature and concluded that a universally accepted and operational definition of self-concept does not exist. Many terms are used interchangeably, such as self-esteem, self-confidence, self-image, body image, self-efficacy, reflected self, and self-concept. In

addition, contradictions frequently exist between theories espoused and measurements used in such research (Sonstroem, 1982). Wylie (1974), in her classic review of the state of the art in self-concept research, recommended either abandoning self-concept theory or making theoretical and methodological changes to make it more scientifically acceptable. She went on to support the latter.

One of the major criticisms of the methodology used in self-concept research relates to the use of a single score for self-concept. This score is based on the non-weighted sum of items reflecting self-perceptions in several domains, such as cognitive, physical, and social. It suggests that people perceive themselves equally in all areas. Sufficient evidence exists indicating that people may feel positive about themselves in one or more domains and negative about their abilities in another. Further, these feelings and the relative importance of each domain may change with age (Sonstroem, 1982).

The most significant and productive self relationships to be investigated involve the areas of a specific domain. A curriculum specialist might investigate the effect of open classrooms versus traditional settings on self-perceptions in the academic area. In physical activity and sport one might investigate the effect of a free play situation versus instruction in motor skills on children's perceptions of themselves in the domain of physical activity.

One might ask why perceptions of one's abilities are important. If one feels positive about oneself in the area of physical skills, will one be more likely to choose to become involved in sport and physical activity? Are perceptions of ability reflective of actual

ability? Limited data exist from which we might answer these questions. However, studies involving upper elementary grade level students suggest that these relationships exist and are positive (Boling & Kirk, 1983; Guyot, Fairchild, & Hill, 1981; Roberts, Kleiber, & Duda, 1981).

A second question which relates to those above is "How do perceptions of competence relate to the primary goals of elementary physical education, i.e., development of motor skills and improvement of fitness?" Ostensibly, these are promoted so that children are competent enough to participate in the common games and sports of childhood and through these games maintain a healthy level of fitness. Little is known about why children choose to become involved. Young children seem to have an incessant desire to be active, but as age increases many become less active. If the skills and concepts learned in the gymnasium are only used during that period of required involvement, the results of physical education would seem to fall short of the objectives of the educational system in general.

The investigation of the relationship of perceptions of ability to actual ability and the relationship of each to participation motivation seems relevant to providing an optimal movement or motor skill development program for children. By understanding the interrelationships of these variables we may determine which ones can be affected within the movement setting. Further, we may better understand how such variables may affect children's desires to become involved in and persist in the games and sports of our culture. Examining theories of motivation seems essential if we are to understand these interrelationships.

Motivation: Theories and Mediating Constructs

Attribution Theory

The most influential approach to motivation theory relative to sport and physical activity has been attribution theory. In this, the basic assumption is that actions are based on a search for understanding (Weiner, 1972). Attribution theory assumes that we judge our successes and failures based on several causal elements, to determine why we succeeded or failed. The major causal categories used are ability, effort, luck, and task difficulty. Weiner (1974) placed these into a two-dimensional model in which causality (internal or external) and stability (stable or unstable) were the dimensions. Each of the four causal elements fell into one of the two levels of each dimension. Ability and effort were internal factors, luck and task difficulty were external. Ability and task difficulty were stable factors, while luck and effort changed, or were unstable. One may legitimately desire to include additional factors in the model, particularly in the sport domain, because the theoretical predictions derive from the dimensions and not the causal factors per se (Roberts & Pascuzzi, 1979).

Self-Perception as a Mediator in Motivation

While attribution theory may remain useful in the investigation of certain aspects of motivation, a growing number of researchers are producing support for perception of ability as the most important determinant of achievement behavior (Covington & Omelich, 1979; Nicholls, 1978; Roberts & Pascuzzi, 1979; Spink & Roberts, 1980).

Several investigators have theorized that attributions of ability and the self-concept of ability play the central role in mediating motivation (Bandura, 1977; Griffin & Keogh, 1982; Harter, 1981a; Kukla, 1978; White, 1959).

The concept of competence was first introduced by White, in 1959, as a psychological construct mediating intrinsically motivated behavior. In his paper, "Motivation reconsidered: The concept of competence," he proposed "effectance" motivation to explain why an individual feels impelled to engage in mastery attempts. He suggested that individuals act because they feel a need to have an effect. If these performance attempts are satisfying, one feels competent, which provides a feeling of efficacy, inherent pleasure and joy. One is also likely to want to repeat that performance. However, White's explanations for such motivational concepts were very general. He viewed competence motivation as a global motive which directed the organism in all achievement-oriented tasks. As such, it did not lend itself to empirical investigation.

In 1978, Harter proposed a framework which expanded White's theory, providing a more specific model of motivation which could be empirically tested. Harter (1981b) concentrated on identifying the specific domains in which competence may be measured, and viewed one's perceptions of competence as the central mediator of one's motivation to achieve in that area. She also has focused on implications of success and failure, the function of rewards in the control exerted by socializing agents, and the relative influence of intrinsic and extrinsic motivation on the competence motive system.

Harter (1981b) identified three primary competence domains (physical, cognitive, and social) plus a general area termed self-worth. This is not surprising, as several theorists in the area of self-concept had done this previously (Coopersmith, 1967; Martinek & Zaichkowsky, 1977; Piers, 1969). However, she demonstrated that rather than assess all domains at once with a collection of specific and overlapping items, from which a total score is used to estimate self-worth or general self-concept, each domain must be assessed independently. General self-concept may or may not be related to any of the specific domains. Children may feel positive about their physical and social skills, negative about cognitive ability, but still have a generally positive feeling about themselves. The use of a composite score may neutralize subjects' strengths and weaknesses, thus, valuable research as well as practical information may be lost (Harter, 1982; Sonstroem, 1982).

A second prominent theoretical model which relates perceived ability to effectance motivation has been proposed by Nicholls (in press). The basic assumptions of his theory are that people's actions are purposeful and are motivated by a desire to (a) demonstrate and/or develop high ability and (b) avoid demonstrating low ability. Individuals can perceive their own level of ability in two ways. First, one may view competence relative to one's past performances or gains in knowledge. Second, competence may be viewed relative to one's peers.

The use of each of these rationales is related to development. Young children focus on self and past experience when they must make

choices concerning motor tasks. Adolescents and older children begin to judge their past performances relative to peer performances. If this comparison leaves them lower than average, they expect to demonstrate low ability. If perceptions indicate that their own abilities are higher than similar others, positive outcomes are expected from performance. Adults use both rationales in varying situations. Thus, the individual's assessment of the probability of the outcome influences subsequent behavior.

Nicholls (in press) drew on attribution theory to some extent by further linking ones perception of ability to effort. For low perceived-ability players, high effort which results in failure, clearly exposes a basic lack of ability. Therefore, in order to avoid exhibiting this low ability they avoid high effort situations. In sport situations, two options are open to these players. They may drop out, which frequently occurs, or they may look for younger, less skilled opponents so that some level of success is possible. In children, an additional type of low perceived-ability individual may exist. This individual has not given up hope and continues to try hard. However, repeated experiences of failure eventually lead to avoidance.

The application of the theories discussed above to sport and game situations appears logical. However, they have been developed by psychologists and validated primarily via cognitive tasks. Further investigation in the motor domain is warranted. Recently some direction has been offered by specialists in exercise (Sonstroem, 1982) and motor development (Griffin & Keogh, 1982).

Sonstroem (1982) reviewed selected research in the area of exercise and self-perceptions and provided some suggestions for improving research in this domain. Based on his own research and the research of others, his postulations are without a structured theoretical framework, but fall closely in line with aspects of theories of self-perception emanating from developmental psychology. He stated that in exercise, self-perceptions appear to be situation specific, i.e., it is more realistic to expect one's level of physical fitness to be related to physical self-concept than global self-concept. Further, the possible correlation between specific domains such as physical activity and global perceptions of self-worth depend on the value which that domain holds for the individual. In adolescents, physical attractiveness or peer group status may relate most highly to perceptions of self-worth. Younger children, especially boys, may place higher value on physical ability (or fitness) levels. However, Sonstroem also supported the concept at least in older subjects, that perceptions of fitness are more significantly related to motivation in physical performance situations than are actual fitness levels.

Griffin and Keogh (1981, 1982) have offered movement confidence as a construct reflecting an individual's feeling of adequacy in a movement situation. They identified movement confidence as a pervasive and mediating influence in movement behavior. Underlying the importance of this construct is the notion that children who are confident about movement will choose to be active, will do so in an assured manner and will be more likely to persist. The alternate

situation implies that children lacking confidence in their abilities will choose not to be active.

These scientists suggest that in required movement situations a cycle of decreasing confidence and skill may occur. Children lacking confidence in motor ability will attend more to feelings of inadequacy, shifting attention from task relevant information, and falling farther behind in skill level and thus movement confidence. To break this cycle they proposed the need to identify such children and structure activities to promote success in a supportive environment. In essence they emphasized the need to improve competence to increase confidence and therefore motivation to move.

In some movement situations an additional variable which may affect one's feelings of confidence and motivation is the anticipation of a specific form of sensory stimulation during performance (Griffin & Keogh, 1982). This may be positive and motivating as in the feelings one perceives while bouncing on a trampoline, or negative, such as the feeling of being unable to breathe easily when first learning to swim.

Empirical Evidence for the Relationship Between Perceived Competence and Motivation

Evidence has been growing to support the theoretical relationship between perceived competence and effectance motivation or motivation to achieve both in the academic setting and in situations involving physical activity. Some contradictory evidence has resulted as well. Perceived competence has most frequently been assessed via such scales as Harter's (1979b) Perceived Competence Scale for Children, or by having children rank themselves relative to peers. Effectance motivation is

reflected in a child's choice to participate or persist in a non-required activity, or by the level of difficulty of a task chosen within a required situation.

Harter's model for the development of mastery motivation has been verified experimentally at various points in its development. Further support has resulted from subsequent studies. Motivation and perceptions of competence in the cognitive domain have been examined most frequently.

In two studies, Harter (1981a, 1981b) examined the relationships among several components of her model as they applied to the cognitive domain. Her subjects were third through sixth grade level children. In the first study (1981a), she administered her assessment instruments to measure the relationship between intrinsic motivation, perceptions of competence, perceptions of control, and actual cognitive competence (as measured by achievement test scores). Higher order factoring revealed that children who were intrinsically motivated were those who perceived themselves as more competent than the others. In turn, they actually were more competent and expressed greater understanding of what controlled their successes or failures. Conversely, those who perceived themselves as less competent actually had lower achievement test scores, were extrinsically motivated, chose to perform easier tasks, and did not know what controlled their successes and failures. In the second study (Harter, 1981b), she examined the relationship of perceived cognitive competence to subscales of the motivational orientation scale. Results indicated that the greater one's sense of

cognitive competence the more intrinsically motivated one is to master, to be curious, and to seek challenges.

In two behavioral studies, Harter (1979a, 1982) examined the relationship of sixth graders' scores on the perceived competence scale to an academic task situation and to athletic involvement. In the first study, children were divided into high (top third) and low (bottom third) subgroups based on their perceived cognitive competence scores. When given their choice of anagrams varying in difficulty level, the high perceived competency group chose considerably more difficult anagrams than those of the low perceived competency group. The second study involved sixth graders from a school in which athletic participation was a prominent school value. Those children selected for sport teams scored significantly higher on the physical and social perceived competence scales than did non-team members. In this situation Harter utilized sport participation as the measure of intrinsic motivation in the physical domain but only examined those who made the team versus all others. Of equal interest would have been an analysis of the scores for children who tried out for but did not make the team.

External studies in the physical domain have provided support for a relationship between perceived competence and motivation to participate. The first published report of a study which directly tested Harter's theories relative to perceived competence and participation motivation in sport was conducted by Roberts et al. (1981). These researchers utilized Harter's Perceived Competence Scale and interview questions to compare fourth and fifth grade participants

and nonparticipants in organized athletics. They found that participants demonstrated higher levels of perceived competence, were more persistent, and had higher expectations of future success. Causal attributions for involvement and non-involvement were ability oriented. They concluded support for that portion of Harter's model which suggests that perceived competence in physical skills has an important relationship to participation motivation in sport contexts.

Guyot, Fairchild, and Hill (1981) assessed fourth, fifth, and sixth grade level children on some of the same variables as did Roberts et al. Their subjects were also classified as participants and non-participants in sport. For both males and females, participation in sport correlated significantly with physical self-concept. Physical self-concept was measured via a subscale of the Piers-Harris Self Concept Scale. In addition, they examined the relationship between physical fitness/motor ability levels and participation. Results suggested a significant relationship for males but not for females.

Not all studies investigating sport participation and perceptions of ability in children have supported a significant relationship. Lewko and Ewing (1980) studied 9 to 11 year old boys and girls. They determined children's perceptions of competence by asking them to rate their ability on a scale from one to ten. Results suggested that boys perceived their ability to be high, regardless of their level of involvement. Girls who were participants perceived themselves as significantly more competent in motor skills than non-participant girls. The method of assessment used in this study may have affected the results. Being good in sports is socially desirable for boys at

this age; therefore, the tendency to overrate oneself on a single item measure may have been great. In Harter's (1982) and Roberts et al.s (1981) studies a more complex and psychometrically sound scale was used (Perceived Competence Scale for Children, Harter, 1979b). It is worded specifically to avoid the suggestion that one response is more socially desirable than another.

Maul and Thomas (1975) compared third grade girls who were involved in a gymnastics program to ones not involved in any organized sport program. They found no significant differences between the groups on concepts of ability to perform gross motor movements. In this study an unpublished scale from a doctoral dissertation was used. In their discussion the authors questioned the validity of the test.

The very nature of sport encourages social comparison. Nicholls (in press) identified this process as important to determining one's perceptions of ability which subsequently affects one's choice to participate in achievement situations. Social comparison seems particularly important within the sport setting. The outcome of a contest, win or lose, is relative to the caliber of the participants. Several researchers have examined the relationship between the social comparison process in the conception of ability and outcome in sport situations.

College age subjects have demonstrated that in sport situations they perceive ability level to be the most common cause of outcome, and that participants judge their performance in a contest relative to their opponent's ability. University students were asked to imagine themselves involved in a variety of competitive situations in sport,

having won or lost the contest (Roberts & Pascuzzi, 1979). They were asked to associate one of the four attributes to specific sets of circumstances. By far the most frequently chosen attribute was ability. Effort was also indicated by some, but not as a major determinant.

When involved in actual competitive situations, college age subjects have also attributed success or failure to ability (Spink & Roberts, 1980). Following participation in a racketball tournament, subjects were asked to indicate to what they attributed the outcome of their match. Responses related to perceptions of their ability as it compared to their opponents' level of ability. Satisfaction with outcome was also related to perceptions of ability relative to that of their opponents, regardless of outcome.

Some evidence exists for the use of social comparison by younger subjects in their perception of ability. Orlick and Botterill (1975) interviewed children aged 7 to 19 years who had never played in organized sport programs. They found that 75% said they wanted to play but did not try out because they felt they were not sufficiently skillful to make the team. Perhaps as Nicholls (in press) suggested, they chose to avoid demonstrating their inability. Fourth and fifth grade sport participants were given a test of perceptions of athletic ability and were asked to rate their own motor ability relative to that of their teammates (Roberts et al., 1980). A low but significant correlation was obtained between the two scores, suggesting that perceived competence is related to one's perception of ability relative to peers.

Two assumptions underly Sonstroem's (1982) postulations regarding the study of self-perceptions in sport. First, that physical skills represent a separate domain in self-perceptions and second, that self-perceptions contain motivational properties. Several studies utilizing adults and children as subjects supported the concept that perceptions of self in specific areas such as fitness or body image may be affected experimentally (Brown, Morrow, & Livingston, 1982; Rohrbacker, 1979). They demonstrated further that global perceptions of self were not affected.

A study of boys at the middle-school level suggested that their perceived level of physical ability related to their motivation to participate in organized school sport programs. Three hundred ninety-three boys were given a test of perceived competence in physical ability at the start of the school year. These scores were compared later to subjects' choices to play or not play intramural sports. Two separate discriminant function analyses yielded canonical correlations of .35 and .40 with 64 and 68% of the subjects correctly classified as participants or nonparticipants, respectively.

Griffin and Keogh's (1981, 1982) theory of movement confidence has much heuristic appeal. Based on similarities to the work of others in achievement motivation such as Harter (1981b) and Bandura (1977), some support is anticipated. Thus far, the only reported empirical support for their model demonstrated the reliability and consistency of one aspect. They determined that independent observers could reliably and consistently identify behaviors of young children as being confident or

non-confident in situations perceived as "high risk" (Keogh, Griffin, & Spector, 1981).

Actual Ability Relative to Perceived Ability and Motivation

The preceeding discussion emphasized the central role of perceptions of ability in choice to participate, and the desire to be affective and to persist in achievement tasks, especially in sport and games. Considering this hypothesis and the support it has generated, one might ask how important the child's actual skill level is in motivation to participate and persist in motor activity. In physical education and sport situations, facilitators generally focus on the improvement of true skill level. Pangrazzi (1982) stated that to avoid developing a feeling of incompetence, young children especially need skilled instructors who can bring about true improvement in skill level. Ostensibly, by raising skill level one increases the child's desire to use those skills in games and sport. Does subsequent motivation occur because the child is truly able to perform at a higher level of skill or because the child thinks improvement has occurred? Further, does one (ability) automatically result in the other (thinking one is able)?

Certainly successful participation requires some basic level of skill. To play soccer one must be able to dribble and pass the ball; the ability to kick a rolling ball is a prerequisite to playing kickball. Experience and research tell us that children at the lower end of the ability continuum learn quickly that they are not as skilled as their peers, are not welcome in games and sport, and learn to avoid displaying their lack of ability. Building confidence without skill

would not be likely to provide a lasting effect on children's desire to participate and persist in sport.

Bandura (1977) identified four sources of self-confidence information: mastery experiences, modeling, verbal persuasion, and emotional arousal. He considered mastery experiences or competence to be the most durable and strongest in developing confidence in one's self. Bressan and Weiss (1982) and Griffin and Keogh (1982) emphasized the importance of the psychosocial construct (i.e., movement confidence) in motivating children to move. They expanded on this concept by suggesting that the best way to increase confidence is by developing competence. They concluded that the development of competence in movement, in a supportive atmosphere, with the necessary incentives, provides the necessary ingredients for developing achievement motivation.

A few investigators have examined the relationship between perceived competence and actual competence in children of elementary school age, within the academic or physical education setting. Generally, a moderate relationship has been observed. Several studies in the academic setting demonstrated that for third through sixth grade children, perceptions of ability clearly differentiated between children of actual high and low ability (Boersma & Chapman, 1978; Chapman & Boersma, in press; Harter, 1981b). While children in this age group demonstrated a relatively accurate concept of their ability, level of achievement correlated more highly with perceptions of ability than with actual ability (correlations were .61 and .31, respectively). In the physical activity setting, Boling and Kirk (1982) studied the

relationship of perceived competence of fifth grade boys in motor skills and actual competence. Their results suggested that those who scored in the upper and lower third on the perceived physical ability scale could accurately be distinguished by their performance on a series of gross motor tasks.

One researcher examined the relationship between perceived and actual competence in physical skills across the ages of 4 to 12 years, in two separate studies. Harter (1982) compared the scores of third through sixth grade children on perceived competence in physical ability to ratings of their motor ability made by their physical education teacher. Correlations were in the .60s for all four grade levels, suggesting that these children were moderately accurate in judging their own motor ability. Correlations between these variables for younger children were very low; an $\underline{r}$ of .26 for the four- and five-year-old children and an $\underline{r}$ of .32 for the six- and seven-year-old subjects (Harter & Pike, in press).

Two points should be noted regarding the studies just cited. First, ability ratings for the younger children were made by classroom teachers, who may have been less accurate in their assessments of motor ability than physical educators. This factor may have contributed to the lower correlations. Second, the pattern of correlations for the third through sixth grade subjects was quite different within the domain of physical activity, than the pattern of correlations for the academic area. Harter found lower, but linearly increasing, relationships between perceived and actual competence in academics.

However, the correlations were similar at each grade level for the physical activity domain.

The relationship between perceived ability and actual ability appears to be affected by immediate and long-term feedback received from significant others. Although perceptions of one's ability appear to be based on years of self-evaluation and comparison, several studies (Dweck & Repucci, 1973; Haas & Maehr, 1965; Maehr, Mensing, & Nafzger, 1962) have demonstrated that the accuracy of self-perceptions of children of the fifth grade level and older may be significantly affected by feedback from others, at least temporarily. In these studies subjects received positive or negative feedback from significant others on a short term basis. Results indicated that a significant change in perceptions of ability could be affected, both positively and negatively, depending on the type of feedback given. This occurred regardless of actual ability in academic settings as well as in physical activity situations. Both types of feedback altered children's opinions, but the effects of negative feedback faded more rapidly than did the effects of praise.

One effect of feedback from a physical education instructor may be increased accuracy in perceptions of physical ability. Yeatts and Gordon (1968) studied seventh graders who had or did not have physical education during their elementary school years. Correlations between their fitness scores and self-image of physical abilities suggested that those who had elementary physical education were significantly more accurate in their assessment of personal fitness.

Only a few researchers have examined the relationship between actual motor ability and participation motivation. The results of these studies have been equivocal. Magill and Ash (1979) compared the actual motor ability of first through fifth grade boys and girls who were participants or nonparticipants in organized sport programs. They found no relationship between motor ability and choice participation. However, their choice of tasks used to represent motor ability did not appear to be representative. The items were: (a) the Minnesota Manual Dexterity Test, (b) a finger tapping task, and (c) a stabilometer task. Physical fitness scores were also available for fourth and fifth grade subjects (Texas AHPER test items). Scores on these tasks differentiated fourth but not fifth grade participants from nonparticipants. King (1982) studied the task choices of preschool and primary grade level children in a free-play gymnasium situation and reported that motor ability was not a significant factor in their task choices. Although she used a representative battery of items to test motor ability, her task choices did not appear to provide a sufficient range of difficulty levels to necessitate a decision about perceived ability on the part of the child. Guyot et al. (1981) studied boys and girls in Grades 4 through 6 who were participants and nonparticipants in sport. They found a significant relationship between participation and motor ability for boys, but not for girls.

Some support for the role of actual ability in achievement motivation/expectancy resulted from a study of 11 and 12 year-old youth soccer players by Scanlon and Passer (1981). The relative importance of actual soccer ability, general self-esteem, overall win-loss record,

opponents' win-loss record, anxiety, and prior record against the same opponent in predicting players' pre-game expectancies was examined. Soccer ability was most predictive, followed by self-esteem. The additional factors did not add significantly to the prediction equation. However, self-perception measures were general. Had a specific measure of perceived competence for physical or soccer ability been used, it may have been more predictive.

On the basis of the studies reviewed in the last two sections, it appears that a significant relationship may exist between perceived competence and motivation to participate for children in the upper elementary grades. Further, these children demonstrate moderate accuracy in identifying their own levels of ability. Evidence that these relationships exist in the movement setting is beginning to accumulate, although not without some controversy. However, the relative importance of motor ability to the perceived competence-motivation paradigm suggested by motivation theorists is not clear. In addition, the question of these relationships existing for younger subjects is unanswered.

The need to investigate the relationships among performance, psychological, and behavioral variables goes beyond the expansion of our body of knowledge. In the applied setting such information may help us understand children with low motivation, and eventually discover better ways to help them. By the time children reach third grade, the youngest age group usually studied, they are reporting perceptions of themselves that have been developing for several years. If we want to understand why some children are not motivated to be

active or have a low perception of their ability, so that we may affect them in the most positive way, we must understand the critical developmental years, i.e., the preschool and early elementary years.

Development of Perceptions of Competence

Descriptive Data

Assessment of the concept of ability, as well as of most "self" attributes, indicates that children report generally positive perceptions of themselves. Mean scores across the age range of preschool to Grade 6 are negatively skewed. Statistically significant differences are not usually found between adjacent grade levels. A trend is suggested in competence scores, across the preschool and elementary ages, which indicates a shift to a somewhat less positive concept of ability. While mean scores decrease, variation within age groups increases with age (Harter, 1978; Harter & Pike, in press; Martinek & Zaichkowsky, 1977; Nicholls, 1978). However, all of the data described above are cross-sectional in nature and based on means. Thus, changes within the group may be masked. Those who were positive about their abilities at six years of age may not be the ones who believe they are the best performers at age eight or nine. Also, differential rates of development of accurate self-perceptions may be occurring but would not be detectable in studies that are cross-sectional in design.

Relationships of Cognitive Processes to the Accuracy of One's Perceptions of Self

Perceptions of one's self are considered to be relatively stable and various domains are hierarchically ordered by approximately seven or eight years of age (Felker, 1974; Harter, 1982; Piers, 1969; Zaichkowsky, Zaichkowsky, & Martinek, 1980). The importance of events occurring prior to this time seems obvious to a developmentalist. However, until recent years little effort had been made to provide empirical evidence for the processes by which changes in self-perceptions occur, or the variables which affect those changes.

Recently, the identification of the various cognitive processes necessary for making accurate assessments of ability and the onset of these processes have shown promise in explaining the development of accuracy in making judgments about ability. One such process is called social comparison procedures. This process involves evaluation of one's own ability via comparison with peers (Festinger, 1954). Veroff (1969) believes that between 5 and 10 years of age social comparison is the most important means of perceiving one's ability. Only beyond this age do children use more objective normative information to evaluate their own abilities.

Observation of children younger than four or five years of age reveals a lack of interest in comparing their abilities with others (Veroff, 1969; Suls & Sanders, 1979). By age four or five children begin interacting with peers and according to some researchers, making comparisons. McClintock and associates (McClintock & Moskowitz, 1976; McClintock, Moskowitz, & McClintock, 1977) found that between ages four and one half and five, if children were given a choice, they began to

choose situations in which a competitive advantage over peers was provided, rather than one in which they were concerned only with their own outcome. Such tendencies were found to increase until about age seven and then leveled off. Ruble, Feldman, and Boggiano (1976) observed that kindergarten, first, and second grade level children in a timed task situation with a peer co-actor, glanced more frequently at the peer as age increased. Masters (1971) reviewed a large number of studies on social comparison in children, and concluded that by age four children are highly involved in social comparison. A representative study involved self-rewarding behavior, in which children who had previously received fewer tokens than a peer, dispensed additional tokens to themselves.

Ruble, Boggiano, Feldman, and Loebl (1980) contended that social comparison ability develops in stages. They suggested that studies such as those reviewed by Masters (1971) represent lower stages of development and that mature, useful functioning does not occur in the preschool years. Young children's observations of their peers may have been motivated by curiosity, a desire to seek information about others, or to be like others, but not by evaluative motives. Ruble et al. (1980) developed a complex design to study children's (kindergarten, second, and fourth grade levels) ability to assess accurately their own behavior compared to others on a novel gross motor task. Expectations of rewards in the study were manipulated to maximize the child's effort at giving honest predictions (even if the child honestly expected his or her own skill level to be lower than others) of future chance of beating opponents of various skill levels. Not until fourth grade were

accurate assessments made. Kindergarten children actually rated their abilities more highly than did the second and fourth grade children.

Stipek (1981) suggested that the highest and lowest achievers may be able to judge their own ability and compare themselves to peers better than average achievers because they are more likely to receive clear and consistent feedback about abilities. She found that kindergarten and first graders, trichotomized into high, middle, and low ability groups were very inaccurate. Even the low achievers overestimated their level of ability. By second and third grade, children were more accurate about their own abilities, and more accurate still about the abilities of peers. She suggested several explanations, including feelings of omnipotence, self-enhancement bias, and faulty information processing due to pre-operational thinking.

On the basis of the studies cited above, apparently social comparison procedures do not begin to function in an evaluative and somewhat accurate manner until approximately eight or nine years of age. Pre-school and primary elementary age children are aware of others' performances, but this awareness stems from a curiosity. Outcome or rewards give more salient information than processes or abilities. Further, younger children tend to be unrealistically optimistic about their abilities.

Additional cognitive capacities which are developing during the preschool and primary years, and which may relate to the development of accurate self-concepts of ability, were elaborated by Nicholls (1978).

1. <u>In order to rank order or compare one's ability to peers, the child must be able to</u>:

a. seriate,

b. decenter (view oneself with relationship to others), and

c. relate temporally separated outcomes to each other.

Children in the pre-operational stage do not have the cognitive skills for such processes. By age five or six, as children enter the concrete operational stage these cognitive skills begin to emerge.

2. Understanding of the relationship between performance norms and ability required for success.

Older children and adults (in the formal operations stage) reason that tasks at which most people succeed require little ability; those which only few can do require high ability.

3. Ability to determine the cause of outcome - why one won or lost.

Experiences (i.e., repeated failures or successes) may give one a feeling of being a loser or winner, good or bad. Until one can separate ability from effort (around age 11) accurate ratings of ability relationships are diminished. Nicholls characterized many young children as persisting in motor and other skills under the assumption that their inherent ability is not low, only additional effort is needed to improve their unsuccessful attempts.

The ability to accurately assess one's level of ability has been shown to change with age. Harter (Harter, 1982; Harter & Pike, in press) and Nicholls (1978) compared children's self-ratings of academic competence with ratings done by the teacher. Harter found correlations of .32 (preschool/kindergarten), .43 (Grades 1 and 2), .28 (Grade 3), .32 (Grade 4), .50 (Grade 5), and .55 (Grade 6). Nicholls reported

correlations of .21, .27, .58, .71, .57, .80, and .78 for ages 7 through 13, respectively. The change, while not linear, shows a positive relationship to age.

Some support exists for the possibility that the accurate assessment of one's competence may develop at different rates for different domains. Correlations between teacher and student ratings of physical competence (Harter, 1982; Harter & Pike, in press) increased during the preschool and primary grade school years and plateaued at a moderately high value during the upper elementary level years. The correlations obtained for this domain were .26 and .32 for ages four to five and six to seven, respectively, while across Grades 3 through 6 a consistent value of .62 was obtained. During the early years physical competence ratings were slightly less accurate than cognitive, both being much higher than the accuracy of social skill ratings. From the third through sixth grade levels, children were much more accurate concerning their perceptions of ability in physical skills than in cognitive or social skills.

Competitive motor activity situations may provide more concrete and obvious feedback than academic situations. Because of this, children may develop accurate perceptions of ability at an earlier age than in other domains (Kleiber, 1981; Pascuzzi, 1981). Pascuzzi (1981) examined the effect of finishing first, second, or third in a foot race on perceptions of competence in preschool and primary elementary grade level children. Place of finish did not affect significantly the perceptions of ability of preschool girls. It did affect the subsequent ability, affect, and expectancy ratings made by preschool

boys and by boys and girls of school age. In addition to the type of feedback provided, the social value of sport, especially for boys, may suggest greater attention to movement than to academic performances.

In summary, based on the concepts related to cognitive functioning discussed above, one may expect preschool age children to be inaccurate raters of their own ability. As cognitive processes mature and social comparison situations increase with age, children become more realistic. Accuracy may develop earlier in motor skill than in other domains due to the many opportunities for comparison during the early years, more frequent contingent feedback and the importance of motor skills to young children.

Harter's Model of Competence Motivation

In order to investigate the relationships among variables related to achievement motivation in physical activity, as is proposed in this study, they should be viewed as part of a larger theoretical model which may provide some evidence (theoretical or empirical) for their relationship. Harter (1981a, 1981b; Harter & Connell, in press) seems to provide the best developmental model for understanding factors that cause children to choose to achieve (to be effective, to be active) and to persist in achievement situations. Her three-phase model concentrates on the early childhood and elementary years and suggests that perceptions of competence are a key component in development of motivation. Following is a summary of Harter's model.

Phase I (See Figure 1). In this phase, infants are intrinsically motivated (designated in the model as effectance motivation) to engage in achievement tasks (labelled mastery behaviors). By producing an

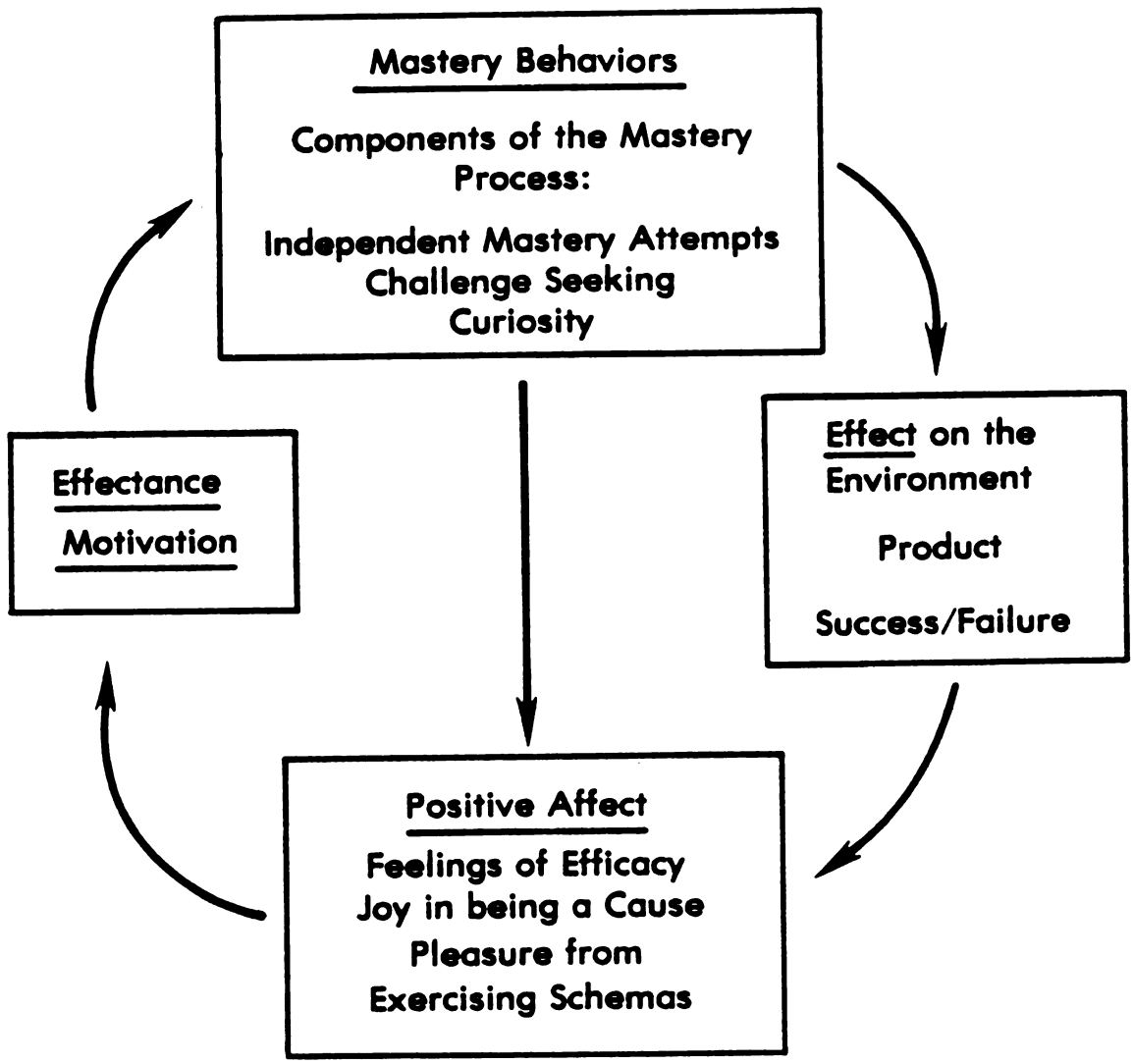


Figure 1: Effectance motivation, adapted from White, 1959 (Harter, 1981a, p. 6)

effect on the environment, they experience pleasure and joy. Awareness of the effects that their actions have on the environment produces a positive effect; often smiling or laughing. Piaget described this process as infants' attempts at effectance and their joy in being a cause. He evoked no special motive to account for this behavior, assuming as Harter does, that it is innate to the organism.

Phase II (See Figure 2). Harter contends that actually from birth on, socializing agents have an effect on children's motivation behaviors. Parents and significant others react to children's attempts to master tasks in two ways, (a) by evaluating the product, and (b) by projecting a level of acceptance or rejection of the attempt. Reactions to the product project right or wrong, success or failure. Through social learning processes such as modeling and reinforcement these responses feed into children's sense of competence and affect the development of their orientation about intrinsic motivation. For example, if parents react to their child's successful attempts at batting a ball with smiles and verbal praise the child may desire to continue the activity and feel competent at batting balls. Reactions to the process project a level of acceptance. Sharing children's joy in being affective has a positive impact on their emerging sense of personal worth. Ignoring or conveying a sense of little value for such efforts may temper children's responses, leading to less positive feelings of worth.

While affect is the central correlate to motivation for mastery behaviors, perceptions of competency and feelings of self-worth become related to motivation, as well. Thus, in Phase II the parents or

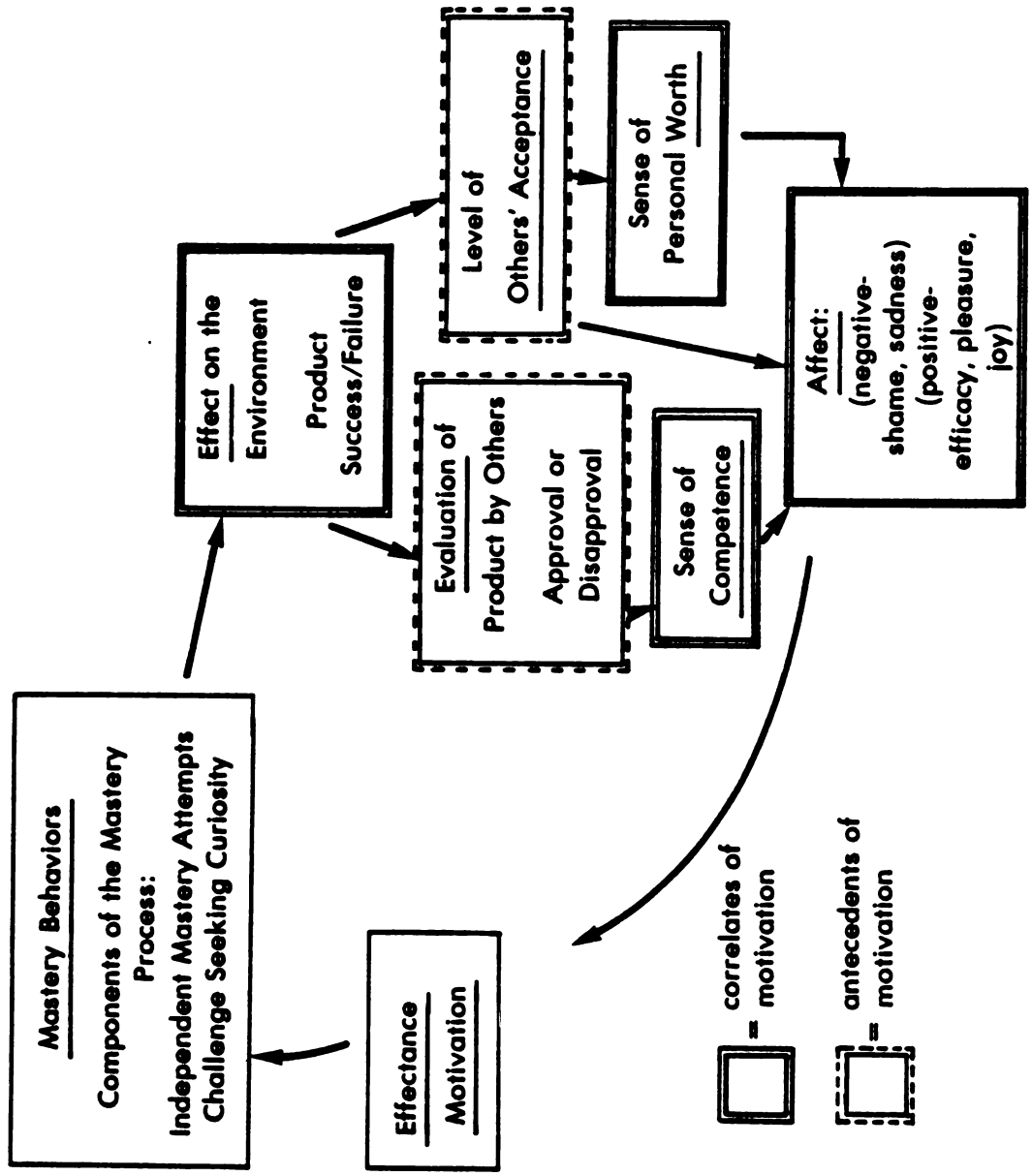


Figure 2: Phase II of the development of effectance motivation (adapted from Harter, 1981a, p. 7)

caregivers lay the foundation for the development of children's sense of competence during infancy and early childhood. Presumably climbing fences, running down hills, and chasing a friend still bring inherent pleasure, but the purity of the perceptions begins to be tempered by the reactions of significant others.

Phase III (See Figure 3). The hypothesized relationship of the major correlates affecting competence/effectance motivation in Phase III has been characterized by Harter (Harter & Connell, in press) as a chain. Four primary correlates are now identified (actual competence, perception of competence, competence affect, and understanding what controls performance outcome). The first three of these appeared in Phase II; however, their relationship to each other and to motivation becomes attenuated somewhat.

In this phase, the effect of children's actions on their environment may be interpreted as their actual level of competence. As in Phase II, significant others respond with both evaluative and acceptance/rejection information. Each continues to have an effect on perceptions of competence and affect, respectively. However, older children begin to perceive themselves in a more complex manner as the capacity for logical thought and appreciation of the relationship between cause and effect emerges. Harter referred to this new aspect of information processing as the internalization of cognitive-informational structures (labelled in Figure 3 as Internalized Set of Mastery Goals and Criteria for Success). Internalized mastery goals and criteria for success begin to be formed when children adopt the performance standards of the significant others in their world. This

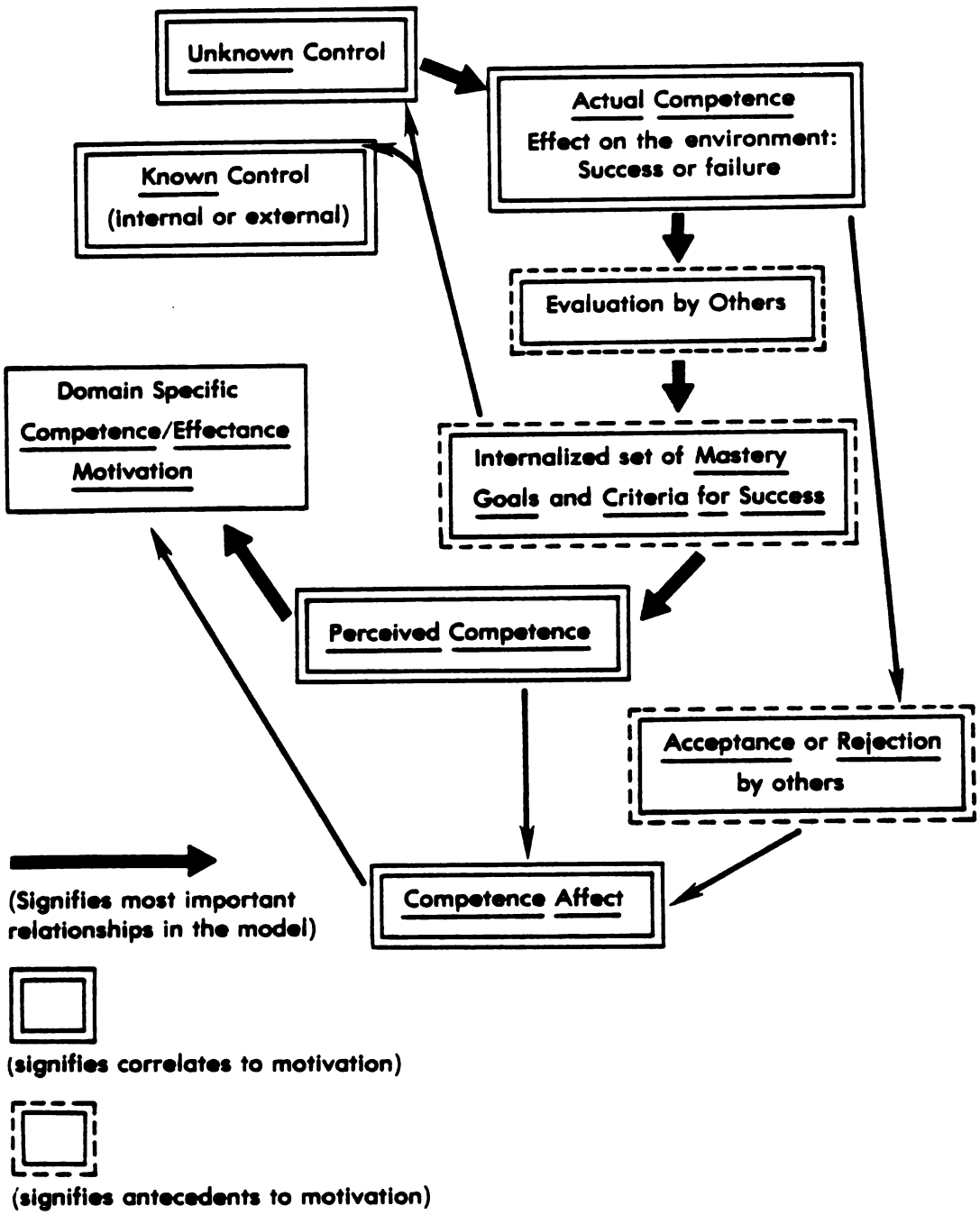


Figure 3: Phase III of the development of effectance motivation (adapted from Harter, 1981a, p. 10 and Harter & Connell, in press).

process allows children to judge how much they value a specific domain and what level of performance constitutes success or competence.

The consistency and relevancy of the evaluative feedback children receive from others influences the degree to which goals and criteria for success are internalized. This, in turn, affects perceptions of who or what controls performance outcome. If children are given clear, consistent, and relevant evaluations about their performances they will develop consistent and realistic internalization structures and understand who controls performance outcomes, i.e., internal or external/powerful others. Inconsistent evaluations lead to ambiguities about the source of control (unknown control).

Harter (Harter & Connell, in press) contended that the driving force for the "motivation chain" is the child's perception of who controls the outcome of performance situations. Those who understand who controls it are the high level performers; those without a clear understanding perform less competently. Competence affect results from one's perceptions of competence and the acceptance or rejection of that performance level by others. It also affects motivation level but not as directly as perceived competence.

Support for the directionality of the variables in Harter's model comes from a study involving upper elementary and junior high school level subjects (Connell, 1981). First, subjects were tested on all elements in her model. Second, structural equation modeling procedures (a type of path analysis) were used to test four possible models or directional relationships among the motivational correlates proposed.

The model presented was the one determined to best fit the data collected.

Most of the resultant relationships seem plausible. However, her reference to the unknown control element as being directly related to performance seems overzealous, based on her cross-sectional data and correlational procedures. Further, Connell (1981) from whose dissertation these results were derived, refers to the understanding of control element as "setting the stage" for the cognitive and affective processing of performance information. Intuitively this seems to be a more reasonable interpretation.

In summary, Harter (Harter & Connell, in press) proposed that a clear understanding of who controls performance outcomes (one's self or powerful others) leads to demonstration of higher levels of actual competence, which leads to higher perceptions of competence and to a strong motivation to have an effect on the environment or demonstrate mastery of tasks in that domain. Conversely, children who do not know why they are successful or unsuccessful perform less competently, perceive themselves as less competent and lack motivation to achieve in that domain.

Gender Differences

Evidence is accumulating that there are gender differences in the domain of physical activity for the three central variables to be investigated in this study, i.e., perceived competence, actual motor ability, and motivation to participate. Based on her own research, Harter (1978) noted a trend toward gender differences in motivation levels for tasks in which a gender difference was noted in skill level.

For tasks in which males demonstrated an advantage over females, either in measures of true ability or those which are stereotyped as masculine, males reported higher levels of motivation. However, for tasks in which females demonstrated equal or higher skill levels compared to males, level of motivation appeared to be equal. Although Harter's investigations have dealt primarily with cognitive skills, a similar trend may be expected in motor skills.

Males appear to have an advantage in level of skill when compared to females both in true ability and as stereotyped by society. Prior to adolescence males have a slight, although in most practical situations a non-significant advantage in actual motor ability. While minor anatomical differences may account for this disparity in skill level, strong cultural expectations are almost certain to play a part in fostering this difference (Herkowitz, 1978).

The stereotype that sport and game participation is more appropriate for males than for females, while changing, certainly still exists. Parents demonstrate a greater response to the involvement in sport of their sons than to their daughters' involvement (Lamb, 1976). Children also display gender differences regarding their opinion of the appropriateness of participation by females in sport. In a study involving third through sixth grade boys and girls, Selby and Lewko (1976) found males less favorable toward female participation in sport than were females, regardless of their own level of participation.

Motivation level in sport and physical activity may be measured by participation versus nonparticipation or persistence in a task. When motivation is measured via percent of each gender participating in

sport, males continue to dominate, even though the number of female participants is increasing (Kleiber & Roberts, 1983; Lever, 1976; Youth Sports Study, Phase I, 1976). When persistence in a task was analyzed, a gender difference was not found (Roberts et al., 1981). However, this measure was of a child's anticipated persistence, not demonstrated persistence. Phase one of a study of sport participation by youth (State of Michigan, 1976) found that one out of four boys participated in and completed a season in baseball while only one in ten girls did so. Additional research is necessary to determine if females who choose to participate will try just as hard to succeed as their male counterparts.

Males typically perform sport skills better than females, and they also perceive their general level of athletic ability to be higher than do females (Duquin, 1978; Wiggins, 1973). This difference in predicted ability may not be true for all tasks, however, Evidence suggests that for those tasks categorized as having "masculine" components such as speed or strength, males perceive their ability to be higher than females, but for "neutral" tasks a gender difference is not found (Corbin, Landers, Feltz, & Senior, 1983; Corbin & Nix, 1979; Corbin, Stewart, & Blair, 1981).

Gender differences in self perceptions may be masked by the use of global self-concept scores. The assessment of global self traits or attributes usually fails to reveal gender differences (Magill & Ash, 1979; Martinek & Zaichkowsky, 1977; Piers, 1969). However, such measurements tend to mask differences which may be occurring within separate domains (e.g., physical, social, and cognitive) by utilizing a

composite score for all assessment items which weights each domain equally. In reality, children are likely to value some competencies more than others, or feel significantly more competent in one area than in others (Rosenberg, 1979). Ability in physical skills is generally considered to be an important source of status for children (Smoll, 1974), however, athletic involvement may be a more salient source of pride and status for males than for females (Kleiber, 1979; Kleiber & Hemmer, 1981). Harter (1981) did not find a gender difference for the cognitive, social, and global subscales across Grades 3 through 6. Only on the physical subscale did males report significantly higher perceptions of ability than did females.

The reactions and evaluations of significant others to young children's attempts to perform movement tasks are important to the development of perceptions of competence. Gender differences in perceived competence, particularly in the physical activity domain, may begin as a result of differential responses by parents. There are several ways in which significant others may have a differential effect. Stereotyped attitudes are likely to be reflected in parents' reactions to and evaluations of the movement performances of their offspring, i.e., more encouraging for boys, less encouraging for girls. This may influence developing perceptions of competence and motivate some to repeat such movements more often than others. The task experiences one has are further expected to influence one's attitudes (Breer & Locke, 1965). If young boys are experiencing movement activities more frequently, and if they are positive, a more positive perception of competence should develop. Further, the increased

participation would provide more opportunities for comparison of abilities whereby a more accurate conception of motor ability may result. With accuracy may come the realization for some boys that they are not as good as they thought they were, thereby discouraging participation. The actual point at which this may begin to occur, and whether it does occur earlier for males than for females is unknown, but warrants further investigation.

Nicholls (1978) hypothesized that an understanding that ability and effort are distinct causal factors should lead to more accurate assessment of one's own competence and thus affect motivation. He studied children ages 5 through 13, and developed four stages of reasoning which he believes children go through regarding reasoning about their achievements in tasks. He found that boys were more advanced in their reasoning in an academic task situation, and the older males (ages 9 to 13) chose more difficult tasks to perform than did females of the same age. However, they were no more <u>accurate</u> in estimating their own level of competence. Accuracy improved with age for both genders.

Some support for Nicholls' theories was produced in a study of fourth and fifth grade participants and nonparticipants in sport (Roberts et al., 1981). Participants believed ability was more important than effort as compared to nonparticipants, but a gender difference in perception of the role of effort and ability was not found. Participants demonstrated higher perceptions of competence, reported that they would persist longer in difficult tasks, and had higher expectations of future success. While admitting the topic is

debatable, these researchers suggested that "...sport selects out those who perceive themselves as more competent to begin with rather than contributing in a substantial way to the development of perceptions of competence" (p. 213). However, this study was cross-sectional in design and only identified participants and nonparticipants. Developmental variables may be examined with greater scientific validity by utilizing a longitudinal design. By following the same subjects over several years, one may find that participation does not increase perceptions of ability for those who find success. For those who are eliminated from teams, are not given an opportunity to participate in games, or are unsuccessful in other ways, organized sport participation may decrease perceptions of ability. Therefore, some of Roberts et al.s nonparticipants may have been drop-outs whose perceptions of competence were higher at an earlier time in their lives but were negatively affected by participation in organized sport.

Young Children's Extent of Involvement in Sport and Games

The number of children participating in organized sport and games has been rising in the last few decades (Kleiber & Roberts, 1983; Martens & Seefeldt, 1979). In addition to the probable trickle-down effect of increased societal interest in fitness and activity, Seefeldt (Seefeldt & Gould, 1980) suggested several reasons for the increase in numbers: (a) lowering of the age at which children may enter organized sport programs, (b) increase in the number of sport situations available to children, (c) greater participation by females, and (d) improved public transportation, providing greater access to sport facilities.

The number of children participating in sport rises during the elementary school years and peaks during the middle school years. Magill and Ash (1979) studied first through fifth grade children in Texas and found an increase in participation by grade level. By third grade over half of their subjects had participated on at least one organized team during the past year. The second graders reported close to 50% participation, while many first grade children were already involved. Results of Phase I of the Michigan Youth Sports Study (State of Michigan, 1976) revealed that most participants entered organized sport at approximately eight or nine although some began as early as age three or four. By 11 or 12 years of age a peak and subsequent drop-off in participation was observed for males and females.

In addition to time spent in organized sport activities, participation in non-agency sponsored physical games is frequent. Kleiber and Roberts (1983) studied the free-time activity patterns of children between the ages of 9 and 11. They reported that the most frequently chosen activity for both boys and girls was physical games, such as ping pong, basketball, and tag, with percent of participation greater for males than females. Other categories into which children's after-school activities were classified included physical free-form activities (playing catch, frisbee, climbing), watching TV, lessons (music, dance, gymnastics), reading, doing homework, etc.

We must confront the facts that (a) community sponsored youth sport programs are continuing to grow, with most children reporting that their initial contact with sport is non-school related, and (b) reductions in the budgets of elementary level physical education

programs continue to be a threat to the provision of adequate programs for all children. In order to regain community support for and strengthen our physical education programs, a more scientific examination of what we can accomplish and why these goals are important is necessary. Many children become involved in sport prior to the third grade. We cannot continue to begin our investigation of the interrelationships of variables such as perceived competence, actual motor ability, and motivation to participate at the upper elementary grade levels. By third grade the foundations of motor abilities and perceptions of those abilities are well established. We must first understand the normal course of development if we are to facilitate development in any area.

Overview of the Study

The purposes of this study were to investigate the relationship between perceived and actual competence in motor ability and the relationship of each to motivation to participate in sport and physical activity. The population of interest was young children, specifically children in kindergarten through the fourth grade levels. Finally, possible developmental changes among the relationships between these variables were of concern.

Research Hypotheses

It was hypothesized that:

1. There is a significant relationship between perceptions of competence in motor ability and participation motivation.
2. There is a significant relationship between motor ability and participation motivation.

3. There is a significant relationship between motor ability and perceptions of competence in motor ability.
4. The strength of each relationship identified above increases with age.

Definitions

Definitions of the following variables will aid in understanding the design of and analyses of this study:

1. Perceived Competence in Motor Ability - This variable denotes children's perceptions of their ability to perform gross motor tasks, as reflected in their responses to test items.
2. Motor Ability - This variable is defined by children's performance on 9 selected gross motor tasks. Four of these items may be classified primarily as sport skill items; five of them reflect motor ability items.
3. Participation Motivation - For this variable, children were classified as participants or nonparticipants in organized sport based on their response to item #2 in the Questionnaire Regarding Participation in Sport and Physical Activity.

   Participants = children who were involved in and completed the season in at least one organized sport during the past year.

   Nonparticipants = children who did not complete at least one season of involvement in an organized sport in the past year.

CHAPTER II

METHOD

Overview

To assess the interrelationships among perceived competence in physical activity (motor skills), actual competence in motor activity, and participation motivation, a field-based descriptive study was conducted. Children in kindergarten through the grade four level were assessed, in school, regarding their perceived competence in physical activity. Motor ability was determined by a battery of motor performance items, also assessed at school. A take-home questionnaire was used to determine children's patterns of participation in sport and the reasons for such choices. Children were asked to complete their questionnaires with parental assistance.

The selection of this age range was based on literature pertaining to the development of perceptions of self and the onset of participation in organized sport. Such research suggests that by approximately age seven or eight, children have developed sufficient cognitive skills and have had the necessary experiences to be forming stable and hierarchical perceptions about themselves (Harter, 1981b; Rosenberg, 1979). By third or fourth grade some level of accuracy in perceptions of self appears to be emerging (Boersma & Chapman, 1978; Harter, 1981b). Some of the environmental variables which affect the development of accuracy of perceptions of ability may be more prevalent at an earlier age in the physical domain (e.g., immediate knowledge of results, opportunities for social comparison). Thus, it is possible that perceptions of physical ability may become established and stable

earlier than perceptions of ability in other domains. By age eight or nine many children choose to become involved in organized sports (Magill & Ash, 1979; State of Michigan, 1976). In order to understand the relationship between perceived competence and participation in motor activity at this age and beyond, the antecedent developmental changes must also be determined. Research which has examined one or more of the variables of interest for this study has typically focused on only the early, middle, or late childhood years. This study involved a more comprehensive age-related analysis, encompassing the time period when critical developmental events may be occurring.

The purposes of this study were (a) to examine the relationship between children's self-concept of physical ability and their motivation to participate in sport and games, (b) to examine the relationship between children's actual motor competence and their motivation to participate in sport and games, (c) to examine the relationship between children's perceptions of competence and their actual competence in motor ability, and (d) to examine the nature of the age-related and gender-related differences in these relationships.

Subjects

Boys and girls in Grades K through 4 served as subjects for this study. Twenty-five males and 25 females were tested within each grade level. The mean ages of subjects in Grades K, 1, 2, 3, and 4 were 70.10, 83.08, 95.34, 108.12, and 119.16 months, respectively.

Subjects were drawn randomly from a pool of volunteers from two elementary schools in the Carbondale, Illinois area. Only school districts which employed physical education specialists were considered

for this study. This decision was based on some evidence that children provided with direct instruction in physical education classes had significantly more accurate perceptions of their physical ability than children who did not have physical education instruction (Yeatts & Gordon, 1968).

Children in the elementary schools in this district are bussed to achieve racial integration. Within this study, 62% of the subjects randomly chosen from the pool of volunteers were white. Thirty percent were black while 8% represented other racial backgrounds. The racial distribution of this sub-population was proportionately similar to that of the entire Carbondale Elementary School District population for Grades K through 4.

Children who were contacted in the five grade levels returned their questionnaires at an average of 70%. The range of values for percent of response by grade level was 67% to 77%.

Based on their responses to survey questions, of the 250 subjects in this study, 122 were classified as participants and 128 as nonparticipants. The percent of participation increased as grade level increased. Values of 28%, 48%, 52%, 50%, and 66% were obtained for Grades K through 4, respectively. Actual numbers of male and female participants at each grade level are presented in Figure 4.

Data Collection

Administrators of schools in the Carbondale, Illinois school district were contacted for participation, since they represented a large, suburban district with racial integration throughout all schools. The socio-economic status of students within this district

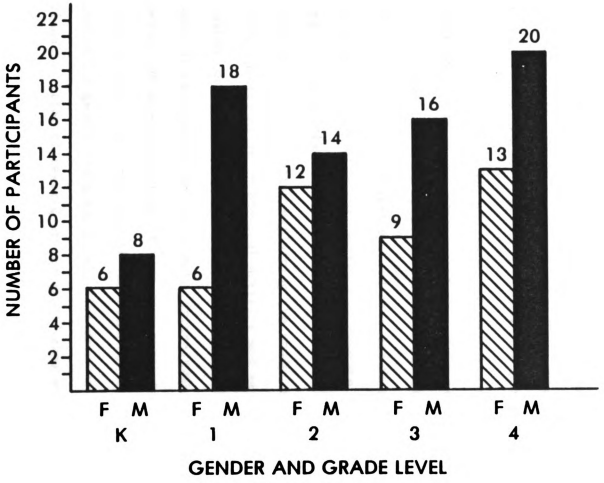


Figure 4. Number of males and females who were classified as participants within each grade level.

district was considered to be primarily lower middle class to middle class.

Contact with school personnel regarding the study was initiated by a telephone call to the district superintendent. Subsequently, a meeting was arranged to discuss the nature of a schools' involvement and purposes of the study. Following the visit, the superintendent agreed to provide his cooperation, to choose the schools to be utilized, and to contact the principal at each school to inform them that this study met with district approval. Subsequent personal contact was made with each principal, printed materials describing the nature of the study were presented, and time and facility commitments were discussed. Each principal agreed to cooperate and chose to inform the teachers about the study.

Following this a letter explaining the study, a questionnaire regarding participation in physical activity and sport, and a parental permission form were sent to the parents of each child in Grades K through 4 in each participating school. Approximately two weeks following the date questionnaires were sent home, children's names were selected at random from the pool of respondents, to fill the quotas as designated for gender and grade level. Children were asked individually, prior to testing at school, if they would participate in the remainder of the study. All children chosen from the pool of respondents agreed to be tested. Testing was conducted during the months of March, April, and May of 1984.

Two different sets of procedures were used to test perceptions of competence in motor ability. Two procedures were necessary due to the

range in ages of the subjects and the protocol designated in the manuals for the companion assessment instruments used. The instrument used with younger children (The Pictoral Scale of Perceived Competence and Social Acceptance for Young Children, Harter, Pike, Efron, Chao, & Bierer, 1983) required individual testing in a quiet, non-distracting atmosphere. Each child in Grade K through 2 was accompanied from his or her classroom by this investigator to a quiet conference room within the school. The subject was seated opposite the tester while testing took place. The tester read directions, descriptions of each picture plate, and perceived competence questions to subjects from a manual prepared by the test developers. Administration time was approximately 15 minutes per child. Following completion of the test children were accompanied back to their rooms and thanked for their participation.

Children in Grades 3 and 4 received the Perceived Competence Scale for Children (Harter, 1979b), by classroom. Printed test forms were distributed and general directions given by this investigator. Sample questions and subsequent test questions were read aloud to the students. In addition to this investigator, classroom teachers remained in the room to answer students' questions throughout the test. Administration time was approximately 30 minutes per classroom.

Following the perceived competence testing, and within approximately two to three weeks, each child was given the motor ability/sport skills assessment battery. Children were tested in pairs of the same gender and grade level. As in the perceived competence testing for younger children, subjects were accompanied from their classroom to the gymnasium for testing, then back again by the test

administrator. Upon arrival at the gym subjects were asked to remove their shoes and socks. Test items were presented in a counterbalanced order, randomized by pairs of subjects. Four sequences of task presentation were used. Subjects in each test pair took turns being the first one to perform test items.

Motor ability/sport skill assessments were accomplished with the assistance of a graduate student from Southern Illinois University. Inter-rater reliabilities were measured for the nine items and were found to be high. A mean of the Pearson product correlations based on 10 subjects was .98.

Instrumentation

Perceived Competence Scales

Two testing instruments were deemed necessary to assess perceived competence in motor ability. Recent evidence suggested that preschoolers and primary grade level children do not think of themselves in as many separate domains as do children in the upper elementary grade levels. In addition, some items appropriate for older children are not meaningful for younger ones (Harter & Pike, in press). The assessment instruments chosen were developed by the same principal researcher with consideration for the points made above (Harter, 1979b; Harter et al., 1983). Each test contained the same question and response format.

Perceived Competence Scale for Children (Harter, 1982). The Perceived Competence Scale for Children was designed to measure children's perceptions of their own ability in each of three competency domains and their feeling of general self-worth or esteem. The

competency domains included: (a) cognitive competence, which was oriented toward academic achievement, (b) social competence which related to social skills, and (c) physical competence, which reflected ability to play sports and games. The general self-worth subscale was considered and designed to be independent of any specific competency domain.

The format of each test item represented an improvement over previous measures of perceptions of oneself in its attempt to reduce the social desirability effects. A "structured alternative format" was used, and both responses were worded so that they would be perceived as socially legitimate. The subject first selected the statement which was most like him or her, then discriminated further by indicating if the answer chosen was <u>really</u> true or just <u>sort of</u> true for him or her.

Each of the four subscales has seven items, scored on a 4-point scale, with 1 indicating low perceived competence and 4 high perceptions of competence. The scores are summed and then averaged for each subscale, resulting in four separate subscale means representing perceptions of competence for each domain and general self-worth.

The validity of the scale is based on factor analytic procedures which involved an initial sample of over 2,000 third through ninth grade children from four states. Results indicated four distinct factors, with only one item cross-loading consistently on a second factor. Average factor loadings of .57, .45, .53, and .38 were obtained for items on the cognitive, social, physical, and general subscales, respectively. The internal consistency of each subscale was assessed using the Kuder-Richardson formula. These reliability

estimates ranged from .73 to .83. Test-retest reliability data involving a 3-month interval ranged from .70 for the general self-esteem to .87 for the physical competence subscales.

Since the main purpose for utilizing this scale was to assess perceptions of competence in the area of physical activity, and only seven items are utilized to assess this domain, seven items were added. An identical format was used for the items, bringing the total item number for this subscale to 14. The purposes for doing this were (a) to increase the reliability of the subtest and (b) to provide items related to tasks assessed in the physical skills test battery.

The addition of items was on advice from personal communication with the test developer, (Harter, August, 1983). Following data collection, the total subscale of perceived competence in motor ability was subjected to reliability analysis using the coefficient alpha, to test for internal consistency among the items. A standardized item alpha (reliability coefficient) of .85 was obtained which approximates the value the test developer found for internal consistency among the original items. Such a value is considered acceptable for measures such as this. The range of alphas obtained by item, if the item was deleted from the test, was from .83 to .85.

Items in Harter's subscale for physical activity:	Items added:
1. do well at all sports	1. do well at games involving kicking balls
2. better at sports	2. do well at games involving catching balls
3. do well at new activity	
4. good enough at sports	

5. first chosen for games
6. play rather than watch
7. good at new games

3. able to run fast
4. do well at games involving throwing
5. can jump far
6. am strong
7. good at dribbling balls

Example of questions included in Harter's scale:

Really true for me	Sort of true for me			Sort of true for me	Really true for me
☐	☐	Some kids do well at all kinds of sports	but	Others don't feel that they are very good when it comes to sports	☐	☐

Example of questions added:

☐	☐	Some kids do well at games that involve kicking balls	but	Other kids don't feel that they are very good at kicking balls	☐	☐

The Pictoral Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, in press). This scale was developed for children ages four through seven years, and is designed to measure two general constructs of children's perceptions: (a) perceptions of competence and (b) perceptions of social acceptance. The competence domain is further divided into items measuring perceptions of cognitive and physical competency while the social acceptance domain consists of

and physical competency while the social acceptance domain consists of items reflecting perceptions of peer and maternal acceptance. Unlike the companion scale for older children, a general self-worth subscale is not included.

The test item format is a "structured alternative format," as is used with older children, however, picture plates are used instead of printed test items. The child points to the picture which depicts the child which is most like him or her, then to a large or small circle beneath the picture, indicating whether the child in the picture is <u>really</u> like him or her, or just <u>sort of</u> like him or her. A set of plates is available for pre-school through kindergarten level children while a separate set is available for first and second grade level children. In order to provide competency items that would be discriminatory, Harter and Pike (the test developers) determined that not all items were appropriate for both developmental levels. Some items do, however, overlap.

Each of the four subscales has six items, scored as in the Perceived Competence Scale for Children. However, factor analysis revealed only two domains, suggesting that at least for the competency domain, children do not distinguish between their cognitive and motor abilities. The factor analysis was based on a sample of over 250, 4- through 7-year-old boys and girls. Items had moderate loadings on their designated factor, and with only two exceptions in the sample of 4- and 5-year-old children, did not cross-load. Average factor loadings for the sample of 4- and 5-year-old children were .47, .29, .41, and .58 for cognitive, physical, peer acceptance, and maternal

acceptance subscales, respectively. In the same order, mean factor loadings for the sample of 6 and 7 year-old children were .53, .39, .60, and .55. Additional support for the validity of the subscales comes from the demonstrated ability of scores from at least three of them to discriminate between children who were identified as having problems related to that competency area and children who were not experiencing problems.

The internal consistency of each subscale, as measured by the coefficient alpha, ranged from .50 to .85. When subscales were combined according to their respective factors, the range was from .75 to .89. Total scale reliability for the preschool/kindergarten items was .88; for first/second grade items, .87.

As with the other perceived competence instrument utilized in this study, additional items were added to the subscale for physical ability. Each subscale currently contains six items, therefore six additional items were added bringing the total to 12. The internal consistency of the items in the expanded subscale for perceived competence in physical ability was examined with reliability analysis using coefficient alpha procedures. An acceptable standardized alpha of .80 was obtained which approximated that obtained by the test developer. The range of alpha values obtained by item, if deleted from the test, was from .76 to .81.

Items included in Harter & Pike's physical activity subscale:		Items added to the scale:
1. good at swinging	items for	1. good at jumping
2. good at climbing	pre-school	2. good at bouncing a ball

3. can tie shoes	& kinder-	3. good at kicking a ball
4. good at skipping	garten level	4. good at throwing a ball
5. good at running	children	5. good at catching a ball
6. good at hopping		6. am strong

Items included in Harter & Pike's physical activity subscale:		Items added to the scale:
1. good at swinging	items for	1. good at jumping
2. good at climbing	first and	2. good at batting a ball
3. good at bouncing ball	second grade	3. good at kicking a ball
4. good at skipping	level	4. good at throwing a ball
5. good at running	children	5. good at catching
6. good at jumping a rope		6. am strong

Examples of the picture plates used to assess perceived competence in motor domain tasks may be found in Appendix F.

Assessment Battery for Motor Abilities and Sport Skills

The items included in the motor assessment battery were chosen to represent (a) specific motor abilities as identified by factor analysis studies and (b) motor skills common to the most popular organized sports of children in the community being studied. Test items had to meet several criteria, as listed below. Each item had to:

1. be appropriate for the age range of 5 to 10 years (appropriate to children's cognitive as well as motor abilities),

2. be reliable,

3. be valid,

4. in conjunction with other items in this assessment battery, not require a total administration time in excess of 30 minutes,

5. be administerable in a typical elementary school gymnasium or multi-purpose room, and

6. not require elaborate or non-portable equipment.

Preliminary items were chosen by this investigator and reviewed by three content experts. Following minor revisions, nine items were agreed upon as representative of the two content areas specified, motor abilities and sport skills. Subsequently, a pilot study was conducted to determine if all items could meet criteria one through four as indicated above. One hundred ninety-four children in Grades K through 4 were assessed with the battery of task items. (For details of the pilot study see Appendix A.) Based on the results of this preliminary study all of the original items were maintained, four of which required revisions in protocol. Test-retest reliability coefficients for a sample of 10 first grade subjects ranged from .57 to .95 for the nine items. Specific item reliabilities may be found in Appendix B.

Face validity of the items was based on the judgment of three content experts, as noted previously. The validity of the battery of items as a measure of general motor ability was examined in the pilot study. All children who were assessed in the pilot study were also rank ordered within grade level on the basis of demonstrated motor performance by their physical education specialist. Rank order scores were converted to z scores and used in multiple regression and discriminant function analyses. Results of the multiple regression analyses suggested that the amount of variance that could be accounted

for by the nine items, within each grade level ranged from 56% to 77% ($\underline{M}$ = 66.4%). Results of the discriminant function analyses suggested that when used in combination, subjects' scores on the nine items could successfully classify them as belonging in the top, middle, or lower third of their grade level in motor performance, as indicated by rank order scores assigned to them. Percent of correct classification ranged from .69 to .88 ($\underline{M}$ = .79).

A brief description of each item included in the battery, how it was scored, and the ability or skill which it measured follows. Complete protocol information is located in Appendix D.

Item	Motor ability or skill tested
1. Standing Broad Jump	(power of legs)

The broad jump test required subjects to stand with toes behind a take-off line on the floor and jump as far as possible onto a tumbling mat. Take-off and landing were on two feet. Score was measured in inches, calculated to the nearest 1/2 inch.

2. Flexed Arm Hang	(muscular endurance of upper arms and shoulder girdle)

Subjects grasped the 1 1/2 inch diameter chinning bar with a pronated grip and maintained as long as possible, a position in which the chin was above the bar and arms fully flexed. Score was number of seconds position was maintained, scored to the nearest 1/10th of a second.

3. Side-step Test	(agility without running)

From a standing position astride a center line, subjects were required to slide 6 feet to the right, touching the right foot to the

floor outside the right side line. Without turning, subjects had to slide in the opposite direction to touch left foot outside the left side line. Sliding continued to alternate side lines until 10 seconds had passed. Points were scored for each line crossed within the 10 seconds.

4. Sixty Yard Shuttle Run (speed and agility while running)

Two cones were placed 15 yards apart with a starting line on the floor, even with the outer edge of one cone. Subjects ran two laps around the cones. Score was the number of seconds which elapsed from start to finish, scored to the nearest 1/10th of a second.

5. Sit-up Test (strength and endurance of abdominal muscles)

Bent-knee sit-ups were performed, on a tumbling mat. Feet were held by the subject's testing partner. Subject's score was the number of sit-ups completed within 30 seconds.

6. Playground Ball Dribble Test (eye-hand coordination and a sport skill)

In this test subjects were asked to dribble a 9 inch red playground ball in and out of a row of six traffic cones placed 8 feet apart. Score was the number of cones the subject dribbled past within 30 seconds.

7. Soccer Ball Dribble Test (eye-foot coordination and a sport skill)

Subjects were asked to dribble (i.e., move the ball with their feet only) a size five indoor soccer ball in and out of a row of traffic cones. The row consisted of five cones placed 10 feet apart. Subjects received one point each time their ball passed between two cones within 30 seconds.

8. Soccer Ball Throw Test (power of upper body and a sport skill)

From behind a restraining line, subjects used a two-handed overhead throwing motion to throw a size five outdoor soccer ball for distance. A step forward was taken as the subject threw the ball. Score was the distance the ball traveled in the air, measured to the nearest inch.

9. Softball Repeated Throws Test (eye-hand coordination and a sport skill)

In this test subjects were asked to throw an indoor softball at a large target on the wall as often as possible within 30 seconds. Subjects were required to catch (or retrieve) each rebound. The ball had to be thrown from within a designated throwing area; catching was not restricted to that area. Score was the number of times the subject hit the target within 30 seconds.

Test-retest reliability of the items as revised from the pilot study was assessed during this study for 10 subjects in each of three grade levels. Five male and five female kindergarten, second, and fourth grade level subjects were tested a second time on the motor ability/sport skill assessment battery within approximately two weeks of initial testing. The Pearson product correlations for the kindergarten grade level subjects ranged from .53 to .89 (M of .72). Values for second grade level subjects ranged from .57 to .98 (M of .79) while the range of values for fourth grade level subjects was from .65 to .91 (M of .77).

Questionnaire Regarding Participation in Physical Activity and Sport

In order to examine the level of participation in sport by subjects and to classify each child as a participant or nonparticipant in organized sport, a questionnaire was developed. The questionnaire was sent home with each child with the request that parents or guardians assist their child in its completion.

Of primary interest was whether or not the child had participated in and completed the season in at least one organized sport during the past year. Those who answered this question with a yes were classified as participants for the purposes of this study. Those who did not complete at least one season of participation in an organized sport program were classified as nonparticipants.

Additional information was requested of the subjects which related to reasons for participating or not participating, amount of time spent at practice, the sport in which the subject participated, how important being good at sports was to them, their choices of activities when given free time, and the amount of time spent in gross motor activity during a week. Such information was used to describe this sample and to understand better why these children were or were not participants in sport.

A copy of the Questionnaire Regarding Participation in Physical Activity and Sport is located in Appendix E.

CHAPTER III

RESULTS

Three major relationships were examined, via univariate as well as multivariate procedures. First, analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA) were used to examine the relationship between children's perceptions of their competence in motor ability and their participation motivation. Second, a MANOVA was used to examine the relationship between motor abilities and participation motivation. Third, the relationship between perceptions of competence in motor abilities and actual motor performance was analyzed via a MANOVA, as well as correlational techniques. The analyses and results obtained will be discussed separately for each major relationship.

Relationship #1: Perceived Competence to Participation Motivation

ANOVA - a 2 X 2 X 5 (Participation by Gender by Grade Level) ANOVA was performed to compare group differences on perceptions of competence in motor ability. Due to unequal numbers of participants and nonparticipants (participation main effect) the general linear model for regression analysis technique was utilized. This method allowed for the examination of each effect holding it orthogonal to all other effects in the model.

The main effect of participation (participant versus nonparticipant in organized sport) was of primary concern. However, sufficient

research suggests that age and gender are related to perceptions of ability. Therefore, these variables and all possible interactions were included in the analysis to investigate the possibility that the relationship between perceptions of competence and involvement may vary in relation to gender and or age (identified as grade level in this study).

Results revealed that the participation main effect, $F(1, 230) = 2.69$, $p < .10$ was not significant. The main effect for gender, $F(1, 230) = 11.16$, $p < .001$, and the grade level main effect, $F(4, 230) = 9.94$, $p < .0001$ were significant. None of the interactions (participation by gender, participation by grade, gender by grade, participation by gender by grade) were found to be signiicant.

Follow-up for determining how the genders differed on perceptions of competence was accomplished by inspection of mean values. The mean for males was 3.36 ($SD = .48$) while females had a mean of 3.13 ($SD = .57$). Perceived competence mean scores could range from one to four with one indicating low perceived competence and four reflecting high perceptions of competence. The mean values suggested that males perceived themselves to be more competent in motor skills than did females.

To investigate the differences among grade levels in perceptions of competence in motor abilities, mean scores were subjected to tests for linear and quadratic trends and Scheffé tests of significant differences between and among groups. A significant linear effect was found $F(1, 245) = 43.34$, $p < .0001$, with mean values decreasing as grade level increased. The test for a quadratic effect was not

significant. Results of the Scheffé procedures suggested three homogeneous subsets of groups (Figure 5). Third and fourth grade level

Grade Level	4	3	2	1	K
Subset One	———				
Subset Two		———	———		
Subset Three			———	———	

Figure 5. Subsets of children (classified by grade level) who were not significantly different on perceptions of competence in motor abilities.

subjects were not significantly different; first, second, and third grade level subjects did not differ significantly; and kindergarten, first, and second grade level subjects were not significantly different. Table 1 contains all cell means and standard deviations.

MANOVA - A second analysis examined the relationship between perceived competence in motor ability and participation, gender, and grade level. In this MANOVA procedure subjects' item scores on the motor ability subscale of the perceived competence scale were used as the dependent variables. Although such a multivariate analysis would conceptually provide a more powerful analysis of the relationship between the independent and dependent variables than the original ANOVA, it was not chosen as the primary model for analysis. This decision was made for two reasons. First, only half of the total number of items used in the motor ability subscale were similar across all grade levels and therefore half of the available information would

Table 1

Perceived Competence in Motor Ability: Cell Means and Standard Deviations for Participants and Nonparticipants by Gender and Grade Level

Participation	Grade Level											
	K		1		2		3		4		Total	
Category	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Participants*	3.58	.32	3.36	.44	3.34	.41	3.20	.56	3.10	.57	3.28	.50
Males	3.66	.34	3.44	.43	3.43	.41	3.16	.55	3.23	.64	3.35	.52
Females	3.47	.27	3.13	.41	3.24	.39	3.26	.60	2.89	.38	3.16	.45
Nonparticipants**	3.58	.42	3.26	.50	3.24	.40	2.96	.58	2.68	.61	3.21	.57
Males	3.62	.28	3.38	.30	3.43	.33	3.03	.56	3.08	.31	3.38	.42
Females	3.53	.51	3.21	.55	3.08	.40	2.92	.60	2.51	.63	3.10	.62
Total	3.58	.39	3.31	.47	3.30	.40	3.08	.58	2.96	.61		

*Number of participants per cell:

Gr K	Gr 1	Gr 2	Gr 3	Gr 4
M=8	M=18	M=14	M=16	M=20
F=6	F=6	F=12	F=9	F=13

**Number of nonparticipants per cell:

Gr K	Gr 1	Gr 2	Gr 3	Gr 4
M=17	M=7	M=11	M=9	M=5
F=19	F=19	F=13	F=16	F=12

be ignored. Second, most of the items that were similar across the grades were added to the subscale by this investigator and were therefore not original items on the scale.

Results of this analysis were similar to those obtained in the ANOVA analysis. The main effect of participation was not significant, Wilks' Lambda = .95, $F(7, 224) = 1.65$, $p < .12$. The main effects for gender, Wilks' Lambda = .91, $F(7, 224) = 3.26$, $p < .003$ and grade, Wilks' Lambda = .69, $F(28, 809) = 3.13$, $p < .0001$ were significant. In addition, one interaction effect was found to be significant, gender by grade, Wilks' Lambda = .83, $F(28, 809) = 1.49$, $p < .05$. This suggested that for one or more items the difference between males' and females' perceptions of ability in motor skills was not the same across all grade levels.

As a follow-up to the significant gender by grade level interaction effect the univariate F values were examined for each dependent variable. At the univariate level only one of the perceived competence items, ability to dribble a ball, demonstrated a significant interaction effect, $F(4, 230) = 3.25$, $p < .01$. Newman-Keuls' procedures were used to examine differences between all pairs of cell means involved in the interaction. The primary source of this interaction appeared to be the fact that males and females did not differ significantly in their perceptions of competence on this item at any grade level except fourth. At this grade level the mean for females (2.68) was significantly lower than for males (3.24). Further, the mean value for females was significantly lower than for all other groups except the third grade level males.

Because many of the subjects in this study were younger than the age at which most children become participants in organized sport, an additional variable, which may also reflect participation motivation, hours per week spent in gross motor activity, was examined. The general linear model for regression analysis was used with perceived competence in motor ability as the dependent variable. Independent variables were hours of play (a continuous variable) and gender and grade level (each identified as a categorical variable).

Results suggested that the hours of play main effect was significant, $F(1, 230) = 3.78$, $p < .05$. A plot of mean values for this main effect (Figure 6) suggested that as the number of hours in a week spent in gross motor activity increased, perceptions of motor ability also increased. The amount of variance in perceptions of competence for which the full model could account was .26. Hours of play specifically accounted for only .014 of the total variance. This appears to be a very small proportion when compared to that accounted for by the other significant main effects in the model, gender and grade level, which accounted for .043 and .174, respectively.

In Figure 6, the mean for 20 hours per week conspicuously departs from the positive relationship between perceived competence and hours per week spent in gross motor activity. The severity of the drop may result from the fact that 1 of the 11 subjects had a mean score for perceived competence which was almost three standard deviations below the mean for the subject's grade level. A specific reason why this subject had such a low score could not be identified. Without this

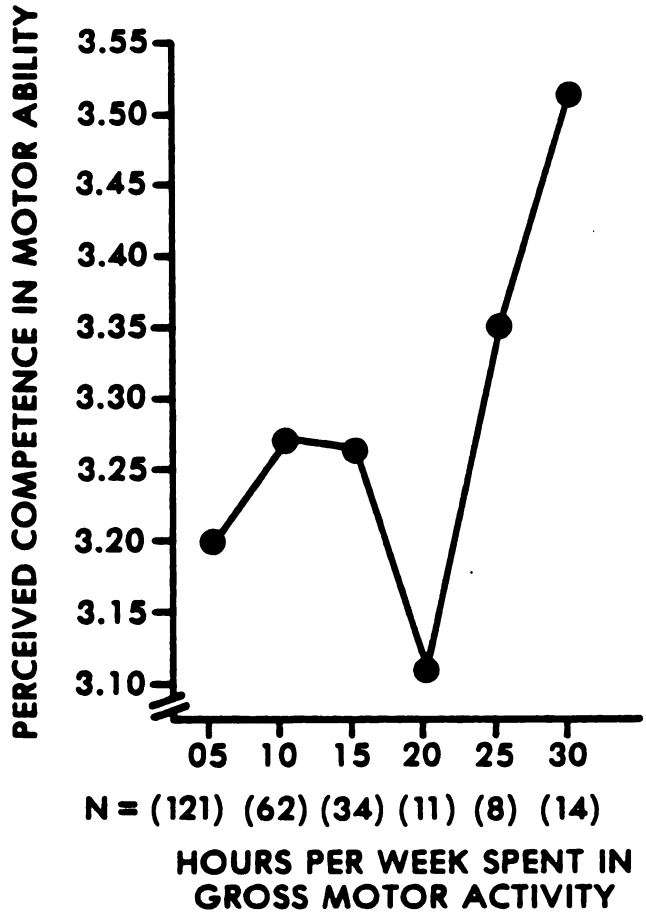


Figure 6. Mean values for perceived competence by hours of play.

score the mean value for 20 hours per week would have been 3.21, providing a less severe drop in the graph.

As noted above, the main effects gender $F(1, 230) = 13.44$, $p < .0003$ and grade level, $F(4, 230) = 13.57$, $p < .0001$ were also significant. The relationships between these variables and perceived competence in motor ability were examined previously in a model with participation as the additional independent variable. Results were similar. Further interpretation of the results relative to these main effects would therefore be redundant (see pages 64-65). None of the interactions included in this model were significant.

Relationship #2: Motor Abilities to Participation Motivation

MANOVA - A 2 X 2 X 5 (Participation by Gender by Grade Level) MANOVA was applied to examine the relationship between childrens' choices to be participants or non-participants in organized sport and their performance on nine selected motor ability and sport skill items. As in the first relationship examined, participation was the effect of primary interest. Gender and grade level were also included because ample research indicates that each has a significant relationship to motor performance. Further, the relationship between participation and motor ability may change with different levels on one or both of these variables.

The results revealed a significant main effect for participation, Wilks' Lambda = .89, $F(9, 222) = 3.01$, $p < .002$; gender, Wilks' Lambda = .71, $F(9, 222) = 9.91$, $p < .0001$; and grade, Wilks' Lambda = .26, $F(36, 833) = 10.02$, $p < .0001$. None of the interactions (participation by gender, participation by grade, gender by grade, participation by

gender by grade) were significant. Univariate F tests, as well as discriminant function analyses were used as follow-up procedures when significant multivariate results were obtained to determine which dependent variables contributed most to differentiating the groups.

Results of the univariate F tests for the involvement main effects showed significant differences between participants and nonparticipants on four of the nine items in the motor assessment battery (Table 2). These items were the soccer ball dribble, basketball dribble, softball repeated throws, and the soccer ball throw items, i.e., the sport skill items. Inspection of the means for these two groups (Table 3) indicated that participants performed better than nonparticipants on all of these items.

The discriminant function analysis suggested that five items could be used to discriminate significantly between these two groups (Wilks' Lambda = .7950, $p < .0001$). These items included the soccer ball dribble, soccer ball throw, situp, sidestep, and flexed arm hang test items. However, the discriminant function coefficients associated with each of these items clearly indicated that the soccer ball dribble item was the most powerful discriminator.

The discrepancy between the results of the univariate F and discriminant function analyses may reflect the difference in the mathematical techniques involved. Univariate F values reflect separate group comparisons for each dependent variable. Therefore, they do not account for intercorrelations among the variables. Discriminant function procedures (when using the stepwise method) attempt to identify in a stepwise manner, the most parsimonious subset of

Table 2

Univariate F Values and Standardized Discriminant Function Coefficients for the Motor Abilities/Sport Skills Test Items

Dependent Variable	Univariate F		Standardized Discriminant Function Coefficient
Participation Main Effect	(Wilks' Lambda = .7950 p<.0001)		
1. Soccer dribble	22.69**		1.00
2. Basketball dribble	10.56**		XX
3. Softball repeated throws	5.20*		XX
4. Soccer ball throw	4.28*		.30
5. Broad jump	0.46		XX
6. 60 yard shuttle run	2.85		XX
7. Situp	0.05		-.36
8. Sidestep	0.35		-.25
9. Flexed arm hang	2.54		.16
Gender Main Effect	(Wilks' Lambda = .7352 p<.0001)		
1. Soccer dribble	47.47**		.81
2. Basketball dribble	40.04**		.52
3. Softball repeated throws	32.27**		XX
4. Soccer ball throw	17.29**		XX
5. Broad jump	11.96**		.40
6. 60 yard shuttle run	5.93*		.28
7. Situp	0.77		-.41
8. Sidestep	2.73		-.80
9. Flexed arm hang	6.63**		.22
	(Wilks' Lambda = .2483 p<.00001)		
Grade Main Effect	(Wilks' Lambda = .7811 p<.0001)		
1. Soccer dribble	33.93**	-.18	-.70
2. Basketball dribble	79.77**	.40	.30
3. Softball repeated throws	80.78**	.41	.38
4. Soccer ball throw	52.17**	.20	.59
5. Broad jump	36.08**	.07	.08
6. 60 yard shuttle run	30.49**	-.07	.70
7. Situp	28.24**	.22	-.36
8. Sidestep	27.67**	.28	-.27
9. Flexed arm hang	1.29	-.23	.39

*p < .05. **p < .01.
XX = item not included in the discriminant function equation

Table 3

Means and Standard Deviations for Main Effects Participation, Gender, and Grade Level on the Motor Abilities/Sport Skills Battery Items

Dependent Variable	Participation			
	Participants		Nonparticipants	
	M	SD	M	SD
1. Soccer dribble	7.52	2.30	5.59	1.80
2. Basketball dribble	16.59	6.15	12.24	5.75
3. Softball throw	10.88	3.77	8.45	4.04
4. Soccer ball throw	196.98	74.61	156.06	64.11
5. Broad jump	47.38	9.68	43.75	8.92
6. 60 yard shuttle run	18.00	1.72	18.82	1.93
7. Situp	14.42	5.30	13.01	4.81
8. Sidestep	15.15	3.35	14.34	3.13
9. Flexed arm hang	10.03	7.78	7.37	6.38
	Gender			
	Males		Females	
	M	SD	M	SD
1. Soccer dribble	7.41	2.18	5.67	2.02
2. Basketball dribble	16.32	6.38	12.41	5.64
3. Softball throw	10.78	3.91	8.51	3.97
4. Soccer ball throw	192.18	75.82	159.88	64.89
5. Broad jump	47.44	9.43	43.60	9.12
6. 60 yard shuttle run	18.14	1.76	18.70	1.95
7. Situp	14.10	5.25	13.29	4.91
8. Sidestep	14.58	3.44	14.90	3.07
9. Flexed arm hang	10.04	7.25	7.29	6.92
	Grade			
	4		3	
	M	SD	M	SD
1. Soccer dribble	7.94	2.22	7.86	2.01
2. Basketball dribble	20.56	3.62	18.18	4.76
3. Softball throw	13.75	2.76	12.32	3.12
4. Soccer ball throw	251.35	66.56	212.32	64.87
5. Broad jump	52.82	7.72	51.59	7.86
6. 60 yard shuttle run	17.47	1.13	17.06	1.30
7. Situp	16.80	3.98	16.80	3.79
8. Sidestep	16.95	2.58	16.27	2.53
9. Flexed arm hang	10.65	9.49	9.24	6.97

	2		1		K	
	M	SD	M	SD	M	SD
1. Soccer dribble	6.75	1.54	5.81	1.94	4.31	1.29
2. Basketball dribble	14.43	4.30	11.47	4.84	7.19	3.21
3. Softball throw	9.66	2.44	7.12	2.45	5.32	2.40
4. Soccer ball throw	173.24	43.04	135.04	37.70	108.19	32.70
5. Broad jump	44.61	6.28	41.83	6.62	36.76	8.03
6. 60 yard shuttle run	18.14	1.50	19.26	1.76	20.20	1.65
7. Situp	14.66	3.32	10.82	5.12	9.40	4.03
8. Sidestep	15.41	2.31	13.62	2.64	11.44	2.88
9. Flexed arm hang	9.36	6.81	7.13	5.41	6.94	6.29

groups (Klecka, 1975). The first step involves choosing one variable which has the highest value on the selection criterion. At each subsequent step the variable added to the equation is the one which will yield the best criterion score (maximize the statistical difference between the groups) given the variable(s) already in the equation.

Of the dependent variables included in these analyses, the soccer ball dribble, basketball dribble, and softball repeated throw items were highly correlated (Table 4). The fourth sport skill item, soccer throw, also demonstrated a moderate correlation to two of those three items. Therefore, when the strongest of these items was entered into the discriminant equation little of the remaining variance could be accounted for by these related variables.

Post hoc univariate F tests for the main effect gender showed a significant difference between males and females for seven of the nine items (Table 2). These included all four sport skill items (soccer ball dribble, basketball dribble, softball repeated throws, and soccer ball throw) and three of the five motor ability items (broad jump, 60 yard shuttle run, and flexed arm hang). Examination of mean values indicated that males performed better than females on all of these items.

The discriminant function analysis also identified seven of the nine items as significantly related to discriminating between the groups (Wilks' Lambda = .7352, $p < .0001$). Specific items varied somewhat from the univariate results. Two of the sport skill items were not included in the discriminant equation while the two motor

Table 4

Intercorrelation Matrix for Items on the Motor Abilities/Sport Skills Assessment Battery

	Basketball dribble	Softball repeated throws	Soccer ball throw	Broad jump	60 yard shuttle	Situp	Sidestep	Flexed arm hang
Soccer dribble	.79	.76	.63	.59	-.62	.53	.48	.38
Basketball dribble		.86	.75	.66	-.67	.60	.56	.32
Softball repeated throws			.78	.70	-.69	.59	.58	.30
Soccer ball throw				.69	-.58	.59	.54	.25
Broad jump					-.64	.65	.59	.39
60 yard shuttle						-.56	-.51	-.35
Situp							.50	.38
Sidestep								.26

ability items which were not significant in the univariate analysis provided some discriminating power.

In the discriminant equation the soccer dribble and sidestep items were weighted most heavily. Mean scores (Table 3) indicated that males performed better on the first of these items while the second one represents the only item on which females scored better than males. The five additional items reflected motor ability and sport skill items. Their coefficients were moderate to low for this equation and may be inspected in Table 2.

Significant univariate Fs were obtained for eight of the nine motor items for the main effect grade level (Table 2). Mean values for these items generally improved as grade level increased (Table 3). Subjects' performance scores on one item, the flexed arm hang, did not differ significantly by grade level.

The discriminant function analysis for grade level resulted in three statistically significant discriminant functions, at the .05 level of significance. However, the third function was very weak, with an associated Wilks' Lambda of .90. Additionally, the subsets of homogeneous grade levels produced by this function provided little meaningful information. Therefore, only the first two functions will be discussed further.

The first discriminant equation was associated with a Wilks' Lambda of .2483 with $p < .00001$ (Table 2). It accounted for 89% of the total discriminating power which could be generated by all possible functions combined. This equation, in addition to providing information which discriminated among the five grade levels, further

suggested a distinction between kindergarten, first grade level subjects versus second, third, and fourth grade level subjects. The basketball dribble and softball throw items were relatively stronger in the equation than the others. However, seven of the nine items included in the analysis contributed a moderate amount of discriminatory power to the equation, and no items were excluded from the function.

The second discriminant function equation was associated with a Wilks' Lambda of .7812, and a $p < .0001$. As in the first function obtained, all items were included in the equation. Those items which were weighted most heavily relative to the others were the soccer dribble, soccer ball throw, and 60 yard shuttle items. This discriminant function also discriminated among the grade levels, but particularly separated the kindergarten subjects from the others and the fourth grade subjects from the others.

The relationship between motor performance and participation motivation as reflected in hours per week spent in gross motor activity was investigated by an additional MANOVA. All nine motor ability/sport skill test items were used as the dependent variables. Independent variables were hours of play (a continuous variable), gender, and grade level. The general linear model for regression procedures was used so that the independent variable, hours of play, could be included as a continuous variable.

Results suggested that the main effect, hours of play, was significant, Wilks' Lambda = .89, $F(9, 222) = 3.18$, $p < .001$. Examination of the univariate analyses generated for each dependent

variable suggested that this variable was significantly related to seven of the nine motor items (Table 5). Plots of the mean performance scores for subjects at six values for hours of play suggested an increase in performance on each of these items as number of hours of play increased (Figure 7).

For several motor items a drop in performance was noted at 30 hours per week (see Figure 7). this may represent an artifact due to the motor performance of the three kindergarten level subjects in this subgroup. Across Grades K to 4, kindergarten subjects scored lowest on all items. These three subjects demonstrated generally lower than average motor abilities for this grade level.

The main effects, gender, Wilks' Lambda = .89, $F(9, 222) = 3.00$, $p < .002$ and grade level, Wilks' Lambda = .49, $F(36, 833) = 4.88$, $p < .0001$ were significant. The relationships between these variables and motor performance were examined previously with similar results (see pages 74-77). Therefore follow-up analyses were not conducted. In addition, none of the interactions tested generated a significant F value.

Relationship #3: Perceived Competence in Motor Ability to Demonstrated Motor Ability

MANOVA - A 3 X 2 X 5 (Perceived Competence in Motor Ability by Gender by Grade Level) MANOVA was performed to compare the relationship between children's perceptions of their ability in motor activity to their actual level of performance on selected gross motor tasks. Within each grade level children's mean scores for perceived competence were used to categorize them into the top, middle, or bottom one-third

Table 5

Univariate F Values for the Motor Abilities/Sport Skills Test Items

Hours of Play Main Effect	Univariate F
1. Soccer dribble	17.60**
2. Basketball dribble	16.38**
3. Softball repeated throws	18.65**
4. Soccer ball throw	8.00**
5. Broad jump	4.04*
6. 60 yard shuttle run	14.42**
7. Situp	5.16*
8. Sidestep	2.56
9. Flexed arm hang	2.20

*$p < .05$. **$p < .01$.

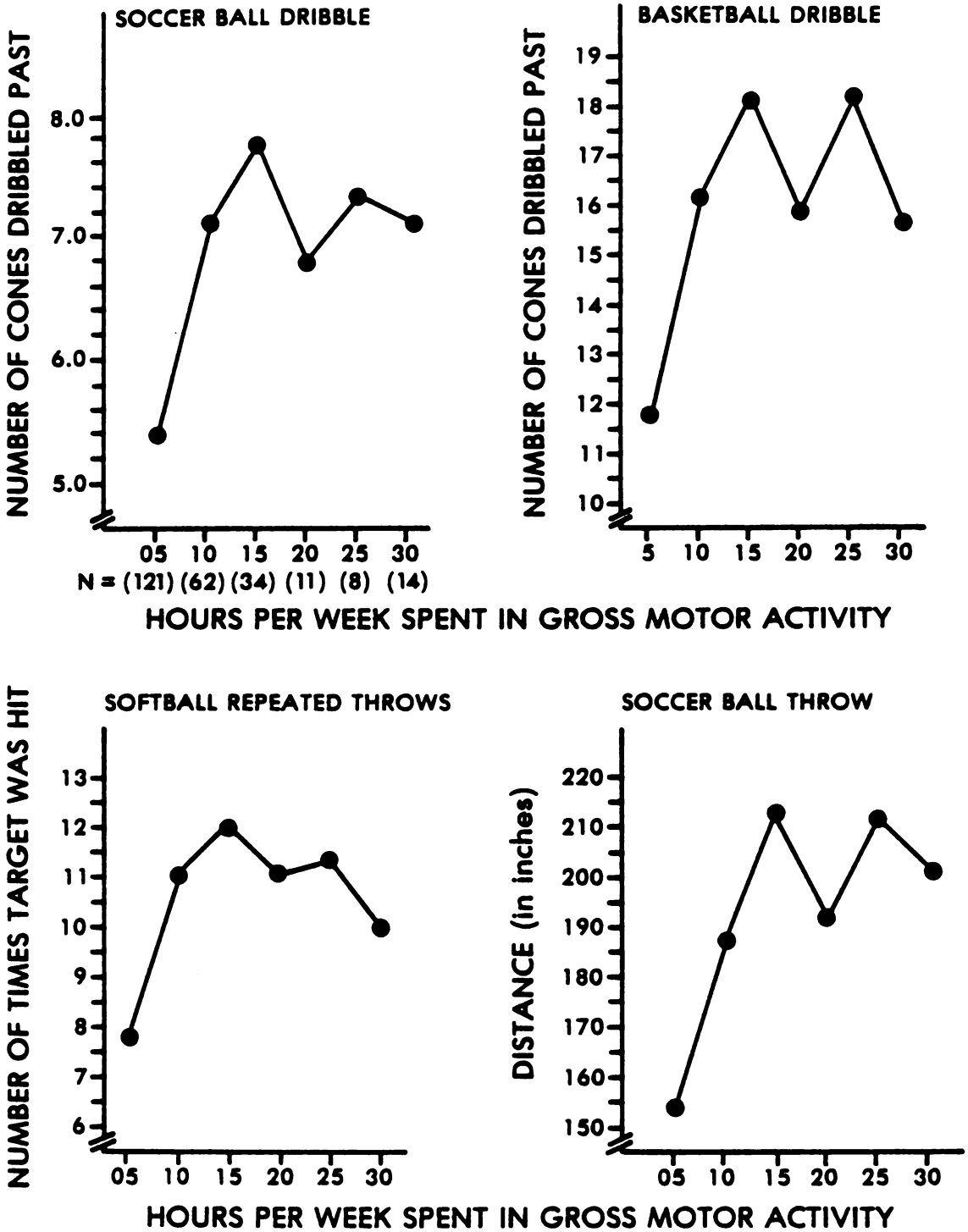


Figure 7. Performance on motor abilities/sport skills items by hours per week spent in gross motor activity.

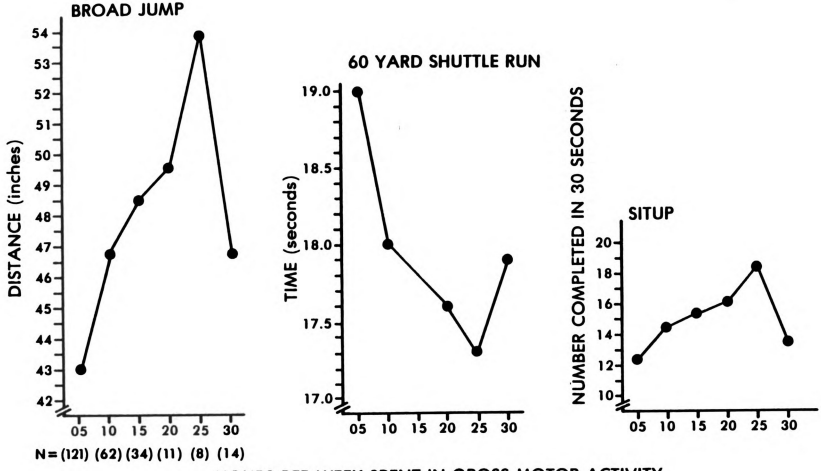


Figure 7. (continued).

(Groups 1, 2, and 3, respectively) among their peers on perceptions of ability in this domain.

Results indicated that all three main effects were significant. The main effect, perceived competence, generated a Wilks' Lambda = .8219, $F(18, 424) = 2.42$, $p < .001$. The gender effect resulted in a Wilks' Lambda = .6986, $F(9, 212) = 10.16$, $p < .001$, and the main effect, grade level, generated a Wilks' Lambda = .2266, $F(36, 796) = 10.76$, $p < .0001$. None of the interaction effects reached significance.

In order to determine which items contributed most to distinguishing among the children as grouped by perceived competence, univariate F and discriminant function analysis procedures were used. A significant difference was obtained for all sport skill items and one motor ability item, the broad jump (Table 6). Mean values for performance scores on all motor abilities/sport skills items suggested a decrease in performance associated with a decrease in perceptions of ability (Table 7).

Discriminant function procedures resulted in one significant function, associated with a Wilks' Lambda of .8712, $p < .002$ (Table 6). The softball repeated throws item emerged as the most powerful discriminator among the dependent variables. Additionally, the soccer dribble, basketball dribble, soccer ball throw, and broad jump were identified as strong contributors to the equation. Relative to group differences, this function appeared to separate best those subjects who were lowest on perceived competence (Group 3) from those of average to high levels of perceived competence (Groups 2 and 1).

Table 6

Univariate F Values and Standardized Discriminant Function Coefficients for the Motor Abilities/Sport Skills Test Items

Dependent Variable	Univariate F	Standardized Discriminant Function Coefficient
Physical Perceived Competence (groups=top, middle, and bottom thirds)		
		(Wilks' Lambda = .8713 $p < .002$)
1. Soccer dribble	7.38**	.62
2. Basketball dribble	8.50**	.70
3. Softball repeated throws	3.63	-1.29
4. Soccer ball throw	10.08**	.72
5. Broad jump	7.36**	.57
6. 60 yard shuttle run	1.80	.31
7. Situp	2.86	XX
8. Sidestep	1.46	- .30
9. Flexed arm hang	0.26	XX

*$p < .05$. **$p < .01$.

XX - item not included in the discriminant function equation

Table 7

Means and Standard Deviations for Groups (top, middle, and bottom third on perceived competence scores) on the Motor Abilities/Sport Skills Test Items

Dependent Variable	Group 1 (top 1/3rd)		Group 2		Group 3	
	M	SD	M	SD	M	SD
1. Soccer dribble	7.20	2.60	6.49	2.17	5.95	1.87
2. Basketball dribble	15.99	6.73	14.44	6.22	12.69	5.66
3. Softball repeated throws	10.28	4.45	9.67	3.78	8.96	4.05
4. Soccer ball throw	198.02	83.84	174.80	66.65	156.12	60.64
5. Broad jump	47.58	10.52	46.30	8.88	42.66	8.43
6. 60 yard shuttle run	18.13	2.01	18.49	1.67	18.63	1.96
7. Situp	14.58	3.83	13.71	4.99	12.82	5.15
8. Sidestep	15.15	3.83	14.62	2.98	14.48	2.97
9. Flexed arm hang	9.50	7.73	8.59	7.05	7.96	6.88

Other main effects in this model (gender and grade level) which were found to be significant will not be discussed here. They were examined previously with motor abilities/sport skill item scores as the dependent variables, in the second relationship investigated.

Canonical correlation procedures were used to determine which subset(s) of items from each set of item scores (perceived competence and motor abilities/sport skills) best represented the relationship between these two larger sets. Developed by Hotelling (1935), canonical correlation finds a linear combination of weighted variables from each set, called a canonical variate, which maximizes the correlation between the two sets of variables. The correlation between the first set of canonical variates is the first canonical correlation. Subsequently, a second and successive set(s) of canonical variates may be obtained, each being orthogonal to all previously derived sets.

Grade levels with identical items on the perceived competence in motor ability subscale were combined. Therefore, three canonical correlations were applied to the data; one for kindergarten level subjects, one for first and second grade level subjects, and one for third and fourth grade level subjects. A significant canonical correlation was obtained for third and fourth grade level subjects, only. Subsequent discussion will refer to these subjects.

Results of the analysis for third and fourth grade level subjects indicated one significant canonical correlation (set of canonical variates), $\underline{R}C_1 = .67$, $\underline{p} < .03$. The eigen value was .45 suggesting that the set of canonical variates shared 45% of their variance.

Generally, the relative importance of each variable to the canonical correlation is expressed by its canonical coefficient, or its weighted contribution to the overall relationship between the variates. However, several statisticians have argued that correlations among the variables in a set may distort the interpretation of the weights of each (Mintzes, 1979; Weiss, 1972). This is similar to the problem of interpreting beta weights in a multiple regression equation when independent variables are highly correlated to each other and the criterion. Therefore, a different statistic, the canonical loading is recommended (Meredith, 1964; Weiss, 1972). Each variable's canonical loading represents the correlation between the variable and the artificially-constructed variate. Canonical loadings may be conceptualized in the same way factor loadings represent a variable's relationship to a particular factor in a factor analysis study. Canonical loadings for items on the two pairs of canonical variates derived in this analysis are presented in Table 8.

Inspection of the loadings suggested that the canonical variate for perceived competence was most reflective of items in the scale which concerned being picked first and being good at sports in general. The items with the highest loadings on the motor abilities canonical variate reflected specific sport skills to a large extent. Overall, the shared relationship appeared to be reflected by perceptions of general ability in games and actual skill in sport tasks.

While one significant canonical correlation was produced in this analysis, with a moderate percent of shared variance, this value for shared variance may be somewhat misleading. Several statisticians have

Table 8

Canonical Loadings for Perceived Competence Items and Motor Ability/Sport Skill items on the Canonical Variate

Items	Canonical Variate Loadings
Perceived Competence Items	
1. do well at sports	.36
2. good at catching	.43
3. good enough at sports	.41
4. good at throwing	-.08
5. good at outdoor games	.35
6. good at dribbling	.41
7. better than others at sports	.40
8. good at kicking	.41
9. rather play than watch	.47
10. good at running	.08
11. good at new games	.51
12. am strong	.46
13. picked first in games	.82
14. good at jumping	.29
Motor Abilities/Sports Skills Items	
1. Soccer dribble	.61
2. Basketball dribble	-.39
3. Softball repeated throws	.35
4. Soccer ball throw	.03
5. Broad jump	.11
6. 60 yard shuttle run	-.03
7. Situp	.23
8. Sidestep	.23
9. Flexed arm hang	.43
	$\underline{R}_{C1} = .67$
	$\underline{R}_{C2}^{2} = .45$

recommended computation of the redundancy index to represent the actual amount of variance in the original set of variables which is predictable by knowing scores of the other set of variables (Cooley & Lohnes, 1971; Karpman, 1981; Stewart & Love, 1968). The proportion of the variance in the perceived competence items which may be predicted by scores on the motor items was .08. The redundancy of the motor items or the proportion of their variance which may be predicted by knowing perceived competence scores was .05. Therefore, neither set of variable appears to provide much power to predict scores on the other set of variables.

Pearson product correlations were obtained between children's scores on seven perceived competence items and eight motor abilities/sport skills test battery items. The perceived competence items related to children's perceptions of their ability to

1. catch,
2. throw,
3. dribble a ball,
4. kick,
5. run,
6. jump, and
7. demonstrate strength.

Motor items used in the correlations were

1. softball repeated throws,
2. basketball dribble,
3. soccer ball dribble,
4. 60 yard shuttle,

5. flexed arm hang,
6. situp,
7. soccer ball throw, and
8. broad jump.

Average correlations within each grade level suggested that on an item by item basis, children in each of the grade levels tested were not very accurate in perceptions of their physical abilities and sport skills. Correlations generally improved with grade level, but by fourth grade a mean r of only .29 was obtained. Values for the kindergarten through fourth grade level subjects were .14, .22, .24, .16, and .29, respectively.

Summary of Results

The results of this study suggested that for these children in the kindergarten through the fourth grade level:

1. Perceived competence in motor ability was not significantly related to participation motivation, as measured by participation in organized sports.
2. Males had a higher perception of their motor ability than did females.
3. Perceptions of competence in motor ability decreased as grade level increased for both males and females.
4. Motor ability, as measured by motor abilities/sport skills items, was significantly related to participation motivation. Participants in organized sports performed significantly better

than nonparticipants. The group difference was due primarily to performance on the sport skills items.

5. Males performed the motor abilities/sport skills tasks significantly better than did females. Males outperformed females in all sport skill items, three of the five motor abilities items, and were not significantly different from the females in two motor ability items.
6. Performance on eight of the nine motor abilities/sport skills items improved as grade level increased. Scores on the flexed arm hang item did not change significantly as grade level changed.
7. Perceived competence in motor ability was significantly related to actual motor ability. Several motor items contributed to this relationship, however, the sport skill items contributed more power to discriminate among levels of perceived competence than did the motor ability items. Further, scores on the motor items could be used to distinguish those subjects who scored in the bottom third on perceived competence from those subjects in the top two thirds better than they could be used to make any other between-groups distinction.
8. Correlations between perceived competence in specific motor tasks and actual performance in those tasks were low at each grade level. However, a slight improvement was demonstrated with the increased grade level. Additionally, only for the third and fourth grade level subjects were significant amounts of shared variance demonstrated between item scores for perceived competence and motor ability.

CHAPTER IV

DISCUSSION

Four hypotheses were stated for this investigation; two of which were supported by the data collected, two were not supported. The first hypothesis which predicted a significant relationship between children's perceptions of competence and their motivation to participate in sport, was not supported. The second and third hypotheses were supported. They predicted significant relationships between actual motor ability and motivation to participate and between actual motor ability and perceptions of competence. The final prediction, that the strength of the relationships predicted (Hypotheses 1, 2, and 3) would increase as grade level increased, was not supported.

Although Harter's developmental theory of motivation (Harter, 1981a, 1981b) suggests that the predicted relationship exists between children's perceived competence in their motor ability and their participation motivation, there are several tenable explanations why support for this aspect of her model was not found. First, the basis for her theory has been drawn primarily from work in the cognitive domain. Within the physical domain several other related variables may intervene. For example, results from this study and others (Alderman & Wood, 1976; Sapp & Haubenstricker, 1978) indicate that two of the most frequent reasons identified by children for pursuing sports are to have fun and to be with friends. Perhaps sport participation for

children is mediated more by factors associated with social involvement than by competence, at least in situations in which children are not eliminated from teams and competition is not stressed as highly as in many programs for older children. Some support for the application of Harter's theory to the motor domain has been suggested by other researchers (Feltz & Petlichkoff, 1983; Roberts et al., 1981; Weiss, Bredemeier, & Shewchuk, 1984).

A second possibility is that the strength of this relationship increases with age, but is not strong enough during the early elementary school years to be detected in a study such as this. In the few previous studies utilizing participants and nonparticipants in sport, older children served as subjects. Subjects in the Roberts et al. (1981) study were the youngest, comprising fourth and fifth grade levels. If this relationship begins to be significant at approximately the fourth grade level, the pooling of subjects could have increased the strength of this relationship. In the present investigation, fewer fourth graders were assessed and their scores were pooled with those of subjects in four lower grade levels. Additionally, an examination of the relationship between perceived competence in motor ability and participation motivation at individual grade levels suggested that as grade level increased, the probability decreased that the mean difference in perceived competence scores between participants and nonparticipants occurred by chance.

The assumption that participation or nonparticipation in sport is a <u>choice</u> made freely by the child, may not be as accurate for young children as it is for older children. This possibility may help to

explain a developmental relationship between perceived competence and participation. Only 28% of the nonparticipants in this study rated not being good enough at sports or not enjoying sports as very important or somewhat important reasons for not participating. The reasons most frequently given for not participating were: (a) programs were too expensive, (b) available programs were too far from home, and (c) subjects were not aware of programs or felt that programs available for children their age did not provide sufficient choices. For participants, the decision to become involved may have been their own. However, many nonparticipants may also have had the desire to participate and the perception that their motor skills were sufficient for successful participation. Other factors (cost, transportation, etc.) may have prevented them from pursuing this form of activity.

In contrast to the results above, some support for the possibility that participation motivation may be related to perceptions of competence in this young age group was obtained by using hours spent per week in gross motor activity as a measure of participation motivation. If hours spent in participation may be considered an activity more directly controlled by the child, then its significant relationship to perceptions of competence may support this aspect of Harter's model. However, the amount of variance in perceived competence scores accounted for by hours of play was small.

Future research involving the relationship between perceived competence in motor ability and participation motivation in young children should consider two factors. First, if the participation/ nonparticipation dichotomy is used, the researcher should establish

that the child's status on this variable is the result of his or her free choice. Second, alternative situations should be investigated which may reflect children's participation motivation. Examples would include level or types of activity engaged in during recess at school, level of participation in physical education class, and percent of free time spent involved in gross motor activity.

The second hypothesis was supported by the results of this study, i.e., a significant relationship was found between children's demonstrated motor performance and their participation motivation. Specifically, subjects who were participants in organized sports performed the selected motor tasks better than did nonparticipants. Follow-up tests suggested that the difference was due primarily to scores on the sport skill items. While direct effects cannot be inferred from the data collected in this study, these results may suggest that involvement in sport may have a significant and positive effect on skill level. In this sample, soccer was the one sport or one of the sports of involvement for 66% of all participants. Seventy-five percent of the participants in third grade or younger participated in soccer. The discriminant function analysis extracted the soccer ball dribble item as the most powerful item in predicting group membership, i.e., participant or nonparticipant. This skill would be the one most likely to be affected by such involvement.

The results of this investigation agree in part with the only other published study which investigated this relationship for children of a similar age range. Magill and Ash (1979) compared the perceptual-motor ability of first through fifth grade level participants and

nonparticipants. Their results suggested that participants did not differ from nonparticipants on these tasks. While their tasks were limited in number and scope of motor abilities, the present investigation examined performance on a wider range of gross motor abilities. At the univariate level of analysis, the present results agree with those of Magill and Ash; none of the motor ability items demonstrated a significant relationship to participation. However, several items did contribute some discriminatory power in the discriminant function equation.

The possibility that a relationship between fitness or motor ability and participation in sport may become significant for older children is suggested by the work of Guyot et al. (1981) and Smoll and Schutz (1984). Guyot and associates found a significant relationship between motor abilities/fitness scores and participation for fourth through sixth grade level males but not for females. Smoll and Schutz found that this relationship was significant for 7th and 11th grade level males and females but not for 3rd grade level subjects.

When hours per week spent in gross motor activity was used to reflect participation motivation the results also supported the second hypothesis. Children who engaged in gross motor activity for greater amounts of time per week performed better than children who were less active in all but two motor items. That more of the motor ability items were significant at the univariate level for this analysis than in the sport participation analysis suggests two plausible explanations. Perhaps children who are more competent in the more "innate" motor abilities also are motivated to be active in their

free time. Alternately, activities of free play may be more effective in increasing the performance of children on motor ability items than is involvement in organized sport at these ages. Increased performance in the sport skill items may have resulted from the probability that participants in sport were included within that group of children spending the greatest number of hours involved in gross motor activity per week.

In a practical sense the support found for the second hypothesis suggests the importance of emphasizing the development of basic sport skills for all primary and middle elementary grade level school children. Particular emphasis should be on skills that are prerequisites for the sports that are popular within the community. Such an effort would help to raise the level of skill for those children not yet involved in community sport programs.

The importance of emphasizing sport skills at an early age is reinforced by the fact that a gender difference also existed for the motor items. The difference was more evident in sport skills than motor abilities, but in all items except two, males performed better than females. At these ages the difference may not be of practical importance for game situations and during these years children may not be eliminated from teams due to skill level differences. By the middle school or junior high school years, as this difference increases, females who try out for coed teams may be at a great skill disadvantage if efforts are not made to improve individual skill levels.

Support for the third hypothesis resulted from a statistically significant relationship which occurred between children's scores on

motor performance tasks and their perceptions of motor ability. Apparently children at these ages had a relatively accurate perception of their ability to perform motor tasks. At least, they were aware of their status as it related to being near the top, middle, or bottom third of their grade level.

The results further suggested that those children at the bottom one third of their grade level on motor performance and perceived competence were more easily distinguished from all others than were the top and average performers. This would not surprise practitioners, who routinely observe that the poorly skilled are made aware quickly of their lack of skill. The fact that this may be demonstrated so early and that sport skills were more strongly related to perceptions of ability than were motor ability items suggests the practical need to assess skill levels and then provide individualized, objectives-based instruction.

These results are generally in agreement with other studies involving older subjects within the physical (Boling & Kirk, 1982; Guyot et al., 1981) and cognitive domains (Boersma & Chapman, 1978; Harter, 1981b). However, some discrepancy is apparent between the present results and those found by Harter (1982) and Harter and Pike (in press) for children ages 4 to 12 within the physical domain. When correlating children's perceptions of their motor competence to teachers' perceptions of the children's competence she found low values for the 4 to 7 year-old subjects and consistently moderate (.60s) values for the 8 to 12 year-old subjects. This suggests an interaction among age, perceptions of ability, and actual ability. This

interaction effect was not significant in the present study and may be due in part to the fact that the measures of actual competence differed in the two studies. Harter used teachers' perceptions of ability while in the present study actual motor performance was measured. Harter's subjects may have been more accurate at reflecting their teachers' perceptions than in understanding their actual competence in specific tasks. In addition, teachers as well as students may have been thinking about children's ability more in general than specific competencies.

The discrepancy may also have occurred because the design of this study and analysis was not powerful enough to detect such a change in the relationships. In fact, follow-up correlational analyses did suggest a stronger relationship with increasing age. The mean values for correlations between specific perceived competence items were low, but increased as grade level increased. Further, only at the third and fourth grade level were canonical correlation techniques able to produce a subset of perceived competence items that could account for a significant amount of variance in a subset of motor performance items.

Further research should investigate the possibility that the correlations between competence and perceptions of competence may be increased by assessing tasks which are more relevant to subjects at each specific grade level. For this study the desire to make comparisons across five grade levels necessitated motor performance tasks that 5 through 10 year-old children could perform. However, some tasks may be used more frequently than others at different grade and

age levels. This may affect how accurately children are able to judge their competence.

The final hypothesis predicted that the strength of the relationships examined in the first three hypotheses would increase with age. Since no interaction effects were significant, this hypothesis was not supported. Specific reasons why this may have occurred were discussed relative to each hypothesis where appropriate, in the preceeding pages.

In general, this prediction was based on the possibility that accuracy and an understanding of the distinction between ability and effort may occur earlier in the sport domain than in other domains. This domain would appear to provide more opportunities for social comparisons, more concrete, frequent, and contingent feedback than the cognitive domain (Klieber, 1981; Pascuzzi, 1981). Each of these factors is important to developing perceptions of competence (Veroff, 1969; Harter, 1981a).

The work of several researchers (Harter, 1981a; Horn, 1984; Minton, 1979), may suggest one reason why greater accuracy did not occur earlier. These researchers have found that in cognitive situations students depend more on feedback from "authoritative figures" than in sport situations. In sport, peer evaluations are more salient; however, they may also be less accurate. In testing situations for this study, the probability that cognitive competence evaluations were frequently based on teacher feedback was evidenced by verbal qualifications that children used when answering math or reading competence questions. For example, one child remarked "I know I'm good

at reading because I'm in the Redbird group." Another commented, "I must be really good at arithmetic, I'm in the 2nd grade workbook and I'm only in 1st grade."

The fact that for young children, the types of gross motor activities engaged in, the environment in which they occur, and equipment available change frequently may actually hinder development of accurate judgment of one's ability to perform specific motor tasks. Nicholls (1978) identified the ability to relate temporally separated outcomes and understanding the difference between ability and effort as necessary to developing accuracy in self-perceptions. At the elementary school level children receive reading and arithmetic instruction and evaluation daily. However, the nature of children's gross motor activities change as they move from the gym, to the playground to home. They also vary depending on weather conditions, availability of equipment, and play partners. Therefore, while one's ability to throw a stone farther than a friend on one occasion may provide immediate and concrete performance information, the chance to throw may not occur again for several weeks at which time the first effort may have been forgotten. Increased time between performance efforts may also make it easier to attribute one's poor performance to lack of effort instead of lack of ability. Thus, developing accurate perceptions of one's specific physical competencies may take more time than for cognitive competencies. For children who become involved in and devote regular practice time to one or more sports at an early age, perceptions of motor competence may become accurate earlier than perceptions of competence in other domains.

Summary

Overall, the findings of this study suggest that for young children, perceptions of competence in motor ability is not a significant criterion for participation in organized sport. However, those who are participants demonstrate a higher level of skill than nonparticipants, and, in a general sense, these children demonstrate an understanding of their skill level within their own grade level.

If, as has been suggested by results from other studies (Feltz & Petlichkoff, 1983; Roberts et al., 1981; Weiss et al., 1984), perceptions of ability do become significantly related to involvement within a few years, then some direction for practitioners may be suggested by these results. During these early years, efforts to improve actual skill levels and the children's understanding that their level of skill has improved and is sufficient for effective participation in sport, would be most beneficial to future development.

From a theoretical standpoint, results of this endeavor support the relationship proposed by Harter (1981a) between perceived competence and actual competence. Contrary to this, however, a significant relationship between perceived competence and participation motivation was not supported for this age group. Possibly during these years a portion of the developmental model may need to be modified (Figure 8). It may be that within sport situations, young children participate for a variety of reasons (of which perception of competence may be one but not yet a major contributor). Participation subsequently affects skill level, which feeds into one's perceptions of skill and ability. In time, the connection between perceived

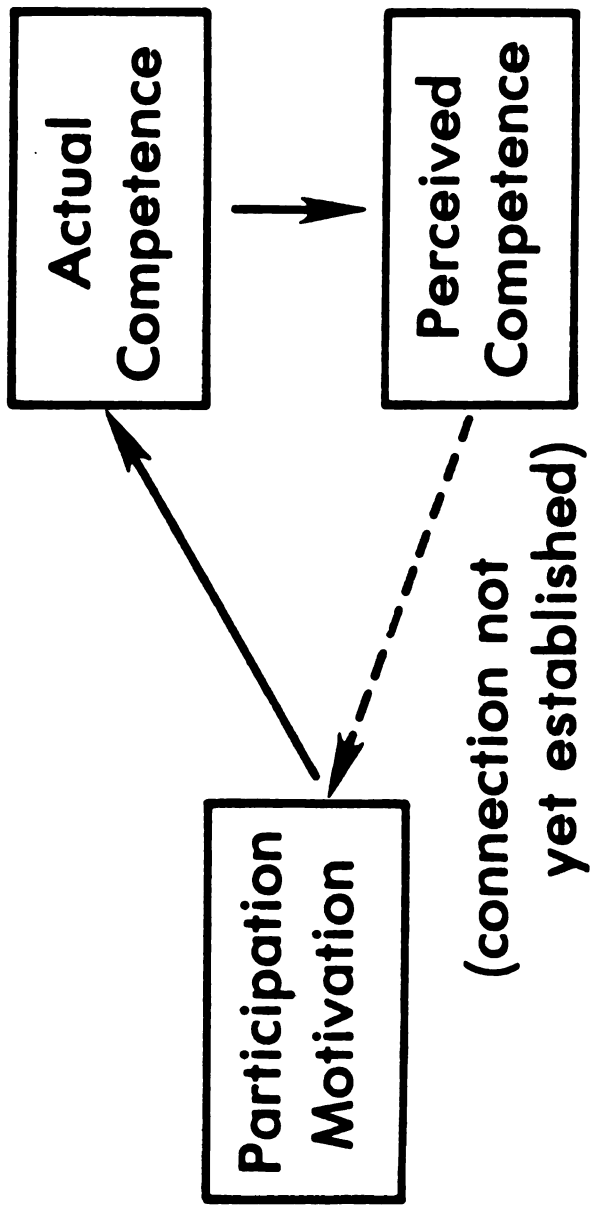


Figure 8. Possible relationship among three elements of Harter's model of competence motivation, within the physical domain, and for young children.

competence and motivation becomes established, although at different rates for different children.

The possibility that the direction of the relationship which may become established between perceived competence and participation motivation may be bidirectional should also be investigated. In older children perceived competence may affect choice to become involved in organized sport. But participation may also affect perceptions of competence. For example, being relegated to sitting on the bench or receiving primarily negative feedback from the coach may lower perceived competence. Perceptions of competence may increase for those who are stars on the team or who receive primarily positive feedback from coaches and peers. Certainly, further research is warranted to establish such relationships, the nature of their cause and effect status, and the timing of such events. The need for a longitudinal approach is evident.

In conclusion, this research effort may be considered exploratory in nature. Until recently, little effort had been made to theorize regarding the developmental relationships among the variables investigated here. Research involving young children within the physical domain is limited and usually was indirectly related to the major research questions being tested.

The psychological characteristics and motor abilities children bring with them to situations which involve motor skill instruction are important. Each affects how the teacher or coach should structure the session. Children who want to learn and expect to enjoy the situation may require the instructor to attend minimally to motivational

techniques, allowing greater emphasis on development of skill. Conversely, children who expect to have little success and to find little pleasure in the situation may require the teacher to place greater emphasis on changing perceptions. Knowledge of children's levels of motor skill provides information the instructor can use to prescribe successful and challenging experiences. Learning experiences need to be appropriately matched to children's levels of skill to maximize improvement.

Understanding how children's psychological characteristics and motor abilities change, which may be changed by means of specific treatments, and how each may affect the subsequent use of skills learned in a movement setting have theoretical as well as practical importance. Such information would further our understanding of development in general and the interrelationships among various domains. In applied situations this information could influence the selection of instructional goals for children at various developmental levels and the expectations of what may be reasonable improvement. Specific learning tasks may also be prescribed more appropriately. At some levels of development change may be facilitated more easily in one domain than another. At other levels we may provide for the development of skills in more than one domain via tasks that are mutually beneficial. Continued research investigating these interrelationships seems warranted. Many questions are still to be answered, and more to be raised, particularly from a developmental approach.

APPENDICES

APPENDIX A

PILOT STUDY

PILOT STUDY

The items in the Assessment Battery for Motor Abilities and Sport Skills were chosen to represent general motor ability in the investigation of the relationships among actual motor competence, perceived motor competence, and participation motivation. The literature clearly suggests that a general attribute of motor ability does not exist, per se (Singer, 1975; Sage, 1977). Therefore, it was deemed necessary to measure a number of tasks representative of several more specific motor abilities. Specific motor abilities which have been identified by factor analysis studies involving children include: speed; power; agility; eye-hand, eye-foot, and general body coordination; flexibility; and balance (Rarick & Dobbins, 1975; Peterson, Reuschlein, & Seefeldt, 1974). Items such as the 30 to 50 yard dash, broad jump, shuttle run, etc., have commonly been used to represent these factors (Smoll, Schutz, & Keeney, 1976; Glassow, Halverson, & Rarick, 1965). Safrit (1973) noted that a problem common to many motor ability tests used to judge motor performance is that they do not relate well to actual sport and game situations. Kirkendall, Gruber, and Johnson (1980) noted that although individual items (measuring speed, agility, etc.) are not very predictive of demonstrated skill in sports, when tested in ways more similar to game situations, correlations increase substantially. Many single tasks may be judged as measuring more than one component (e.g., basketball dribble test measures a skill specific to a sport as well as eye-hand coordination; soccer ball dribble test measures a skill specific to a sport, agility, and eye-foot coordination). A battery composed of

items representing motor ability factors and sport skills was therefore developed to be representative of many, though certainly not all, components of general motor ability.

The items included in the preliminary assessment battery were chosen with six additional criteria in mind. The purpose of the pilot study was to determine how well each item could meet four of the six criteria. There were as follows. Each item had to:

1. be appropriate for the age range of 5 to 10 years (appropriate to children's cognitive as well as motor abilities),
2. be reliable,
3. be valid, and
4. in conjunction with other items in the assessment battery, not require a total administration time in excess of 30 minutes.

The nine items included in the preliminary test battery were:

1. standing broad jump
2. flexed arm hang
3. side-step test
4. sixty yard shuttle run
5. sit-up test
6. basketball dribble test
7. soccer ball dribble test
8. soccer ball throw test
9. softball repeated throw test

Methods:

Subjects: A total of 88 females and 106 males were tested on all nine items of the test battery. All were volunteers from an elementary

school in Carterville, Illinois, enrolled in grades kindergarten through four. Ages ranged from a mean from kindergarten subjects of 67.5 months to a mean of 119.5 months for fourth grade level children.

Procedures: During the months of December and January (1983-1984 school year) children were tested on the battery items as part of their physical education classes. Each day two stations were set up in the gymnasium. The physical education specialist assisted in the testing by administering one item while this investigator administered the other one. Upon entering the gym children were asked to remove their shoes and socks and to report to the station at which they were to begin testing that day. Assignment to stations was random and changed daily. After being tested in one station the student reported to the other station for a second test. All physical education classes met two to three times per week for 30 minutes each class period. Testing for the pilot study was accomplished for each grade level over a period of approximately 2 1/2 weeks.

Ten first grade level children who were members of a class not included in the total pilot study were chosen randomly as subjects in an examination of the test-retest reliability of the items. These children were taken in pairs to the gymnasium during free time and tested on all items by this investigator. The order of presentation of the items was counterbalanced and randomized for each pair of subjects. Subsequent to initial testing a retest was administered one week later.

In addition to the actual testing, all subjects were given a rank order score based on their general level of motor performance as

demonstrated in their school physical education class. Rankings were generated within each grade level by the children's physical education specialist.

Results:

The results of the pilot study will be addressed as they related to compliance of the test items with the criteria noted previously. All data referred to are included in Appendix C.

1. Appropriateness of items across age range of 5 to 10 years

a. Cognitive requirements: For the sit-up test, directions appeared to be somewhat difficult for kindergarten level subjects to comprehend. Some children did not seem to understand the concept of doing as many sit-ups as possible in 60 seconds with a rest within that period of time, as needed. Protocol for this item was adjusted, as noted below in section 1c. None of the other items appeared to be too difficult for the youngest children to understand. In addition to verbal directions given, all tasks were demonstrated as well for the kindergarten and 1st grade level children. Demonstrations were supplemental for children in grades 2 through 4 as deemed necessary.

b. Physical requirements: Inspection of the means and standard deviations for each item across the 5 grade levels suggested an appropriate age related increase for all items. Minimum and maximum values obtained suggested the lack of a floor or ceiling effect for most items. For one item, the flexed arm hang, several subjects at each grade level were unable to maintain the starting position, and mean values were low. The possiblility that this occurrence was sample specific was suggested when these scores were compared to scores of

children the same age who were part of a larger group to whom the same test was administered. Since mean values and standard deviations were acceptable, this item was maintained. Examination of scores for this item within the major study suggested that the low values obtained in the pilot study may have been specific to that sample.

c. Protocol: Throughout the pilot study several aspects of administration and scoring were examined. For the ball dribble (with hands) three different balls were tried; a junior basketball, fully inflated 9 inch playground ball, and a semi-deflated 9 inch playground ball. The 9 inch playground ball (inflated to a pressure of 2 1/2 lbs) provided most control and did not hurt the hands of young children while still offering a challenge for older children.

The sit-up test allowed children to perform as many sit-ups as possible within 60 seconds. However, two scores were recorded, (a) number done before a rest was taken, if taken and (b) total number done in 60 seconds. This was done to examine a possible recovery factor which may interfere with the strength and endurance factors desired. A significant difference was not found between the two, although some children did stop, rest, and then continue. Additionally, some younger children did not seem to understand the concept of doing as many sit-ups as possible within 60 seconds with a rest within the test as needed. Therefore to alleviate the possibility of confounding the recovery effect with strength and endurance and to eliminate confusion, a 30 second sit-up test was used to replace the 60 second test.

When test-retest reliabilities were obtained, that for the 60 yard shuttle was relatively low, .57. Since the distance covered was

judged as being short enough to be considered more of a speed than an endurance measure, a second trial was added (as is typically done in 30 and 50 yard dashes) to increase this value.

The protocol for the side-step test indicated penalties for cross-over steps. During the pilot study some younger children, although demonstrating appropriate use of sliding steps during practice, sometimes reverted to galloping, particularly to one of the two directions. Therefore, verbal reminders were given when such movements occurred and lines crossed with such movements were not be counted.

One change was made in the scoring of the soccer ball dribble test to increase objectivity. Pilot procedures called for awarding a point for each cone dribbled past, as in the basketball dribble. However, younger children sometimes skipped cones due to a lack of control, which made judgments regarding awarding points difficult. Scoring procedures were therefore adjusted to award a point each time the ball crossed an imaginary line formed by any two adjacent cones in the row of cones.

Procedures for all items not specifically addressed above were maintained as originally formulated. Protocol for all items may be found in Appendix B.

2. Test-retest reliability

Scores for five male and five female first grade level children resulted in generally moderate to high Pearson product correlation values. The range was from .57 to .95 with only two scores below .79.

The average across all nine items was .80. From this information it was judged that the items chosen demonstrated sufficient reliability.

3. Validity

The validity of this battery of items to provide objective values for motor abilities and sport skills was examined by comparing the scores that subjects attained on the test items to their rank order score within their grade level. Rank order scores were converted to percentiles and then to Z scores and used as the dependent measure in a series of multiple regression analyses. These analyses suggested that at each grade level some combination of items was able to account for a significant amount of the variance in rank order scores. The average $R^2 = .664$, while individual grade level values were .56, .66, .77, .59, and .75 for Grades K, 1, 2, 3, and 4, respectively.

Discriminant function analyses were also performed on these data. Subjects' z scores were used to classify children into one of three categories, top, middle, or bottom one-third of their class relative to overall motor performance. Classification (Group 1, 2, or 3) was the criterion variable, while the nine test items were the predictors in the model. One significant ($p < .05$) discriminant function equation was obtained for each grade level, with the exception of kindergarten. At this grade level a Wilks' Lambda of .3854, chi-squared = 23.84, $p < .16$ was obtained prior to extracting any discriminant functions. This suggested that the variation to be accounted for among the three groups was small. However, the two disciminant function equations which were produced correctly classified 78% of the subjects. The average percent of correct classification for Grades 1 through 4 was 79.5. Therefore

subjects' scores on these motor items were judged to relate adequately to their overall motor performance as evaluated by their physical education specialist.

4. Administration time

During the test-retest portion of the study it was found that 2 first grade level subjects could perform the full battery of tasks in approximately 30 minutes. Kindergarten level children were expected to take slightly more time to complete the test items while older children were expected to finish in less time. The inclusion of all items therefore was not expected to require too much time within the demands of the total dissertation study.

APPENDIX B

PILOT STUDY - SUMMARY STATISTICS

PILOT STUDY - SUMMARY STATISTICS

Item	Grade	M	SD	Minimum	Maximum
Sidestep	4	18.63	2.16	14.0	24.0
	3	16.44	1.68	12.5	20.0
	2	14.43	1.92	11.0	19.5
	1	13.85	2.07	6.0	17.5
	K	11.48	1.92	7.5	16.5
Softball Throw and Catch	4	13.61	2.66	5.5	18.0
	3	11.90	2.57	7.0	18.5
	2	10.03	2.93	4.0	17.0
	1	7.24	2.65	2.0	14.5
	K	4.91	1.39	2.5	9.5
Situps to 60	4	29.87	8.30	10.0	50.0
	3	32.44	9.26	8.0	47.0
	2	27.08	8.72	7.0	45.0
	1	23.38	6.84	7.0	37.0
	K	11.03	8.19	0	28.0
Broad Jump	4	51.43	6.60	34.7	64.7
	3	49.83	9.11	27.3	71.2
	2	45.61	7.06	34.5	63.2
	1	43.29	8.04	29.0	59.7
	K	35.34	8.71	17.5	55.0
Soccer Dribble	4	8.71	1.94	4.7	13.3
	3	7.79	1.74	4.3	11.7
	2	7.77	1.66	5.0	12.0
	1	6.42	1.85	3.0	12.0
	K	4.92	1.72	2.0	9.0
60 yd Shuttle	4	17.52	1.40	14.5	20.9
	3	17.88	1.26	15.3	20.7
	2	18.05	1.14	15.8	20.5
	1	19.15	1.57	16.1	23.0
	K	21.45	2.15	16.9	26.1
Soccer Throw	4	262.35	51.87	164.7	374.0
	3	221.27	48.32	128.3	322.7
	2	191.54	50.23	100.0	283.7
	1	141.52	37.22	76.0	217.0
	K	112.07	35.11	39.7	182.0

Item	Grade	M	SD	Minimum	Maximum
Flexed Arm Hang	4	8.32	10.23	0.0	52.4
	3	13.62	12.02	0.0	56.1
	2	8.04	6.54	0.0	27.3
	1	6.26	6.21	0.0	26.3
	K	4.44	4.48	0.0	17.8
Basketball Dribble	4	19.46	3.73	12.0	29.5
	3	16.80	4.65	8.0	28.0
	2	16.07	4.87	6.5	27.0
	1	9.73	3.21	4.0	16.5
	K	6.27	2.59	3.5	14.0
Age	4	119.50	6.67	110.0	133.0
	3	105.10	5.53	97.0	126.0
	2	93.70	4.59	84.0	107.0
	1	81.05	6.14	73.0	96.0
	K	67.47	5.18	61.0	79.0

Test-Retest Results: Pearson Product Moment Correlations
N=10 first grade subjects (five females, five males)

1. Soccer Dribble	.79
2. 60 yd Shuttle	.57
3. Soccer Ball Throw	.59
4. Flexed Arm Hang	.91
5. Sidestep Test	.86
6. Softball Throw and Catch	.89
7. Situps to Stop	.82
Situps to 60 sec.	.82
8. Broad Jump	.85
9. Basketball Dribble	.95

Multiple Regression Analyses

I.V.s were ordered: Broad Jump, flexed arm hang, situps (to 60 sec), basketball dribble, softball throw, 60 yard shuttle, soccer throw, soccer dribble, sidestep test.

D.V. was z score: determined by a transformation of rank order score, as assigned by child's physical education specialist.

Grade	N	F	R^2	p
4	38	(9,28)=9.12	.75	.0001
3	45	(9,35)=5.52	.59	.0001
2	37	(9,27)=10.03	.77	.0001
1	42	(9,32)=6.95	.66	.0001
K	32	(9,22)=3.13	.56	.01

Discriminant Function Analyses

Method used for the discriminant analyses was the direct method, i.e., all variables were entered into the analysis at the same time.

Group = 1, 2, or 3 (child's position in the top, middle, or bottom one-third of their class based on rank order scores assigned by their physical education specialist)

Predictors = Broadjump, flexed arm hang, situps (to 60 sec.), basketball dribble, softball throw, 60 yard shuttle, soccer throw, soccer dribble, sidestep test.

Grade	Wilks' Lambda	X^2	p	% of subjects classified correctly
4	.194	50.85	.0001	84.2
3	.397	35.06	.009	68.9
2	.213	46.34	.0003	78.4
1	.225	52.20	.0001	88.1
K	.385	23.84	.16	78.1

Item Intercorrelations

		60 yd Shuttle	Soccer Throw	Flexed Arm Hang	Sidestep	Softball Throw	Situps to 60 sec.	Broad Jump	Basketball Dribble
	4th	-.44	.57	.29	.06	.40	.28	.40	.64
Soccer	3rd	-.31	.42	.15	.33	.54	.22	.30	.63
Dribble	2nd	-.39	.46	.35	.30	.67	.42	.46	.70
	1st	-.57	.42	.44	.30	.74	.49	.57	.61
	K	-.33	.25	.41	.19	.37	.22	.59	.47
	4th		-.41	-.29	-.41	-.42	-.48	-.64	-.64
60 yd	3rd		-.19	-.33	-.61	-.28	-.44	-.46	-.33
Shuttle	2nd		-.43	-.49	-.37	-.47	-.61	-.58	-.52
	1st		-.41	-.34	-.42	-.51	-.34	-.68	-.42
	K		-.45	-.33	-.41	-.21	-.29	-.74	-.33
	4th			.27	.05	.56	.21	.63	.52
Soccer	3rd			.38	.28	.63	.36	.56	.49
Throw	2nd			.39	.24	.73	.41	.67	.76
	1st			.23	.19	.69	.25	.45	.40
	K			.49	.09	.16	.30	.53	.39
	4th				.10	.28	.33	.39	.51
Flexed	3rd				.19	.13	.52	.54	.15
Arm Hang	2nd				.22	.40	.46	.43	.44
	1st				.16	.39	.34	.36	.39
	K				.18	.43	.49	.42	.55
	4th					.19	.19	.24	.20
Sidestep	3rd					.38	.18	.48	.36
	2nd					.48	.37	.50	.47
	1st					.26	.37	.41	.22
	K					-.03	.28	.46	.38

(list continues)

		60 yd Shuttle	Soccer Throw	Flexed Arm Hang	Sidestep	Softball Throw	Situps to 60 sec.	Broad Jump	Basketball Dribble
	4th						.33	.55	.67
Softball	3rd						.40	.42	.64
Throw	2nd						.48	.72	.85
	1st						.47	.60	.68
	K						.12	.31	.48
	4th							.31	.45
Situps	3rd							.51	.24
	2nd							.63	.46
	1st							.62	.60
	K							.41	.31
	4th								.53
Broad	3rd								.49
Jump	2nd								.70
	1st								.50
	K								.42

APPENDIX C

INFORMATION LETTER FOR PARENTS

AND

CONSENT FORM

Information Letter for Parents

Dear Parent(s) or Guardian,

In the past few years educators have demonstrated a greater commitment to documenting the progress of their students in all subject areas. In physical education and sport it has been assumed that involvement enhances development in several areas besides actual skill in sports, such as leadership, self-confidence, and cooperation. Rarely has such change actually been measured. One reason is that little is known about how such qualities develop in children, within the normal environment.

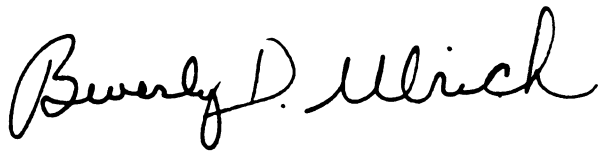
I am currently a doctoral student specializing in the development of motor ability in children. As a former elementary physical education teacher and director of pre-school programs, I have a strong interest in research that has practical application. In my dissertation study I will be investigating the development of children's self-concept of ability in motor skills. Self-concept of ability will also be compared to children's actual motor abilities and choice to participate in sports and games.

I will be working with children in kindergarten through fourth grade at Winkler and Parrish elementary schools, and would like to ask you to allow your child to participate in this study. Children will be asked to 1) complete the attached questionnaire (at home, with parental assistance), time involved: approx. 10 minutes; 2) take a test of perceptions of ability (at school; 3rd and 4th grade children will receive the test as a group, younger children will be tested individually), time involved: approx. 20 minutes; and 3) take a test of sport skill/motor ability (at school, to be administered in pairs of subjects), time involved: approx. 30 minutes. In the perceptions of ability test, children will be asked to respond to statements that indicate what they are like. Sample questions might ask them how good they feel they are at playing outdoor games, making new friends, or kicking balls. Nine short test items comprise the motor skill battery, examples of which include: soccer ball dribble, softball throw, broad jump, and shuttle run.

All of the information collected during this study will be kept strictly confidential. The names of all subjects will be replaced with identification numbers as soon as all testing is completed. Only group information will be referred to in any publication of the results of this study. Individual parents or children will be free to discontinue participation at any time. Upon completion of the study, information concerning the findings will be made available to all interested parties involved, within the confidentiality limitations.

The principals of the schools to be involved in this project (Mr. Drake and Mr. Nelson) as well as the district superintendent, (Dr. Thomas) have reviewed this study and procedures and have agreed to cooperate with me. In addition, this project is being conducted through the joint cooperation of the physical education departments of Michigan State and Southern Illinois Universities. If you will allow your child to participate, please read and sign the attached consent form and assist your child in completing the participation questionnaire. Please have your child return these forms to his or her classroom teacher within two weeks. If you have any questions regarding this study, please feel free to contact me at the telephone number or address listed below.

Your cooperation in this project will be greatly appreciated. The results of studies such as this help to provide information through which educators may continue to strive to provide a better educational environment for all children.



Beverly D. Ulrich
202 North Oakland
Carbondale, IL 62901 457-8906

Parental Consent Form

1. I have read the information contained in the accompanying letter concerning the motor development study which will be conducted with children in kindergarten through fourth grades in the Carbondale elementary schools. I will give my permission for my child _____ to participate as a volunteer in this study being conducted by Beverly D. Ulrich.

2. The study has been explained to me and I understand what my child's participation will involve.

3. I understand that participation by my child is subject to his or her verbal consent. Further, I understand that I (or my child) am free to discontinue participation at any time.

4. I understand that the identity of the subjects involved will be treated with strict confidence, and that subjects will remain anonymous. Within this restriction, results of the study will be available at my request.

Signed _____

Date _____

APPENDIX D

MOTOR ABILITIES/SPORT SKILLS ASSESSMENT BATTERY: PROTOCOL AND SCORE SHEET

MOTOR ABILITIES/SPORT SKILLS ASSESSMENT BATTERY - PROTOCOL

- All subjects will perform the test items in bare feet.
- Encouragement will be offered by the test administrator throughout the testing session.
- Items will be administered to each subject in one of 4 counterbalanced orders, randomized by subject.

1. Standing Long Jump

Equipment: mat, masking tape, tape measure, pointing stick or yard stick

Description: Subject stands with toes behind the take-off line, with feet several inches apart. Prepartory arm and leg movements are encouraged and demonstrated for subjects. Take-off and landing are on two feet.

Scoring: Two practice and three trial jumps are given. Distance is measured from take-off line to point where body touches the mat nearest to the line, calculated to the nearest 1/2 inch. Three trial jumps are recorded, final score is the mean of the three trials.

2. Flexed Arm Hang

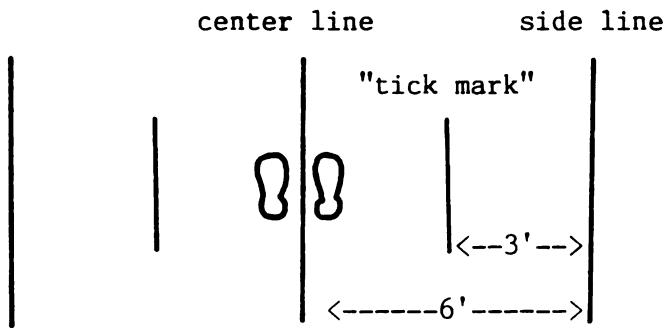
Equipment: doorway gym bar approximately 1 1/2 inches in diameter, stopwatch

Description: Height of the bar is adjusted so it is approximately 6 inches above the subject's height. Subject grasps the bar with a pronated (palms away) grip, and is helped (boosted or may use a bench) into a position in which chin is above the bar, with chest close to it and arms fully flexed. Position is maintained as long as possible. Trial ends when performer rests chin on bar or elbows extend beyond 90°.

Scoring: One trial is given and recorded to nearest tenth of a second. (Spotter/timer should stop legs from swinging when subject begins to hang freely. Raising the knees or kicking legs to remain hanging is not permitted.)

3. Side-step Test

Equipment: masking tape, stopwatch

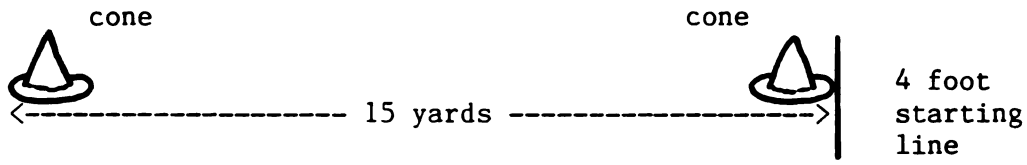


Description: From a standing position astride the center line, subject slides (sidestep) to the right touching foot to floor outside the right side line; without turning moves in opposite direction to touch left foot outside left side line. Sliding to right and left continues, touching as often as possible in 10 seconds. Cross-over steps may not be used, and one point is deducted each time a cross-over step is utilized. Use of a gallop to move from side to side is also not allowed, and lines crossed in this manner are not counted.

Scoring: Each trip from the center line across a marker counts one point. For example, moving to the right the prformer crosses a tick mark for one point, the outside marker for two, back across the tick for three, across center line for four, across left tick mark for five, and so on until 10 seconds have passed. (To simplify scoring, scorer may begin counting each of the three longer lines by "2" starting with the first sideline crossed, then add an additional "1" point at the end if the last line crossed was a tick mark.) Subjects receive a 5 second practice, followed by two 10 second trials. Subject's <u>score</u> is the mean of the two 10 second trials.

4. <u>60 Yard Shuttle</u>

Equipment: masking tape, stopwatch, two cones



Description: Two cones are placed so their outer edges are 15 yards apart. A starting line is placed on the floor, even with the outer edge of one cone. Subject runs two laps around the cones. Runner is asked to keep turns close to but not touching markers.

Scoring: Time is recorded to the nearest 1/10th of a second. Two trials are given; subject's <u>score</u> is the mean of both trials.

5. <u>Basketball Dribble Test</u>

Equipment: 9 inch red playground ball inflated to 2 1/2 pounds of pressure, six cones, masking tape, stopwatch

Description: Six cones are placed in a straight line, first one is 5 feet from the starting line, rest are 8 feet apart. On "go" subject dribbles with either hand in and out of cones, continuing for 30 seconds. (Cones are placed in a line parallel to and 6 feet from a wall. Tester moves in a line parallel to and 6 feet from the subject as subject dribbles through the course, on the side of the cones which is opposite to the wall. Tester insures that a loose ball does not get farther away from the subject than 6 feet, by stopping it.)

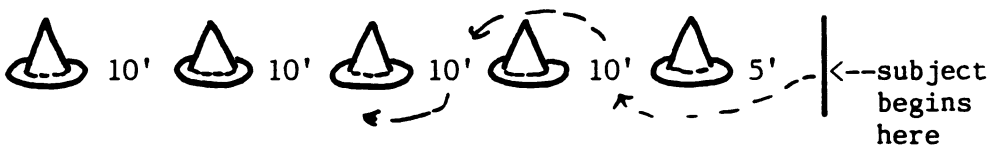
Scoring: One point is awarded for each cone passed in 30 seconds. A cone is considered passed when the subject's body is even with it. Two trials are given, with score being the mean of both trials.

6. Soccer-ball Dribble Test

Equipment: One semi-deflated indoor soccer ball (size five, inflated to 4 pounds of pressure), five cones, masking tape, stopwatch

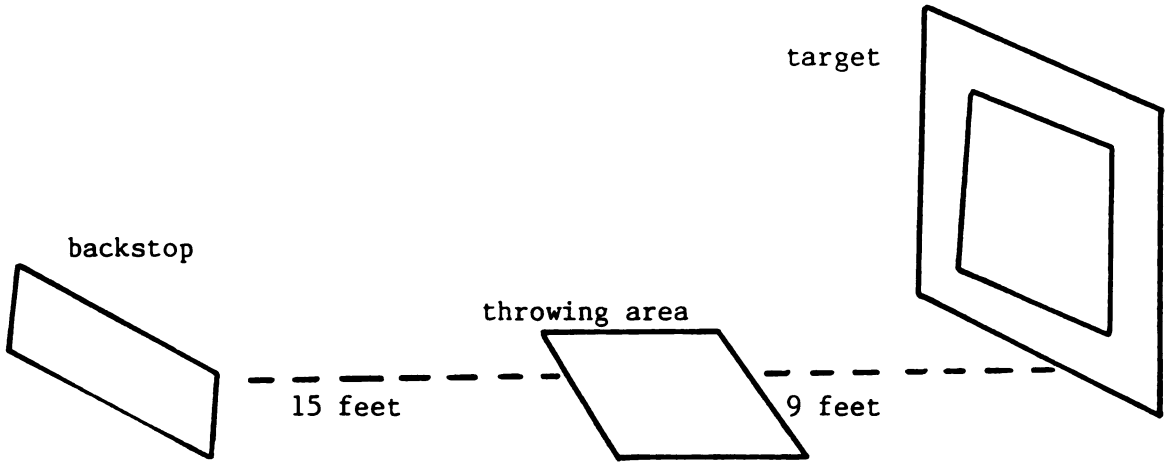
Description: Five cones are placed in a straight line, 10 feet apart with the first one 5 feet from starting line. On "go" subject dribbles soccer ball with feet in and out of the cones for 30 seconds. As noted above for the basketball dribble, cones are placed 6 feet from a wall, and tester runs parallel and along the side of the subject to keep "loose" balls from getting too far away.

Scoring: Subject receives one point each time the ball passes between two cones in 30 seconds. Three trials are given, and subject's score is the mean for all three trials.



7. Softball Repeated Throws Test

Equipment: Two indoor softballs, masking tape for wall target and throwing area, table turned on its side for a backstop



Description: a. Target area is outlined with masking tape on the wall as shown (10 feet X 5 1/2 feet).
b. Throwing area is marked on floor, 9 feet from the target (5 1/2 feet X 5 1/2 feet).
c. Table is placed on its side, 15 feet from the throwing area to serve as a backstop.
d. Child stands in throwing area with softball in hand. On "go" child throws ball overhand at target, attempts to catch rebound in air or after bouncing, repeating as often as possible in 30 seconds. Child may leave throwing area to catch but must return to execute throws. All throws must hit within target to score a point. A practice of 10 seconds preceeds two 30 second trials.

Scoring: One point is scored for each throw in which the ball hits within the target boundaries. Subject's score is the mean of two trials.

8. Soccer Throw-in for Distance

Equipment: one size five soccer ball, tape measure, masking tape

Description: From behind the restraining line, subject utilizes a two-handed overhead throw for distance. One step is taken prior to throwing, but restraining line may not be stepped on or over until after the ball is released.

Scoring: Two practice trials, followed by three test trials are given. Distance is measured from a line perpendicular to the restraining line, to the nearest inch. Subject's score is the mean of the three test trials.

9. Sit-up Test

Equipment: mat, stopwatch
Description: To assume the starting position, the subjects lie on their backs with knees flexed, feet on the mat approximately 12 to 15 inches from the buttocks. Hands are clasped behind the head. Feet are held by a partner to keep them in constant contact with the mat. The subject, by tightening his or her abdominal muscles, curls to a sitting position, touching both elbows to knees. Chin should remain tucked into chest. One sit-up is completed when the subject returns to the original starting position (midback must make contact with the mat). Testing begins when tester says "go".
Scoring: One 30 second trial is given. Subject's score is the total number of sit-ups completed within that time period.

MOTOR ABILITIES/SPORT SKILLS ASSESSMENT BATTERY - SCORESHEET

Form A

Date_____

Gr_____

Name	Basketball Dribble			60 yd Shuttle			Sit-ups	Flexed Arm-hang	Soccer Dribble			
	T1	T2	$\bar{X}$	T1	T2	$\bar{X}$	T1	T1	T1	T2	T3	$\bar{X}$
1. M F												
2. M F												

	Softball Throw			Broad Jump				Soccer Throw				Sidestep Test		
	T1	T2	$\bar{X}$	T1	T2	T3	$\bar{X}$	T1	T2	T3	$\bar{X}$	T1	T2	$\bar{X}$
1.														
2.														

APPENDIX E

QUESTIONNAIRE REGARDING PARTICIPATION IN PHYSICAL ACTIVITY AND SPORT

QUESTIONNAIRE REGARDING PARTICIPATION IN PHYSICAL ACTIVITY AND SPORT

Dear Parent(s) or Guardian:

The questions on this survey were written to obtain responses from your child's point of view. However, for many children within the range of ages being surveyed, some questions may be too difficult for their reading level while other questions require recall that may be beyond their current memory. Please assist your child in responding to the enclosed questionnaire. In some cases only a few of the questions may apply to your child, but all levels of response are important to this study. Your assistance in helping your child complete and return this questionnaire to his or her teacher within two weeks is greatly appreciated.

Sincerely,

Beverly D. Ulrich

Beverly D. Ulrich

(For additional information regarding this survey and its purpose see enclosed materials.)

Child's Name _____
(first name and first initial of last name only)

1. Have you been involved in one or more community or school sponsored sport programs in the past year, other than physical education class? (from Spring 1983 through Spring 1984)

____ yes ____ no

(If your answer was yes, please continue with question #2. If your answer was no, go on to question #4).

2. If you answered yes above, please complete one set of the following questions for each sport in which you were a participant.

Sport #1

A. Name the sport _____.
B. Did you complete the season? ____ yes ____ no
C. How many hours a week did you spend at practice? _____
D. Would you like to play this sport again next year? ____ yes ____ no
E. Would you like to try a different sport instead? ____ yes ____ no
F. Below are some reasons people give for participating in sports. Read each item and decide if that item describes a reason why you participated in this sport. Mark an "X" to indicate if that reason is very important, somewhat important, or not at all important for you.

		Very Important	Somewhat Important	Not at all Important
a. To improve my skills, or learn new skills	a.	☐	☐	☐
b. To have fun	b.	☐	☐	☐
c. Because my parents thought I should	c.	☐	☐	☐
d. To be physically fit	d.	☐	☐	☐
e. To compete	e.	☐	☐	☐
f. To be with my friends or make new friends	f.	☐	☐	☐
g. For excitement	g.	☐	☐	☐
h. I like the challenge	h.	☐	☐	☐
i. I had nothing else to do	i.	☐	☐	☐
j. Other (please specify)	j.	☐	☐	☐

_____

From the reasons listed above, go back and circle the reason that was the most important to you.

Sport #2

A. Name the sport _____.
B. Did you complete the season? ____ yes ____ no
C. How many hours a week did you spend at practice? _____
D. Would you like to play this sport again next year? ____ yes ____ no
E. Would you like to try a different sport instead? ____ yes ____ no
F. Below are some reasons people give for participating in sports. Read each item and decide if that item describes a reason why you participated in this sport. Mark an "X" to indicate if that reason is very important, somewhat important, or not at all important for you.

		Very Important	Somewhat Important	Not at all Important
a. To improve my skills, or learn new skills	a.	☐	☐	☐
b. To have fun	b.	☐	☐	☐
c. Because my parents thought I should	c.	☐	☐	☐
d. To be physically fit	d.	☐	☐	☐
e. To compete	e.	☐	☐	☐
f. To be with my friends or make new friends	f.	☐	☐	☐
g. For excitement	g.	☐	☐	☐
h. I like the challenge	h.	☐	☐	☐
i. I had nothing else to do	i.	☐	☐	☐
j. Other (please specify) _____	j.	☐	☐	☐

From the reasons listed above, go back and circle the reason that was the most important to you.

Sport #3

A. Name the sport _____.
B. Did you complete the season? ____ yes ____ no
C. How many hours a week did you spend at practice? _____
D. Would you like to play this sport again next year? ____ yes ____ no
E. Would you like to try a different sport instead? ____ yes ____ no
F. Below are some reasons people give for participating in sports. Read each item and decide if that item describes a reason why you participated in this sport. Mark an "X" to indicate if that reason is very important, somewhat important, or not at all important for you.

		Very Important	Somewhat Important	Not at all Important
a. To improve my skills, or learn new skills	a.	☐	☐	☐

	-3-	☐	☐	☐
b. To have fun	b.	☐	☐	☐
c. Because my parents thought I should	c.	☐	☐	☐
d. To be physically fit	d.	☐	☐	☐
e. To compete	e.	☐	☐	☐
f. To be with my friends or make new friends	f.	☐	☐	☐
g. For excitement	g.	☐	☐	☐
h. I like the challenge	h.	☐	☐	☐
i. I had nothing else to do	i.	☐	☐	☐
j. Other (please specify)	j.	☐	☐	☐

_____

From the reasons listed above, go back and circle the reason that was the most important to you.

3. If you chose to become involved in an organized sport program but did not complete the season, please answer the following questions.

A. Name the sport _____.

B. Below are some reasons that people give when they stop participating in a sport. Read each item and decide if that item describes a reason why <u>you</u> stopped participating. Mark an "X" to indicate if the reason was very important, somewhat important, or not at all important for you.

		Very Important	Somewhat Important	Not at all Important
a. I did not have enough fun	a.	☐	☐	☐
b. Practice was boring	b.	☐	☐	☐
c. There was no teamwork	c.	☐	☐	☐
d. I was not as good as I wanted to be	d.	☐	☐	☐
e. I wanted to play a different sport	e.	☐	☐	☐
f. I did not like the coach	f.	☐	☐	☐
g. It was not exciting enough	g.	☐	☐	☐

h. The training was too hard	h.	☐	☐	☐
i. I did not like the pressure	i.	☐	☐	☐
j. Other (please specify)	j.	☐	☐	☐

_____

From the reasons listed above, go back and circle the reason that was the most important for you.

4. If you answered no to question number one, please read the items below and decide if that item describes a reason why you did not participate in an organized sport in the past year. Mark and "X" to indicate if that reason was very important, somewhat important, or not at all important for you.

		Very Important	Somewhat Important	Not at all Important
a. I do not enjoy playing sports	a.	☐	☐	☐
b. I did not make the team	b.	☐	☐	☐
c. No sports are available for children my age	c.	☐	☐	☐
d. The available programs were too far from my home	d.	☐	☐	☐
e. The available programs cost too much money	e.	☐	☐	☐
f. I am not very good at sports	f.	☐	☐	☐
g. Playing on a team takes too much time	g.	☐	☐	☐
h. My parents thought I should not play on a team	h.	☐	☐	☐
i. Other (please specify)	i.	☐	☐	☐

_____

From the reasons listed above, go back and circle the reason that was the most important for you.

5. Place a check beside each age listed below, if when you were that age. you participated in at least one community or school sponsored sport program.

	Age	Name the sport or sports		
_____	5	_____	_____	_____
_____	6	_____	_____	_____
_____	7	_____	_____	_____
_____	8	_____	_____	_____
_____	9	_____	_____	_____
_____	10	_____	_____	_____

6. How important is being good at sports to you?

____very important ____somewhat important ____not at all important

7. If you could choose to spend free time at school doing one of the following, which would you choose 1st, 2nd, 3rd, 4th, and 5th (please number the activities below).

____taking music or art lessons

____reading new books in the library

____playing games which involve arithmetic or spelling

____playing games in the gym

____working on a science project

8. How many hours a week do you spend playing physical games, such as basketball, tag, kickball, jumping rope, frisbee, playing catch, baseball, etc.?

____ 5 or less ____ 10 ____ 15 ____ 20 ____ 25 ____ 30 or more

9. Name the sport programs available to children your age, in your area.

_____ _____

_____ _____

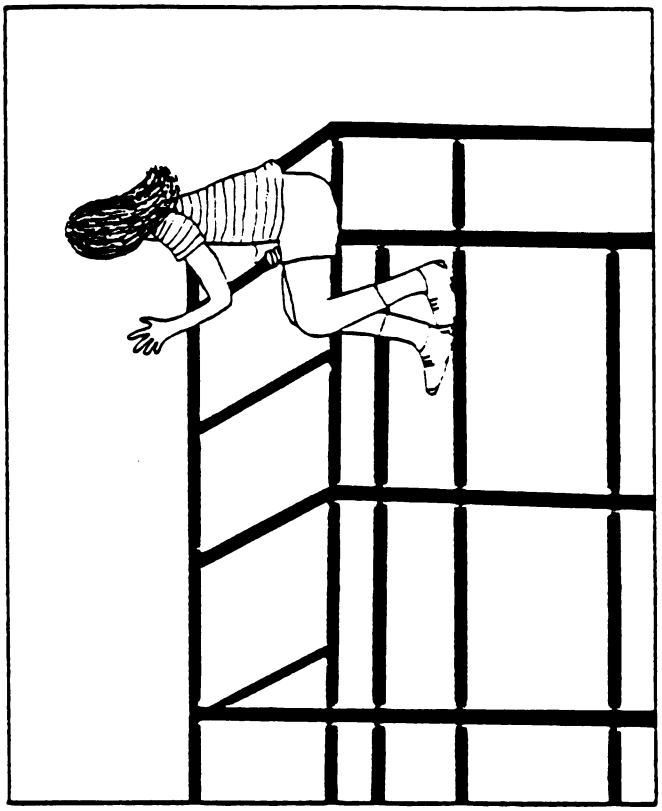
_____ _____

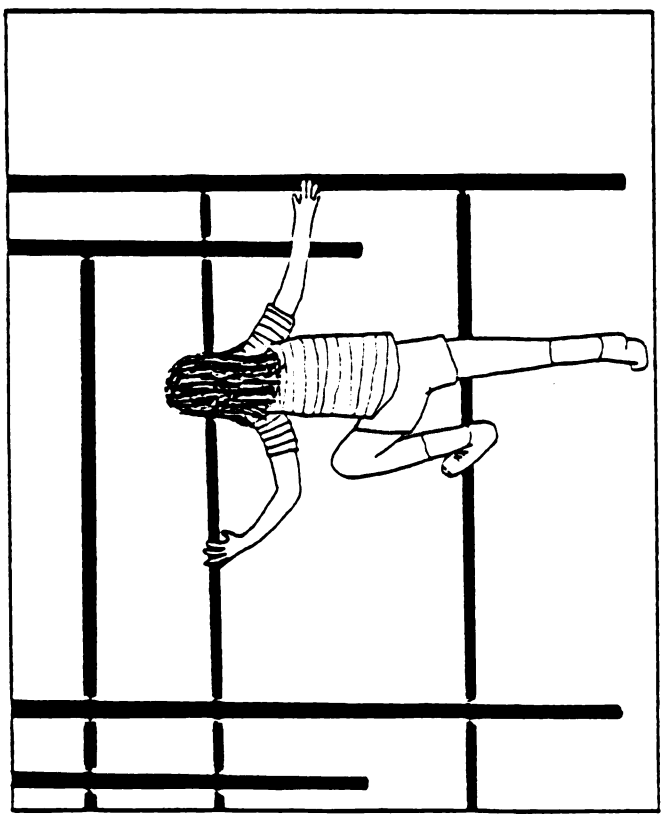
10. What sport or game do you like to play best of all? Why?

_____ _____

APPENDIX F

SAMPLE PICTURE PLATES FROM THE PICTORAL SCALE OF PERCEIVED COMPETENCE AND SOCIAL ACCEPTANCE FOR YOUNG CHILDREN AND FROM PLATES ADDED BY THE INVESTIGATOR





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