SELF-PERCEPTIONS ABOUT ACTIVITY - CHILDREN'S CONFIDENCE AND ENJOYMENT

by

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ABSTRACT

This dissertation reports the development of a scale to measure childrens' and adolescents' self-perceptions regarding their involvement in those physical activities typical of youth. Self-efficacy theory is used as a perspective from which to view these perceptions. The test-retest reliability, and both the construct and predictive validity of this scale are investigated and established. The development and testing of a Participation Questionnaire and a Teacher's Evaluation form are also reported herein.

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I. Introduction

Population surveys indicate that at least 40% of North Americans lead relatively inactive lives (Stephens et al., 1985), with the prevalence of sedentary lifestyles increasing with age (Caspersen et al., 1986). At the same time, epidemiological evidence is accumulating that strongly suggests that even a moderate degree of habitual physical activity may have significant long-term health benefits (Powell & Paffenbarger, 1985). Physical activity reduces the risk of cardiovascular disease, ameliorates hypertension, enhances weight control, and slows osteoporosis (Haskell et al. 1984; Siscovik et al., 1985). It is further reported that physical activity may have beneficial effects on psychological conditions such as anxiety and depression (Raglin & Morgan, 1985; Taylor et al., 1985). These health benefits are becoming increasingly apparent in Western societies as the level of activity required in both home and workplace steadily decreases, and inactive behaviour patterns become more commonplace. In fewer and fewer situations is the energy expenditure required by one's vocation sufficient to meet the requirements thought necessary for good health (Dishman et al., 1985). Concomitantly, a certain degree of physical activity is gradually becoming accepted by the general public as a necessary health behaviour (Casperson et al., 1985). As

a result, individuals are becoming more dependent on involvement in energetic recreational pursuits, enrollment in exercise programs, and the development of habits such as walking short distances rather than driving, in attempts to attain the degree of physical activity held necessary for optimum health (Stephens et al., 1985). Nevertheless, sedentary behaviour patterns are still commonplace among North American adults.

The health benefits of physical activity for children are also becoming increasingly apparent (Newman et al., 1986). It has been a long-standing belief that a certain amount of activity is necessary for children to achieve optimal development (Shephard, 1982).

A number of health difficulties associated with inactivity during childhood have been established. Childhood obesity is strongly associated with hypoactivity (Dietz & Gortmaker, 1985; Epstein et al., 1982; Dietz, 1977). The ill-effects on health of obesity are widespread, ranging from respiratory symptoms to cardiovascular difficulties (Telama et al., 1985; Somerville et al., 1984). There is also strong evidence of the detrimental effects of obesity, whether moderated through reduced social interaction with peers or lowered feelings of self-competency, on the psyche of the child (Straus et al., 1985; Richardson et al., 1961; Monello & Mayer, 1963).

The long-term health effects of physical inactivity during childhood are thought to lie largely in the early development of precursors of cardiovascular disease (Telama et al., 1985). Psycho-social health may be more immediately influenced by hypoactivity It is in this domain that the sedentary child may be at greatest risk.

The probable maintenance of hypoactive behaviours into adulthood may be the single most important outcome when discussing the long-term health risks of hypoactivity during childhood and adolescence. Whether or not hypoactive behaviour patterns developed during childhood persist into adulthood has not been directly investigated. Strong circumstantial evidence for this possibility does exist if the relationship between inactivity and obesity is accepted. Obese children, largely inactive, have a significantly increased risk of becoming obese adolescents and adults, also largely inactive (Cronk et al.,1983; Garn & LaVelle, 1985; Zack et al., 1979).

In an attempt to ameliorate the potential health difficulties associated with inactivity, exercise programs for children have been introduced that attempt to increase children's levels of activity (Gilliam et al., 1982; MacConnie et al., 1982). Intervention programs designed to assist obese children commonly include attempts to increase levels of physical activity (Brownell et al., 1983; Epstein & Wing, 1987). These programs have been successful in increas-

ing activity while children are enrolled, although the long-term effect of these programs, on either activity levels or risk of cardiovascular disease, has not been established.

The Health Belief Model (HBM) as outlined by Becker et al. (1972), provides a useful perspective when discussing physical activity as a health behaviour. This model predicts that a health behaviour will be undertaken and continued if: (1) the individual feels susceptible to a condition (2) that is also perceived as having serious consequences; (3) that individual believes that the behaviour in question will reduce their susceptibility to the condition or reduce the seriousness of its effects; (4) the benefits of the behaviour are seen to outweigh the costs, and; (5) some "cues to action" are present, whether from mass media campaigns, doctor's prescription, or advice from other sources (Becker & Maiman, 1975; Cummings et al., 1978). The HBM is applicable to preventive health behaviours and has been widely employed and investigated (Becker et al., 1972, 1977). From within the framework of this model it may be difficult for children to perceive the negative health consequences of habitual inactivity, or the health benefits of increased habitual activity. Thus there would not be sufficient motivation for children to modify their existing activity levels. The health consequences of hypoactivity may be too remote and the beneficial effects of increased activity too abstract to produce behavioural change in children. The potential for

health-derived motivations alone leading to changes in children's volitional levels of activity, would appear minimal. The reasons why children and adolescents display such a wide range of habitual activity are poorly understood (Bouchard et al, 1983; LaPorte et al., 1982; Telama et al., 1985). The evidence appears to controvert the widely held belief that all children love to be active (Sundqvist, 1980). Few investigations have attempted to discern why hypoactive children are so inactive relative to their peers. We have some knowledge of why some children pursue athletic endeavors, but this research deals with only a small and select subgroup at the opposite end of the spectrum of activity levels (Lee, 1982; Overman & Rao, 1981). An understanding of the factors which underlie children's hypoactivity is necessary if successful programs to increase children's activity levels are to be designed and implemented. This understanding must go beyond relegating inactivity to default causes. Children may not be inactive simply due to lack of opportunity or the lack of motivations similar to those of more active children. The reasons why some children consistently select involvement in physically inactive pastimes warrants investigation.

The development and maintenance of any particular level of habitual activity, for either adults or children, is likely dependent upon the interplay of a complex of factors: attitudes, self-perceptions, motives, opportunities, facili-

ties, morphology, abilities and capabilities (Dishman et al., 1985). Potentially among the most important of these factors is the presence of either a positive or negative attitude toward physical activity (Neale et al., 1969; Sallis et al., 1986; Shephard, 1982).

It is probable that childhood is the single most important period for the development of attitudes and self-perceptions regarding physical activity (Ausubel & Sullivan, 1970: Mussen et al., 1974). While numerous definitions of attitudes are employed in the literature, attitudes are defined here as the degree of positive or negative affect held toward some object or construct (Triandis, 1971). Self-perceptions are judgments of competency or probable affect regarding outcomes associated with involvement in a particular situation or behaviour. If negative attitudes toward activity are developed during childhood and adolescence, it is probable that these will continue into adulthood and that a predilection toward hypoactivity will exist (Godin & Shephard, 1986; Sonstroem, 1976). A key element in developing more physically active adults may be to nurture positive attitudes toward activity during childhood (Shephard, 1982). Establishing self-perceptions among children which regard physical activity as both enjoyable and achievable may be of even greater utility in developing appropriate activity habits.

In situations where individuals simply dislike physical activity, it is probable that they will avoid opportunities to be physically active and will be resistant to programs designed to increase this behaviour (Kenyon, 1968; Harris, 1973; Sonstroem, 1978). Even if some degree of health motivation to become active is present, a perception that physical activity is unenjoyable and that one is incompetent likely implies that intervention programs will have difficulties with compliance. Indeed, public awareness of the many positive health benefits of an active lifestyle is increasing (Stephens et al., 1985). However, it is unreasonable to assume that this knowledge alone can overcome a dislike or lack of interest in physical activity to the point where permanent changes in activity habits will occur. In fact, believing that being active is good for one does not appear, by itself, to affect participation by adults in voluntary exercise programs (Dishman et al., 1985). Adherence to these exercise programs is poor and continuation of exercise habits promoted in such programs is even poorer (Belisle et al., 1987).

At the present time it is not possible to design adequate intervention programs for hypoactive children. There is a distinct lack of information regarding the causes, development, and treatment of this behaviour pattern. Surprisingly little research has investigated the relationships between children's attitudes, self-perceptions, and

levels of activity (Dishman et al., 1985; Godin & Shephard, 1986; Neale et al. 1969; Worsley et al., 1983). We simply do not know the effect that children's perceptions of their involvement in physical activity have on their activity level, or on their attitudes toward physical activity and actual activity habits as adults.

The importance of gaining an understanding of the determininants of hypoactivity during childhood can be summarized succinctly. Hypoactivity may expose the child to increased physiological and psycho-social health difficulties and predispose to predominantly inactive behaviour habits during adulthood. Insufficient physical activity is detrimental to various aspects of health throughout an individual's lifespan. If these behavioural habits are largely developed during childhood, and if hypoactive children are to be recognized and assisted early, it is necessary to gain an understanding of the dynamics of hypoactivity.

While this argument is based on several major assumptions, it is congruent with much of what developmental theory suggests should be the case. The primacy of childhood in the development of behaviours, and the plasticity during childhood in the modification of behaviours, are concepts shared by most developmental theorists (Lerner, 1976). For example, there is some retrospective evidence that attitudes toward activity developed during childhood have a persistent effect on activity habits in adulthood (Harris, 1970). This

perspective provides a rationale for the importance of understanding the attributes of the hypoactive child.

In all likelihood, participation in physical activity has never been a source of pleasure for hypoactive children, but rather a source of discomfort, embarrassment, and frustration. Physical activity may have been devalued by parents and siblings. These children have probably rarely experienced success in physical activities with his or her peers, and as a result, have increasingly withdrawn from active play situations in order to avoid failure (Herkowitz, 1980). Since avoiding physical activity reduces the chances of experiencing further unpleasant consequences, the child is reinforced for sedentary behaviours (Kazdin, 1984). This situation, in itself, further limits any possibilities for future success in physical activities, as the child will develop physical skills and physiological capacities more slowly than their active peers (Bar-Or, 1983).

Possible reasons for children's lack of success, or perception of incompetence in physical activities, are legion. Poor physical abilities (the clumsy child), physical or mental handicap, morphologic disadvantage, lack of play opportunity, and negative parental attitudes may all play roles in predisposing a child to failure in physical activities. The end result, however, is likely the same - a child who dislikes and avoids physical activity and who perceives activity as unenjoyable and difficult. This scenario is

typical of that suggested by the concept of learned helplessness where, faced with a constant failure to achieve expectations, individuals discontinue attempts to succeed and withdraw from the behaviour (Abrahamson et al., 1978). It is also consistent with Bandura's (1977) conception of perceived self-inefficacy, where individuals, convinced of a lack of personal effectiveness in some behaviour, will avoid that behaviour and not sustain efforts to improve their competency. Regardless of the existence of motivations for personal health, social opportunities or the like, it is difficult to conceive of children with low levels of self-efficacy spontaneously adopting a physically active lifestyle.

To recapitulate, physical activity is thought to hold numerous and significant benefits for the optimal development of children (Rarick, 1973). It is also likely that attitudes and lifestyle habits developed as children will continue into adulthood (Shephard, 1982). Further, it is plausible that an individual's activity habits are most amenable to change during childhood (Martens, 1975). The circumstantial and anecdotal evidence for a high prevalence of hypoactive children is substantial. Estimates of the prevalence of obesity during childhood, which could be viewed as a marker of potential hypoactivity, range from 15 to 30% (Garn & LaVelle, 1985; Garn & Clark, 1976; Peckham et al., 1985). While the majority of obese children are inactive, it is also probable that a significant number of non-obese

children are inactive as well. It would appear then, that childhood is the most beneficial, effective, and efficient time period in which to promote change in hypoactive behaviours. However until the factors that underlie children's hypoactivity are more fully understood, intervention programs will have little hope of success.

From this perspective, it is apparent that a measure of children's and adolescents' self-perceptions regarding physical activity is a necessary ingredient in the study of this problem. Until this potentially powerful attribute can be measured it is not possible to gauge its effect on children's activity levels or to determine fully the efficacy of intervention programs. At the present time no instrument is available which measures this attribute reliably and validly.

This dissertation reports the development of a self-report scale to measure the self-perceptions of children and adolescents regarding their involvement in physical activity. In particular, two aspects of children's self-perceptions have been identified as necessary for inclusion in this scale. These are: (1) self-perceptions regarding the degree of enjoyment associated with physical activity and, (2) confidence in capability to participate with some measure of competency.

The following chapters describe the development of the Self-Perceptions About Activity - Children's Confidence

and Enjoyment (SPAACCE) scale. A review of the literature will precede a description of the procedures followed in this research. These chapters will be followed by a description of the design and analysis of the SPAACCE scale and the independent variable measures (Participation Questionnaire and Teacher's Evaluation form) developed for this study. These results will be discussed and conclusions presented.

The design of the instruments described below, and the analysis of the data collected during development of the SPAACCE scale, were carried out in a manner which would allow the testing of the following hypotheses. These hypotheses allow a fundamental examination of the construct validity of the SPAACCE scale.

1. Perceived self-efficacy should correlate well with children's levels of habitual activity, with very inefficacious children being markedly inactive.
2. Physical education teachers' ratings of children's motor abilities, participation levels, and confidence and enjoyment in physical activity would correlate positively with children's self-report of self-efficacy.
3. Children with very low levels of perceived self-efficacy should demonstrate very poor motor proficiency. The converse should also hold true.
4. Perceived self-efficacy is a stable trait and therefore the SPAACCE scale should demonstrate strong test-retest reliability.

II. Review of Literature

1. Introduction

This chapter will review several factors considered crucial in the decision making that accompanied the development of an instrument to measure children's and adolescents' self-perceptions regarding their involvement in physical activity. The theoretical perspective from which this development takes place will first be established. This will be followed by a critical overview of measures currently available that attempt to investigate similar areas of concern. Finally, measures of habitual activity and of motor proficiency will be discussed. These measures are crucial in the development of the scale reported here.

2. Theoretical Perspective

Predicting behaviour is a common goal of psychologists. Among the more influential theories in this regard has been Fishbein's model of behavioural intention (Fishbein & Ajzen, 1975). Fishbein contends that behavioural intentions, defined as a person's own subjective probability that he or she will perform a given behaviour, will accurately predict

overt behaviour. He maintains that intentions are primarily established by personal attitudes toward the performance of the behaviour and the perceived social consequences of performing that behaviour (Fishbein & Ajzen, 1974; Saltzer, 1981). This model has been employed, with varying degrees of success, in a number of studies involving physical activity (Riddle, 1980; Godin & Shephard, 1986). Bentler and Speckart (1979) have suggested that the inclusion of the effects of previous behaviours on personal attitudes and perceptions of subjective norms might increase the predictive validity of this model. They further suggest that attitudes and past behaviours may impose direct effects on present behaviour. For example, children might hold the attitude that physical activity is healthful, and believe that teachers and peers value activity (subjective norms). However, if from past experience, they also perceive that activity holds little promise of enjoyment, they might not become involved in activities. Fishbein's theory assumes that intention is the antecedent of behaviour, and that the prediction of behaviour can be made from a knowledge of intention. Saltzer (1981) examined the applicability of this theory in gaining an understanding of the results of a weight control program and suggested that this conception may only hold for individuals who possess a well internalized locus of control, particularly if they hold high outcome value expectancies for the behaviour in question. Godin and Shephard (1986) attempted

to apply Fishbein's theory to the exercise intentions of 698 children in grades 7 to 9. Their results provided only moderate support for this theory as over 50% of the variance in exercise intentions was not accounted for by attitudes and subjective norms. They found that more variance in exercise intentions could be explained among those children who reported early experience with physical activity. This finding supports the suggestion of Bentler and Speckart that the effects of previous behaviours on intentions must be measured. The caution of Triandis (1971) that affect, intentions, subjective norms, cognitions, habits, and prior experience must all be considered, and not attitude alone, when attempting to predict future behaviours remains substantially true.

Rather than attempting to predict behaviour, some theorists have attempted to develop models that can account for behavioural change. While many of the same variables are involved as in theories that attempt to predict behaviour (attitudes, intentions, self-perceptions, prior experience, etc.), the emphasis is on attempts to understand what drives and moderates changes in behaviour. This perspective is a more utilitarian one, in that understanding the mechanisms underlying change should allow the design and development of treatments to induce change.

Bandura's (1977) theory of self-efficacy is an example of this theoretical approach. Self-efficacy refers to

the sense of being able to produce and regulate events and situations in one's life (Bandura, 1982). Perceived self-efficacy is a measure of individuals' degree of confidence in their ability to cope with a given situation or to produce a certain behaviour effectively. Bandura (1977, 1982) has suggested that self-efficacy is a central mechanism underlying behavioural change. Judgments of self-efficacy develop from four main sources of information: actual performance attainments, vicarious experiences, social influences (such as verbal persuasion), and physiological states associated with, and interpreted as indicators of, performance (Bandura, 1977, 1982). Among adults, lowered levels of perceived self-efficacy have been demonstrated to weaken competitive endurance and performance when performing novel physical activities (Weinberg et al., 1979, 1981). Similar findings have not been made in children. Lee (1982) demonstrated that self-efficacy was a significant predictor of performance in gymnastics competitions for young girls. Godin et al. (1986) reported no difference in exercise behaviours between individuals with high and low levels of perceived physical abilities.

When attempting to understand what determines hypoactive behaviour, perhaps the most parsimonious theory from which to approach this task may be that of self-efficacy. This is particularly true if an eventual goal is to develop programs to ameliorate these behaviour patterns. Children's

confidence in their ability to participate successfully in physical activities would be a direct indicator of perceived self-efficacy. Self-perceptions about the enjoyment associated with physical activity would be an indirect measure of self-efficacy. An inefficacious child would not perceive personal involvement in physical activity as enjoyable. Care must be taken here to note that this measures only the perception of the potential for enjoyment for the individual alone. This distinction is made in an attempt to distinguish between what Bandura (1977) refers to as an expectancy outcome (participating in physical activities results in enjoyment for me) and perceived self-efficacy (I can competently perform physical activities). A belief that physical activity is personally unenjoyable, or unattractive, and a low level of confidence in one's ability to participate successfully in physical activities, would both indirectly and directly indicate a degree of perceived self-inefficacy. It should be noted that self-efficacy theory has mainly been applied to single-act criteria and that its application to a more general class of actions, such as physical activity, may attenuate its predictive value.

If children's perceived self-efficacy about being physically active were low, this theory would predict that they would avoid activity and expend little effort in any attempt to become more active (Bandura et al., 1980; Bandura, 1982). Not until these children's perceived self-efficacy

regarding activity is increased, would stable and independent increases in activity be noted. For the hypoactive child, in the realm of physical performance, it is probable that each of the influences on self-efficacy is, and has been, negative in nature. This may be particularly true if children are in some way at a disadvantage in the performance of motor skills and are subject to the same performance expectations as non-disadvantaged children. Self-efficacy theory also predicts that positive enactive and vicarious experience will lead to increased levels of self-efficacy and an associated increase in the target behaviour (Bandura, 1982). As such, this theoretical perspective allows not only an interpretation of the relationship between self-perceptions and action, but also provides a basis for the development of appropriate, and testable, intervention strategies. Participant modelling, symbolic modelling, and cognitive mastery approaches have been demonstrated to be successful treatment strategies in the development of stronger perceptions of self-efficacy (Bandura et al., 1980).

Self-efficacy theory is not without its critics (Abrahamson, 1978; Berkovec, 1978). Much of this criticism has focused on Bandura's differentiation of the concepts of efficacy expectations and outcome expectations. There exists some controversy over the possible lack of distinction between these terms (Kazdin, 1978). Bandura (1984) has responded to these criticisms by stating that:

> ...it is because people see outcomes as contingent on the adequacy of their performance, and care about those outcomes, that they rely on self-judged efficacy in deciding which course of action to pursue and how long to continue a chosen course (p. 235).

Outcomes affect future judgments of self-efficacy, and self-efficacy has an effect on performance, but the two concepts are distinct. This response has failed to satisfy some critics (Marzillier & Eastman, 1984) who contend that it is virtually impossible to separate and independently measure these two concepts. Further criticism has been levelled at the procedures which Bandura and his colleagues have employed to measure self-efficacy, particularly the interpretation of the modified Likert scale format used to establish perceived efficacy (Eastman & Marzillier, 1984). Bandura and his colleagues measure self-efficacy by providing subjects with a statement describing some behaviour. They then present subjects with a scale which ranges from 10 - 100 with three descriptors; "quite uncertain", "moderately certain", and "certain", with which to rate their degree of confidence in performing that behaviour. These concerns with measurement deal with relatively minor aspects of methodology, are largely based on potential semantic uncertainties, and do not reflect on the validity of the theory itself.

In spite of criticism, self-efficacy theory remains admirably suited for investigations concerned with hypoactivity. Self-inefficacy is a concept parricularly appropriate when discussing the absence of behaviours that are generally perceived as being adaptive or desireable. When concern is with a behaviour pattern which might be changed to the benefit of an individual, self-efficacy theory provides a sound perspective as it provides a stepping out point for intervention strategies. Since both these preceding statements hold true for hypoactivity during childhood, self-efficacy theory has been selected as the theoretical rationale from which the current investigation has proceeded.

At the present time there are no commonly available measures of children's perceived self-efficacy regarding involvement in physical activities. Studies investigating the interrelationship between self-efficacy and children's activity have focussed on single behaviours and have largely been concerned with tests of the theory (Lee, 1982).

Rather than attempt to measure perceptions of self-efficacy, much research has been concerned with attempts to measure children's and adolescents' attitudes toward physical activity. These attitudes have been explored along numerous avenues (Harter, 1978; Smoll et al., 1976; Schutz et al., 1985; Overman & Rao, 1981). Play attributes (exploration, drive reduction, arousal seeking, etc.), social factors, personal health motivations and enhancement of self-image

have all been suggested as factors in the development of a child's attitude toward physical activity (Ellis, 1973, 1976; Telma and Sivennoinen, 1980; Kenyon, 1969; Harris, 1973; Neale et al. 1969). The effects of socio-economic factors, as well as parental and peer attitudes on the development of childrens' attitudes toward physical activity, have also been investigated (McPherson et al., 1976; Griffiths & Payne, 1976). However, there appears to be little information regarding the relationship between children's levels of habitual activity and their enjoyment or dislike of activity, or the confidence that they have in their ability to participate. Rather than determining if children enjoy physical activity, for example, most researchers have attempted to define the specific set of motives and attitudes that underlie activity. From this research we have gained insight into the various reasons why active children are motivated to be active (Kenyon, 1968; Klint & Weiss, 1986; Longhurst & Spink, 1987, Overman & Rao, 1983), but little insight into the causes of hypoactivity. In particular, children's attitudes toward the instrumentality of physical activity have been studied. A number of self-report measures have been developed that attempt to measure this attribute (Neale et al., 1969; Smoll et al., 1976). Determining these attitudes alone presents a number of conceptual difficulties when discussing both the development of children's levels of habitual activity, and the use of such information in the

design of intervention strategies. There are two implicit assumptions in this approach. One is that children possess attitudes only toward the instrumentality of being active. It is reasonable that children also possess attitudes toward the instrumentality of being inactive. Inactive children may seek out sedentary pursuits, in part perhaps to avoid physical activity. They may perceive inactivity as being instrumental in the avoidance of shame, hurt, and humiliation. Children are not inactive by default simply because they do not possess sufficiently positive attitudes toward activity; they are inactive by choice. Motivations for inactivity are not simply the converse of motivations for activity.

A second assumption is that the development of scales which determine attitudes toward the instrumentality of being physically active will allow interventions to be designed which will increase individuals' activity levels by improving their attitudes. It is questionable whether any program designed to motivate children by appeals to any motive based on these instrumentalities will be effective with children who perceive themselves as incompetent in physical activities.

This scenario is similar to the recidivism commonly reported following exercise programs for obese children and adolescents believed to represent a sedentary pediatric population (Botvin et al., 1979; Epstein & Wing, 1987). It is enlightening to note that the most successful intervention

programs for obese children are those that contain a strong behaviour modification component (Brownell et al., 1983; Epstein & Wing, 1987). Indeed, Epstein et al. (1982) noted that obese children who were involved in a program that promoted changes in lifestyle activity habits maintained weight losses and fitness improvements to a significantly greater degree than similar children engaged in a more traditional exercise program. Children in the lifestyle cohort were allowed to select the type, extent, frequency, and timing of the activities that they engaged in. Self-efficacy theory would suggest that the lifestyle group would select activities that they felt more efficacious in and that these activities would likely be dissimilar to those involved in a traditional exercise program. This was the case in Epstein's study, as the lifestyle group reported no running and cycling for exercise, and significant differences were present between groups on all seven of the activity categories measured.

Unfortunately, little insight has been gained into the motives, self-perceptions, and attitudes toward activity of inactive children. It is not understood why some children choose to be inactive, nor are instruments available which would allow the exploration of this question. An approach to these questions from the perspective of self-efficacy theory holds substantial promise, both for gaining a greater understanding of hypoactive children and for the design and

development of successful interventions. The validity of the criticisms presented here cannot be established as there is no available measure for determining children's self-efficacy regarding physical activity either prior to, or following, participation in programs designed to increase physical activity.

3. Measures of Children's Attitudes Toward Activity

Most attempts to investigate the relationships between various cognitive constructs and activity behaviours have focussed on measuring and describing childrens' attitudes and motives. A small number of instruments have been reported which attempt to measure children's attitudes toward physical activity, either in whole or in part. Much of the work in this area has been based on research by Kenyon (1968a, 1968b) who developed a conceptual model to characterize physical activity, based on its perceived instrumentality for young college students. Essentially, he uncovered what these students believed physical activity could provide them. Kenyon proposed six dimensions that he felt characterized physical activity: physical activity (1) as a social experience, (2) for health and fitness, (3) as the pursuit of vertigo (excitement), (4) as an aesthetic experience, (5) as catharsis, and (6) as an ascetic experience. Kenyon referred to these dimensions as the "perceived instrumental values of physical activity" (1968a p96). While this research was

methodologically sound, questions remain about the generalizability of the findings due to limitations in the sample population, particularly age limitations.

There have been two widely reported scales developed to measure attitudes toward physical activity among children and adolescents; Simon and Smoll's (1974) Children's Attitudes Toward Physical Activity (CATPA) scale and Sonstroem's (1978) Physical Estimation and Attraction Scale (PEAS). Both of these instruments have been based principally on Kenyon's work, particularly the six subdomains of physical activity that he proposed.

Simon and Smoll's (1974) CATPA employs a semantic differential approach and modifies the language originally employed by Kenyon for use by children in grades 4 through 6. They tested their instrument with 992 children and found it to possess high internal consistency for each of the subscales. A six week retest with 472 children indicated low test-retest reliabilities, ranging from .32 to .65 for the various subscales. As the validity of Kenyon's work was widely accepted they felt no need to establish the validity of their instrument. Smoll et al. (1976) investigated the relationship between the CATPA scale and children's activity levels and selected physical performance measures. They correlated the score on each subdomain with self-reports of the frequency of involvement in activities associated with that subdomain. Multiple correlations were .60 for males and

.45 for females. No attempt was made to determine either the validity or the reliability of their physical activity questionnaire. They also tested each child on three widely accepted performance measures, a softball throw, a 50 yard run and a standing long jump. These are tests of gross motor skills and muscular strength and do not measure the fine motor abilities or non-strength related physical abilities of children (such as balance, agility and coordination) that have a direct influence on the production of skilled movement. Although norms for these tests are widely available, these measures do not adequately determine children's motor proficiency. They found no significant multiple correlations between these scores and the CATPA results. The relationship between performance and activity levels was not reported.

Schutz et al. (1985) reported the restructuring of the CATPA. They reduced the semantic differential pairs for each subdomain from eight to five, lowered the seven point response scale to five points, added an "I do not understand" response, and divided the social subdomain into two separate dimensions. While they review the validity and reliability results of the original CATPA, they do not report any new information regarding the effects of their modifications. The CATPA scale has not been sufficiently established as being either valid or reliable. It adequately measures children's attitudes toward the perceptions of instrumentality regarding physical activity as determined by Kenyon. The relationship

that these attitudes may have with past, present, or future behaviours has not been investigated.

Neale et al. (1969) and Sonstroem (1974, 1976, 1978) reported the development of the Physical Estimation and Attraction Scales (PEAS) which attempted to measure the self-perceptions of adolescent boys regarding physical activity. This scale is again based largely on Kenyon's research, although this is incorporated into Sonstroem's model of participation in physical activity. This model suggests that individuals' levels of participation in strenuous physical activity are largely based on their perception of their athletic ability and the attractiveness of vigorous sports. This scale is comprised of 100 true/false statements. This scale has been demonstrated to have high split-half reliability and reasonable construct validity. However, the scale is limited in that it is designed only for boys, is largely concerned with vigorous athletic experience, has not been designed for use with pre-adolescents, and has been demonstrated to be susceptible to faking (Dishman 1980).

To base attitude scales for children on Kenyon's six dimensions of the perceived instrumentality of physical activity derived from college students is fraught with difficulty. Do children have the same perceptions of instrumentality? Are the gender differences in these perceptions, apparent in Kenyon's research, present among children? In particular, what relationship would be expected between the

behaviour of children and a measurement of their attitudes toward the perceived instrumentality of physical activity? Kenyon's work has significantly increased our knowledge of the dimensions of physical activity. However, there is tenuous logic in applying his findings to the development of instruments to measure of children's attitudes toward physical activity. For example, Telama and Silvennoinen (1979) reported eight factors in the structure of 11 to 19 year olds' motivation for physical activity. The relative importance of several of these factors changed significantly with age. Whether the same phenomenon would occur with even younger children is not known. Blair (1985) reported significant changes in the professionalization of attitudes toward play with age.

Harter (1978) developed a self-report scale for use with children that measures self-perceptions of competency in the areas of intelligence, social skills and physical skills. This scale is psychometrically sound and possesses numerous admirable qualities for use with children. It contains seven items that compose a "competency in physical activity" subscale. This subscale has been demonstrated to possess high internal consistency and high test-retest reliability for children in grades 3 through 6 in a wide range of samples taken throughout the United States. Classroom teacher ratings of physical competence correlated from .41 to .43 with their students' perceptions. The results of 209 students were cor-

related with their gym teachers' ratings and a correlation of .62 was obtained. The physical competence subscale had correlations ranging from .46 to .58 with the social competence subscale. Only on the physical competence subscale were gender differences apparent, with boys consistently scoring higher. The items in the physical competence subscale were not developed from Kenyon's research. However, this subscale is comprised of only seven items developed primarily to reflect children's competency in sports and outdoor games, and therefore does not tap into the full realm of children's experience in physically active situations. As well, by design, this scale does not attempt to determine children's self-perceptions regarding enjoyment about involvement in physical activity. For these reasons this instrument is insufficient to meet the need to determine children's and adolescents' self-perceptions regarding physical activity.

4. Measures of Children's Habitual Activity

In order to develop measures that determine the causes of hypoactivity it is obvious that instruments are required to establish an individual's level of habitual activity. A number of different strategies have been employed in attempts to develop such measures. These either attempt to quantify the energy expenditure of activity or strive to describe the characteristics and frequencies of various

activities. Heart rate monitors, motion sensors, behavioural observations, activity diaries, and questionnaires have all been employed in attempts to determine energy expenditure (LaPorte, 1985; Rutenfranz et al., 1974; Saris et al., 1977). Activity questionnaires and motion sensors have been used in attempts to describe and characterize habitual activity (Taylor et al., 1985).

Heart-rate monitoring is perhaps the most promising of the activity measures when quantification of energy expenditure is the goal (Montoye, 1984). Heart-rate monitors allow a direct physiological measurement of activity insofar as heart rate is related to oxygen uptake ($\dot{V}O_2$) (LaPorte, 1985). The continuous measurement afforded by these instruments reflects both the intensity and duration of activity and allows a reasonable estimate of energy expenditure (Anderson, 1978; Blair, 1984; Bradfield, 1971; Montoye, 1984). Gilliam et al. (1981), MacConnie et al. (1983) and Saris (1984) have reported minimal reactivity and a good degree of social acceptability when heart-rate monitors have been used in studies involving children. (Reactivity refers to changes in behaviour that occur simply due to the fact that individuals are aware that an observation of some sort is taking place (Kendall & Williams, 1982)).

A major drawback when employing heart-rate to determine energy expenditure is the need to establish individual regression lines for the heart rate/oxygen uptake

equation (Montoye and Taylor, 1984). The use of these regression lines is complicated by the numerous transitory effects on heart rate other than those caused by physical activity. The effects of emotion, various levels of arousal, changing climate, digestion, and extent of muscular involvement all confound the interpretation of the heart rate activity relationship (Anderson et al., 1981; Haymes et al., 1984; Turner, 1985; Vokac et al., 1975). This relationship is especially difficult to establish at lower levels of activity that comprise the preponderance of daily recordings (Dauncey & James, 1979). As well, common activities (such as swimming) preclude the use of these monitors. The high equipment costs and continuing laboratory costs also pose serious difficulties when considering the use of heart-rate monitors. In studies that require large samples the difficulties associated with heart-rate monitors far outweigh the advantages.

Motion sensors and accelerometers provide an alternative means of directly measuring physical activity. These instruments quantify the movements of the individual over time, are non-obtrusive, and appear minimally reactive (LaPorte, 1985). Motion sensors have been employed in studies involving children (LaPorte et al. 1982). However, motion sensors provide no information on the duration, frequency, or intensity of activity. The positioning of the instrument also appears critical as movements that involve only one portion of the body may not be measured. While motion sensors may

provide a good measure of the relative degree of activity, their measurement limitations, cost, and personnel requirements pose serious difficulties for their use in large scale administrations.

Self-report diaries have also been employed in attempts to both quantify and qualify habitual activity. Diary keeping attempts to make individuals the observers of their own behaviours. As subjects need to carry their diaries and make constant entries, concerns have been raised about the reactivity and accuracy of such measures (McFall, 1977; Nelson et al., 1978). Bouchard et al. (1983) and Seliger et al. (1974) have reported the use of diaries with children aged 10 years and older. Neither of these studies attempted to validate their instruments. Diaries have been successfully employed in studies involving children that have examined behaviours other than habitual activity (Gross & Drabham, 1982). At the present time however, no acceptable self-report diary is available for measuring children's level of habitual activity. The feasibility of this method in studies involving large samples is also questionable.

By far the most common means of measuring activity are questionnaires, and questionnaires plus interviews. The vast majority of these have been developed for use with adult populations (Sallis et al., 1985; Taylor et al., 1985). These measures can provide descriptive information on the type, frequency, and self-reported intensity of activity. Their

validity is difficult to assess as no gold standard exists for the measurement of habitual activity. These instruments are limited by difficulties in comprehension, accuracy of recall, scope of questioning, and data analysis (Sallis et al. 1985; Taylor et al., 1982). Numerous questionnaires have been developed for specific studies involving children and adolescents (Ilmaren & Rutenfranz, 1980; Neale et al. 1969; Saris et al., 1980; Small et al. 1976; Sunnegardh et al., 1985; Verschurr et al., 1984). The format of these questionnaires is seldom reported and a description of reliability or validity testing is seldom provided. At the present time no acceptably valid and reliable self-report measure of habitual physical activity is available for use in a pediatric population. However, this approach is by far the most feasible for use in studies involving large sample sizes. For this reason, the development of a reliable and valid self-report instrument to describe the relative involvement of children in various physical activities would be appropriate for use in the research reported in this paper. Determining the energy expenditure of children relative to their self-perceptions regarding involvement in physical activity is not necessary in the context of this study.

5. Measures of Motor Proficiency

It is reasonable to hypothesize that children who differ in self-perceptions regarding physical activity may also differ in their motor functioning. Numerous test procedures have been published purporting to measure various aspects of motor skill, motor development, motor abilities and motor proficiencies (Singer, 1975). Of these many measures, the test battery developed by Bruininks (1977), the Bruininks-Oseretsky Test of Motor Proficiency, stands out. This test battery is an adaptation of the Lincoln-Oseretsky Motor Development Scale (Sloan, 1954), an early, well reasoned, test of motor ability for young children (Rosentsweig, 1980). Other adaptations of this scale have been reported (Roach & Kephart, 1966; Stott, 1966), but the Bruininks version is the only one to establish its reliability and validity fully. Gallahue (1982), a respected authority on children's motor development, notes that 91 measures of motor development and ability have been published. Of these, he singles out only the Bruininks-Oseretsky test battery as being valid in assessing children's motor ability, particularly suitable for those with special needs. This soundly developed instrument has very well established norms and is suitable for use with children possessing a wide range of abilities. Both fine-motor and gross-motor abilities are measured. The test battery includes measures of running speed and agility, balance, bilateral coordination, strength, upper limb coordination, response speed, visual-motor

control, and upper-limb speed and dexterity. Each of these measures taps a motor ability identified by Fleishman (1964), and as such provides an overall measure of a child's current motor capacity.

These tests require no exceptional equipment or facilities and have well established instructions. Norms for the various subtests were developed from results obtained from 892 children, carefully sampled as to age, sex, race, community size and geographic location based on 1970 United States census figures. Both American and Canadian children were involved in this testing. Two-week test-retest reliability coefficients ranged from .70 to .90 for the various subtests, with a reliability coefficient of .84 for the composite score. A short version of the test battery was found to correlate highly (.86) with the composite score taken from the full version. Norms are available for 6.5 - 14.5-year-old children. A weakness of these norms is that they are not differentiated by gender. The Bruininks-Oseretsky battery has been employed in testing learning disabled children and, as would be expected from the results of other research, these children were found to score significantly lower than nondisabled children (Bruininks & Bruininks, 1977).

The Bruininks-Oseretsky test is particularly well suited for large-scale testing as it requires no exceptional facilities and has a well validated short version (20 to 25 minutes of testing). This instrument is appropriate for an

investigation of inefficacious children as it has been developed with the capability of identifying children with motor difficulties. No subtest puts a child at any physical risk and children, irrespective of ability, generally perceive the test battery as "fun". While other tests of various aspects of motor ability exist, only the Bruininks-Oseretsky test battery measures a wide spectrum of both fine and gross motor abilities. For these reasons the short version of the Bruininks-Oseretsky test was selected for use in this research.

III. Procedures

This chapter will describe the procedures used in testing the SPAACCE scale, the Participation Questionnaire, and the Teacher's Evaluation form. The process of testing moved through two distinct stages.

In the first stage (Phase 1), the original SPAACCE scale, a preliminary version of the Participation Questionnaire, and the initial Teacher Evaluation form were administered to a large sample of schoolchildren in Grades four through eight. The results of this testing were then analyzed and all three measures modified accordingly.

The modified measures were then used 18 months later in the second stage (Phase 2), with a wider range of schoolchildren in Grades 4 through 12. In Phase 2 the testing of both the SPAACCE scale and Participation Questionnaire was repeated two weeks later. Following this, children comprising groups who had either very high or very low scores on the SPAACCE scale were tested for motor proficiency using the Bruininks-Oseretsky test. Once this testing was finished, physical education teachers completed evaluation forms for each of their students.

This section will describe the test procedures used in the two stages of testing. The analysis of the data obtained from each stage will be presented in the following chapter.

1. Phase 1: Initial Large-Scale SPAACCE Testing

The initial large-scale testing of the SPAACCE test took place in February of 1987. All children in Grades four through eight were tested in J. L. Mitchener School (JLM) in Cayuga, and Centennial School (CCS) in Caledonia, Ontario. These two schools are the only elementary schools administered by the Public School Board of Education for these towns. Two smaller (194 students in Grades 4 through 8) elementary schools operated by the Catholic School Board of Education also serve these two towns but were not involved in the testing. The tested schools serve the populations of the towns as well as a large outlying rural hinterland.

Immediately after completing the SPAACCE scale, children completed a five item Participation Questionnaire. The schools' physical education teachers were given a four point participation and physical ability evaluation form for each child. These were completed in the week following the testing. This form was completed by the teacher who was responsible for teaching physical education to the child named on each form.

Before starting the test session the principal investigator was introduced to each class by the class teacher. The teacher then remained in the room for the duration of the testing as an aid to maintaining class discipline.

An effort was made to keep test instructions identical for each class throughout this testing. However, some adaptations were made as a result of questions asked and difficulties presented during the testing of the first classes. These additions were relatively minor. For example, following questions by a few students in the first class tested, it was pointed out to each subsequent class that the term "phys. ed." in the SPAACCE form was an abbreviation of physical education and that it referred to gym class. No further difficulties with this term were expressed. The instructions which had been developed during the pilot testing with single subjects proved to be entirely adequate, and little difficulty was noted or expressed in completing the tests. An additional instruction was given, ten minutes into the test session, to control noise and activity levels in the classroom.. Children were asked to work on some school task or to read quietly after they had completed the survey so as not to disturb their classmates who were still completing the forms. This instruction quite adequately served its purpose. The tests were referred to as "scales" or "surveys" in order to minimize the anxiety that some children may

experience if the forms were referred to as "tests". This strategy was also employed to minimize any inclination the children may have had to search for "right" or "wrong" responses.

2. Phase 2: Reliability and Validity Testing

Following the analysis of the results of the pilot testing the SPAACCE scale was revised and prepared for further testing. The modified SPAACCE test, along with a completely revised, comprehensive, Participation Questionnaire, was administered twice, two weeks apart, to all children in Grades four through eight in CCS and in JLM. This testing took place in May of 1988.

Once again, the physical education teachers completed the Teacher's Evaluation forms, rating each child's level of ability, confidence, enjoyment, and participation regarding physical activity. This form was completed in the week following the SPAACCE testing.

Ten classes were tested at CCS and nine classes at JLM. The testing was done on a class administration basis and all testing was carried out by the principal investigator. The classroom teacher introduced the investigator and then remained seated in the classroom during the time needed to complete the forms. Each class was allowed 35 minutes to complete both forms, including instruction time. In no case was a child unable to complete this task within the allotted

time, although two children (later identified as being learning disabled students) required a great deal of encouragement to do so. CCS was tested over a two day period, while JLM was tested in a single day.

Following a few introductory remarks, the children received instructions for the Participation Questionnaire, followed immediately by instructions for the SPAACCE test. Once the instructions were complete the children began filling out their forms, beginning with the SPAACCE test. After finishing the SPAACCE test the children completed the Participation Questionnaire which was attached to the SPAACCE form. This procedure was much more economical in time than providing separate time periods with separate instructions for each of the tests. The instructions for the SPAACCE test were given immediately prior to starting that test in order to take full advantage of any recency effects. Questions that children wished to ask during the introductory instructions were answered individually following the instructions, if the question still remained unanswered. During the testing any children who had a question simply had to raise their hand and the question was answered promptly and personally.

When the children had completed their forms they raised their hands and the forms were collected. The class was instructed to read or work quietly until all their classmates had completed the forms. In no instance was there any difficulty with class discipline, although in four situa-

tions particular children required some individual admonishment to behave themselves. The presence of the school teacher in the classroom no doubt had a calming effect. Learning disabled and physically handicapped children who were integrated into the regular classroom were tested along with their peers.

Following the initial test administration each class was informed that the investigator would be returning "in a couple of weeks" and that if they had any questions regarding the purpose of the surveys that they would be answered then. No mention was made of a retest.

Two weeks later the testing was repeated. The order of testing by classroom was identical on both administrations. The instructions given prior to each test administration were virtually identical. In the introductory remarks one change was made for the second administration in order to maintain attention to the instructions and provide some motivation for completing the surveys yet again. This addition mentioned "that a few children had had some problems in filling out the surveys, not that their answers were wrong - because there are no right or wrong answers, just what's most like you - but because they didn't listen carefully to the instructions and made mistakes in the way they filled out the form. Most of you did a great job in filling out the forms, just a few of you had problems. Let's all pay attention to the instructions carefully now so that all of us can

do a great job in filling out the surveys." A single informational point regarding the Participation Questionnaire was added in response to questions received during the initial administration. The difference between a school sport and a school intra-mural activity was emphasized by asking the children to pay particular attention to the instructions for each section of the Participation Questionnaire. The identical instructions were then given for the SPAACCE test as in the initial administration. At no time was any mention made, or hint given, that answers on the second test should correspond to those of the first test.

Following the second test administration each class was given an opportunity to ask any questions that they may have had about the purpose, application and fate of the surveys. This question time was possible since the time taken to complete the forms for a second time was five to ten minutes shorter on the second occasion. The decrease in time taken to fill out the forms was due to a number of factors. The introduction of the tester to the class by the teacher was very brief. Children did not ask questions during the introductory instructions but waited till they were filling out the forms and far fewer questions were asked regarding the format of the Participation Questionnaire. There is little doubt that the time savings were largely due to the familiarity of the children with the Participation Questionnaire format.

Adolescents in Grades nine through 12 were tested at Cayuga Secondary School (CSS). Two test administrations were given 15 days apart. The 15 day period resulted from the school being on a "six day" schedule and it was decided to test the students on the same "schoolday" on each occasion. This meant that the students came to the testing from the same class on each occasion and had had the same order of classes prior to the testing. On each test day the testing took place in the same order by grade, and in the same physical location, the school cafeteria. Ten classes were tested, four Grade nine and two each from Grades 10, 11, and 12.

Students were called from their classes by an announcement from the school principal and were seated in long rows at tables in the cafeteria in every second seat. This arrangement was preferred by the school administration as it was felt to minimize class disruption. The arrangement did cause some discipline problems for the investigator as the preferred quiet atmosphere was not possible to maintain. However, the large majority of students cooperated extremely well. Three Grade nine students were asked to leave during the initial test administration as they indicated a lack of willingness to proceed as requested. Each test administration was completed in a single day.

Four of six Grade nine classes and two of four Grades 10, 11, and 12 classes were tested. Students at this

school are randomly assigned to their home rooms so no special selection procedures were taken, other than to ask the principal to select classes in descending order. Thirty-four per cent of the entire school population enrolled in the normal secondary school program was tested and 66% of the Grade nine students were tested. On the retest day, excitement in the school was high as it was both a Friday and the day of the end of year school dance.

3. Scoring Procedures

Following the initial test administration, each student's form was given a code number and the test responses entered directly into the computer. Following the second test administration, the code number was matched by student name to each survey and that survey again entered directly into the computer in a separate file. No test scores or comments were ever made on the test forms themselves nor were the two test forms ever stored together. This was done in an effort to ensure blindness in the scoring of the retest. The test scores were entered into separate computer files which were merged following scoring. The total scores for each test were not computed until all test results had been entered. In this way there was no possibility of matching retest to test scores and complete blindness was maintained. Students who were only present for either the test or retest were kept in separate files.

Individual SPAACCE items were scored with the negative "really like me" response receiving a score of 1.

4. Phase 2: Motor Proficiency Testing

Once both tests had been scored, their mean result was computed. Cutoff points were determined from the mean SPAACCE scores at which at least the 20 highest and lowest scoring males and females from the elementary grades could be identified. These children were selected for motor proficiency testing using the Bruininks - Oseretsky Test battery. In each case more than 20 children were selected, as the cutoff points did not fall naturally at a point where only 20 children qualified. In order to remove any potential bias, each eligible child was tested, even though this resulted in uneven numbers in each of the four test cells. Twenty-nine low scoring females, 22 low scoring males, 22 high scoring females, and 20 high scoring males were tested. An additional test group was established which consisted of all 15 learning disabled children who, having been integrated into the regular classroom, had completed the SPAACCE testing.

All of these children were subsequently tested with one exception. A single girl from the low scoring group had contracted a serious eye infection and was absent from school from the test period until the end of the school year. As the low scoring female group had the largest number of subjects (29), the loss of this individual was not felt to present a significant effect. A single high scoring boy was tested

whose results were discarded as this child was older than the established age norms for the Bruininks-Oseretsky test.

The inclusion of this ineligible subject resulted as a consequence of efforts to maintain as high a degree of blindness to the SPAACCE scores as possible. As all testing and selection was performed by a single individual, care was taken not to allow any information to be observed or recorded which might allow the subsequent identification of a child to his or her test group. In order to maintain this blindness the following procedure was followed. The identification numbers of eligible children were taken from the computer files. The identification numbers of the learning disabled children were determined from lists provided by the schools. These identification numbers were numerically ordered which effectively mixed the high and low scoring groups as well as the learning disabled children. The identification numbers were cross-referenced with the original response sheets in order to determine the names and classrooms of the children. The school administration then determined the order in which the testing would take place. This was done to enable effective organization of the testing by the school administration and thereby avoid any conflicts between class activities and the motor testing. During testing the researcher had only lists of names, ordered by classroom, with no means of identifying the SPAACCE score, or any classification of learning disability, of any child. At no point in

this process was a child's name linked to his or her SPAACCE score.

In both schools the testing took place in the gymnasium, with the running test performed on the gym floor and the remaining tests performed on the adjoining stage. The layout of the gymnasia was very similar in both schools. Every child was tested in a relaxed atmosphere with test anxiety kept to a minimum. The children were informed before testing that, if for any reason, they did not wish to participate they were free to withdraw. Although some children were mildly anxious upon entering the gymnasium, once they were informed about the nature of the tests, particularly that these were not "fitness" tests, no children expressed any hesitation about participating. Every child was briefly interviewed following the test battery completion and without exception referred to the tests as "fun". During this interview children were also asked if there was a test that they hadn't understood and if they had any physical ailment that they felt had interfered with their performance. Their comments, if any, were noted on the test response forms.

This testing took approximately 20 to 25 minutes per child to complete. The testing in both schools was completed over a period of 10 days. No difficulties were encountered in test administration or subject compliance. Test protocols established for the Bruininks-Oseretsky test were strictly followed, with one exception; the running test

was performed first in order to minimize the number of times that the child had to move from the stage to the gymnasium floor. This change was insignificant, was consistent for each child, and would not be expected to have any effect on the test results. During the testing period the outside weather was sunny and warm which allowed the gymnasia to be kept free from any class activity, as physical education classes were held outside. This effectively minimized external distractions for the children.

5. Phase 2: Teacher Evaluations

Following completion of the motor testing, the principal investigator met with the physical education teachers of the three schools. The teachers were provided with evaluation forms, organized by class, each of which had the name of one of their students. They were then given a set of verbal instructions, and any questions that arose were answered. The need for objectivity in completing the forms was stressed. No connection of the evaluation forms to the validity testing of the SPAACCE scale was made. The obvious relationship between the two aspects of testing was explained as being part of a "comprehensive evaluation of children's attitudes and participation in physical activities". Completed forms were returned to the school offices one week later.

In the secondary school, physical education class is strongly recommended for Grade 9 students and is virtually compulsory. Since students in other grades were not all taking physical education class it was decided only to obtain teacher evaluations for the Grade 9 students. Only for this grade would a complete match of teacher evaluations and SPAACCE scores be possible. The principal investigator met with only the Grade 9 physical education teachers, and followed the same procedure as with the elementary school teachers. One exception was that the teachers organized the student forms into class sections, as this information was not available to the investigator. Completed evaluation forms were returned two weeks later. At this time the school administration supplied lists of Grade nine students who had selected physical education class as an elective for the following year. This information was not available to the physical education teachers before completing the evaluations and so could not be considered a potential source of bias.

Each item on the teacher evaluation was scored with the least favourable response being given a score of 1. The items were then summed to provide a total score.

IV. Design and Analysis

This chapter will provide an analysis of the data collected in both the initial large-scale testing of the SPAACCE scale (Phase 1), and the validity and reliability testing stage (Phase 2) of the development of the SPAACCE scale. The design of the SPAACCE scale as well as the design of the Participation Questionnaire and the Teacher's Evaluation form will also be described in this chapter. Due to the extent and complexity of the research design, the analyses will be presented in the following manner. In order to minimize repetition, the population samples involved in both phases will first be described. As the Participation Questionnaire developed in this study will be used in the validity testing of the SPAACCE scale, it will form the second section of the analysis. The Teacher's Evaluation scale, which was also developed for this study, forms part of the validity testing of the SPAACCE scale and will be discussed in the third section of the analysis. Finally, the results of the reliability and validity testing of the SPAACCE scale will be presented.

1. Sample Characteristics

A. Phase 1: Initial Large-Scale Testing

The initial large scale testing of the SPAACCE scale took place in February of 1987. All children in Grades four through eight attending Caledonia Centennial School (CCS) and J. L. Mitchener School (JLM) in the Haldimand (Ontario) School Board were tested (see Table 1). Five hundred and forty-three children successfully completed the scale, 265 from CCS and 278 from JLM. Twenty-six children were absent from school on the day of testing. Five test results were spoiled; therefore 94.6% of the target population completed the testing.

Of those successfully completing the testing, 277 were boys and 266 were girls (see Table 2). The ages of the children ranged from 9 to 15 with a mean of 11.7. Sixteen learning disabled children who were integrated into regular classrooms were included in this sample.

B. Phase 2: Reliability and Validity Testing

This stage of testing took place in May of 1988. All children in Grades 4 through 8 attending CCS and JLM were tested. Students from Grades 9 through 12 from Cayuga Secondary School (CSS) were also tested in this phase (see Table 1). A total of 757 students were involved; 291 from CCS, 263 from JLM, and 203 from CSS. Of these, 267 from CCS,

Table 1

Sample size - Phase 1

School	Completed Testing	Absent	Spoiled
Caledonia Centennial	265	16	3
J. L. Mitchener	278	10	2
Totals	543	26	5

Sample size - Phase 2

School	Completed One Test Only	Completed Both Tests	Absent Both times	Spoiled
Caledonia Centennial	291	267	0	4
J. L. Mitchener	263	240	1	3
Cayuga Secondary	203	181	6	3
Totals	757	688	7	10

Table 2

Sample Characteristics

Phase 1	
Elementary schools	
Age (SD)	11.7 (1.5)
Males/Females	277/266
Learning Disabled	16

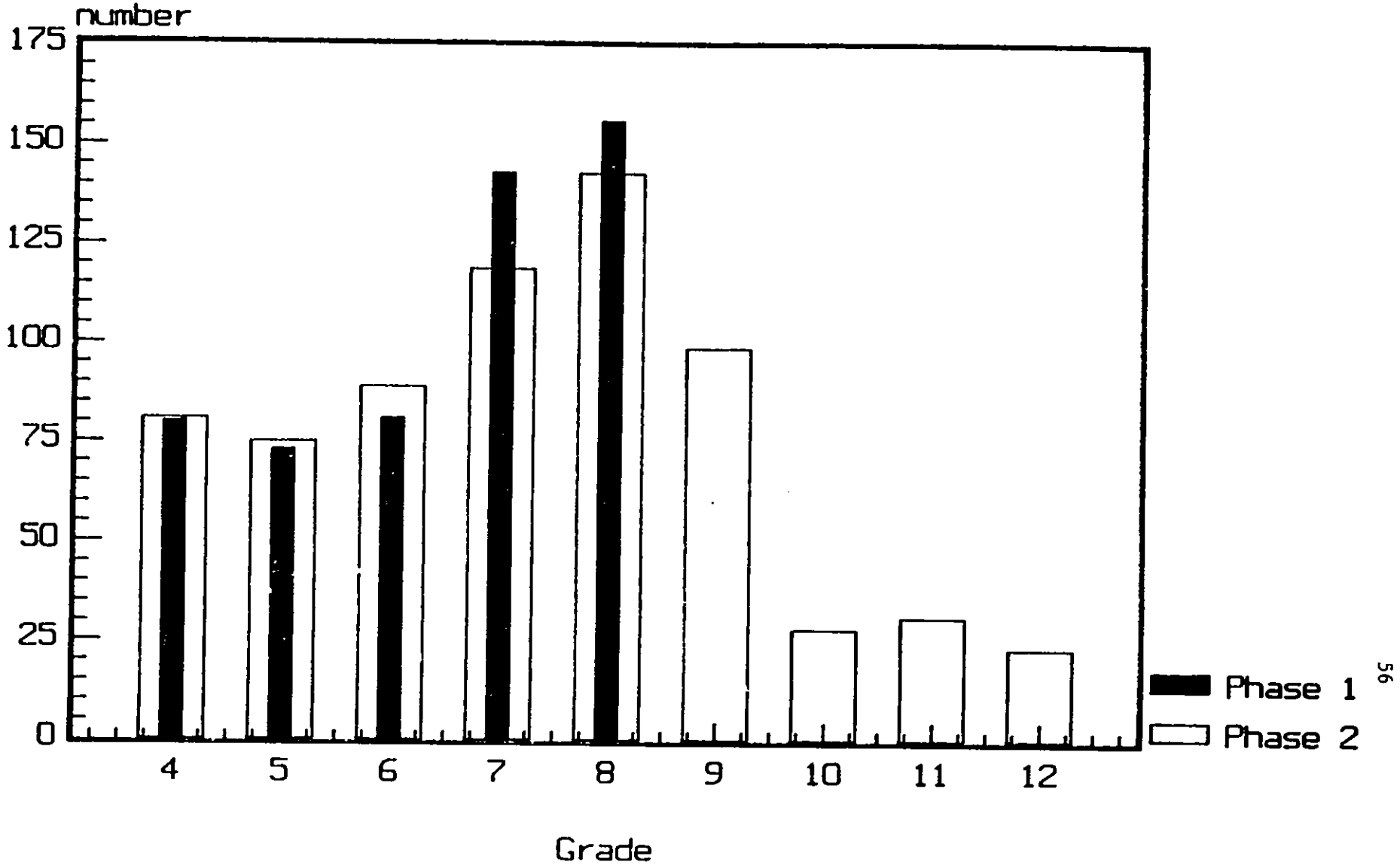
Phase 2		
	Elementary schools	**Secondary school**
Age (SD)	12.4 (1.5)	16.0 (1.3)
Males/Females	255/252	100/81
Learning Disabled	15	-
Town/Rural	291 (57.5%)/216 (42.5%)	-
Family Size (SD)	2.9 (1.2)	3.0 (1.4)
Birth Order (SD)	1.9 (1.1)	2.1 (1.2)

240 from JLM, and 181 from CSS completed both the initial test and the two-week retest. One child was absent on both test days in the elementary schools and seven test results were spoiled. Therefore, in the elementary schools, 90.3% of the target population successfully completed all aspects of the testing. In the secondary school, three tests were improperly completed, obviously with intent. Six students were absent on both testing days. Therefore, 86.2% of the secondary school sample completed the testing.

In the elementary schools, of the 507 children completing both tests, 255 were males and 252 were females. In the secondary school, 100 males and 81 females completed all testing. Children in the elementary schools had a mean age of 12.4, ranging from nine to fifteen. The ages of the secondary school students ranged from fourteen to nineteen, with a mean of sixteen. Table 2 presents information regarding the sample characteristics of gender, age, residence, family size, and birth order.

For the children who completed both tests, a breakdown of the sample size by grade is presented in Figure 1. The two elementary schools receive children from rural schools which provide classes only up to Grade 6, explaining the increased numbers of students in Grades 7 and 8. In the secondary school, while there are greater numbers of Grade 9 students in any case, this sample reflects an intention to

Figure 1
Sample Size by Grade



test a majority of the Grade 9 students since only this grade had virtually compulsory physical education class. The elementary and secondary school populations will be analyzed separately due to the relatively small number of students in grades 10 to 12.

Students were classified as being from a rural setting if they required bus transportation to school; 291 (57.5%) of the elementary children were classed as being from town and 216 (42.5%) were classed as being from rural settings. Due to the location of CSS well outside of a town, school transportation is not a valid means of determining town or rural settings and is not presented.

Learning disabled students who were integrated full-time into the regular classrooms in the elementary schools were included in this testing. Fifteen of 17 such children completed all testing. As learning disabled children comprise a distinct subgroup of students, their results were analyzed separately. In total, 492 elementary school students, without learning disabilities, completed all aspects of testing.

2. Design of the Participation Questionnaire

Concurrent with the development of the SPAACCE scale was the design and development of a Participation Questionnaire to provide a measure of children's activity

levels. The development of this questionnaire moved through several distinct stages which are reported below. A preliminary Participation Questionnaire used in Phase 1 testing was not subject to these developmental phases and is presented in Appendix 1.

A. Review of Existing Measures

Existing measures were reviewed in an attempt to locate a suitable instrument already in place. Failure to find such a measure altered the focus of the review to that of searching for approaches, formats, phraseology, and items which might be employed in a new questionnaire and which met the criteria set out below. No single measure provided a model for the resulting questionnaire. However, numerous lessons were gleaned from this review which assisted in the design of the instrument reported here. The chief result of this review was a determination of the need to develop a participation questionnaire which would meet the requirements of this research.

B. Design Criteria

A small number of design criteria was established prior to the construction of the Participation Questionnaire. These were:

1. The questionnaire was to be developed from the ground up, and therefore would not be based on any existing instrument. The questionnaire should be suitable for use by children and adolescents aged 8 to 18, biased toward the needs of younger children.

2. The questionnaire should tap organized physical activities at school and in the community, as well as free choice recreational activities. The seasonal nature of children's activities should be recognized.

3. The questions was phrased in language that children aged 8 to 18 would comprehend. Descriptive activity terms that are of significance to children, rather than those more convenient to the researcher, were employed. In all situations language and descriptions favouring the comprehension of younger children were given preferential treatment.

4. While no attempt was to be made to determine the metabolic equivalents of activities, some impression of frequency, duration, and intensity was attempted.

5. Basic demographic information was gained. This included age, birthdate, family size, birth order, and home location (town or rural).

6. Gaining an impression of what children feel is the extent of their activity was considered more important than items which would attempt to determine actual activity levels exhaustively and minutely.

7. Gender bias was avoided. When describing activities, examples typical of both males and females were included.

C. Development of Subsections

Following the review of existing measures and discussions with a number of individuals involved in physical activity settings with children, several specific areas for investigation were identified. The questions children had concerning the items in the basic Participation Questionnaire employed in Phase 1 were given strong consideration.

The major division in the questionnaire was between organized and unorganized activities. Organized activities were divided into five categories: (1) intra-mural school sports, (2) inter-school sports teams, (3) community league sports teams, (4) sport and/or dance clubs, and (5) sport and/or dance lessons. These categories were felt to cover the realm of organized activities available to children, while remaining distinct enough to avoid confusion and overlapping responses.

Unorganized activities were not so conducive to categorization. However, seasonal recreation, daily play activity patterns at home and school, non-active pastimes, and friend and family involvement were identified as areas requiring investigation. This section was divided into two sub-sections; seasonal activities and free time activities.

D. Development of Items

In order to economize the time taken both to complete and score the questionnaire, items were developed which provide children a range of responses of which they simply had to select the most appropriate one. In addition to these response choices, free response opportunities were provided for activities which were not covered by the structured responses. As well, a number of completely free response items were included, all of which were in the subsection dealing with free time activities.

For each of the subsections dealing with organized activities, items were developed to tap the extent (number of activities over past year), frequency (times per week), and duration (hours per week) of involvement. As well, two items were designed to tap the intensity of effort, referring to either the extent of fatigue following participation, or the degree of physiological intensity (breathing heavily, heart beating quickly, sweating) associated with the activity. A final item investigated the number of friends involved in similar activities.

The items dealing with free time activities comprised the single largest sub-section and provided a range of choices from inactive (reading, talking, watching television, etc.) to playing active games. These choices, along with an opportunity to write a novel response, were provided

for each of a number of discrete and easily recognizable daily time periods (recess or spares, lunch periods, after school and before supper, after supper and before bed, and weekends and holidays), where children had opportunities to freely select what they were doing. A number of free response items were provided to allow children to indicate their "favourite" pastimes (active or non-active) or most common activities. Two summer activities (bicycling and swimming) and two winter activities (skating for fun and cross country skiing) were investigated for both frequency and intensity (fatigue) in an attempt to gain some insight into seasonal recreational activities. A number of items tapped the frequency of non-active pastimes (watching television, reading, playing video games). As well, items which tapped the frequency of playing active games with friends and with family were developed. A single item determined if children had daily or weekly chores or work.

Demographic items were placed at the beginning and end of the free time subsection. These determined the time taken to get to school, the mode of school transportation (in order to determine town or rural setting), the number of older and younger brothers and sisters, age, grade, and birthdate.

At this point, the questionnaire items were reviewed by a number of individuals experienced with children and test design. Their suggestions regarding language,

terminology, and question and answer format were employed in refining the instrument.

E. Instructions

The initial instructions are general in nature, provide an introduction to the nature of the questionnaire, and are designed to be suitable for use when the questionnaire is given either to individual children or large groups. A single sample question is provided. These instructions were reviewed by the researcher with each class before they filled out the questionnaire. Each subsection has a brief set of instructions which more fully describe the content of that section. If the section was not appropriate for that child, for example, if they were not involved in any school sports, they were instructed to proceed immediately to the next section. This format greatly economized time as certain subsections rarely applied for the younger students. The free time activities were the first to be reported and did not have a default instruction. The term "active game", which was used throughout this section, was described as "things like tag or skipping or playing catch". This description was used to differentiate between organized and unorganized physical activities. This distinction was repeated verbally in the introductory instructions.

Once the instructions had been developed, they were reviewed by a number of individuals experienced in either test design or pediatric testing. Their comments and suggestions were incorporated into the form. At this point the questionnaire was administered to six children known to the investigator and their comments and results were considered. Following these final modifications the questionnaire was considered ready for large scale administration (see Appendix 2).

F. Phase 1 - Analysis

In the initial large-scale testing, children completed a very simple nine point Participation Questionnaire. Children were asked to indicate whether or not they had been involved in school intramural activities, school sport teams, community sport teams, and sport and/or dance lessons during the past year. They were then asked to list the activities of each type in which they had participated. The number of listed activities was simply totalled to provide a composite participation score, yielding a mean of 5.4 (SD = 2.7). A two-way analysis of variance (ANOVA) determined that males scored significantly higher than females ($F = 13.709$, $df = 1,524$; $p < .01$), with a mean of 5.8 (SD = 2.7) as opposed to a mean of 4.9 (SD = 2.5). There were no age differences. Differences were significant for intramural participation and

involvement in community sport teams, but, as expected, not significant for participation in school sport teams. School policy dictates matching teams of boys and girls were required for any inter-school sport.

A single item on the Teacher Evaluation form probed children's level of involvement in physical activities. This item correlated moderately with the composite participation total ($r = .41$, $p < .01$).

G. Phase 2 - Analysis

i. Descriptive Statistics

The total scores for the Participation Questionnaires were determined and the mean result of the two test applications computed (see Table 3). The mean results will be employed unless otherwise stated.

A one-way ANOVA revealed differences with age on the Participation scores in the elementary school ($F= 2.319$, $df= 6.485$). Tukey's post hoc test showed that twelve year old children (29.6, SD = 7.6) had significantly higher ($p<.01$) mean scores than nine (23.8, SD = 2.2), ten (26.3, SD = 5.6), and fourteen (27.0, SD = 6.2) year old children (see Figure 2). These were only in the Organized Activity subsection.

ii. Reliability

A two week test-retest procedure was used to investigate the reliability of the expanded, eight page, 61-item Participation Questionnaire (Appendix 2). As stated previous-

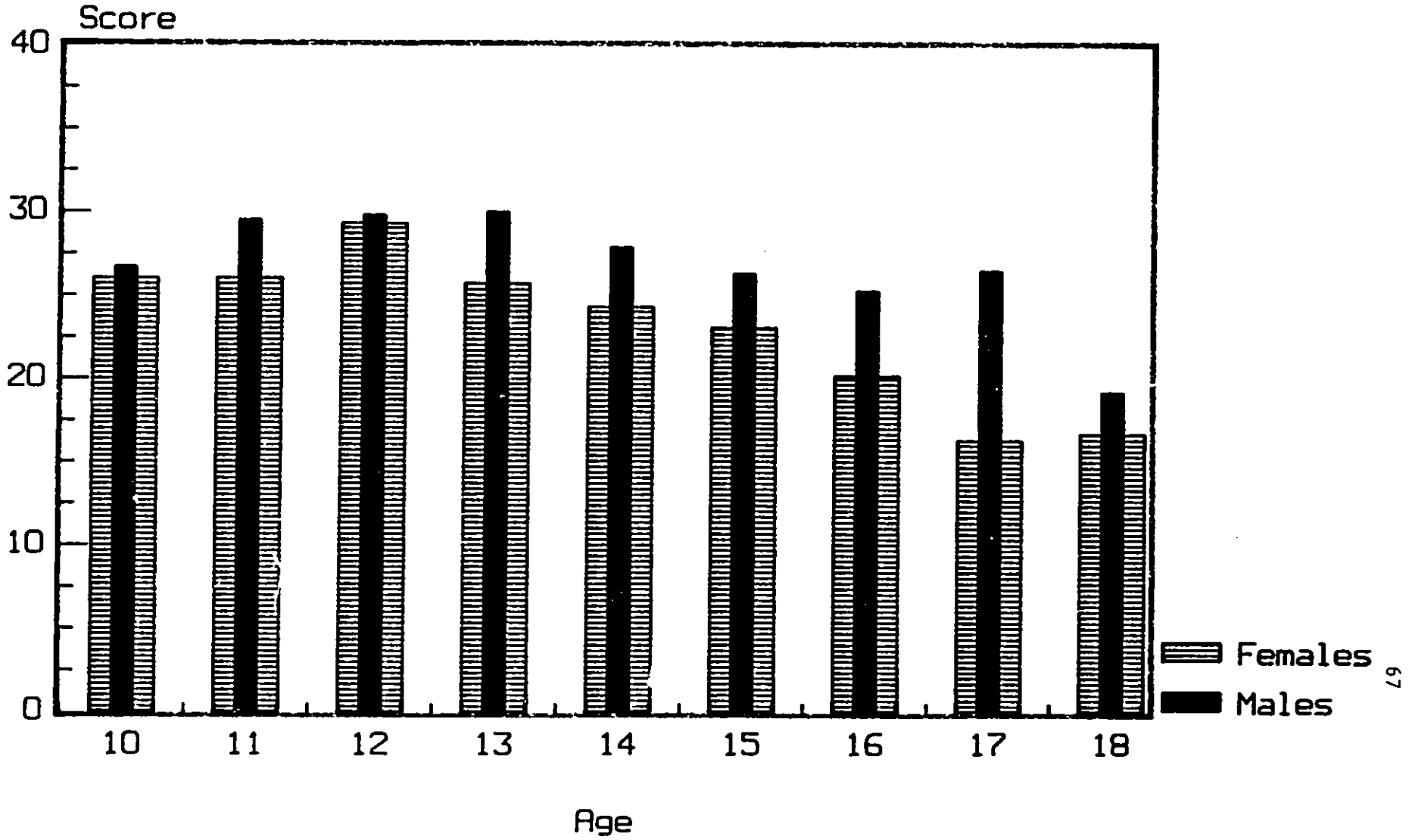
Table 3

Participation Questionnaire Results

	Elementary Schools	Secondary School
Total score	27.8 (6.6)	22.6 (8.6)
Organized Activities	7.7 (4.3)	5.2 (5.1)
Free Time Activities	20.2 (3.6)	17.5 (4.5)

(standard deviation)

Figure 2
Total Participation Scores
(Age and Gender)



ly, the questionnaire was divided into two main parts, Free Time Activities and Organized Activities (sports and games). These sections were further subdivided into school activities, community activities, seasonal recreation and free time activities. The reliability coefficients for the total and all subsection scores are presented in Table 4.

The Free Time Activity section, composed of twelve items, was sub-divided into free choice (eight items) and seasonal recreational activities (four items). The free choice items allowed children to indicate which of a range of pursuits they were most often engaged in during various time periods of a day. Active pursuits were given a score of 1 and inactive pursuits a score of 0. The four seasonal recreational items were scored from 0 (never) to 5 (all the time). The test-retest correlations for each of these subsections of the questionnaire are presented in Table 4.

The Organized Activity section was also divided into two subsections: school sports (intramurals and inter-school sport teams), and community sports (sport league teams, sport and dance clubs, sport and dance lessons). Reliability coefficients for these subsections are also presented in Table 4.

Scores were also determined for the frequency (times per week), duration (hours per week), and intensity of participation in organized activities. The intensity score

Table 4

Participation Questionnaire Test-Retest Coefficients

	Elementary Schools (n = 507)	Secondary School (n = 181)
Total Score	.81	.90
Organized Activity		
Subsection Total	.60	.92
School Activities	.66	.87
Community Activities	.53	.86
Frequency (times/week)	.74	.80
Duration (hours/week)	.73	.84
Intensity	.72	.83
Free Time Activities		
Subsection Total	.80	.86
Seasonal Recreation	.79	.79
Free Choice Activities	.70	.78

(all p's < .01)

was derived by summing the products of the number of reported activities times the reported usual level of intensity (measured by self-reported heart rate, respiratory stress, and sweating response) for each of the organized activity subsections. The test-retest correlations for these variables are presented in Table 4.

iii. Validity

The validity of the Participation Questionnaire was not directly measured. However, correlations between Teacher Evaluations of participation, and expected gender differences in participation, were examined. Possible differences between children from town and rural settings were investigated as well.

The Teacher Evaluation form contained four items which related to participation in either organized or unorganized school physical activities. Two of these items referred to actual situations, the remaining items referred to potential situations. For the elementary school data, correlations between the total participation score and each of the four teacher evaluation items ranged from .39 to .44 ($p < .001$). For the organized school activities score, correlations between the two teacher evaluation items concerned with organized school activities were .43 and .41 ($p < .001$).

Only the Grade nine students in the secondary school were evaluated by their physical education teachers. For the 89 students taking Grade 9 physical education, correlations ranging from .41 to .50 ($p < .001$) were obtained between the total participation score and the four teacher evaluation items. For organized school activities and the two related evaluation items, correlations of .58 and .52 ($p < .001$) were obtained.

Significant gender differences in participation were expected, based on numerous and consistent reports that males are more physically active than females (Canada Fitness Survey, 1985; U.S. Department of Health and Human Services, 1988). For both the elementary and secondary school data, separate one-way ANOVAs showed significant gender differences ($p < .001$), males higher, for total participation scores ($F=16.787$, $df= 1,490$; $F=15.215$, $df= 1,179$). The difference between genders increased with age from elementary to secondary schools (see Figure 2) as expected from the results of the Canada Fitness Survey.

Since significant gender differences were apparent, stepwise regressions were employed to predict total participation scores and school activity scores from the teacher evaluation responses, forcing gender as a covariate (see Table 5). For the elementary school data an R of .45 predicted total participation scores from the two potential participation responses. The same correlation predicted school

activity scores, however only the two items which probed participation in organized school activities loaded in the equation. For the Grade nine students, an R of .56 was obtained, with only the item dealing with actual participation in organized school activities predicting the total participation score. The same item predicted school activity scores; however, the multiple R now increased to .63.

Differences in activity levels between children from town and rural settings were investigated (see Figure 3). A one-way ANOVA showed a significant difference ($F= 3.989$, $df= 1,490$; $p < .04$) between the total participation scores of children from rural settings (26.9, SD = 6.8) and children from towns (28.1, SD = 6.4). There were no significant differences in organized activities. However, a significant difference ($F= 6.33$, $df= 1,490$; $p < .01$) was revealed between the free choice activity means, with the rural children having a lower score (6.6, SD = 2.2 vs. 7.1, SD = 2.0).

3. TEACHER'S EVALUATION FORM

The second instrument developed for this study was a Teacher's Evaluation form. This form was completed by the physical education teacher for each child.

A. Design Criteria

A number of design criteria were established prior to the development of the evaluation form. These were:

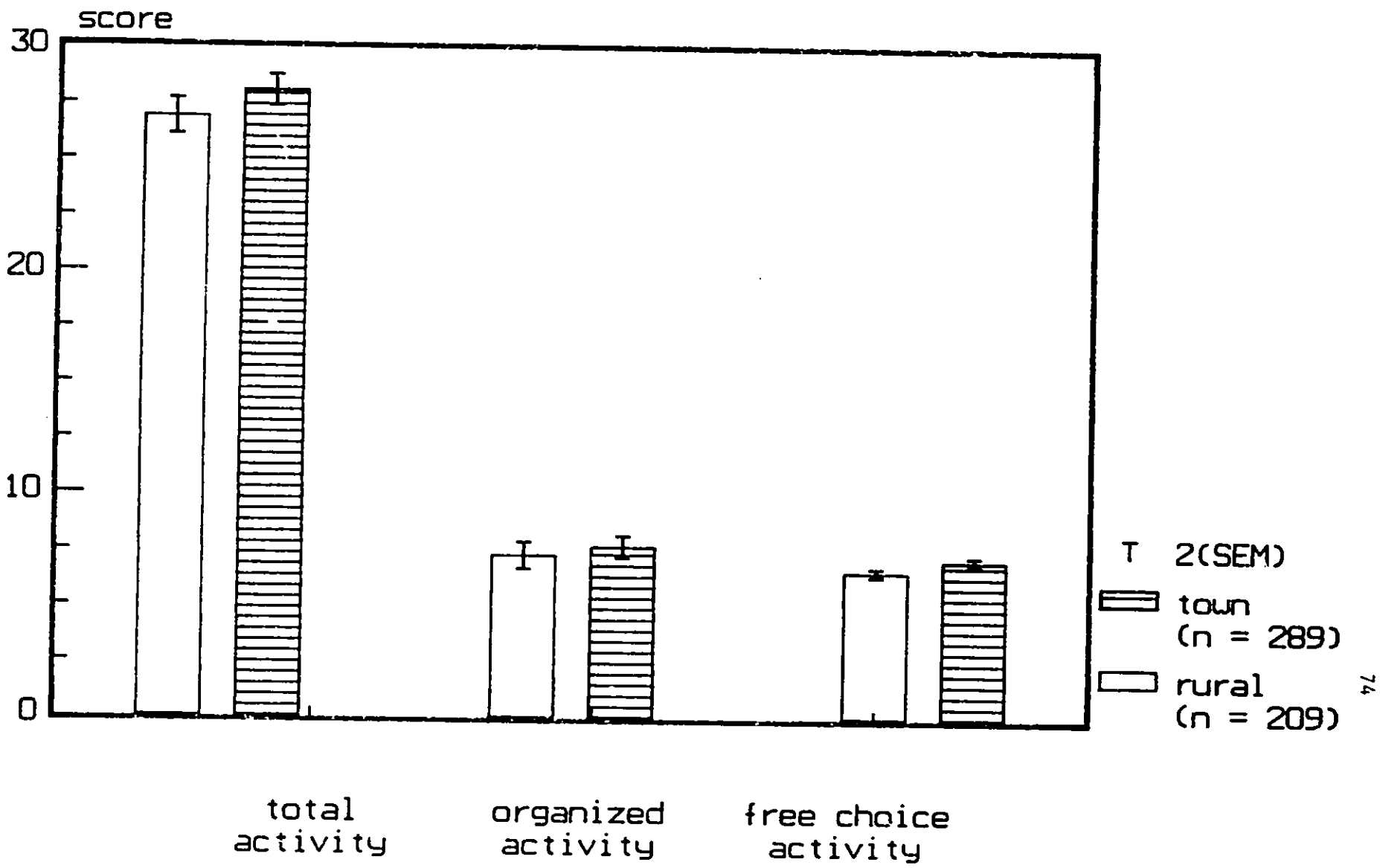
Table 5

Stepwise Regressions to Predict Participation Scores from Teacher Evaluations

	Step Number	Variable Entered	Multiple R
Elementary Schools (n = 492)			
Total Score	1	gender	.1809
	2	potential school sport participation	.4394
	3	potential free play participation	.4510
School Activities	1	gender	.1726
	2	actual school sport participation	.4334
	3	potential school sport participation	.4570
Secondary School (n = 89)			
Total Score	1	gender	.2527
	2	actual school sport participation	.5551
School Activities	1	gender	.2419
	2	actual school sport	.6344

all p's < .01

Figure 3
Participation Results vs. Residence



(a) The form should tap the teacher's perception of a child's physical ability, motor skill, enjoyment of activity, confidence in their ability, and level of participation in school activities.

(b) The form should avoid terms which might introduce a gender bias in the teacher's evaluation.

(c) Items should be worded in a straightforward manner to avoid confusion and excess interpretation.

(d) The form should be easily understood and readily completed in order to minimize time demands on teachers, and thereby encourage compliance.

B. Item Development

In the initial large-scale testing of the SPAACCE scale, teachers were provided with a preliminary four item student evaluation form (see Appendix 3). A single item probed each of the student's physical ability, enjoyment, and participation in physical activities. A fourth item gauged the teacher's familiarity with the child. The phrasing of each of these items was reviewed by three teachers, and their comments used to modify the items.

Responses were made using a five point Likert scale ranging from "Much lower than average" to "Much higher than average". The responses to the three items which evaluated the child were totalled to form a composite score.

C. Instructions

Instructions were given verbally to each teacher and reiterated in a single paragraph at the beginning of the evaluation form. The instructions simply asked the teachers to respond as frankly as possible based on their personal school-based experience with the child named on the form. In the verbal instructions the confidential nature of their evaluation was affirmed. At no time, and in no way, was the relationship between the evaluation form and the validation of the SPAACCE scale mentioned. The teachers were not notified of the evaluation form until all SPAACCE testing was completed.

D. Revision of Teacher Evaluation

Following the initial large scale pilot testing of the SPAACCE scale, revisions to the Teacher Evaluation form were carried out. The design criteria were adapted in the following ways:

(a) The item probing participation was divided into two items, probing participation in organized and free choice activities.

(b) The item probing familiarity with the student was dropped as the evaluation was to be carried out toward the end of the school year, when it was expected that the teachers would know the children well.

(c) In order to minimize age and gender bias in responses, each item asked the teachers to form their response relative to "students of the same age and gender".

(d) New items to tap the teacher's perception of the child's physical ability and skill, and participation in organized and free choice activities were added. These items allowed the teacher to evaluate the student's response to a potential situation rather than the assessment of actual behaviour. These items were added as a check and balance for the possibility that teachers might feel more free to make a negative judgement of a child when reference was to a hypothetical situation. The areas of enjoyment and confidence were not thought to be susceptible to this potential bias.

(e) The "actual" items were followed by the enjoyment and confidence items on one page, which were then followed by the "potential" items on the reverse side of the form. The direction of the descriptors for the "actual" and "potential" items was reversed as a check for non-appropriate response patterns.

The statements in the revised 10 item scale were reviewed and the comments of the reviewers considered in the final editing of the form. The evaluation form was now considered ready for use in the validation of the SPAACCE scale (see Appendix 4).

E. Analysis of Teacher Evaluations

i. Phase 1

The scores of the three items concerning the child were combined into a composite rating. The mean composite score was 9.0 (SD = 1.9), covering the maximum possible range of 3 to 15. Significant gender differences ($p < .01$) were noted on each of the individual items as well as on the composite rating, with males scoring higher in each instance. There were no significant differences between the evaluations made by male and female teachers. Males had a composite total of 9.4 (SD =1.9) while females had a mean score of 8.6 (SD = 1.9). The differences between the means on the individual items were: .3 for ability, .5 for participation, and .6 for enjoyment. There were no significant differences between schools, grades, or ages on either individual item or composite scores. In only three cases did a teacher note a lower than average familiarity with a child. In each case, the children's families had only recently moved into the school district.

ii. Analysis - Phase 2

No attempt was made to investigate the construct validity of the revised, 10 item, Teacher Evaluation form directly. However, a number of indirect probes of the construct validity of this instrument were possible.

The mean score for the elementary school children was 32.4 (SD = 9.6), with scores distributed over the entire range from 10 - 50. For the secondary school population, the mean score was 32.9 (SD = 9.1), with a range of 12 - 49.

There were no significant differences between the evaluations recorded in the two elementary schools. No significant differences were noted between different ages, grades, or place of residence (town or rural) for either elementary or secondary school evaluations.

A one-way ANOVA showed a significant gender difference in the elementary school evaluations ($F=46.890$, $df= 1,490$, $p < .01$)(see Table 6). This difference was not apparent in the secondary school evaluations.

The evaluations of the 15 learning disabled children were lower (29.0, SD = 10.3) than the non-disabled students (32.4, SD = 9.6). This difference was not significant ($p < .19$), perhaps due to the small number of learning disabled children.

As noted in the preceding analysis of the Participation Questionnaire, teacher evaluations were employed in stepwise regressions to predict various subsections of the Questionnaire. Specific Teacher Evaluation items loaded in a differential manner, which corresponded well to the aspect of the Participation Questionnaire under investigation. In both

TABLE 6

GENDER DIFFERENCES IN TEACHER'S EVALUATIONS

Mean Scores (SD)	Males	Females
Total score	35.2 (9.0)	29.5 (9.6)
Actual Situations	14.2 (3.7)	11.8 (3.8)
Potential Situations	13.6 (3.7)	11.6 (4.2)
Enjoyment and Confidence	7.4 (2.0)	6.1 (1.9)

all p's < .001

the secondary and elementary evaluations, the two items that referred to school sports were the only items which loaded in equations to predict participation in school activities.

The design of the evaluation form allowed a test of convergent validity. Four items, referring to children's actual levels of ability and participation, were repeated on the second page of the form, referring this time to potential situations which mirrored the actual situation items. This allowed an approximation of an equivalent form. For the elementary school student evaluations, a correlation of .89 ($p < .001$) was seen between the actual and potential situation items. For the secondary school students, a correlation of .96 ($p < .001$) was obtained between these factors.

The gender differences apparent in the elementary school data existed in the correlations between actual and potential situation item totals. Male scores correlated .89 ($p < .001$) while female scores correlated .81 ($p < .001$). One-way ANOVAs showed that significant gender differences were present for both the actual ($F=43.352$, $df= 1,490$) and potential situation item subtotals ($F= 33.261$, $df= 1,490$) (see Table 6). The degree of difference was greater, however, among the actual items. The mean gender item difference for the actual items was .6, while the mean difference for the potential situation items was .5. A significant gender difference was also noted for the enjoyment and confidence items total. Males were rated as enjoying physical activity

more and having greater confidence in their abilities than females. The mean gender difference for these items was .7.

A further difference existed between the secondary and elementary school evaluations when these results were used in stepwise regressions (gender forced as a covariate) to predict the total Participation Questionnaire scores. For the secondary school data, an R of .56 was obtained, with only the item referring to actual free time participation loading in the equation. For the elementary school data, an R of .45 was obtained, with only the two potential situation items which evaluated participation loading in the equation.

4. Design and Analysis of the Self-Perceptions About Activity - Children's Confidence and Enjoyment (SPAACCE) Scale

A. Design Criteria

A number of essential criteria were established at the outset of the design process. These criteria were:

(a) The test should avoid floor effects, as a principal concern was to understand children with poor self-perceptions about involvement in physical activities. Ceiling effects were not as large a concern.

(b) The test should be non-threatening to the self-esteem of the child. This was to allow children the freedom to make essentially negative statements about themselves which they might otherwise hesitate to make. This was particularly

important as physical activity is generally viewed as a "good" thing which makes it susceptible to responses biased by a concern for social acceptability.

(c) No neutral responses were to be allowed in order to polarize children's self-perceptions. This was to increase the strength of a negative statement and not allow a "safe" place for children to park their responses.

(d) The scale was to be usable for children aged 8 to 12, and potentially usable for adolescents aged 13 to 18. The primary concern was to develop a scale which would tap the self-perceptions of young children, hopefully at an age where those perceptions are still amenable to change. It was also hoped that the instrument might be able to track these perceptions through adolescence as well, although this was a secondary consideration.

(e) The scale should be widely generalizable and therefore avoid terms which referred to specific games or practices. Different physical activities vary in popularity and familiarity among children of various ages, in various regions and socio-cultural-economic environments.

(f) The scale should be suitable for physically disabled individuals and should therefore avoid reference to any specific physical skill, particularly locomotor skills. This would allow the scale to be used in a wide variety of clinical and special education settings without modifications or special instructions. Physically disabled children are at

particularly high risk for difficulties regarding physical activity.

(g) Gender bias should be avoided. As some physical activities are commonly available to, or participated in, only by a single sex (for example ringette, skipping, football, or wrestling), no reference would be made to them. This was of particular importance as significant gender differences were anticipated in self-perceptions regarding physical activity.

(h) The test should be usable for either individual or group administrations. This should allow the scale to be used in both clinical and educational settings.

(i) The test was to be easily scored and the results understood by a variety of clinicians and educators.

B. Review of Formats of Existing Tests

A variety of established attitude tests which were accepted for use with children and adolescents were then reviewed. These tests did not need to be concerned solely with physical activity, as the intention was to review only formats which might have some potential for use in this study. As well, a number of attitude tests for adults, such as those developed by Corbin et al. (1978) and Nielsen et al. (1984), that specifically dealt with physical activity, were assessed for their potential to be adapted for use by children. This review included seeking the opinions of a number of individuals working with children and adolescents

in a variety of clinical and physical education settings. These individuals were asked to recommend test formats which they had found to be suitable for children, as well as to comment on the adaptability of a number of adult oriented scales which measured attitudes toward physical activity.

C. Selection of Design and Vocabulary

As a result of this review, the format of Harter's (1982) Perceived Competence Test was selected. This approach appeared to allow the possibility of meeting all the design criteria. Harter developed a format whereby children had to select from a pair of sentences the one that they felt better described themselves. Harter believes that the sentences divide the population of children into halves, and that children identified themselves with that half of the population that the sentence described and were thus not singled out. After selecting a sentence, children then indicated whether they felt that the sentence was "sort of true" or "really true" for them. It has been established that Harter's test is not susceptible to social acceptance bias (Harter, 1982).

At this point a number of key words and phrases were sought with the intention of describing the majority of children's experiences with physical activity. Children were viewed as being exposed to physical activity in three main settings: free play, organized sports, and physical education

class. Since free play was not a term commonly employed or easily understood by children, it was replaced by the phrase "outdoor games". This seemed to describe the majority of children's free play situations which were active in nature.

D. Design of Test Items

A number of sentence pairs were then created which employed combinations of a physical activity phrase and a term which connoted either enjoyment or confidence. Terms such as "fun", "like", or "enjoy" were used to describe enjoyment, while terms such as "are good at", "easy", or "hard" were used to connote confidence. Sentence pairs were created which allowed a child to (a) select a phrase which indicated either enjoyment or a lack of enjoyment regarding physical activity, or (b) select a phrase which indicated either confidence or a lack of confidence in participating in physical activity. An example of a pair of sentences in the enjoyment domain is:

some kids really enjoy playing sports	BUT	other kids don't like playing sports

The sentences were designed to have a range of "strengths" of wording regarding either enjoyment or confidence. For example, adjectives such as "really" were employed to strengthen the tone of descriptors of enjoyment or confidence. The distance within sentence pairs could then be modified to allow a range of negativity or positivity. For

example, the distance within a sentence pair with the terms "enjoy" and "don't like" is not as great as that within a sentence pair having the terms "really enjoy" and "don't like". The intent of this strategy was to allow children a range of possible expressions of their self-perceptions of enjoyment or confidence.

A second strategy, incorporated to meet the same goal, was to refer to situations or choices of varying "strengths". For example, phrases which refer to the difficulty in learning how to play active games are not as strong as those which refer to whether or not children are selected by their peers first or last to play active games.

These sentence pairs referred to either sports, outdoor games, or physical education classes. In order to minimize the threat to a child's self-esteem in the sentence pairs which dealt with a child's perception of their physical ability, verbs such as "think", "feel", and "find" were employed. For example the phrase "some kids think they aren't very good at sports" is much less threatening than the phrase "some kids are no good at sports". This phraseology, when employed in the "some kids ... BUT other kids ..." format, assists in allowing children to make statements about themselves which are essentially negative without being directly self-critical.

Sentence pairs employed by Harter (1982) to determine competence in physical activity were modified and included in

this group of sentence pairs.

The 32 sentence pairs which were developed were then reviewed by a number of individuals experienced with children in a variety of clinical and physical education settings. These individuals were asked to comment on the suitability of each sentence pair as well as children's comprehension of both language and meaning. These comments were then used to modify the sentence pairs.

A number of children, from 8 to 16 years of age, were then asked to comment on the resulting sentences. These children were all known to the principal investigator and responded candidly, even suggesting slang vocabulary with which they were familiar. (These slang phrases were not employed as they contravened the design criterion for maximum generalizability.)

Twenty of the original 32 sentence pairs remained after this process and they formed the body of the scale.

E. Development of Instructions

Instructions were developed so that children could complete the scale entirely by themselves, but could also be used with assistance from another individual. This facilitated its use with large groups. These instructions were then critiqued by a number of individuals experienced with administering psychometric scales to children. Following modifications based on their recommendations, the scale was then

individually administered to a small number of children aged 8 to 14. The scale was given by a number of clinical staff. The instructions were modified slightly on the basis of the staff's and children's comments. The scale was now considered ready for larger pilot testing, as well as for continued pilot testing in a clinical situation (see Appendix 5).

F. SPAACCE Scale Testing Phase 1: Initial Large-scale Testing

i. Analysis

In this phase, 543 children successfully completed the SPAACCE scale along with the early version of the Participation Questionnaire (see Table 1). Six spoiled tests were discarded. Scores ranged from 28 to 80 (full range is 20 - 80), with a mean score of 64.3 (SD = 10.3). No significant differences were noted between the two schools, or between different grades or ages. A two-way ANOVA showed no age differences but a significant ($F=38.416$, $df=1,524$); $p < .01$) gender difference; males had a mean score of 67.5 (SD = 8.7), while females had a mean score of 61.6 (SD = 10.6).

Multiple stepwise regressions were performed, forcing gender as a covariate, and employing various Participation Questionnaire scores and Teacher Evaluation items as predictors. There were 524 non-learning disabled children, with whom the teachers indicated that they had at least average familiarity, included in this analysis. A multiple R of .64 was obtained, with participation in intramural activities,

school sports, and community sport teams, and teacher rating of ability loading on the equation (see Table 7).

ii. Factor Analysis

A factor analysis was performed on the 20 items which comprised the SPAACCE scale. As it was anticipated that some correlation would exist between the hypothesized factors measured by the SPAACCE scale, both orthogonal and oblique solutions were obtained. The same factor structure was present in both cases. Cattell's (1966) scree test was employed and resulted in the retention of three factors. These factors were; (a) Confidence in Physical Ability and Skill (eight items), (b) Enjoyment of Organized Physical Activities (seven items), and (c) Enjoyment of Non-structured Physical Activities (five items). These factors accounted for 51% of the variance.

The factor pattern is presented in Table 8. Two items showed significant factorial complexity and these were isolated for revision. The factor pattern was stable when repeated for each school separately. The factor pattern also remained stable when the sample was divided by gender.

G. Revision of SPAACCE Scale

Following the completion of Phase 1 the SPAACCE scale underwent a series of revisions. The two items which

Table 7

Stepwise Regression to Predict SPAACCE From Selected Variables
Phase 1

	Step Number	Variable Entered	Multiple Correlation
Elementary Schools (n = 524)	1	gender *	.3037
	2	teacher rating of ability	.5163
	3	community sport team involvement	.5807
	4	school sport teams	.6140
	5	intramural sports	.6382

$p < .01$

* = variable forced as covariate

Table 8

Factor Loadings, Item Means, and Standard Deviations
SPAACCE Testing - Phase 1

Item Abbreviation	Factor 1 Confidence	Factor 2 Enjoyment (organized)	Factor 3 Enjoyment (unstructured)	X	SD
good at games	.55			3.4	.7
don't get hurt	.35			3.0	1.0
do well in sports	.80			2.9	1.0
learn games quickly	.27	.23	.23	3.6	.6
the best at sports	.72			2.6	.9
like to watch games	.50			3.2	.9
last chosen to play	.59			2.7	1.0
not good enough	.75			3.0	1.0
enjoy phys. ed.		.83		3.5	.7
good time playing		.40		3.6	.8
phys. ed. best class		.82		3.4	.8
like playing sports		.43		3.5	.8
phys. ed. games hard		.45		3.4	.7
have fun in phys. ed.		.80		3.7	.7
do well in phys. ed.		.55		3.3	.8
can't wait to play			.49	2.9	1.0
really like games			.51	3.4	.9
like to play games			.78	3.2	.9
watch T.V. in free time			.79	2.7	1.1
like quiet games	.46		.48	3.4	.9
Eigenvalue	4.0	3.3	2.7		

demonstrated factorial complexity were completely reworded in order to avoid any confusion in interpretation. The term "outdoor games" appeared difficult for some children to comprehend as referring only to active games. The term "active games" appeared to satisfy all questions and became a replacement. The instructions proved to be adequate and were revised only slightly in wording and presentation. The revised SPAACCE scale was reviewed by a number of individuals skilled in test design and administration and was accepted as ready for use in Phase 2 (see Appendix 6).

H. Phase 2: Reliability and Validity Testing of SPAACCE

i. Descriptive Statistics

Phase 2 took place 15 months after Phase 1. In Phase 2, 507 elementary and 181 secondary school students completed both administrations of the revised SPAACCE scale (see Table 1). The results of the two tests were averaged, and unless noted otherwise, the mean results will be presented here. The range of the SPAACCE scale is from 20 to 80. The mean score for elementary school students was 65.2 (SD = 10.3). Learning disabled children had a mean score of 62.0 (SD = 9.3). The secondary school students had a mean score of 60.8 (SD = 10.9).

The elementary and secondary school data were analyzed separately. There were no significant differences in SPAACCE results between the two elementary schools, with grade or age, with type of residence (town or rural), with

family size, or with birth order. However, a significant gender difference was apparent in both the elementary ($F= 54.403$, $df= 1,490$) and secondary school ($F= 6.312$, $df= 1,179$) data (see Table 9 and Figure 4). There was no significant difference between the learning disabled students and the non-learning disabled students, perhaps due to the small number of learning disabled children.

ii. Factor Analysis

Factor analyses were performed on each set of test results for both the secondary and elementary school students. Further factor analyses were performed on the results from each of the elementary schools, as well as for males and females, in both elementary and secondary schools. As some correlation was expected between factors, both orthogonal and oblique solutions were obtained. In each case the same factor structure resulted. Once again, Cattell's (1969) scree test was employed in order to establish an appropriate number of factors for retention. As with the initial large-scale data set, three factors emerged. These factors are referred to as Confidence (seven items), General Enjoyment (ten items), and Enjoyment of Physical Education Class (three items).

For the elementary school data, the factor structure was consistent between schools, gender, and test order with one exception (see Table 10). The item which referred to getting hurt while playing sports moved between the Confidence and General Enjoyment factors. This item was removed

Table 9

Gender Differences in SPAACCE Results

	Elementary School		Secondary School	
	Males	Females	Males	Females
Total Score	68.5 (SD=8.2)	62.0 (SD=11.2)	62.6 (SD=11.1)	58.6 (SD=10.4)
Factor 1 (general enjoyment)	34.6 (SD=4.4)	31.4 (SD=5.9)	31.5 (SD=6.0)	29.6 (SD=5.7)
Factor 2 (confidence)	23.5 (SD=3.6)	20.9 (SD=4.5)	22.2 (SD=4.2)	20.3 (SD=3.7)
Factor 3 (phys. ed. enjoyment)	10.8 (SD=1.6)	10.1 (SD=2.6)	9.1 (SD=1.9)	8.9 (SD=1.6)

All gender differences significant at $p < .01$ except Factor 3 for Secondary School

Figure 4
SPAACCE Scores by Grade and Gender

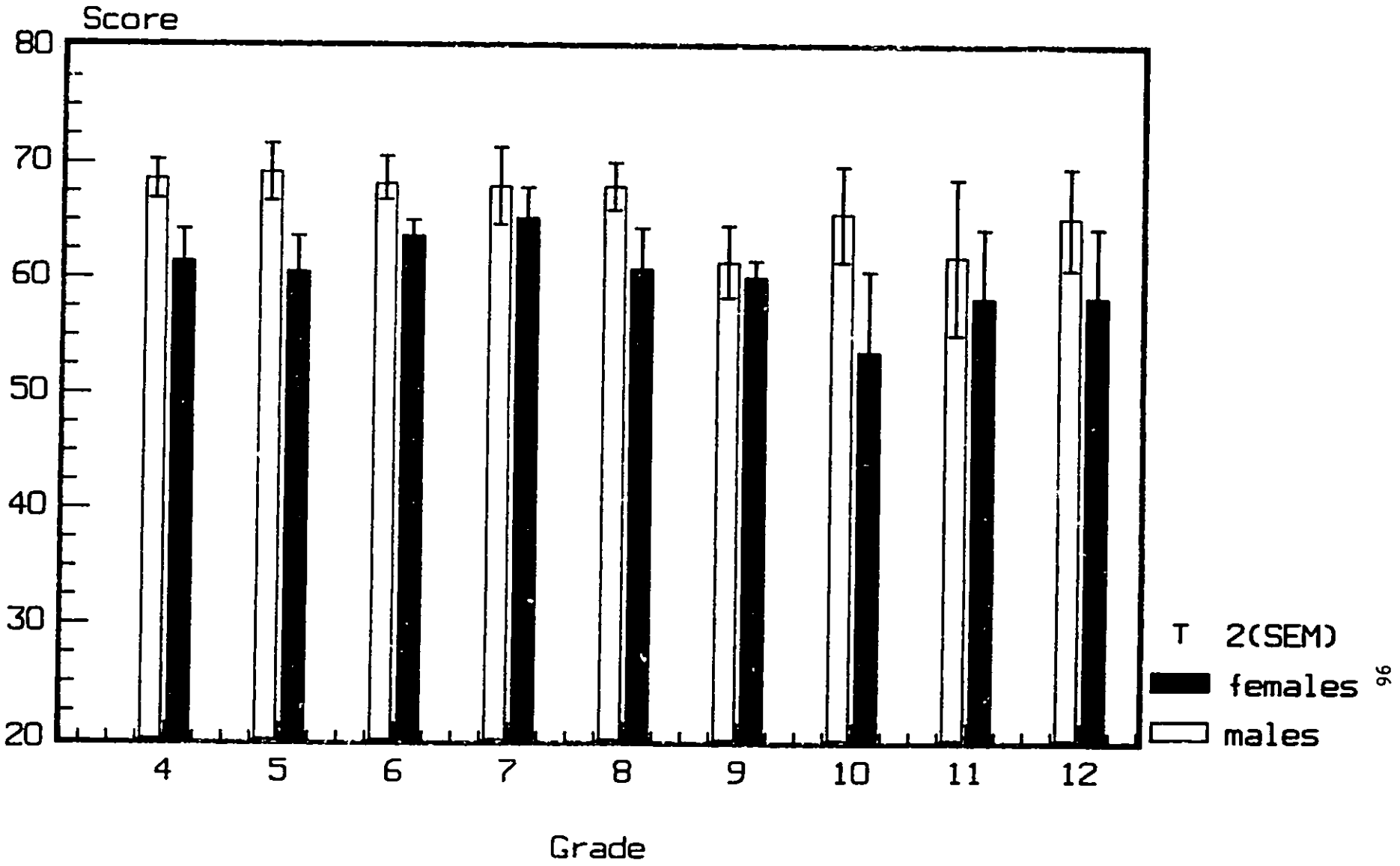


TABLE 10

Factor Loadings, Elementary Schools

	Test 1 (Test 2)		
Item Abbreviation	Factor 1 Confidence	Factor 2 Enjoyment	Factor 3 Enjoyment (phys. ed.)
good at active games	.58 (.51)		
do well in sports	.59 (.51)		
hard to learn games	.51 (.48)		
best at sports	.53 (.50)		
good at phys. ed.	.44 (.41)		
last to be chosen	.49 (.47)		
not good enough	.52 (.49)		
play active games		.38 (.55)	
like active games		.49 (.44)	
no fun playing sports		.46 (.43)	
like playing sports		.44 (.43)	
get hurt playing	(.37)	.31	
rather read or videos		.49 (.54)	
like to watch		.44 (.40)	
like to take it easy		.40 (.44)	
like quiet games		.44 (.47)	
like to relax, t.v.		.46 (.50)	
enjoy phys. ed.			.73 (.80)
phys. ed. is best			.73 (.80)
fun in phys. ed.			.77 (.81)
Eigenvalue	3.8 (4.3)	3.5 (4.2)	2.6 (2.8)

from the SPAACCE scale at this point. Unless otherwise noted, all further analyses will involve the remaining 19 items in the SPAACCE scale.

For the secondary school data the factor structure mirrored that of the elementary schools apart from the mixing of items between the two Enjoyment categories (see Table 11). This was expected, as not all secondary school students were enrolled in a physical education class. When the secondary school data were forced into a two factor solution, the Enjoyment factors merged, and the Confidence factor remained unchanged, for both the test and retest data.

The variance accounted for by the three factor solutions ranged from 54% to 59% for the secondary school data, and from 50% to 59% for the elementary school data. The variance accounted for by the two factor solutions for the secondary school data ranged from 53% to 57%.

Gender differences apparent in the total SPAACCE score were also evident for each of the factors, except Enjoyment of Physical Education class in the secondary school data (see Table 9).

iii. Reliability

The pre-test and two-week post-test results were correlated to determine the test-retest reliability of the SPAACCE scale and the three factors (see Table 12). Unless noted otherwise, Pearson product-moment correlations are

TABLE 11

Factor Loadings, Secondary School

Item Abbreviation	Factor 1 Confidence	Factor 2 Enjoyment	Factor 3 Enjoyment (phys. ed.)
	Test 1 (Test 2)		
good at active games	.65 (.60)		
do well in sports	.74 (.58)		
hard to learn games	.56 (.41)		
best at sports	.76 (.51)		
good at phys. ed.	.64 (.51)		
last to be chosen	.71 (.60)		
not good enough	.74 (.59)		
play active games		.54 (.58)	
like active games		.62 (.52)	
no fun playing sports		.69 (.54)	
enjoy playing sports		.59 (.57)	
get hurt playing		.41	(.98)
rather read or videos		(.51)	.48
like to watch		.42 (.48)	
like to take it easy		(.56)	.57
like quiet games		.45 (.46)	
like to relax, t.v.		.46 (.52)	
enjoy phys. ed.		(.59)	.81
phys. ed. is best		(.62)	.84
fun in phys. ed.		(.60)	.81
Eigenvalue	4.2 (4.5)	3.9 (6.0)	3.2 (1.3)

Table 12

SPAACCE Reliability Coefficients

	Elementary schools	Secondary school
Total score	.88	.93
Factor 1 Confidence	.86	.82
Factor 2 Enjoyment	.81	.83
Factor 3 Phys. Ed. Enjoyment	.79	.83

all p's < .001

reported, using a p-level of .01. In no situation were coefficients different between the 20 item and 19 item versions of the scale.

For the elementary school data, an r of .88 was obtained between the test and retest. For the secondary school students, an r of .93 was obtained. For the elementary school data, correlations ranged from .79 to .86 for the three factors. In the secondary school, correlations for the three factors ranged from .82 to .83. The lower correlations for the factors, as opposed to the total score, were anticipated as each factor is comprised of fewer items.

In order to investigate the internal consistency of the scale, each item was correlated against the factor it loaded on (with the factor corrected for the item being investigated) and each of the other two factors. This process was repeated for the data from both test administrations, for both elementary and secondary school students. In no case did an item correlate higher with a factor other than the one on which it loaded, although the factorial complexity of previously mentioned items was apparent (see Appendix 7).

It was possible to investigate the stability of the SPAACCE scale to a limited degree. There were 281 elementary school students and 56 Grade 9 students who had completed all testing in both Phase 1 and Phase 2. An r of .66 was obtained when the ults of the initial SPAACCE scale were correlated with the results of the modified SPAACCE scale which had been

administered 15 months later. While almost all items had been subject to some revision following Phase 1, two items had been significantly altered. When these items were removed from both sets of test data, the correlation remained at .66.

The two week test-retest reliability correlations were .87 for the 281 elementary school students who had completed Phase 1 SPAACCE tests, and .87 for the 226 students who had not been involved in Phase 1. There was no significant difference between the SPAACCE scores of the two groups in Phase 2.

iv. Validity

The construct validity of the SPAACCE scale was investigated in a number of ways. Initially, correlations were determined between the results of the Teacher Evaluations, Participation Questionnaire, and the SPAACCE results. Various aspects of the Teacher Evaluations and Participation Questionnaire were also correlated with the SPAACCE scale (see Table 13).

Moderate correlations exist between the SPAACCE scores and the Participation Questionnaire and Teacher's Evaluation results for the elementary school data. For the secondary school data the correlations are consistently stronger.

Elementary school students who were in the high and low scoring male and female groups on the SPAACCE scale were

Table 13

SPAACCE Validity - Selected Variable Correlations

Variable	Elementary schools (n=492)	Secondary school (n=181)
Participation Questionnaire		
total	.54	.65
organized activities	.39	.56
school sports	.36	.65
community sports	.29	.45
frequency	.36	.56
duration	.38	.61
intensity	.37	.59
free time activities	.53	.62
seasonal recreation	.26	.33
free choice activity	.62	.74
Teacher Evaluations		(n=87)
total score	.59	.66
potential items	.57	.62
actual items	.56	.64
enjoyment and confidence items	.56	.67
Bruininks-Oseretsky Motor Proficiency Test (n=92)		
rank percentile	.78	
standard score	.73	

all p's < .01

tested for motor proficiency using the Bruininks-Oseretsky test battery (see Table 13). The test battery allows three forms of scoring: stanines (ranging from 1 to 9), rank percentiles (ranging from 1 to 99, but which do not have an equal difference between scores), and standard scores (which range from 24 to 74, and have an equal difference between scores). As rank percentiles allow the greatest range of scores, and since extreme scores were expected, this form of scoring will be reported here, unless otherwise noted.

Ninety-two non-learning disabled, and 15 learning disabled students were tested. The results of this testing are presented in Table 14 and Figure 5. Male and female results are reported separately, as the Bruininks-Oseretsky scale does not provide separate scoring scales for different genders.

A single high scoring SPAACCE female (score of 77), did much more poorly than would have been expected (rank percentile of 7). This subject had complained of an upset stomach in the post-test interview. However, as she did not feel that her condition had altered her performance, this result has been included in the analysis. This same situation was repeated with a high scoring male (SPAACCE score of 80, rank percentile of 34) who complained of a sore back in the post-test interview.

The results of the Participation Questionnaire, and Teacher's Evaluations, for the high and low scoring students

Table 14

Bruininks - Oseretsky Results of Students With High or Low SPAACCE Results

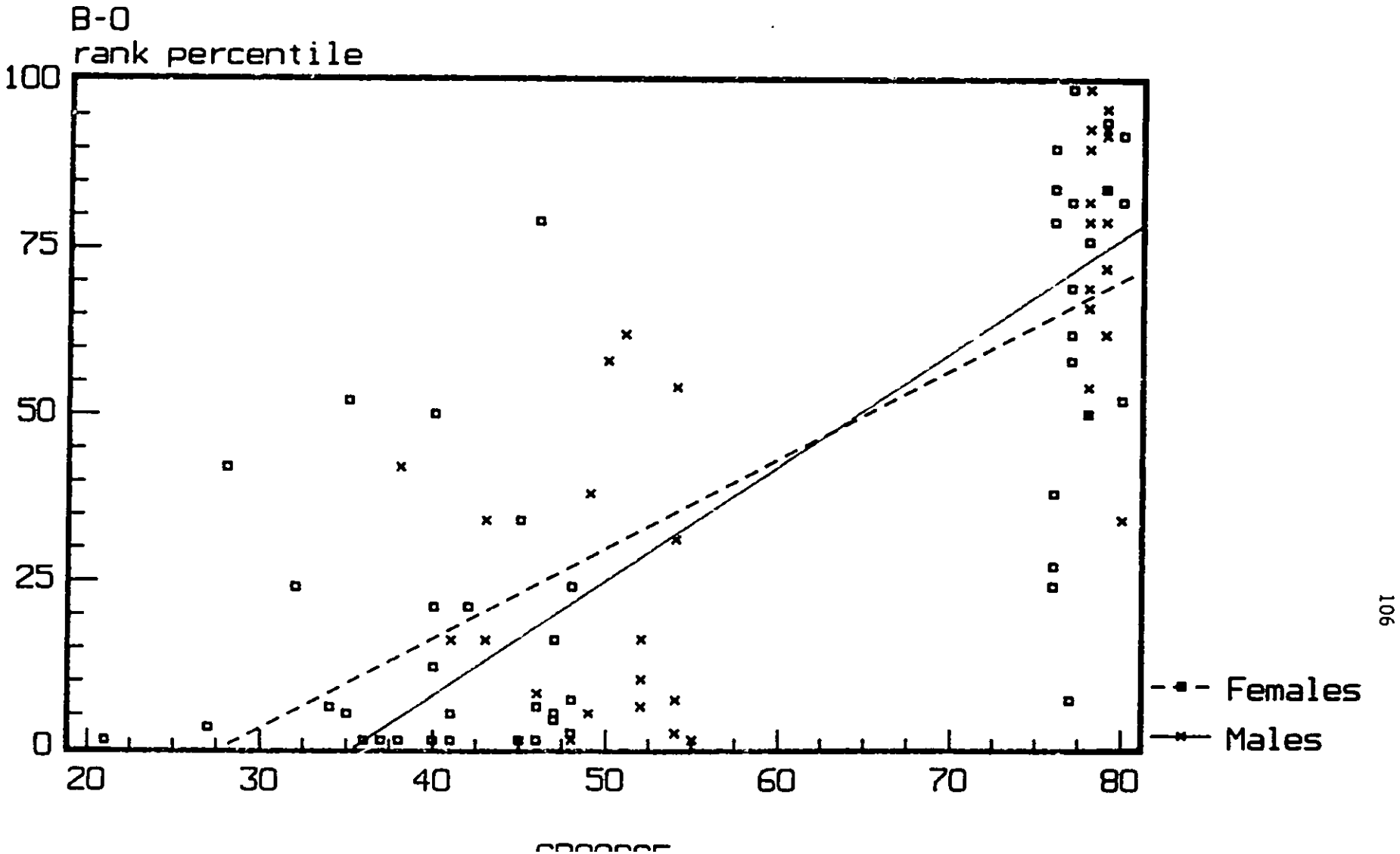
	Low SPAACCE scores		High SPAACCE scores	
	males	females	males	females
Number	19	29	22	22
Mean B-O rank percentile	21.4	15.2	75.7	68.9
Standard Deviation	(20.7)	(19.4)	(17.2)	(26.0)
SPAACCE range	38 - 55	21 - 48	78 - 80	76 - 80

Learning Disabled Students

Number	15
Mean B-O rank percentile	28.1
Standard Deviation	(28.6)
SPAACCE range	37 - 76

note: B-O = Bruininks - Oseretsky

Figure 5
SPARCCE vs. Bruininks-Oseretsky



were examined, and are presented in Table 15 (see also Figures 6 and 7). In every section and subsection of the Participation Questionnaire and the Teacher's Evaluation, highly significant differences ($p < .001$) were obtained between groups. The differences were also highly clinically significant. In both organized activities and free choice activities, the high scoring group reported almost twice as much activity. In the Teacher's Evaluations, the high scoring group had above average scores, while the low scoring group had below average scores for each subsection.

The 15 learning disabled students who were involved in the SPAACCE testing also took part in the motor proficiency testing. As was anticipated from the results of previous research (Bruininks and Bruininks, 1977), these students performed much lower than average, with a mean rank-percentile score of 28 (SD=28.5).

The SPAACCE scores of the learning disabled students, while also lower than average, did not correlate highly with their motor testing results, yielding a correlation of .31.

When the Bruininks-Oseretsky results of the non-learning disabled students were examined using a T-Test, the high SPAACCE scoring children performed significantly better than the low SPAACCE scoring children ($t=12.461$, $df=90$, $p < .01$). Relative to what would have been expected had a

Table 15

High and Low Scoring SPAACCE
vs
Participation and Teacher Evaluation Results

	Males		Females	
	low	high	low	high
Participation Questionnaire				
total	22.3 (4.9)	32.4 (6.7)	19.7 (6.1)	33.2 (6.0)
organized activities	4.1 (3.6)	9.9 (4.5)	4.0 (3.7)	10.1 (5.0)
free choice activities	5.4 (1.6)	8.2 (2.2)	3.9 (1.4)	8.7 (1.2)
Teacher Evaluation				
actual situations	10.2 (3.2)	16.9 (3.4)	8.1 (3.1)	14.3 (2.6)
potential situations	9.5 (3.5)	16.5 (3.2)	7.7 (3.2)	14.3 (3.7)
enjoyment/ confidence	5.5 (1.6)	8.7 (1.7)	4.1 (1.7)	7.8 (1.3)

all differences between high and low groups significant, $p < .01$

Figure 6
High and Low SPAACCE Scores and
Participation Results - Males

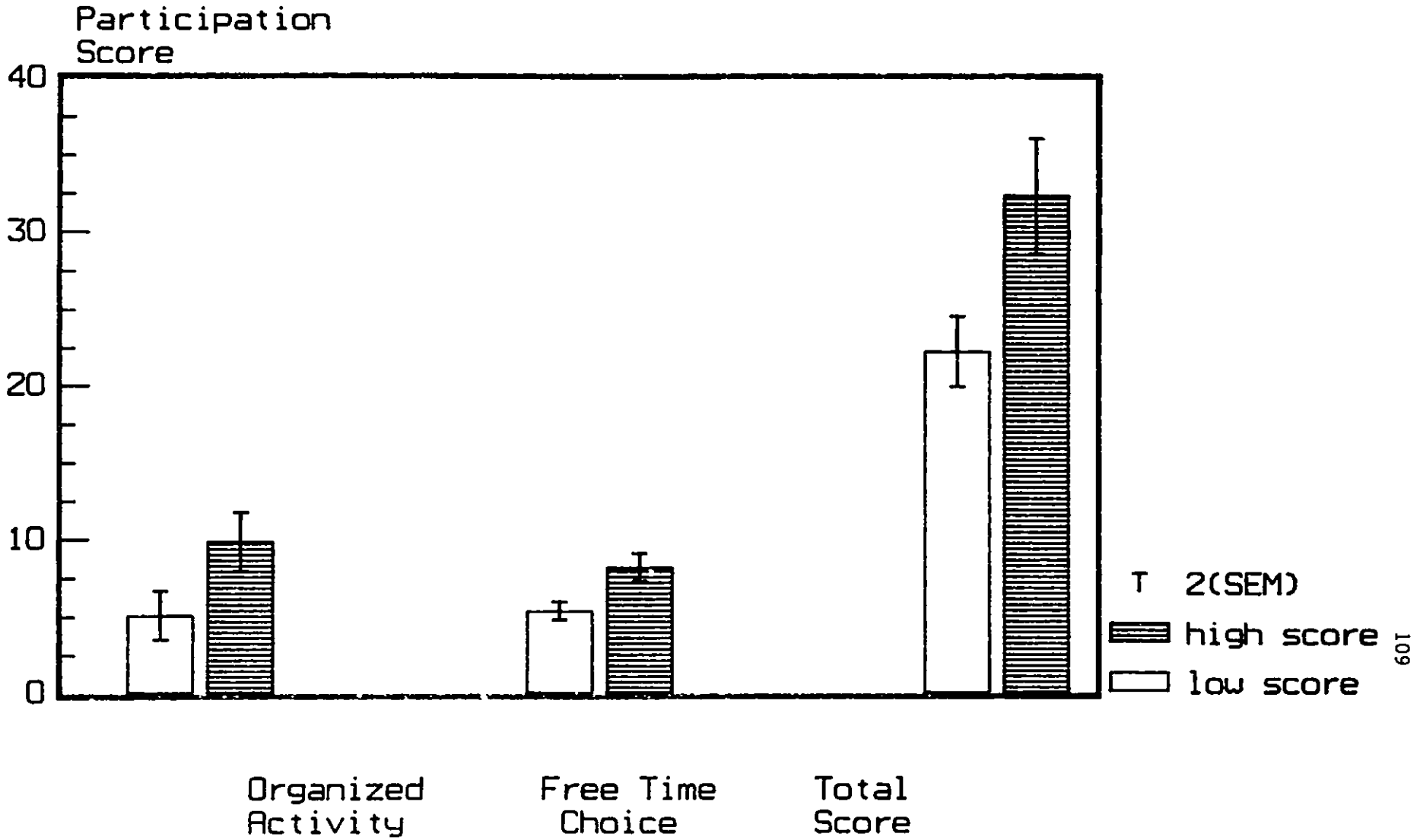
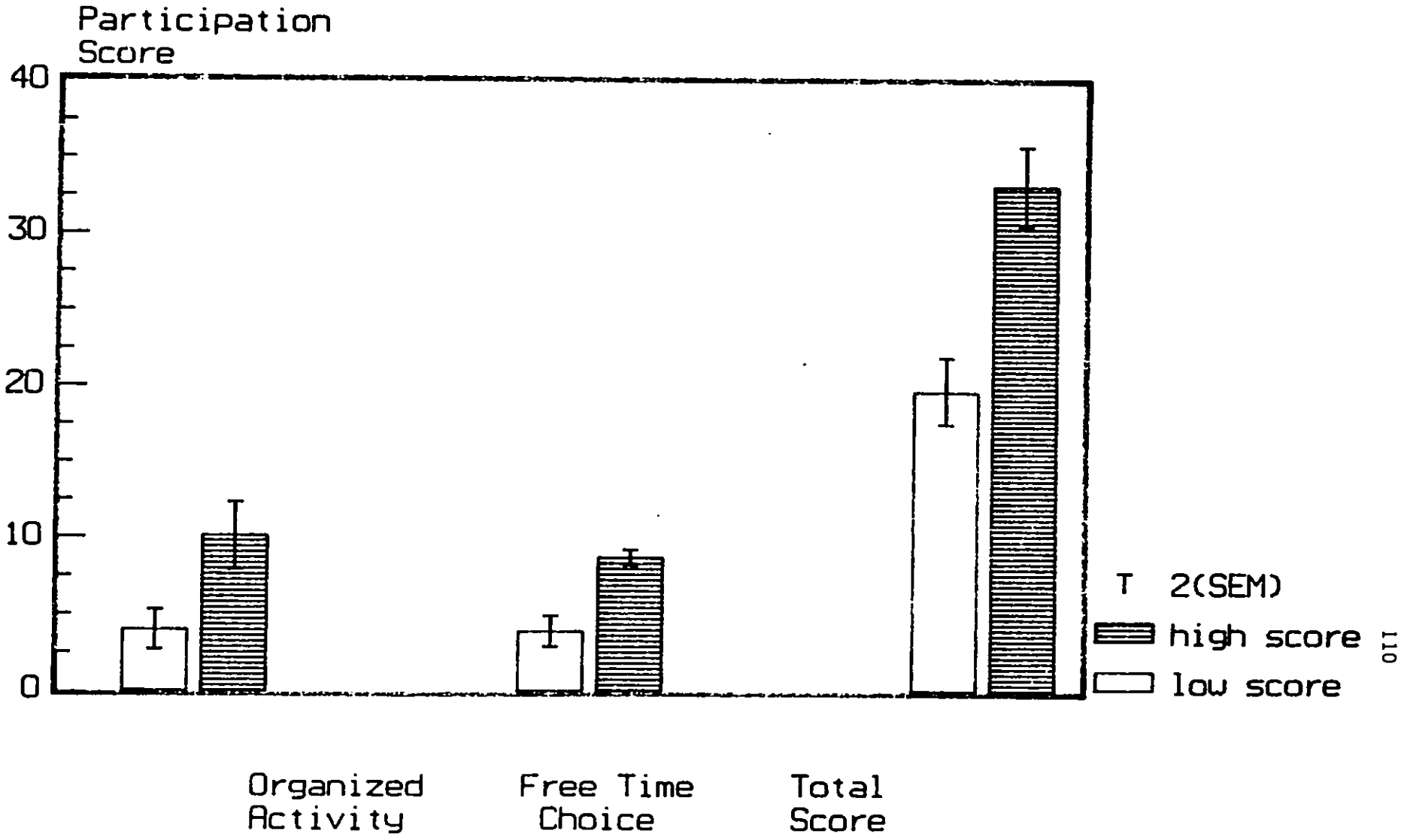


Figure 7
High and Low SPAACCE Scores and
Participation Results - Females



random sample of children been tested, the mean results for both the high and low SPAACCE groups on the Bruininks - Oseretsky were much better or poorer. A multiple stepwise correlation was performed to predict Bruininks-Oseretsky scores from the results of the three SPAACCE factors, with gender forced as a covariate. A multiple correlation coefficient of .79 was obtained, with only the Confidence factor loading in the equation.

A stepwise multiple correlation of .74 was obtained when predicting Participation Questionnaire scores from the SPAACCE factors, with only the two Enjoyment factors loading in the equation.

The predictive validity of the SPAACCE scale was evaluated among the Grade nine students. The results of the SPAACCE scale were analyzed in conjunction with the students' selection or avoidance of physical education class in the following school year, at which point physical education class was completely optional (see Table 16). At the time of this testing students had already completed their course selections for the coming year and their choices were made available by the school administration. Employing different cut-off points for males and females, a total accuracy of 78% was achieved. When the 36 students whose SPAACCE scores fell in the middle range of 53 to 63 were removed from this analysis, a total accuracy of 86% was obtained.

Table 16

Predictive Validity

Grade Nine Students Taking Grade Ten Physical Education

MALES

		Taking grade 10 physical education?		
		no	yes	Total
SPAACCE score	40 - 65	21	7	28
	66 - 80	4	20	24
	total	25	25	52

FEMALES

		Taking grade 10 physical education?		
		no	yes	Total
SPAACCE score	39 - 61	16	6	22
	62 - 80	5	16	21
	Total	21	22	43

	Sensitivity	Specificity	Negative Predictive	Positive Predictive
Males	84%	80%	83%	75%
Females	76%	73%	76%	73%

Table 17

Stepwise Regressions to Predict Participation From SPAACCE Factors

	Step Number	Variable Entered	Multiple R
A: Elementary Schools			
1. Total Score	1.	gender*	.1820
	2.	total SPAACCE	.5420
2. Organized Activity	1.	gender*	.1341
	2.	confidence	.3968
3. Free Choice Activity	1.	gender*	.2682
	2.	enjoyment	.6245
	3.	confidence	.6342
4. School Sports	1.	gender*	.1749
	2.	confidence	.3493
	3.	enjoyment	.3647
B: Secondary School			
1. Total Score	1.	gender*	.2799
	2.	total SPAACCE	.6907
2. Organized Activity	1.	gender*	.2400
	2.	confidence	.5589
	3.	enjoyment (phys. ed.)	.5981
3. Free Choice Activity	1.	gender*	.3373
	2.	enjoyment	.7684
4. School Sports	1.	gender*	.2296
	2.	confidence	.5995
	3.	enjoyment	.6478
	4.	enjoyment (phys. ed.)	.6590

* = variable forced as covariate

all p's < .01

A second test of the predictive validity of the SPAACCE scale was undertaken by attempting to predict various totals of the Participation Questionnaire using the three factors isolated in the scale. Stepwise regressions were performed for both elementary and secondary school data (see Table 17). As significant gender differences were apparent in the Participation Questionnaire, gender was forced as a covariate in each equation. The results of the stepwise regressions ranged from .40 to .63 for the elementary school students, and from .60 to .77 for the secondary school students. For the learning disabled children, a multiple correlation of .71 was found to predict the total Participation score.

V. Discussion

The SPAACCE scale has been developed from the perspective of self-efficacy theory. This theory contends that individuals who have self-perceptions of incompetence regarding the performance of some behaviour will avoid situations which require that behaviour and not persist in attempts to improve their competency. Self-efficacy theory predicts that, if perceptions of competence are improved, stable and permanent changes in behaviours will result. This theoretical approach may be of substantial utility in attempts to understand behaviours, such as physical inactivity, which resist change.

Physical activity has been demonstrated as a behaviour important for the growth and development of children, and for the overall health of both children and adults. Physical activity is also a behaviour which becomes less prevalent with increasing age. Physical activity habits

established during childhood appear to influence adult levels of activity strongly.

Self-efficacy theory predicts that individuals with low perceptions of competence regarding physical activity will demonstrate low levels of participation in such activities. Self-efficacy theory also predicts increased levels of physical activity if perceptions of incompetence are addressed and changed. Childhood appears to be a critical time for the development of lifelong physical activity habits. Investigations into the development of self-efficacy regarding physical activity during childhood, hold great promise for gaining an understanding of the development and maintenance of differing levels of habitual activity.

At the present time there are no instruments available which measure the perceived self-efficacy of children regarding physical activity. The purpose of this research has been to develop a valid and reliable self-report scale which will measure children's self-perceptions regarding physical activity. In particular, self-perceptions regarding confidence in participation and enjoyment of involvement in activity were measured. These two factors provide both a direct and an indirect measure of perceived self-efficacy. As a result, the Self-Perceptions About Activity - Children's Confidence and Enjoyment (SPAACCE) scale was developed and tested.

In order to establish the validity of the SPAACCE scale two additional measures were developed; a Participation Questionnaire, and a Teacher's Evaluation form. Both are necessary to establish the validity of the SPAACCE scale, and they will be discussed first.

Participation levels should correlate well with a measure such as the SPAACCE scale, which taps factors associated with perceptions of self-efficacy. Furthermore, the results of the SPAACCE scale should allow a fair degree of prediction of the level of participation. There are numerous other factors which may impinge on children's levels of participation; however, self-perceptions of confidence and enjoyment have been hypothesized here to play a major, and crucial, role.

The Participation Questionnaire was demonstrated to be a reliable instrument for children and adolescents. The test-retest correlation for the total score for the elementary school students was .81. The test-retest reliability of the questionnaire was particularly strong among secondary school students with a correlation of .90.

For the elementary school data, only moderate correlations were obtained for the organized activities section. Two unanticipated occurrences intervened between test periods which may have resulted in poorer than hoped for reliabilities. The signing-up period for community baseball teams fell during the test-retest interval. This is a very

popular activity in these communities and the large number of children involved may have introduced some error into the responses. A second occurrence was that both schools held field days during the test interval. This was considered an intra-mural activity. Children who won their events were selected to attend an inter-school track and field meet. Although this meet occurred after the retest, these children considered (quite rightly) that they belonged to an inter-school sport team. The mean scores for the organized activity section moved from 7.1 (SD = 4.5) on the first test to 7.7 (SD = 5.9) on the second. This difference was evenly split between school and community sports. For the secondary school students the reliability coefficients are strong for each section of the questionnaire. There were no intervening events during the testing interval which would have been expected to alter responses significantly. The baseball leagues which held their sign-up period had an age limit of 13 which made the secondary school students ineligible.

This finding suggests the need for modifications to the time period being recalled. As well, attention must be paid to the timing of administration, in light of the seasonal nature of children's organized sports.

It is interesting to note that the correlations for frequency, duration, and intensity are substantially higher than those for the organized activity subtotals. This occurred even though each of these variables is in some way

dependent on the number of activities in which the child participates. It suggests that children envision a fairly stable, average or typical week.

The validity of the Participation Questionnaire was not directly established. A gold standard of habitual activity to allow a direct examination among children does not exist. However, the validity of the questionnaire was probed by other means. Age trends and gender differences, as expected from previous research (Canada Fitness Survey, 1985; U.S. Dept. Health and Human Services, 1988), were present, with males reporting greater activity, and older children reporting less activity. Moderate correlations between participation scores and teachers' evaluations of participation levels were obtained. Specific teachers' evaluation items correlated most strongly with subsections of the questionnaire which were directly related to that item.

Children from rural settings reported fewer free choice physical activities than did those from urban settings. A number of items in the free choice section questioned the type of activities that children engaged in with friends and family during daily time periods following school. As children in rural areas take a bus to and from school, and generally do not live in close proximity to neighbors, they may have fewer opportunities to be active. While the clinical significance of this difference is minimal, and the statistical significance is mainly due to

the large sample size, the difference is in the predicted direction.

The Teacher's Evaluation form allows a second test of the construct validity of the SPAACCE scale to be made. Physical education teachers have an excellent opportunity to observe the physical abilities, participation levels, and the enjoyment and confidence of their students regarding physical activities. Therefore, the results of the SPAACCE scale should correlate well with the Teachers' Evaluations, particularly those items which deal with enjoyment and confidence.

The Teacher's Evaluation form was not directly validated. However, the construction of the form allowed a comparison of four items which questioned actually observed participation and ability levels to be compared to matching items which questioned potential situations which involved the same attributes. The strong correlations between the actual and potential situation items provides an indication of good convergent validity.

Although teachers were instructed to compare children to others of the same age and gender, significant gender differences were apparent among the elementary school evaluations. This gender difference was present among both male and female teachers. There may be several possible explanations for these differences. Unlike their elementary school counterparts, secondary school teachers have activity

classes that are segregated by gender for most of the year and specialize in teaching physical education. Therefore, the secondary school teachers may have been in a more favourable situation to compare their students to other students of the same age and gender.

The gender differences in the actual and potential situation item scores are more difficult to interpret. As the potential situations are largely hypothetical, and the teachers were informed in the instructions that they were hypothetical, the lower mean item gender difference may reflect teachers' thinking that, theoretically, there should be no gender differences. The actual situation items reflect what they perceive on a daily basis. The largest gender difference is in the enjoyment and confidence items, which did not specify "compare to same age and gender". This supports the suggestion that what teachers see, and what they believe they should see, are somewhat different. This result reflects the gender differences in the SPAACCE scale scores. It is interesting to note that females' scores remained virtually the same for both actual and potential situations, while males' mean item scores were .6 lower for the potential items.

The SPAACCE scale demonstrated excellent reliability characteristics. Test-retest correlations were high for both elementary (.88) and secondary school (.91) students. There were no difficulties with the internal consistency of

the scale. Each item correlated more highly with item subtotals of the factor that it loaded on than the remaining two factors in both the test and retest data. Only a single item, being hurt while playing, showed factorial complexity in the test and retest factor analyses of the elementary school data and it has been removed from the SPAACCE scale. Upon close consideration the equivalence of children's responses to this item is not difficult to understand. Being often hurt while playing sports might just as easily affect perceptions of enjoyment as it would confidence. There was a greater amount of factorial complexity in the two "enjoyment " factors in the secondary school data. This resulted as a significant number of students were no longer enrolled in physical education classes. The Enjoyment of Physical Education factor is only suitable for inclusion as a separate factor among students taking physical education class.

The stability of the factors measured by the SPAACCE scale was partially established. Two hundred and eighty one elementary school students and 56 Grade 9 students who completed Phase 2 testing had also completed the original version of the SPAACCE scale 15 months earlier in Phase 1. A correlation of .66 was found between the Phase 1 and Phase 2 SPAACCE results. This moderate correlation remained even though a thorough revision of the SPAACCE scale had taken place in the interim. Despite wording modifications, graduation from elementary to secondary school, and the passage of

15 months of adolescence, a correlation of this size provides strong evidence that the SPAACCE scale measures a fairly stable trait.

The two week SPAACCE test-retest reliability coefficients for the 281 elementary school students who had completed Phase 1 testing, and the 226 students who had not been involved in Phase 1, were both .87. There was no significant difference between the SPAACCE scores of these two groups. The strong overall test-retest reliability coefficients were not influenced by prior experience with the SPAACCE scale. As well, prior experience did not influence children's responses on the SPAACCE scale, which provides additional evidence in support of the stability of the trait being measured by the scale.

The SPAACCE scale was constructed to isolate children's self-perceptions of enjoyment and confidence regarding involvement in physical activities. The factor analyses of the data confirmed the presence of these two factors. Apart from the single item that demonstrated factorial complexity, each item fell into the factor which it was designed to measure. This finding strongly supports the construct validity of the SPAACCE scale.

The appearance of a third factor, Enjoyment of Physical Education, was an unexpected result. This factor was strongest among elementary school children. It is possible that children view physical education class activities as

distinct from other physical activities for some reason. The mean scores for the three items which comprised this factor were slightly higher than most of the items in the general Enjoyment factor. This may result from the efforts of teachers to develop activities which all children find enjoyable. An alternate and equally plausible explanation is that children enjoy physical education class because it is a break from academic pursuits which are viewed as tedious and unenjoyable.

The construct validity of the SPAACCE scale was investigated from several other directions. Moderate correlations of the scale with Participation Questionnaire and Teacher Evaluation results were determined. In every instance the correlations were stronger among the secondary school students.

This finding has several possible explanations. Secondary school students have more autonomy over their participation in physical activities, as well as a greater range of possible pastime choices. While lowering their actual levels of participation, these factors may also potentiate the effect of poor self-perceptions regarding physical activity. Given more freedom of choice, and a greater range of opportunities and time demands, adolescents may be more greatly influenced in their activity choices by their self-perceptions.

The correlations with the organized activity subsections are lowest among the elementary school children. This may occur since young children are not always free to choose whether or not they are involved in an organized activity. Both parents and teachers often encourage participation in organized activities for various reasons. For example, in both elementary schools, participation in intramural activities is strongly encouraged and rewarded. In some instances, such as field days, participation is virtually mandatory.

The stronger correlations between the SPAACCE results and the free choice subsection of the Participation Questionnaire lend support to the construct validity of the scale. As well, these correlations strengthen the argument that autonomy in decision making may have a moderating influence on actual activity. Free time activity items questioned what children did when they had a choice. These items reflect what the child wants to do when free of the direct influence of parents and teachers.

As physical education teachers would be expected to have a sound basis for evaluating a child's confidence, enjoyment, participation and ability, these moderately strong correlations provide good evidence of the SPAACCE scale's construct validity. The stronger correlations among the secondary school students may reflect the greater time in

physical activity settings that the secondary school teachers have with their students.

The results of both the Participation Questionnaire and the Teacher's Evaluation lend support to the construct validity of the SPAACCE scale. Further support for construct validity is evident when only the results of children whose SPAACCE scores were very high or low are examined. Children in these categories were isolated for motor proficiency testing and this sample is available for closer examination.

A correlation of .78 was obtained between the SPAACCE scores and the Bruininks-Oseretsky rank percentile scores for the 92 children with high or low SPAACCE results who were tested for motor proficiency. Children with high SPAACCE results performed much better than those children with low scores on the Bruininks-Oseretsky test battery. They also scored much higher than would be expected for a randomly selected group of students, with a mean rank percentile score of 73. Children with low SPAACCE scores also scored much lower than would be expected from a randomly selected group, with a mean rank percentile score of 17. This suggests that isolating children by extreme SPAACCE results also isolated children with very low and very high levels of motor proficiency. Children who have poor motor proficiency would be expected to have low levels of confidence and enjoyment regarding physical activity. Poor motor abilities will predispose children to failure in physically active situa-

tions. Conversely, children with high levels of motor proficiency should perform well in physical activities and therefore have high levels of confidence and enjoyment. As both of these hypotheses were confirmed in this testing, the construct validity of the SPAACCE scale gains strong support.

It would be expected that high scoring children would also be very active, and indeed this is the case. Low scoring children have participation levels that are significantly lower ($p < .01$) than the average results. While these results are insufficient to establish the construct validity of the SPAACCE scale, they are in the expected direction.

The SPAACCE scale demonstrated strong predictive validity when the three factors Confidence, Enjoyment, and Enjoyment of Physical Education, were employed in a multiple stepwise regression to predict the results of the Bruininks-Oseretsky results. A multiple correlation of .79 was obtained, forcing gender as a covariate, with only the Confidence factor loading in the equation.

The moderately strong multiple correlations achieved when predicting Participation Questionnaire results from the SPAACCE factors lend solid support to the predictive validity of the SPAACCE scale. For the elementary school students, the SPAACCE scale accounted for 29% of the variance in the Total Participation score and 48% of the Free Choice Activity subsection. For the secondary school students, the SPAACCE scale accounted for 40% of the variance in the Total

Participation score and 59% in the Free Choice Activities subsection. These results suggest that the effect of self-perceptions of enjoyment and confidence on involvement in physical activity increases throughout childhood and adolescence. This effect is particularly evident in the area of unstructured recreation.

The order that the SPAACCE factors loaded in these stepwise regressions to predict participation lends additional support to the scale's construct validity. In every subsection of the Participation Questionnaire dealing with organized sports and games, the Confidence factor loaded first and predominated. In the Free Choice Activity subsection, the Enjoyment factor loaded first and predominated. Only individuals with substantial confidence in their ability would be expected to be involved in organized sport activities. Individuals who enjoy being active would be expected to select active games and pastimes in situations where they had a choice.

A second approach to examine the predictive validity of the SPAACCE scale was possible among the secondary school sample. Grade nine students are virtually required to take physical education class. This class becomes completely optional once taken in Grade nine. The results of the SPAACCE scale were employed to predict which Grade nine students would elect to take physical education class as an option in Grade ten. The SPAACCE scale results predicted

Grade 10 selection with 77% accuracy for the 95 students taking Grade nine physical education. The predictive accuracy increased to 86% for the 59 students whose SPAACCE scores fell outside the middle range of 53 to 64.

This accuracy is impressive when factors other than self-perceptions about confidence and enjoyment, which may influence the selection of physical education class, are considered. Students with specific career goals may elect not to continue with physical education class as the constraints on their time of strictly academic subjects may be too great. Other students may elect to take physical education class simply because they perceive the academic demands of this course to be lower than those of alternative courses.

Fifteen learning disabled elementary school students, who were integrated into regular classrooms, were also tested in this research. Their results on the SPAACCE test were lower than non-learning disabled students, but did not achieve statistical significance ($p < .10$). This lack of significance can be attributed largely to the small sample size. The learning disabled students were tested for motor proficiency as previous research had indicated that they would perform more poorly than average (Bruininks & Bruininks, 1977). These children did score much lower than average, with a mean rank percentile of 28. Children who were learning disabled were not identified to the tester; however, not a single child stated any difficulty in understanding the

instructions for any test item. Poor performance was probably not related to difficulties in test comprehension.

While learning disabled children scored much below average in motor proficiency, they did not score far below average on the SPAACCE scale. These children did not have statistically significant lower Participation Questionnaire results or Teacher Evaluations. This suggests that children who have been identified as learning disabled may receive extra attention, both in encouraging them to be active, and in assisting them to overcome their apparent clumsiness. This additional attention may be present both at school and at home and may ameliorate the relationships between motor abilities, participation levels, and self-perceptions of confidence and enjoyment. Even so, a multiple correlation of .71 was present when participation totals were predicted from the three SPAACCE factor scores, with gender forced as a covariate. Only the Enjoyment factor loaded in the equation.

The SPAACCE scale has been demonstrated to have excellent reliability, strong construct validity and very good predictive validity. Some need for modifications to the scale is evident from this testing. In particular, the item referring to the possibility of being hurt while playing will be removed as it demonstrated factorial complexity. For situations where students are not taking physical education the three items comprising the Enjoyment of Physical Education can be ignored or included in a General Enjoyment

factor, and a two factor result examined. If possible, replacing the abbreviation "phys. ed." with the full term "physical education" would be helpful, and remove the need to explain the abbreviation from the instructions. Apart from these modifications the SPAACCE scale requires no revisions.

A few of the design considerations of the scale have not been investigated. Children younger than nine years of age, and larger numbers of older adolescents should be tested to allow a more complete range of norms to be established. Physically disabled children and adolescents should be tested to explore the utility of this scale for use among these populations. The potential for social acceptability bias needs to be investigated more completely. In particular the possibility of "fake good" responses should be evaluated.

The SPAACCE scale is now ready for educational, clinical and research applications. In educational settings it may prove beneficial in the evaluation of physical education programs. In clinical settings it may prove useful in diagnosing inactive children with very low levels of self-efficacy regarding physical activity, and in evaluating programs developed to assist children in becoming more active. In both clinical and educational settings, new approaches to the design of intervention programs to increase activity levels, which incorporate concerns about self-efficacy, can now be evaluated.

The development of this scale allows a number of research questions to be addressed. In particular, it is now possible to investigate whether or not programs designed to improve children's levels of self-efficacy are successful, and if these programs also increase levels of habitual activity. The long term effects of improved self-efficacy on activity levels can also be examined. Long-standing questions about the interaction between children's activity levels and other aspects of children's lives can now be explored from a different perspective - the effect of children's level of perceived self-efficacy regarding physical activity on other areas of self-efficacy.

This research has also raised a more central question. There appears to be a strong correlation between perceived self-efficacy and physical activity levels among children. Very substantial numbers of children are relatively inactive. What modifications to the structure of physical education programs and the direction of activity promotion programs might best address children's levels of self-efficacy regarding physical activity? Attention should now be focussed on the creation of programs which will develop and maintain strong perceptions of self-efficacy among children. These programs will have to touch many aspects of children's lives which contribute to perceptions of self-efficacy, including school and community activity programs, parental attitudes and health promotion programs. Each of these areas

of possible intervention present novel challenges, however the potential health rewards resulting from the development of more active lifestyles are significant.

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PARTICIPATION INFORMATION

Please answer the following questions. Just circle your answer or write your answer in the space provided. Please be careful and take your time answering these questions. If you are not sure what the question means just ask!

1. Do you participate in physical education classes? yes no

2. Do you participate in any house league activities? yes no

3. If you do participate in house league activities please list them below.

_____

4. Do you belong to any school sport teams? yes no

5. If you belong to any school sport teams please list them below.

_____

6. Do you play for any other sports teams (like baseball or hockey) or belong to any sports clubs (like swimming or gymnastics) which are not school teams? yes no

7. If you do belong to any other sports teams or sports clubs please list them below.

_____

8. Do you take any lessons for sports or dance? yes no

9. If you do take lessons for sports or dance please list what they are below.

_____

THANK-YOU!

PARTICIPATION QUESTIONNAIRE

NAME .... BIRTHDATE (month)....... (day).... (year).....

GRADE ...... AGE ...... Do you take physical education? yes / no

INSTRUCTIONS: In this survey you will be asked about the activities that you do at school and in your spare time. There are no right or wrong answers because this is not a test! Just answer each question as best as you can remember. Please read each question carefully before you answer it. TO ANSWER A QUESTION JUST CIRCLE YOUR ANSWER OR PRINT YOUR ANSWER IN THE SPACE PROVIDED. Only circle one answer for each question.

Here is an example question to practice on.

How often do you eat an apple?

1. never 2. once a month 3. once a week 4. once a day

!!!
!!!

SECTION 1

FREE TIME ACTIVITIES: This section asks questions about what you do during your free time. Some of the questions will be about recess, some about what you like to do after school and others will be about what you do on weekends and holidays. Active games mean things like tag or skipping or playing catch.

1. During recess (or spares) do you spend most of your time:

   1. Talking with friends 2. Doing schoolwork 3. Playing active games

2. After school and before you eat supper, most of the time do you:

   1. Watch T.V. 2. Talk with friends 3. Play active games 4. Play video games
   5. Do other things (......................)

3. After supper and before you go to bed,do you spend most of your time:

   1. Watching t.v. 2. Talking with friends 3. Reading books
   4. Playing active games 5. Doing other things (...................)

TURN THIS PAGE OVER AND CONTINUE ON THE OTHER SIDE

4. On weekends, do you spend most of your time:

1. Watching T.V. 2. Reading 3. Playing active games 4. Playing video games
5. Talking with friends 6.Doing other things (.....)

5. During your free time what are the three (3) things you like to do the most!

1. ..... 2. ..... 3. .....

PART A

6. During the summer, how often do you ride a bike?

1. never (If your answer is never go directly to PART B)
2. once a month 3. once a week 4. once a day 5. all the time

8. When you finish riding your bike do you usually feel:

1. very tired 2. tired 3. a little tired 4. not tired at all

PART B

9. During the winter how often do you go skating for fun?

1. never (If your answer is never go directly to PART C)
2. once a month 3. once a week 4. once a day 5. all the time

10. When you finish skating do you usually feel:

1. very tired 2. tired 3. a little tired 4. not tired at all

PART C

11. How often do you go swimming for fun during the summer?

1. never (If you answered never go directly to PART D)
2. once a month 3. once a week 4. once a day 5. all the time

TURN TO THE NEXT PAGE AND CONTINUE.

12. When you have finished swimming do you usually feel:

1. very tired 2. tired 3. a little tired 4. not tired at all

PART D

13. During the winter how often do you go cross-country skiing?

1. never (If you answered never go directly to (PART E)

2. once a month 3. once a week 4. once a day 5. all the time

14. When you finish skiing are you usually:

1. very tired 2. tired 3. a little tired 4. not tired at all

PART E

15. If there are other activities that you do once a week or more please list them below:

1. ..... 2. ..... 3. .....

16. How often do you watch T.V.?

1. every day 2. almost every day 3. hardly ever 4. never

17. How many hours a day do you usually watch t.v.?

0-1 1-2 2-3 3-4 4-5 5 or more

18. How often do you read a book in your free time?

1. every day 2. almost every day 3. hardly ever 4. never

19. How many hours a day do you usually read books?

0-1 1-2 2-3 3-4 4-5 5 or more

20. How often do you play video games in your spare time?

1. every day 2. almost every day 3. hardly ever 4. never

21. How often do you play active games with your friends after school?

1. every day 2. almost every day 3. hardly ever 4. never

TURN THIS PAGE OVER AND CONTINUE ON THE OTHER SIDE

22. How often in a week do you play active games with your family?

1. every day 2. almost every day 3. hardly ever 4. never

23. When you are playing active games with your friends or family, how often do you play hard enough to breathe heavily or make your heart beat quickly?

1. very often 2. often 3. sometimes 4. hardly ever 5. never

24. If you have daily or weekly chores at home (cutting grass, shovelling snow, farm chores, paper route) please list them below.

1. ..... 2. ..... 3. .....

25. How do you usually get to school?

1. walk 2. ride a bike 3. by bus 4. by car

26. How long does it take you to get to school?

1. 15 minutes 2. 1/2 an hour 3. 1 hour or more

27. How many <u>older brothers</u> do you have? .....

28. How many <u>older sisters</u> do you have? .....

29. How many <u>younger brothers</u> do you have? .....

30. How many <u>younger sisters</u> do you have? .....

<u>SECTION 2.</u>

INTRAMURAL GAMES (HOUSE LEAGUE) These are games like bordenball or volleyball that you play in teams at school. Only include <u>active</u> games. These <u>do not include</u> games you play in physical education classes recesses or spares. If you haven't played any intramural games this year check here [ ] and go directly to section 3.

31. How many different intramural (house-league) activities have you played <u>this school year</u>?

0 1 2 3 4 5 or more

(If you answered 0 please go directly to section 3)

<u>TURN TO THE NEXT PAGE AND CONTINUE</u>

32. During your intramural games how often did you have to work hard (breathing heavily, sweating, heart beating quickly)?

1. very often 2. often 3. sometimes 4. hardly ever 5. never

33. After playing games in intramurals are you usually:

1. very tired 2. tired 3. a little tired 4. not tired at all

34. How many times a week, on the average, do you play intramural games?

0 1 2 3 4 5 or more

35. How many hours each week do you think that you spend playing intramural games at school?

0 1 2 3 4 5 or more

36. How many of your friends play intramural games?

1. most of them 2. a few of them 3. none of them

SECTION 3

SCHOOL SPORTS TEAMS These questions are about school teams that play sports against teams from other schools. If you don't play for any of your school's sports teams check here [ ] and go directly to section 4.

37. This school year how many school sports teams have you belonged to?

0 1 2 3 4

(If you answered 0 go directly to SECTION 4)

38. After a game or practice are you usually:

1. very tired 2. tired 3. a little tired 4. not tired at all

39. During games or practices did you have to work hard (breathing heavily, sweating, heart beating quickly):

1. very often 2. often 3. sometimes 4. hardly ever 5. never

TURN THIS PAGE OVER AND CONTINUE ON THE OTHER SIDE

40. How many hours a week do you usually spend in practices or games for school sports teams?

0 1 2 3 4 5 or more

41. How many of your friends play on school sports teams?

1. most of them 2. a few of them 3. none of them

SECTION 4

SPORTS TEAMS OUTSIDE OF SCHOOL
These are teams like hockey, ringette, soccer, and baseball in leagues that are not part of your school. If you haven't played on any sports teams in the last year check here [ ] and go directly to section 5.

43. In the last year how many sports teams have you played on?

0 1 2 3 4 5 or more.

(If you answered 0 go directly to section 5)

44. How many times a week, on average, do you go to a practice or game?

0 1 2 3 4 5 or more

45. How many hours a week, on the average, do you think you spend at practices and playing games for sports teams?

0 1 2 3 4 5 or more

46. During games and practices did you have to work hard (breathing heavily, sweating, heart beating quickly):

1. very often 2. often 3. sometimes 4. hardly ever 5. never

47. After a practice or game did you usually feel:

1. very tired 2. tired 3. a little tired 4. not tired at all

48. How many of your friends play on sports teams?

1. most of them 2. a few of them 3. none of them

TURN TO THE NEXT PAGE AND CONTINUE

SECTION 5

SPORTS AND DANCE CLUBS These are clubs like gymnastics, martial arts (karate, judo, etc.), tennis, golf, swimming, horseback riding, and dance (jazz, ballet, tap). It doesn't include groups like Cubs or Guides or 4H. If you didn't belong to any sports or dance clubs in the last year check here [ ] and go directly to section 6.

49. In the last year how many DANCE clubs have you belonged to?

0 1 2 3 4 5 or more

50. In the last year how many SPORTS clubs did you belong to?

0 1 2 3 4 5 or more

51. How many times a week, on average, do you go to a sport or dance club competition or practice?

0 1 2 3 4 5 or more

52. How many hours a week, on average, do you think that you spend at sport or dance club activities?

0 1 2 3 4 5 or more

53. During practices or competitions how often did you have to work hard (breathing heavily, sweating, heart beating quickly):

1. very often 2. often 3. sometimes 4. hardly ever 5. never

54. How tired do you feel after a sport club practice or competition?

1. very tired 2. tired 3. a little tired 4. not tired at all

55. How many of your friends belong to sports clubs?

1. most of them 2. a few of them 3. none of them

TURN THIS PAGE OVER AND CONTINUE ON THE OTHER SIDE

SECTION 6

SPORTS AND DANCE LESSONS This section asks questions about lessons that took in the last year to learn things like swimming, tennis, golf or dance. It also includes hockey schools. It doesn't include practices for teams or clubs. If you didn't take any sport or dance lessons in the last year you are finished!

57. In the last year how many different kinds of sports or dance lessons did you take?

0 1 2 3 4 5 or more

58. How many hours a week, on average, did you spend at sport or dance lessons?

0 1 2 3 4 5 or more

59. How many times a week did you go to a sport or dance lesson?

0 1 2 3 4 5 or more

60. How many of your friends take sport or dance lessons?

1. most of them 2. a few 3. none

61. During your sport or dance lessons how often did you have to work hard (breathing heavily, sweating, heart beating quickly):

1. very often 2. often 3. sometimes 4. hardly ever 5. never

YOU'VE REACHED THE END!! - THANK-YOU VERY MUCH!!

CHILD ACTIVITY EVALUATION

Instructions:

For the child named below, please circle the choice that you feel most accurately and appropriately describes the child. Please do this for each of the three questions. This should be based on your experience with the child in physical education classes, recess, house leagues, school teams and any other area in which you have had the opportunity to observe the child.

Name: _____

1. Would you describe this child's participation in physical activities as:

below average ----------average----------above average

2. Would you describe this child's enjoyment of physical activity as:

below average ----------average----------above average

3. Would you describe this child's physical abilities as:

below average ----------average----------above average

Finally, please indicate how much time you have been able to observe this child in a physical activity setting by circling the most appropriate response below.

minimal ----------moderate----------substantial

Thank-you for your time in completing this evaluation!

This form asks a number of questions about the physical skills, abilities and participation levels of the student named below relative to other students of the same age and gender that you have taught. Your cooperation in carefully completing this form is much appreciated. Please base your answers on your personal observations of this student during physical education classes, intramural sports, interschool sports, and lunch periods and recess. Please circle the most appropriate answer. Thanks!

STUDENT .....

1. In terms of physical ability (strength, agility, endurance), compared to other students of the same age and gender, this student is:

well below average | somewhat below average | average | somewhat above average | well above average

2. In terms of physical skill (how well they can play), compared to other students of the same age and gender, this student is:

well below average | somewhat below average | average | somewhat above average | well above average

3. Compared to other students of the same age and gender, to what extent does this student participate in physically active games during recess, lunch and after school:

well below average | somewhat below average | average | somewhat above average | well above average

4. Compared to other students of the same age and gender, to what extent does this student become involved in house league or intramural sports and inter-school sports:

well below average | somewhat below average | average | somewhat above average | well above average

5. Please rate this student's enjoyment at being involved in physically active games and sports:

well below average | somewhat below average | average | somewhat above average | well above average

6. Please rate this child's confidence in his or her ability to participate in physically active games and sports:

well below average | somewhat below average | average | somewhat above average | well above average

Please continue on the other side of this page.

The following questions ask you to rate this student in a number of hypothetical situations dealing with physical activity. In all cases please base your answer on your observations of this child during physical education classes, lunch periods and recess. Your careful consideration of these questions is much appreciated.

7. If this student (along with his/her classmates of the same gender) had to complete an obstacle course that required substantial strength and endurance, would you expect this student to complete the course in a time that was:

much better than average	somewhat better than average	average	somewhat worse than average	much worse than average

8. If you were to teach this student a new sport skill that required a great deal of agility and coordination, compared to his/her peers, how quickly would you expect this child to learn and master that skill:

much faster than average	somewhat faster than average	average	somewhat slower than average	much slower than average

9. If you were placed in charge of developing your school's teams for a variety of inter-school sports competitions, over the course of the year would you expect this child to try out for your school teams:

much more often than average	somewhat more often than average	about average	somewhat less often than average	much less often than average

10. During recess or lunch period if you saw a group of students this child's age and gender playing a very active game outside, how likely would it be that this child would be among those involved?:

much more than average	somewhat more than average	about average	somewhat less than average	much less than average

Thank-you very much for completing this form. Your thoughtful answers are very much appreciated!

Appendix 5

CATPAS

Name: .... Boy or Girl (circle which) Age: ......

INSTRUCTIONS:

In this form you have to choose between pairs of sentences and circle the one that is the most like you. For example:

Some kids have one nose on their face	BUT	Other kids have three noses on their face!

That shouldn't be too hard for you to decide! Once you have chosen which sentence is most like you then you have to decide if it is SORT OF TRUE for you or REALLY TRUE for you, and put a checkmark in the right space. Here is another example for you to try. Remember: First circle the sentence that is most like you and then check off if it is REALLY TRUE or SORT OF TRUE for you.

REALLY TRUE for me	SORT OF TRUE for me				SORT OF TRUE for me	REALLY TRUE for me
[ ]	[ ]	Some kids like to play with computers	BUT	Other kids don't like playing with computers	[ ]	[ ]

Now you are ready to start filling in this form. There are no right or wrong answers, just what is most like you. Take your time and do the whole form carefully. If you have any questions just ask! If you think you are ready you can start now.

!!
!!

REALLY TRUE for me	SORT OF TRUE for me				SORT OF TRUE for me	REALLY TRUE for me
[ ]	[ ]	Some kids can't wait to play sports after school	BUT	Other kids would rather do some-thing else	[ ]	[ ]
[ ]	[ ]	Some kids really enjoy physical education class	BUT	Other kids don't like physical education class	[ ]	[ ]

REALLY TRUE for me	SORT OF TRUE for me				SORT OF TRUE for me	REALLY TRUE for me
[ ]	[ ]	Some kids don't like outdoor games	BUT	Other kids really like playing out-door games	[ ]	[ ]
[ ]	[ ]	Some kids don't have much fun playing sports	BUT	Other kids have a good time playing sports	[ ]	[ ]
[ ]	[ ]	Some kids think phys. ed. is the best class	BUT	Other kids think phys. ed. isn't much fun	[ ]	[ ]
[ ]	[ ]	Some kids are good at outdoor games	BUT	Other kids find outdoor games hard to play	[ ]	[ ]
[ ]	[ ]	Some kids don't like playing sports	BUT	Other kids really enjoy playing sports	[ ]	[ ]
[ ]	[ ]	Some kids worry about hurting themselves play-ing sports	BUT	Other kids don't care about getting hurt playing sports	[ ]	[ ]
[ ]	[ ]	Some kids like to play games outside	BUT	Other kids would rather watch T.V.	[ ]	[ ]
[ ]	[ ]	Some kids do well in all sports	BUT	Other kids feel they aren't very good at sports	[ ]	[ ]
[ ]	[ ]	Some kids learn new outdoor games quickly	BUT	Other kids find it hard to learn new outdoor games	[ ]	[ ]
[ ]	[ ]	Some kids think they are the best at sports	BUT	Other kids think they aren't very good at sports	[ ]	[ ]

REALLY TRUE for me	SORT OF TRUE for me				SORT OF TRUE for me	REALLY TRUE for me
[ ]	[ ]	Some kids find games in phys. ed. hard to do	BUT	Other kids are good at games in phys. ed.	[ ]	[ ]
[ ]	[ ]	Some kids watch games being played outside	BUT	Other kids play most of the time	[ ]	[ ]
[ ]	[ ]	Some kids are among the last to be chosen for games	BUT	Other kids are usually picked first	[ ]	[ ]
[ ]	[ ]	Some kids like to watch T.V. in their free time	BUT	Other kids would rather play games outside	[ ]	[ ]
[ ]	[ ]	Some kids have fun in phys. ed. class	BUT	Other kids would rather miss phys. ed. class	[ ]	[ ]
[ ]	[ ]	Some kids aren't good enough for sports teams	BUT	Other kids do well on sports teams	[ ]	[ ]
[ ]	[ ]	Some kids like to play quiet games inside	BUT	Other kids like to play active games outside	[ ]	[ ]
[ ]	[ ]	Some kids do really well in phys. ed. class	BUT	Other kids don't do very well in phys. ed. class.	[ ]	[ ]

WHAT'S MOST LIKE ME

Name: .... Boy or Girl (circle which) Age: ......

Birthdate: month/....... day/..... year/......

INSTRUCTIONS:

In this survey you have to read a pair of sentences and then circle the sentence that you think is more like you. For example:

Some kids have one nose on their faces	BUT	Other kids have three noses on their faces!

That shouldn't be too hard for you to decide! Once you have circled the sentence that is more like you, then you have to decide if it is SORT OF TRUE for you or REALLY TRUE for you, and put a checkmark in the right box. Here is another example for you to try. Remember: First circle the sentence that is more like you and then check off if it is REALLY TRUE or only SORT OF TRUE for you.

REALLY TRUE for me	SORT OF TRUE for me				SORT OF TRUE for me	REALLY TRUE for me
[ ]	[ ]	Some kids like to play with computers	BUT	Other kids don't like playing with computers	[ ]	[ ]

Now you are ready to start filling in this form. THERE ARE NO RIGHT OR WRONG ANSWERS, JUST WHAT IS MOST LIKE YOU. Take your time and do the whole form carefully. If you have any questions just ask! If you think you are ready you can start now. BE SURE TO FILL IN BOTH SIDES OF EACH PAGE!

!!

REALLY TRUE for me	SORT OF TRUE for me				SORT OF TRUE for me	REALLY TRUE for me
[ ]	[ ]	Some kids can't wait to play active games after school	BUT	Other kids would rather do some-thing else	[ ]	[ ]
[ ]	[ ]	Some kids really enjoy physical education class	BUT	Other kids don't like physical education class	[ ]	[ ]

REALLY TRUE for me	SORT OF TRUE for me				SORT OF TRUE for me	REALLY TRUE for me
[ ]	[ ]	Some kids don't like playing active games	BUT	Other kids really like playing active games	[ ]	[ ]
[ ]	[ ]	Some kids don't have much fun playing sports	BUT	Other kids have a good time playing sports	[ ]	[ ]
[ ]	[ ]	Some kids think phys. ed. is the best class	BUT	Other kids think phys. ed. isn't much fun	[ ]	[ ]
[ ]	[ ]	Some kids are good at active games	BUT	Other kids find active games hard to play	[ ]	[ ]
[ ]	[ ]	Some kids don't like playing sports	BUT	Other kids really enjoy playing sports	[ ]	[ ]
[ ]	[ ]	Some kids always hurt themselves when they play sports	BUT	Other kids never hurt themselves playing sports	[ ]	[ ]
[ ]	[ ]	Some kids like to play active games outside	BUT	Other kids would rather read or play video games	[ ]	[ ]
[ ]	[ ]	Some kids do well in most sports	BUT	Other kids feel they aren't very good at sports	[ ]	[ ]
[ ]	[ ]	Some kids learn to play active games easily	BUT	Other kids find it hard learning to play active games	[ ]	[ ]

REALLY TRUE for me	SORT OF TRUE for me				SORT OF TRUE for me	REALLY TRUE for me
[ ]	[ ]	Some kids think they are the best at sports	BUT	Other kids think they aren't very good at sports	[ ]	[ ]
[ ]	[ ]	Some kids find games in phys. ed. hard to play	BUT	Other kids are good at games in phys. ed.	[ ]	[ ]
[ ]	[ ]	Some kids like to watch games being played outside	BUT	Other kids would rather play active games outside	[ ]	[ ]
[ ]	[ ]	Some kids are among the last to be chosen for active games	BUT	Other kids are usually picked to play first	[ ]	[ ]
[ ]	[ ]	Some kids like to take it easy during recess	BUT	Other kids would rather play active games	[ ]	[ ]
[ ]	[ ]	Some kids have fun in phys. ed. class	BUT	Other kids would rather miss phys. ed. class	[ ]	[ ]
[ ]	[ ]	Some kids aren't good enough for sports teams	BUT	Other kids do well on sports teams	[ ]	[ ]
[ ]	[ ]	Some kids like to read or play quiet games	BUT	Other kids like to play active games	[ ]	[ ]
[ ]	[ ]	Some kids like to play active games outside on weekends	BUT	Other kids like to relax and watch T.V. on weekends	[ ]	[ ]

PLEASE CHECK TO MAKE SURE THAT YOU HAVE ANSWERED ALL THE QUESTIONS!

THANK-YOU!

Appendix 7

Item Sub-Total Correlations, Secondary School

Test 1 (Test 2)

Item Abbreviation	Factor 1 Confidence	Factor 2 Enjoyment	Factor 3 Enjoyment (Phys. Ed.)
good at active games	.69 (.77)	.39 (.53)	.30 (.39)
do well in sports	.83 (.85)	.59 (.51)	.41 (.48)
hard to learn games	.60 (.65)	.36 (.45)	.29 (.33)
best at sports	.76 (.68)	.45 (.44)	.27 (.32)
good at phys. ed.	.68 (.77)	.43 (.43)	.45 (.50)
last to be chosen	.75 (.77)	.45 (.40)	.33 (.32)
not good enough	.78 (.77)	.53 (.55)	.30 (.34)
play active games	.47 (.47)	.74 (.75)	.57 (.51)
like active games	.35 (.44)	.63 (.69)	.34 (.46)
no fun playing sports	.45 (.56)	.68 (.77)	.39 (.56)
enjoy playing sports	.49 (.59)	.72 (.79)	.47 (.63)
get hurt playing	.16 (.18)	.14 (.22)	.11 (.01)
rather read or videos	.44 (.52)	.63 (.73)	.49 (.50)
like to watch	.44 (.52)	.63 (.75)	.27 (.42)
like to take it easy	.40 (.46)	.72 (.72)	.51 (.58)
like quiet games	.52 (.54)	.66 (.72)	.40 (.48)
like to relax, t.v.	.34 (.31)	.66 (.63)	.43 (.37)
enjoy phys. ed.	.44 (.48)	.56 (.45)	.72 (.73)
phys. ed. is best	.45 (.48)	.62 (.42)	.72 (.64)
fun in phys. ed.	.43 (.43)	.54 (.42)	.61 (.72)

Appendix 7

Item Sub-Total Correlations, Elementary Schools

Item Abbreviation	Factor 1 Confidence	Factor 2 Enjoyment	Factor 3 Enjoyment (phys. ed.)
	Test 1 (Test 2)		
good at active games	.78 (.80)	.53 (.57)	.37 (.38)
do well in sports	.80 (.83)	.51 (.61)	.38 (.41)
hard to learn games	.67 (.72)	.45 (.54)	.34 (.33)
best at sports	.71 (.74)	.44 (.53)	.34 (.37)
good at phys. ed.	.64 (.68)	.43 (.51)	.42 (.52)
last to be chosen	.67 (.69)	.40 (.48)	.33 (.28)
not good enough	.78 (.81)	.51 (.64)	.42 (.36
play active games	.44 (.49)	.61 (.73)	.33 (.31)
like active games	.33 (.46)	.59 (.68)	.21 (.37)
no fun playing sports	.46 (.56)	.65 (.68)	.34 (.36)
enjoy playing sports	.49 (.60)	.67 (.71)	.41 (.41)
get hurt playing	.18 (.21)	.33 (.30)	.21 (.14)
rather read or videos	.33 (.51)	.62 (.75)	.32 (.37)
like to watch	.45 (.47)	.65 (.64)	.34 (.32)
like to take it easy	.42 (.49)	.62 (.66)	.34 (.30)
like quiet games	.51 (.62)	.70 (.78)	.39 (.37)
like to relax, t.v.	.34 (.44)	.58 (.66)	.23 (.29)
enjoy phys. ed.	.45 (.48)	.45 (.44)	.79 (.81)
phys. ed. is best	.46 (.44)	.42 (.43)	.81 (.84)
fun in phys. ed.	.42 (.42)	.42 (.44)	.79 (.82)