THE CORRELATION BETWEEN LEVELS OF PHYSICAL ACTIVITY, ACADEMIC PERFORMANCE AND SELF-ESTEEM IN GRADE 4 CHILDREN IN A SOUTH AFRICAN PRIVATE SCHOOL.

by

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Title of thesis/dissertation/mini-dissertation:

The correlation between levels of physical activity, academic performance and self-esteem in grade 4 children in a South African private school.

I declare that this mini-dissertation is my own original work. Where secondary material is used, this has been carefully acknowledged and referenced in accordance with university requirements.

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3 November 2016

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ABSTRACT

The study of self-esteem has spanned more than a century, with theorists approaching it from many and varied standpoints. This study aimed to examine the relationship between physical activity, self-esteem and academic achievement in grade 4 children at a private school in South Africa. A correlational research design was used to investigate the relationships between the Piers-Harris Children's Self-Concept Scale, 2nd Edition, the Physical Activity Questionnaire for Older Children, and Academic Achievement. The results indicated a statistically significant positive correlation between self-esteem and academic achievement (r = 0.420). Correlations were noted between levels of physical activity and physical self-concept (r = 0.486) and between academic achievement and intellectual and school self-concept (r = 0.562). Future research beyond merely correlational analysis would provide more insight into the nature of the relationships.

Key words: Self-esteem, Self-Concept, Piers-Harris 2, Physical Activity, PAQ-C, Academic Achievement, Correlational, Children

CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 Introduction

At the opening of the Sports and Recreation South Africa Conference held in Durban in 2010, the former Minister of Sport and Recreation, Makhenkesi Stofile acknowledged the importance of re-introducing physical education into our schools (SAPA, 2010). Four years later, in 2014, Dr Francois Cleophas - a senior lecturer in sport science at Stellenbosch University, described the state of physical education in South African schools as having "reached a point beyond crisis" (Cleophas, 2014, para. 5). On July 17, 2014, the Minister of Sport and Recreation, Fikile Mbalula, included the following extract in his speech during the budget vote debate:

> Our consistent call to have physical education de-linked from the subject life orientation, and made a stand-alone subject has been ignored and disregarded. We strongly and firmly believe that physical education is key to ensuring that sport at schools becomes an integral part of the curriculum. (Cleophas, 2014, para. 1)

1.2 The Importance of Physical Education in Our School Curriculum

Research indicates that levels of physical fitness and mental health and welfare are inextricable concepts (Bauman, 2004; Brosnahan, Steffen, Lytle, Patterson, & Boostrom, 2004; Crone, Smith, & Gough, 2005; Morgan, Parker, Alvarez-Jimenez, & Jorm, 2013; Street, James, & Cutt, 2007). Studies show that physical activity may provide both physiological and psychological benefits in children and adolescents (Brown, Pearson, Braithwaite, Brown, & Biddle, 2013; Disman et al., 2006). A growing body of research suggests that physical activity can improve mental health, including depression, anxiety, self-esteem, self-concept, anger, stress and executive functioning (Alpert, Field, Goldstein, & Perry, 1990; Babyak et al., 2000; Davis et al., 2011; Hassmen, Koivula, & Uutela, 2000; Liu, Wu, & Ming, 2015; Penedo & Dahn, 2005).

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A meta-analysis of research on children's physical activity and mental health was conducted in 2011 by Ahn and Fedewa. The results showed that increased physical activity had measurable positive effects on the mental health of the participants. South African public schools are no longer appointing trained physical education teachers and physical education programs are being left in the hands of generalist education teachers (van Deventer, 2004, 2009). This shortage of training and lessened interest in physical education has led to a reduced focus on physical activity in schools. Physical education is now a small part of the broader Life Orientation programs and there are vastly different levels of physical education from school to school. Frantz (2008) believes that South Africa needs "a structured, cost-effective approach to physical and health education in schools that stipulates national objectives and detailed strategies to realize the objectives" (p. 39).

According to the World Health Organisation (2012b), lack of physical activity is rising. The World Health Organisation (2012a) further states that physical activity has been associated with psychological benefits in young people by reducing anxiety and depression, contributing to social development by enabling social interaction and providing an opportunity for building self-confidence.

1.3   Physical Activity and Mental Health

In a report prepared for the World Health Organisation in 1998, Micheli et al. asserted that participation in sports improves self-esteem, self-perception and psychological well-being. In a review by Mutrie and Parfitt (1998), it was concluded that physical activity was positively associated with good mental health, and research shows that regular physical activity correlated with psychological benefits such as diminished stress, anxiety and depression (Csikszentmihayli, 1975; Hassmen et al., 2000; Long, 1985; Page & Tucker, 1994). Studies show that increased physical activity at age 9 is a predictor of improved self-esteem at ages 11 to 13 (Schmalz et al., 2007).

Steiger, Allemand, Robins and Fend (2014) found that individuals who began their adolescent years with low self-esteem were more likely to show depressive symptoms

twenty years later as adults. High self-esteem is a predictor of more satisfying interpersonal relationships, better job performance and improved academic achievement (Judge & Bono, 2001; Marsh & Craven, 2006; Murray, 2005). Numerous studies have linked low self-esteem to maladaptive consequences, such as antisocial behaviour, aggression and delinquency, lower levels of physical and mental health and fewer economic prospects (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Orth, Robins, & Widaman, 2012; Trzesniewski et al., 2006; Zimmerman, Copeland, Shope, & Dielman, 1997).

1.4   Physical Activity and Cognitive Ability

Plato, Aristotle and, more recently, Rousseau in the eighteenth century, have said that the development of the mind and the development of the body are connected (Hills, 1998). More contemporary researchers suggest that the development of cognitive or learning expertise is stimulated by physical activity (Barr & Lewin, 1994; Sallis et al., 1999; Shephard, 1996). Lindner (2002) found that schools that performed better academically had higher levels of physical activity and school sports than lower performing schools. Recent research by Trudeau and Shephard (2009) has shown a positive relationship between increased physical activity and concentration whilst Bailey et al. (2009) assert that there is an urgent need for additional research into the relationship between physical activity and cognitive results.

1.5   Research Problem

Since there is much evidence linking low self-esteem with psychological problems in later life (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Orth, Robins, & Widaman, 2012; Trzesniewski et al., 2006; Zimmerman, Copeland, Shope, & Dielman, 1997) and higher self-esteem with greater quality of life (Judge & Bono, 2001; Marsh & Craven, 2006; Murray, 2005), interventions focused on improving self-esteem are necessary. A study by Schmalz et al. (2007) found that implementing measures to improve self-esteem at 10 years of age had a perceptible positive effect at age 11 to 13 and in South Africa, 10-year-old children are in grade 4. Higher physical activity levels have been correlated with better academic performance and increased cognitive capacity, as well as ability to concentrate (Barr &

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Lewin, 1994; Lindner, 2002; Sallis et al., 1999; Shephard, 1996; Trudeau & Shephard, 2009). As physical education is no longer a priority in the majority of schools in South Africa, a preliminary study to determine whether there is a correlation between the levels of physical activity engaged in by South African grade 4 children and levels of self-esteem and academic achievement could provide compelling reasons to redress the status quo.

It is with this in mind that this research focuses on the question: Is there a correlation between level of physical activity and self-esteem and between level of physical activity and academic performance in grade 4 children in a private school in South Africa?

1.6   Main Concepts

This section will briefly introduce the main concepts under investigation in the present study. An in-depth discussion of these concepts will follow in Chapter 2, *Literature Review*.

1.6.1   Self-Esteem, Self-Image and Self-Concept

There is no single, universally agreed upon definition for self-esteem (Tesser & Martin, 2006). The terms *self-image*, *self-concept* and *self-esteem* are routinely used in research exploring these constructs and definitions often overlap. Baumeister (2005), states that other synonyms for self-esteem include 'self-worth', 'self-regard', 'self-confidence' and 'pride'.

1.6.1.1 Self-Image

According to Demo (1992), and Falk and Miller (1998), *self-image* can be viewed as short-term perceptions of the self which may be dependent on situation or role and are, therefore, changeable.

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1.6.1.2 Self-Concept

O'Mara, Marsh, Craven and Debus (2006) state that, as with many psychological constructs, *self-concept* lacks a formal theoretical definition by empirical researchers because "everybody knows what it is" (p. 181). For many theorists, *self-concept* refers to the more permanent aspects of self, which are recognisable in the individual across situations (Demo, 1992; Falk & Miller, 1998). Baumeister (1999) explains the *self-concept* as a person's beliefs or ideas about him or herself. This may include attributes such as aspects of personality, for example being charming or straightforward. Piers and Harris, authors of the Piers-Harris 2 Children's Self-Concept Scale define *self-concept* as "a relatively stable set of attitudes reflecting both description and evaluation of one's own behaviour and attributes" (Piers & Herzberg, 2002, p. 3).

1.6.1.3 Self-Esteem

Self-esteem has been described by some researchers as the judgmental component of the self, or the value that the individual places on the various aspects of the self (Beane & Lipka, 1986, as cited in Lewis & Knight, 2000; Falk & Miller, 1998). Brown (1993, 1998), and Brown and Dutton (1995) define self-esteem more simply as the feelings of affection one has for oneself. Baumeister (1998) describes self-esteem simply as what a person thinks about him or herself. According to Baumeister, self-esteem is a person's all-encompassing self-evaluation and self-esteem may be domain-specific.

Harter's model (1985) assumes that self-concept is based on "cognitive assessments of self-competence in various contextual domains" (Hughes, 2011, p. 8). Self-concept, then, may also be understood as the evaluative component of self, which gauges competencies of aspects of the self in comparison with other aspects of the self, as well as in comparison with other people who are deemed important (Shavelson, Hubner, & Stanton, 1976). In this view, self-esteem and self-concept are described as the sum total of beliefs about the self, which takes into account the differing domain-specific evaluations.

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Marshall and Brown (2006) note that many of the measurement tools that assess self-esteem in a global sense contain subscales that assess a person's self-evaluations across many domains. According to Biddle and Mutrie (2008), *self-esteem* may be seen as an extension of the construct *self-concept*, although they concede that many researchers use the terms interchangeably. For the purposes of this study, *self-esteem* and *self-concept* are considered to be synonyms and will be operationally defined to align with the attributes measured by the Piers-Harris Children's Self-Concept Scale, Second Edition (Piers-Harris 2) (Piers & Herzberg, 2002). Self-esteem will thus be defined as a person's overall feelings of competence, which takes into account the sub-domains of: Physical Appearance and Attributes; Intellectual and School Status; Happiness and Satisfaction; Freedom from Anxiety; Behavioural Adjustment; and Popularity (Piers & Herzberg, 2002).

1.6.2   Physical Activity

Physical activity can be defined as any bodily effort produced by skeletal muscle, leading to energy expenditure (Caspersen, Powell, & Christenson, 1985).

1.6.3   Academic Performance

Academic performance can be defined as the outcome of education or the extent to which a child has achieved their educational goals (Ward, Stoker, & Murray-Ward, 1996). For the purposes of this study, academic performance will be measured by the mean of the results achieved by each individual during their most recent examinations as recorded in a school report.

1.7   Aims and Objectives

1.7.1 Aims

The primary aim of the study is to determine if there is any correlation between levels of physical activity, self-esteem and academic performance in grade 4 children in South Africa.

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1.7.2 Objectives

The objectives of the study are to determine whether there is a correlation between levels of physical activity and level of self-esteem, to determine whether there is a correlation between levels of physical activity and academic achievement and to determine whether there is a correlation between level of self-esteem and academic achievement.

The hypotheses set for these objectives are:

1.7.3 Hypotheses

Null Hypothesis 1: There is no correlation between levels of physical activity and self-esteem scores.

Research Hypothesis 1: There is a correlation between levels of physical activity and self-esteem scores.

Null Hypothesis 2: There is no correlation between levels of physical activity and academic achievement.

Research Hypothesis 2: There is a correlation between levels of physical activity and academic achievement

Null Hypothesis 3: There is no correlation between self-esteem scores and academic achievement

Research Hypothesis 3: There is a correlation between self-esteem scores and academic achievement.

1.8 Chapter Outline

The following is an outline of the remaining chapters included in this dissertation:

Chapter 2: Literature Review

The literature review will contain a comprehensive discussion of research which has been conducted on self-esteem, physical activity and academic performance.

Chapter 3: Research Methodology

The methods used for both the collection and analysis of the data will be discussed in this chapter.

Chapter 4: Results

This chapter will include the results from the data analysis and the interpretation of results.

Chapter 5: Discussion of Findings, Limitations of the Study, Recommendations for Future Research and Conclusion

This chapter will include the interpretation and discussion of the results from Chapter 4, taking the literature and theory discussed in the previous chapters into account.

1.9 Conclusion

This chapter introduced the topic of research, the rationale behind the study, the main concepts under investigation and briefly defined the terms which will be used throughout the study. Chapter 2 will discuss and evaluate existing literature on self-esteem, physical activity and academic performance, as well as related topics.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

A considerable amount of research has been conducted in the areas of self-esteem, the benefits of physical activity and the predictors of academic achievement, but relatively few studies have tied these variables together. This chapter will examine the existing literature in the fields of self-esteem, physical activity as it relates to mental health, and physical activity as it relates to academic achievement.

2.2 Self-Esteem

As mentioned in the introduction, the terms *self-concept* and *self-esteem* are routinely considered to be synonyms in research exploring these constructs (*see 1.6.1.3*). Despite more than a century of research, the concept of self-esteem lacks a universally accepted definition (Tesser & Martin, 2006).

2.2.1 Historical Perspective

William James is credited with first introducing the topic of self-esteem more than a hundred and twenty-five years ago in his book *The Principles of Psychology*, published in 1890 (Mruk, 2006). According to Damon and Hart (1982) and Macrae et al. (2015), James divided the self into two main components, the "Me" and the "I". The "Me" referred to the person's qualities that allow the self to be known, including "(a) The material Self; (b) The social Self; and (c) The spiritual Self" (James, 1890, p. 292) that define the self as a distinctive individual. The "I" component of self, "(d) The pure Ego" (James, 1890, p. 292) could be understood as the "self-as-knower" (Damon & Hart, 1982, p. 844), a component of self which assimilates experiences from a subjective standpoint (Harter, 2016; Macrae et al., 2015). A stable self-identity stems from a sense of continuity of this aspect of self (Damon & Hart, 1982).

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James considered self-esteem to be a basic and fundamental human need (Damon & Hart, 1982). According to Baumeister, Dale and Sommer (1998), research shows that even Freud's psychodynamic defence mechanisms, initially understood as an unconscious way to keep sexual and aggressive impulses under control, can be seen as mechanisms for supporting self-esteem. Charles Horton Cooley, as early as 1902, argued that self-esteem originates not only from self-evaluations, but from the perceived evaluations of others (Cooley, 1902/1964).

Despite these early theorists' interest in the self and self-esteem, it took more than half a century for social psychologists to begin researching what constitutes self-esteem, how it is developed and maintained, the functions it performs and how it does so. Much of the recent research into self-esteem builds on the early conceptual frameworks of William James and Charles Horton Cooley, both of whom published in the latter part of the 1800's and early 1900's (Harter, Bresnick, Bouchey, & Whitesell, 1997).

2.2.2 Components of Self-Esteem

Nathaniel Branden (1994, 2006) began researching self-esteem in the 1950's and published his first articles on self-esteem in the 1960's. Branden (1994, 2006) defines self-esteem as follows:

> *Self-esteem is the disposition to experience oneself as being competent to cope with the basic challenges of life, and as being worthy of happiness.* Thus, it consists of two components: (1) *self-efficacy-confidence* in one's ability to think, learn, choose, and make appropriate decisions; and (2) *self-respect-confidence* that love, friendship, achievement, success - in a word, happiness - are natural and appropriate. (p. 238)

Self-esteem has been defined as a reflection of an individual's evaluation of his or her own worth (Crocker & Major, 1989). Researchers such as Leary and Baumeister (2000) have conceptualised self-esteem as a constantly fluctuating system of beliefs about one's own worth, relative to others. This may include attributes such as aspects of personality, for example being personable or honest. Baumeister (1999) contrasts this with a definition of

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self-esteem as how a person *evaluates* him or herself. According to Baumeister, self-esteem is a person's all-encompassing self-evaluation and may be domain-specific; for example, a person may acknowledge that he or she is a really great chef, but a fairly average tennis player and an awful singer.

Self-esteem is thus dependent on both situation and external feedback and is in a constant state of flux (Leary & Baumeister, 2000). At the heart of definitions of self-esteem are self-perceptions and self-evaluation. In very broad terms, self-concept or self-esteem is a person's view of oneself. Various theorists have posited different types of self-esteem, over the years (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). Some of these will now be discussed.

2.2.2.1 Contingent vs. Non-Contingent Self-Esteem

In this view, self-worth is contingent on meeting standards or expectations of those whose approval is valued, in areas such as appearance, academic performance, physical ability or other criteria (Crocker & Wolfe, 2001; Deci & Ryan, 1995; Kernis, 2003). Conversely, non-contingent self-esteem refers to the unconditional positive regard for the self, described by Carl Rogers (1959, 1961) rather than random or inconsistent approval (Neighbors, Larimer, Markman Geisner, & Knee, 2004). The view that people vary in the degree to which their self-worth depends on meeting external criteria, especially social approval, is not new (e.g., James, 1890).

2.2.2.2 Implicit vs. Explicit Self-Esteem

Hetts and Pelham (2001) describe both implicit (non-conscious) and explicit (conscious) self-concepts, and contend that a full understanding of a person's self-concept requires an exploration of both implicit and explicit beliefs about the self. In this view, individuals who have high-self-esteem show positive attitudes to anything associated with themselves (implicit), as well as agreeing explicitly with statements about self-worth (Bosson, Brown, Zeigler-Hill, & Swann Jr., 2003).

2.2.2.3 Authentic vs. False Self-Esteem

According to Deci and Ryan (1995), the distinction between authentic or true self-esteem and contingent or false self-esteem can be seen in terms of an integrated or true self and an unintegrated or false self. In line with self-determination theory (Deci & Ryan, 1991), a person can only develop an integrated or authentic sense of self when their environment allows them to satisfy the three fundamental psychological needs for autonomy, competence and relatedness (Ryan, 1993). "True self develops as one acts volitionally (i.e., autonomously), experiences an inner sense of efficacy (i.e., competence), and is loved (i.e., feels related to) for who one is rather than matching some external standard" (Deci & Ryan, 1995, p. 33). This can become problematic when love or esteem from another is contingent upon living up to that person's standards in some area, rather than one's own standards, which leads to giving up autonomy and exhibiting a false, socially-implanted self (Deci & Ryan, 1995).

2.2.2.4 Stable vs. Unstable Self-Esteem

Kernis and Waschull (1995) believe that the instability of self-esteem has more than one form. They theorise that some people with unstable self-esteem may exhibit brief, dramatic shifts from feeling extremely positive about themselves to feeling extremely negative, whilst others may only differ in the degree to which they feel positive about themselves or, conversely the degree to which they routinely feel negatively about themselves (Kernis & Waschull, 1995). The nature of these fluctuations depends on a variety of factors, including the domain in which the person is operating, as well as how positively or negatively the person has evaluated recently occurring events (Markus & Kunda, 1986). According to Kernis and Waschull (1995), the core of unstable self-esteem is the predisposition to demonstrate short-term variations in global feelings about the self. Stable self-esteem would thus be a view of the self that is not linked with specific events and outcomes (Kernis, 2005).

2.2.2.5 Global vs. Specific Self-Esteem

In addition to the aforementioned aspects of self-esteem, researchers have determined that there are two main areas of self-esteem, *global self-esteem* and *specific self-esteem* (Brown, 2015; Herek, Gillis, & Cogan, 2015; Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995) which will be the focus of the current study. Global self-esteem is considered to be the overall evaluation of the self or a person's positive or negative attitude toward the self as a whole (Harter, 2006; Marsh, 1990; Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995) and can be seen as an indicator of general well-being and psychological health (Paradise & Kernis, 2002; Rosenberg et al., 1995). Specific self-esteem, on the other hand, can be seen as more relevant to behaviour (Rosenberg et al., 1995). Rosenberg et al. explain the difference between global and specific self-esteem using the example of a university student who may have particular feelings about his or her university as a whole (global), but feel differently about each department (specific).

Building on the view that perceptions of self are shaped through interaction with the environment as well as by internal factors, Shavelson, Hubner and Stanton (1976) devised a multi-dimensional, hierarchical model of self-concept (self-esteem) that profoundly influenced self-concept (self-esteem) research and which has been supported by empirical investigation (Fok & Langevin, 2015; Marsh & Hattie, 1996; Marsh, Craven, & Martin, 2006; Marsh & Seaton, 2013).
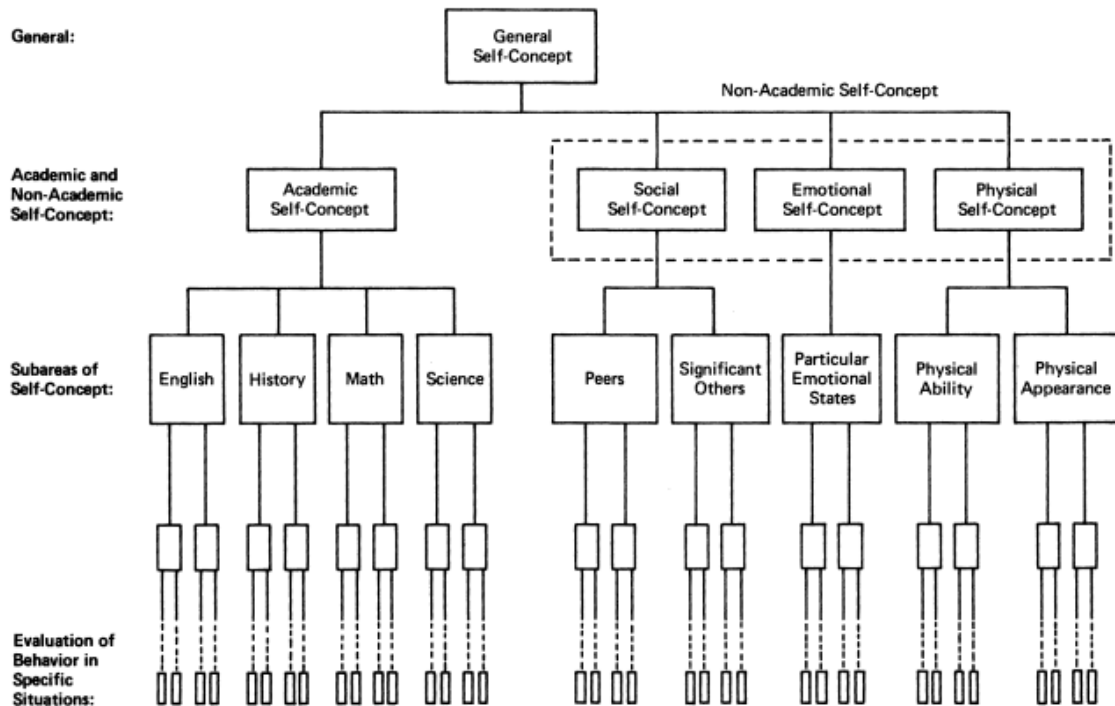
Figure 2.1: One possible representation of the hierarchic organisation of self-concept (Shavelson et al. 1976, p. 413).

The approach of Shavelson et al. (1976) (*see Figure 2.1*) assumes that the view of the self is structured in a hierarchy, with the global self-view at the pinnacle. Beneath it are the more specific aspects of the self, such as the academic, social, emotional and physical self. Below that in the hierarchy of self-knowledge are the more specific sub-areas of self-concept, such as how one relates to peers and significant others, for example (Shavelson et al., 1976). According to Marsh and Hattie (1996), there is sufficient evidence to suggest that when the individual sub-areas are measured separately, they combine statistically to produce a superordinate global self-esteem factor (Swann & Bosson, 2010).

2.2.3 Global Self-Esteem

The concept of global self-esteem has received a great deal of attention from researchers in recent years. Trzesniewski, Donnellan and Robins (2003) cite studies linking high global self-esteem to numerous positive outcomes including occupational success, healthy social relationships, subjective well-being, positive perceptions by peers, academic achievement, persistence in the face of failure, and improved coping and self-regulation

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skills. High global self-esteem has been linked to satisfaction and happiness in later life (Harter, 1999). Conversely, studies show that low self-esteem is linked to numerous problematic outcomes, such as depressive symptoms, anxiety, health problems, aggression and antisocial behaviour (Donnellan, Trzesniewski, Robins, Moffitt, & Caspi, 2005; Trzesniewski et al., 2003).

A number of researchers (Andrews, 1998; Harter, 1997, 2016; Pelham & Swann, 1989) consider that global self-esteem is the divergence of real, domain-specific self-evaluation from the ideal. This echoes William James's (1890) definition of self-esteem as the manner in which our actual performance relates to our supposed potential. These researchers argue that a lack of competence in an area to which an individual attaches importance can affect global self-esteem negatively. To support this notion, Harter (1993) found relatively high correlation levels (r = 0.70) between domain-specific evaluation in areas that were important to the subject and their self-esteem, whilst there was a relatively low correlation between domain-specific evaluation in areas considered unimportant and their self-esteem (r = 0.30).

2.2.4 Specific Self-Esteem

Many other self-esteem theorists consider that the construct is better conceptualised as state-like processes (Trzesniewski et al., 2003). Brown and Marshall (2006) make a distinction between a person's self-confidence and their self-esteem. Their stance is that what some researchers call domain-specific self-esteem (or the way that people evaluate their own abilities in various domains) should rather be called *self-evaluation* or *self-appraisal*. Brown and Marshall (2006) state that many people incorrectly equate the self-confidence that comes with competence in a specific domain with overall self-esteem. They note that many of the measurement tools that assess self-esteem in a global sense contain subscales that assess a person's self-evaluations across many domains (Harter, 1986; Marsh, 1993; Piers, 1984; Piers & Harris, 1964; Shavelson et al., 1976). In this view, a person can have differing levels of self-esteem in different domains (high athletic self-esteem but low social self-esteem, for example). People who have higher feelings of self-worth across more domains evaluate themselves more positively, experiencing a higher level of self-

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worth than those with low self-esteem (Brown, 1998; Brown & Marshall, 2006). Similarly, self-esteem varies when people either excel or fail in important domains upon which their self-esteem depends (Crocker, Moeller & Burson, 2010; Crocker, Sommers, & Luhtanen, 2002).

The 1997 findings of Harter et al. incorporate the function of perceived competence in areas which the person deems important, thus self-esteem comprises two separate and distinct dimensions: worth and competence. Self-efficacy and self-respect are key aspects of self-esteem. Harter's model assumes that self-concept is based on "cognitive assessments of self-competence in various contextual domains" (Hughes, 2011, p. 8). Developmentally, pre-teens and adolescents are observed to show multiple self-representations according to context and role, describing themselves completely differently depending on the interpersonal context in which they find themselves, for example in relation to teachers, parents and peers (Harter, 2016; Harter et al., 1997)

2.2.5 Consequences of Low Self-Esteem

According to O'Brien, Bartoletti and Leitzel (2006), low self-esteem is implicated in twenty-four diagnostic contexts in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM–IV–TR*; American Psychiatric Association, 2000) either as a criterion for disorders, as an associated feature of other disorders, or as a criterion for disorders that are being considered for future editions of the DSM. Harter (1999) conducted a review of empirical literature and found substantial support suggesting that attaining a high level of self-esteem and, more specifically, avoiding low self-esteem is important for life-long health and well-being. Baumeister, Campbell, Krueger and Vohs (2003) state that in the 1970's and 1980's, in the earlier days of what they termed the "self-esteem movement" (p. 2), it could be declared that low self-esteem had a causal effect on "welfare dependency, unwanted pregnancy, school failure, crime, drug addiction, and other problems" (p. 2).

Research has found correlations between low self-esteem and numerous adverse behaviours and emotions, including loneliness, anxiety, unsafe sex, teenage pregnancy, jealousy, criminal behaviour, eating disorders, substance abuse, depression, and belonging

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to deviant groups (Fergusson & Horwood, 2002; Leary 1999; Leary, Schreindorfer & Haupt, 1995; Rosenberg, Schooler, & Schoenbach, 1989; Sprott & Doob, 2000). Trzesniewski et al. (2006) found that low levels of self-esteem in children and adolescents are predictors of poor health and limited future economic prospects. Orth et al. (2009) established that low self-esteem is a risk factor for depression, but not vice versa.

Low self-esteem appears to affect an individual's resilience when threatened (Spencer, Josephs, & Steele, 1993). Low self-esteem during adolescence could act as a predictor of less desirable mental health consequences (Orth, Robins, & Meier, 2009; Orth, Robins, & Roberts, 2008), including future suicide attempts (Lewinsohn, Rohde, & Seeley, 1994; Wichstrøm, 2000) and an inability to form positive social support systems (Marshall, Parker, Ciarrochi, & Heaven, 2014). It may impact on relationships, as people with low self-esteem could see rejection where none exists (Wood, Hogle & McLellan, 2009), and may be prone to overly dissecting problems with romantic partners (Murray, Rose, Bellavia, Holmes, & Kusche, 2002). Likewise, rejection appears to affect people with low self-esteem more strongly than those with high self-esteem (Sommer & Baumeister, 2002). According to Baumeister et al. (2003), researchers have begun, in recent years, to conduct more methodologically rigorous, large-scale studies on the possible effects of self-esteem, so that we are no longer relying on what they refer to as "anecdotes, impressions, and untested assumptions about the value of self-esteem" (p. 2).

2.2.6 The Pursuit of High Self-Esteem

Not all authors report that low self-esteem is implicated in the aforementioned litany of human misery (Mruk, 2006). Some researchers believe that the pursuit of high self-esteem may even be detrimental to the self (Baumeister, 2005; Baumeister, Campbell, Krueger, & Vohs, 2003; Baumeister, Smart, & Boden, 1996; Crocker & Park, 2004; Kernis 2003; Killam & Kim, 2014), or at least of questionable value (Seligman, Reivich, Jaycox, & Gillham, 1995). According to Sedikides (1993), the drive to maintain a high self-esteem may make a person dismiss undesirable feedback as unreliable or prejudiced. This may, in turn, lead to a person failing to take responsibility for his or her harmful actions and may lead to an inaccurate self-concept. It may also lead to anger and aggression toward those who

threaten the ego (Baumeister, Smart, & Boden, 1996; Neff & Vonk, 2009; Twenge & Campbell, 2003). Perhaps the most extreme downside of the desire for high self-esteem is illustrated by narcissists who have inflated egos that are unstable and whose voracious pursuit of social approval often leads to problems in relationships (Ackerman et al., 2011; Campbell & Baumeister, 2001; Campbell, Bosson, Goheen, Lakey, & Kernis, 2007; Campbell, Rudich, & Sedikides, 2002; Crocker, Luhtanen,et al., 2003; Neff & Vonk, 2009; Swann & Bosson 2010; Zeigler - Hill, Clark, & Pickard, 2008).

Many other researchers, however, are of the opinion that high self-esteem is both necessary and adaptive and can be used as a gauge of good adjustment (e.g., Branden, 1994; Harter, 2016; Heilbrun, 1981; Kahle, Kulka, & Klingel, 1980; Mruk, 2006; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004; Taylor & Brown, 1988). Branden (1994) asserts that self-esteem arises from feeling that one is capable of coping with life's challenges and feeling that one deserves happiness. It has been suggested by psychologists that humans have a basic need to develop high self-esteem and to build a positive self-view (e.g., Baumeister, Heatherton, & Tice, 1993; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004; Taylor & Brown, 1988). Jordan, Spencer, Zanna, Hoshino-Brown and Corell (2003) suggest that there are healthy and secure forms of high self-esteem that are not unstable, narcissistic or ego-defensive.

Some of the appeal of self-esteem is that it is linked to positive states, including happiness and optimism (Baumeister, 2005; Lucas, Diener, & Suh, 1996). Lyubomirsky, Tkach and DiMatteo, (2006) found a high correlation ($r = 0.58$) between happiness and self-esteem. The review of self-esteem research conducted by Baumeister et al. (2003) conceded that high global self-esteem is linked to persistence, openness to experimentation and adventurous behaviour, although it is unclear whether higher self-esteem is the cause or the effect. People with high self-esteem are more likely to take initiative, acting on their beliefs and impulses and are more likely to speak up and even criticise the group as well as defend victims of bullying (Baumeister, 2005). Baumeister (2005) also states that the converse of this is that people with high self-esteem are also more likely to be bullies themselves.

Branden (1994), building on research that he began in the 1950's, states that self-esteem is a basic human need that is essential for survival and typical development. More recently, Rodewalt and Tragakis (2003) conducted an inquiry into research on self-esteem and found that self-esteem is one of the "top three covariates in personality and social psychology research" (p. 66). It is the subject of lively debate amongst researchers and theorists. It is possible that it is one of the most often-researched topics across all subdiciplines of psychology (Falk & Heine, 2015; Scheff & Fearon, 2004). Mruk (2006) discusses how part of the reason is that self-esteem is implicated at both ends of the human behaviour spectrum. On one end of the continuum, self-esteem is mentioned in regard to various mental disorders; at the middle of the spectrum, it is implicated in being able to cope with the more everyday problems of ordinary life; and at the other end of the spectrum, healthy self-esteem is mentioned in relation to positive mental health and happiness.

2.2.7 Researching Self-Esteem

Mruk (2006) gives three reasons why he believes that there is a need to research self-esteem:

> First, today, self-esteem may be more important for individuals and the society in which they live than ever before, especially in terms of what is typically described as "self-regulation" and "quality of life." Second, the research and ideas that historically characterized this field have undergone a striking period of rapid growth and severe critique. This re-examination of self-esteem is beginning to result in the development of more sophisticated research, more comprehensive theories, and more effective tools for enhancing self-esteem. Finally, new influences, such as the advent of positive psychology, are beginning to affect the field in ways that must be examined and understood to make sense of the changing face of self-esteem in modern psychology. (p. 2)

More recently, researchers in the field of Positive Psychology have picked up the baton, with Mruk (2006) saying that self-esteem should be central to the study of well-being,

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which is the main focus of Positive Psychology (for more on this, see *3.3, Paradigmatic Point of Departure*):

> After reading the new studies and literature on this version of positive psychology, however, I soon realized that self-esteem was not a major part of it. I think that is a terrible mistake and decided it was necessary for someone to demonstrate how self-esteem is and should be an important part of any positive psychology, whether conceived in the twentieth century by the humanistic perspective or in the new millennium by a more traditional approach to psychology. (Mruk, 2006, p. xiv)

2.2.8 Measuring Self-Esteem

According to Mruk (2006), in order to measure self-esteem, we need to be sure that the measurement tool takes into account the multi-dimensional nature of self-esteem. Many of the early self-esteem tests were unidimensional in their design, for example, Rosenberg's Self-Esteem Scale, first developed in 1965 (Mruk, 2006). Fortunately, other researchers such as Piers (1984), Harter (1985), O'Brien and Epstein (1983, 1988), Tafarodi and Swann Jr. (2001) and Piers and Herzberg (2002) have developed original measures that take into account domain-specific areas of self-esteem, to determine an all-encompassing measure of global self-esteem.

There has been some debate as to whether self-esteem measures should be used with young children. Working in the 1980's, Harter and Pike speculated that although children as young as 8 or 9 years are able to evaluate their own performance in specific domains, they do not have the cognitive capacity to assimilate these evaluations into a more general, global self-concept (Harter, 1983; Harter & Pike, 1984). For this reason, Harter (1983) suggested that instruments measuring global self-esteem, given to young children, lack construct validity. This notion was challenged by Marsh, Craven and Debus (1991) who contend that domain-specific self-esteem may develop later than a global sense of self-worth and thus, global self-esteem can be measured with validity in young children. A confirmatory factor analysis was conducted by Marsh et al. (1991) on their Self-Descriptive Questionnaire, using a sample of six- to eight-year-old children. Results showed the

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existence of a reliable, well-defined sense of global self-worth in the children that was independent of any domain-specific aspects (Marsh et al., 1991; Marsh, Ellis & Craven, 2002).

The Piers-Harris 2 (Piers & Herzberg, 2002) is based on the "theoretical assumption that self-concept is multi-dimensional" (p. 21). Global self-concept or self-esteem is made up of more specific appraisals of various "feelings, abilities and behaviours" (p. 21). Implicit in the Piers-Harris 2 is the perspective that children may view themselves differently in one domain than in another.

2.2.9 Improving Self-Esteem

Branden (1994) implies that self-esteem is not fixed and can be improved. Other eminent researchers in the field, for example Battle, Jarratt, Smit and Precht (1988), define self-esteem as relatively fixed, stable and resistant to change *once formed*. Various researchers have put forward interventions intended to raise self-esteem (e.g. Baumeister, Smart, & Boden, 1996; Neff, 2009; O'Mara, Marsh, Craven, & Debus, 2006). Branden (1994) and Harter's (1997, 2016) approaches emphasise the importance of internally-generated practices to improve and maintain self-esteem. Marshall et al. (2015) found that adolescence was one of the periods where self-esteem was most prone to decline, and Chung et al. (2014) found adolescence and young adulthood to be the most precarious, where intervention may have the most profound effect. Implicit in the work of these theorists is the notion that self-esteem can be improved.

A conclusion may be posited from the preceding discussion on self-esteem that global self-esteem is made up of various sub-domains (Harter, 1985; O'Brien & Epstein, 1983, 1988; Piers, 1984; Piers & Herzberg, 2002; Tafarodi & Swann Jr., 2001). A person's global self-esteem can fluctuate, depending on the level of mastery attained in a domain which is deemed important to that person (Crocker, Moeller & Burson, 2010; Crocker, Sommers, & Luhtanen, 2002). It follows, then, that the more important areas in which a person attains mastery, the higher that person's global self-esteem is likely to be (Brown, 1998; Brown & Marshall, 2006). Two of the major sub-domains which are covered by

research into self-esteem are the physical self-concept and the academic self-concept (e.g., Piers & Herzberg, 2002; Shavelson et al., 1976). The following sections will examine these factors more closely.

2.3 Physical Activity

Regular physical activity has numerous significant health benefits for young people, including obesity prevention, cardiovascular fitness, improved bone density and enhanced psychological well-being (Janssen & LeBlanc, 2010; Strong et al., 2005). The recommendation is that school-aged youth spend a minimum of 60 minutes per day engaged in physical activity that is varied and developmentally appropriate (Camacho-Miñano, LaVoi, & Barr-Anderson, 2011; Janssen & LeBlanc, 2010; Strong et al., 2005). In order for the health benefits to be maximised, physical activity should be of at least moderate intensity (equivalent to brisk walking), although aerobic activities, defined as "vigorous-intensity activities that cause heavy sweating or large increases in breathing or heart rate" (Carlson, Fulton, Schoenborn, & Loustalot, 2010, p. 306) provide maximum health benefits (Janssen & LeBlanc, 2010; Mutrie & Faulkner, 2004).

According to Fox, Boutcher, Faulkner and Biddle (2000), there is now a strong evidence base supporting the existence of a strong relationship between physical activity and psychological well-being. A meta-analysis conducted by Ahn and Fedewa (2011) showed that the effects of physical activity on the mental health and well-being of children, although small, were significant. Overall, physical activity led to better mental health outcomes for all children. Physical activity has been shown to decrease both trait and state anxiety (Taylor 2000). Biddle and Mutrie (2008) cite numerous studies that show that moderate-intensity levels of physical activity have a positive effect on affect and mood (e.g., Arent, Landers & Etnier 2000; Berger & Motl, 2001; Biddle, 2000; Joseph, Royse, Benitez, & Pekmezi, 2014; Leith, 1994; McDonald & Hodgdon, 1991; Parfitt, Markland & Holmes, 1994; Stephens, 1988).

Physical activity behaviours engaged in during adolescence are more likely to be carried through into adulthood, according to several longitudinal studies (Gordon-Larsen,

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Nelson, & Popkin, 2004; Telama, 2009; Telama et al., 2005). This highlights the necessity for encouraging participation in physical activities before and during this stage. Mutrie and Faulkner (2004) argue that physical activity and physical fitness are central to the principles of Positive Psychology. What they refer to as the *somatopsychic principle* is summed up in the phrase "*'mens sana in corpore sano'* ('a healthy mind in a healthy body')" (p. 147).

2.3.1 Physical Activity and Self-Esteem

According to Biddle and Mutrie (2008), self-esteem is often seen as the biggest indicator of psychological well-being. Advances in self-esteem measurement that include various sub-domains have led to improved understanding of possible links between physical activity and self-esteem (Biddle & Mutrie, 2008). Self-esteem can either be seen as a motivational *determinant* of physical activity or as an *outcome* of physical activity (Sonstroem, 1997a, 1997b). In this view, self-esteem acts as a *determinant* of physical activity when a person with a high level of physical self-worth is more likely to participate in physical activity because it provides an opportunity to maintain or enhance this pre-existing high level of physical self-worth. Self-esteem can be seen as an *outcome* of physical activity when the physical activity allows a person to achieve task mastery or skill development in the physical arena.

Mutrie and Faulkner (2004) state that improving physical strength or capacity enables us to feel more capable of performing everyday physical tasks which, in turn, gives us a more positive view of our physical selves and can, as a result, influence our self-esteem. Research conducted across more than 40 randomised controlled trials between 1970 and 2000 showed moderate to high correlations ($r = 0.5 - 0.7$) between evaluations of the self in the physical domain (for example physical self-worth, or physical competence) and self-esteem (Fox, 1997; Fox, 2000). Fox (2000) determined that physical activity is implicated in improved physical self-worth, including improved body image. For some people, this is sufficient to generalise to improved global self-esteem.

Gruber's 1986 meta-analysis of physical activity and self-esteem development in children calculated an overall correlation of 0.41 between physical activity and self-esteem

over twenty-seven studies, with sixty-one percent of the studies showing a positive effect. Biddle and Mutrie (2008) state that although physical activity can enhance self-esteem through changes in self-perception, it is one-dimensional to believe that physical activity alone can improve self-esteem. In a quantitative review conducted by Spence, McGannon and Poon (2005), participation in physical activity shows small but significant positive changes in global self-esteem. The authors recommend that further research be conducted using measures which examine domain-specific self-evaluations in order to determine the exact nature of the relationship between self-esteem and physical activity.

2.3.2 Physical Activity and Academic Achievement

According to Spirduso (1994), cognitive functioning can be regarded as brain functions including memory, spatial abilities and abstract reasoning. These cognitive functions are supported by processes such as attention, information processing speed, and perception. Physical activity has been shown to affect muscles and organs which, in turn, modify and regulate both structure and functions of the brain (Dishman et al., 2006b).

Physical activity has been shown to facilitate executive functioning (i.e. processes which are necessary in the selection, organisation and initiation of goal-directed behaviours) in both adults and children (Davis et al. 2011; Tomporowski, Davis, Miller, & Naglieri, 2008). According to Colcombe and Kramer (2003), executive functioning appears to be more likely to be affected by aerobic exercise than other aspects of cognition. Some researchers have suggested that the changes in children's brain function as a result of systematic physical activity will be more global than those seen in adults (Hillman, Castelli, & Buck, 2005). A child who is unable to plan effectively, use working memory efficiently, shift mental sets and exhibit impulse control is less likely to focus in the classroom and is thus less likely to excel academically (St Clair-Thompson & Gathercole, 2006).

Research indicates that taking time out of children's classroom time for physical activity does not have a negative effect on academic performance, whilst providing significant health benefits (Dwyer, Coonan, Leitch, Hetzel, & Baghurst, 1983; Lees & Hopkins, 2013; Mutrie & Faulkner, 2004; Sallis et al. 1999; Taras, 2005; Trudeau & Shephard, 2009).

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Tomporowski et al. (2008) propose that exercise may be the simplest method of augmenting the aspects of children's cognitive functioning which are instrumental in cognitive development. Vigorous physical activity in children has been linked to better grades (Coe, Pivarnik, Womack, Reeves, & Malina, 2006) and physical fitness has been linked to academic achievement (Castelli, Hillman, Buck, & Erwin, 2007; Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Lees & Hopkins, 2013; Wittberg, Northrup, Cottrell, & Davis, 2010). Multiple studies have reported a positive correlation between participation in sports and academic achievement (e.g.: Bluechardt et al., 1995; Field, Diego, & Sanders, 2001; Holland & Andre, 1987; Otto & Alwin, 1997; Stegman & Stephens, 2000; Stevenson, 1975).

Fedewa and Ahn (2011) conducted a meta-analysis of research on the effects of physical activity on children's achievement and cognitive outcomes. Their quantitative synthesis covered 59 studies from 1947 to 2009 and results showed that physical activity has a significant and positive effect on children's cognitive achievement, with aerobic exercise having the greatest effect.

2.4 Academic Achievement and Self-Esteem

As discussed in *2.2.4,* global self-esteem may vary when a person either excels or fails in a specific domain which is considered important to them (Crocker, Moeller & Burson, 2010; Crocker, Sommers, & Luhtanen, 2002). Multiple studies suggest a positive link between global self-esteem and academic achievement in children, but the relationship is complex and lacks clarity (Alves-Martins, Peixoto, Gouveia-Pereira, Amaral, & Pedro, 2002). According to Baumeister (2005), a review of more than one hundred studies with over 200 000 students as subjects showed that there is a positive relationship between self-esteem and academic achievement, but correlation does not equal causation. Harter (1982) stated that "constructs such as self-concept and self-esteem are vaguely defined at the conceptual level and therefore do not point to any clear operational definition" (p. 87). Perhaps because of this ambiguity, an earlier review of 128 studies examining the relationship between academic achievement and self-esteem showed a low correlation of 0.212 (Hansford & Hattie, 1982).

Improved measures of self-esteem which include sub-scales, have led to deeper insights into the nature of the relationship between these two constructs. A major longitudinal study (Bachman & O'Malley, 1977) followed 1500 boys as they moved through high school. The authors concluded that the self-esteem of students rose and fell depending on their grades, rather than grades depending on level of self-esteem. Other studies have found similar results, stating that children put effort into academic work at school to achieve higher grades in order to maintain a generally positive global self-esteem (Baumeister et al., 2003). Research by Marsh and Craven (2006) demonstrated that academic self-concept and achievement have reciprocal effects on each other. Marsh and O'Mara (2008) demonstrated that whilst academic self-concept had a measurable reciprocal effect on academic achievement and educational attainment, global self-esteem had no effect. Simply stated, academic achievement appears not to be dependent on high global self-esteem but high self-esteem may be dependent on academic achievement when academic achievement is important to the self.

2.5 Conclusion

This chapter has provided a broad overview of the existing literature on self-esteem, physical activity as it relates to mental health, and physical activity as it relates to academic achievement and cognitive ability, as well as the relationship of these variables to each other. It is clear that although there is a wealth of information on these topics, more research is required to understand the specific mechanisms by which each variable affects the others. The following chapter will describe the methodology used in the current research.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter will discuss the research methodology used in the current study. The chapter begins with a discussion of the research design, followed by the paradigmatic point of departure. The chapter will also cover the sampling method used, the measurement tools, and ethical issues addressed during the study. Finally, the scoring details for the measurement tools and data analysis method employed will also be discussed.

3.2 Research Design

The present study made use of a correlational research design, the goal of which is to observe and describe the interaction between variables (Gravetter & Forzano, 2012). This research strategy is intended to establish that a relationship exists between variables and to describe the nature of that relationship. Since the purpose of this type of research is merely to determine whether there is a connection between the variables, there is no intention of manipulating, controlling or interfering with the variables (Gravetter & Forzano, 2012).

The variables Physical Activity Level, Self-esteem, and Academic Performance were measured for each individual. A correlational analysis was used to determine the strength and direction of the relationship between each of these sets of results (Gravetter & Forzano, 2012).

3.3 Paradigmatic Point of Departure

The current research study falls within the paradigm of Positive Psychology. The term 'Positive Psychology' was initially coined by Maslow in his 1954 book, *Motivation and Personality*, in the title of the final chapter, "Toward a Positive Psychology" (p. 353). In 2000, Seligman and Csikszentmihályi first described their relatively new "science of positive subjective experience, positive individual traits and positive institutions which promises to

improve quality of life and prevent the pathologies that arise when life is barren and meaningless" (p. 5). A comprehensive theory was first put forward by Seligman in 1998 as an alternative to the prevailing doctrine of psychology as providing relief from suffering and addressing pathology (Lee Duckworth, Steen, & Seligman, 2005; Seligman, 1999). According to Seligman and Csikszentmihályi (2000), very little attention had been paid to interventions that enhance the lives of people, enabling them to flourish.

> The message of the positive psychology movement is to remind our field that it has been deformed. Psychology is not just the study of disease, weakness, and damage; it also is the study of strength and virtue. Treatment is not just fixing what is wrong; it is also building what is right. Psychology is not just about illness or health; it is also about work, education, insight, love, growth, and play. And in this quest for what is best, positive psychology does not rely on wishful thinking, self-deception, or hand waving; instead, it tries to adapt what is best in the scientific method to the unique problems that human behaviour presents in all its complexity. (Seligman, 2002, p. 4)

According to Seligman and Csikszentmihályi (2000), the three initial missions of psychology before World War II were to remedy mental illness, to enhance productivity and increase fulfilment in people, and to encourage and improve natural aptitude, or "high talent" (p. 6). The war changed the world and led to a focus on healing and assessing individual mental illness. The positive psychology approach focuses on human strengths as a defence against mental illness such as "courage, future-mindedness, optimism, interpersonal skill, faith, work ethic, hope, honesty, perseverance and the capacity for flow and insight, to name several" (p. 7) and on creating a "new science of human strength whose mission will be to understand and learn how to foster these virtues in young people" (p. 7). Positive psychology is the scientific investigation of optimal functioning (Killam & Kim, 2014).

Improving self-esteem is a way to improve most facets of subjective experience, including emotional and psychological well-being, a positive outlook for the future, social skills as well as group-level values such as responsibility, tolerance and altruism (Seligman &

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Csikszentmihályi, 2000). Positive psychology focuses on promoting accurate self-perceptions and on providing dynamic, effective means of improving quality of life in order to thrive, including developing skills, strengths and relationships, and forming healthy life habits (Killam & Kim, 2014).

Within Positive Psychology, evidence suggests four areas in which physical activity positively impacts mental health (Fox et al., 2000). According to Fox et al. (2000), physical activity may prevent mental health problems; it has been researched as both a treatment for existing mental illness as well as a means to improve the quality of life of people who have mental health problems; finally, it has been studied as a means to improve the psychological well-being of the general populace. Mutrie and Faulkner (2004) contend that these functions place physical activity at the centre of what positive psychology aims to achieve. Physical activity fulfils a preventative function, a function of increasing positive emotions and has a distinct purpose in a positive approach to mental health (Fox et al., 2000; Mutrie & Faulkner, 2004).

3.3.1 Positivistic Positive Psychology

This new vision of positive psychology encourages psychologists to conduct rigorous research on the positive aspects of human behaviour (Mruk, 2006). Positivistic positive psychology provides a framework that encompasses theory, research and practice (Compton, 2005). It strives to separate itself from the earlier, humanistic version of positive psychology by embracing the traditional empirical naturalistic paradigm and its commitment to quantitative research methods (Seligman & Csikszentmihályi, 2000).

Seligman and Csikszentmihályi (2001) support an objective and value-free observation of the world which has been described as an "impossibly objective vantage point entirely beyond the human fray […], a kind of God's eye point of view" (Richardson & Guignon, 2008, p. 615). There are proponents of a shift from this abstractionist ontological viewpoint toward a more relational ontology where 'objective' and 'subjective' domains of being are not ontologically separate from one another but intersect and complement each other to create a holistic way of being (Slife & Richardson, 2008). As it stands, Positive

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Psychology adopts a positivist philosophy of science, which parallels the current research study's methodological considerations.

3.4 Sampling

The study was limited to a single private school in Johannesburg that uses English as the medium of instruction. This is as a consequence of logistics and the limited budget available to a student researcher. Purposive sampling (Gravetter & Forzano, 2012) was used to determine suitable candidates for the research study. The inclusion criteria for participation in the study included the requirement that the child speaks English as a first or home language and that that child has attended the selected school since Grade 1. This was to ensure, as far as possible, language proficiency in the language used in the questionnaires.

Once the school was identified and the study was approved by the Operational Head of the school, 80 children in grade 4 (aged 9-10) were invited to participate in the study. The population for the current research is all 9 to 10 year olds as studies show that increased physical activity at age 9 is a predictor of improved self-esteem at ages 11 to 13 (Schmalz et al., 2007).

3.5 Sample Description

Only 33 parents gave consent for their children to participate in the study. Demographic data was collected using the Piers Harris Children's Self-Concept Scale, 2nd Edition (Piers-Harris 2). The demographic characteristics of the sample will be outlined below.

3.5.1 Age

Figure 3.1 shows the frequency distribution of ages, in years, for participants. Ages ranged from 9 years, 8 months and 27 days to 11 years, 4 months and 16 days. The mean age for participants was 10.36 years with a standard deviation of 0.41.
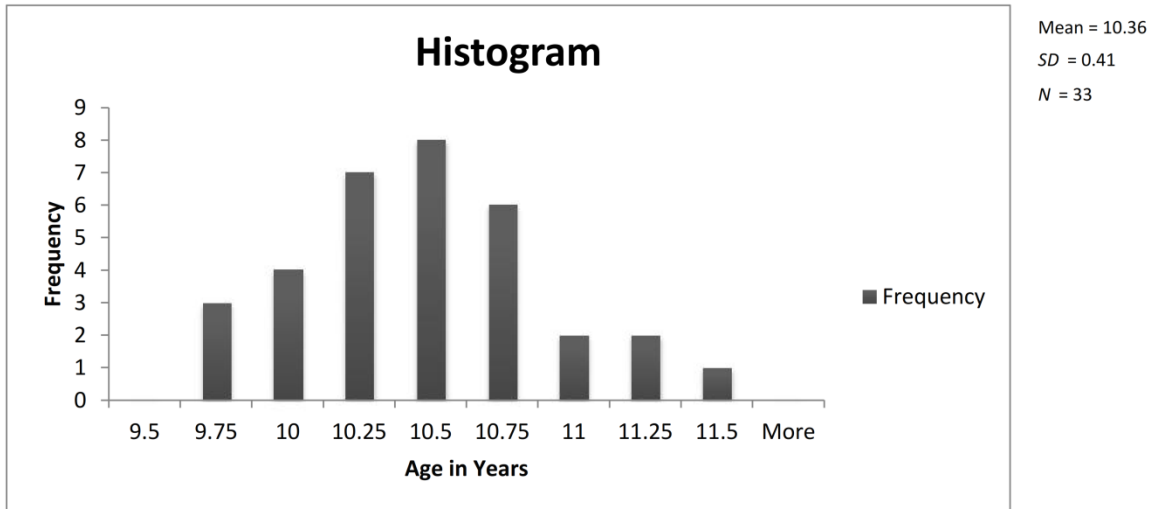
Figure 3.1. Frequency Distribution of Age of Sample

3.5.2 Gender

The sample consisted of 17 boys and 16 girls. Figure 3.2 shows the distribution of gender in the sample.
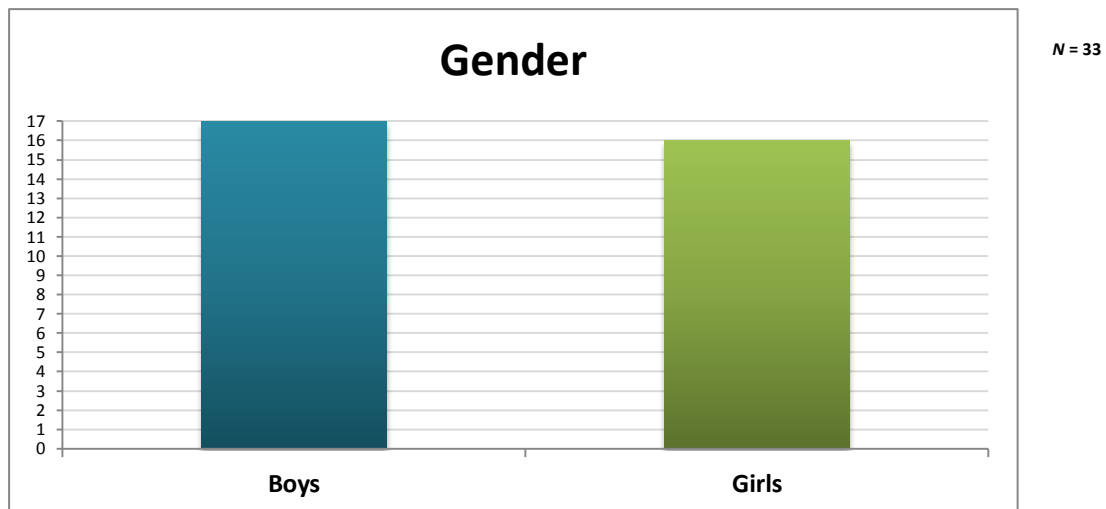
Figure 3.2. Gender Distribution of Sample

3.5.3 Race/Ethnicity

The sample comprised 40% White participants (n = 13), 33% Black participants (n = 11), 21% who self-labelled as "Other" (n = 7) and 6% Asian participants (n = 2). Figure 3.3

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shows the racial/ethnic composition of the sample. "Other" comprised children who self-identified as either "Mixed-race" or "Indian".

Race / Ethnicity
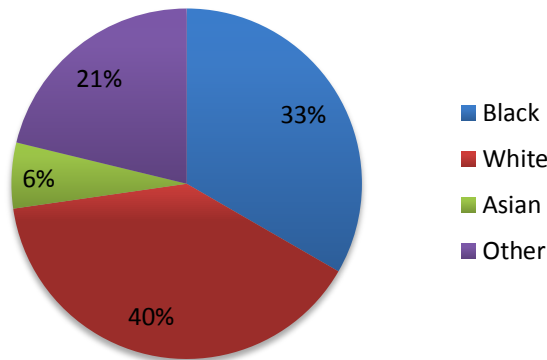
Figure 3.3. Racial / Ethnic Composition of Sample

3.6 Measurement Instruments

To measure the relationship between self-esteem, physical activity and academic achievement, the Piers-Harris Children's Self-Concept Scale (Piers-Harris 2), the Physical Activity Questionnaire for Older Children (PAQ-C) and Academic Progress Reports were used. The Piers-Harris 2 contained items for demographic information. Each measure will be discussed in detail below.

3.6.1 Self-Esteem

3.6.1.1 Piers Harris Children's Self-Concept Scale, 2nd Edition (Piers-Harris 2)

All participants completed the Piers-Harris 2, one of the most frequently-utilised measures of psychological well-being in children and adolescents (Piers & Herzberg, 2002). According to Piers and Herzberg (2002), the Piers-Harris 2 is cited in more than 500 professional journals in psychology, education and health sciences. The measure is appropriate for children aged 7 to 18 years and has been widely used in research on self-esteem in diverse countries, settings, social, national, and minority groups (Jeske, 1985;

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Piers & Herzberg, 2002), including South Africa where it has been administered to black, white and mixed-race children (De Saxe, 1979; Dunstan & Nieuwoudt, 1994; Kelly & Duckitt, 1995; Skuy, Gaydon, Hoffenberg, & Fridjhon, 1990; Skuy et al., 1995; Swartzberg, 1982). The scale comprises 60 items covering six domain scales (*see 3.7.1.2*), which are presented in a simple yes-no format, written at a second-grade reading level (Piers & Herzberg, 2002).

The paper and pencil version of the test with Autoscore™ answer sheets was administered to the participants as a group in two sessions and took approximately 15 minutes to complete. It was administered and hand-scored by the researcher, using the Autoscore™ answer sheets and the manual provided by the distributor. The Piers-Harris 2 measures six domain areas as well as overall self-concept (Piers & Herzberg, 2002). The assessment is based on the child's own insights and awareness rather than on interpretations by either teachers or parents.

3.6.1.2 Reliability of the Piers-Harris 2

Internal consistency is the degree to which the items that the scale is made up of are all assessing the same underlying attribute (Gravetter & Forzano, 2012). According to Pallant (2010), the most commonly used statistic is Cronbach's coefficient alpha (α). The Cronbach's coefficient alpha indicates the average correlation among all the items that make up the scale (Pallant, 2010). Values range from 0 to 1, with higher values indicating greater reliability and, depending on the type of scale and what it is being used to measure, different levels of reliability are required (Pallant, 2010). Nunnally (1978) recommends a minimum level of 0.7.

A review of the Piers-Harris 2 was conducted in 2011 by the Community-University Partnership for the Study of Children, Youth, and Families (CUP). The review analysed findings by Demetrios and Foudoulaki (2002), Gans, Maureen and Ghany (2003), Kelley (2005), as well as Piers and Herzberg (2002) to investigate the reliability and validity of the Piers-Harris 2 (CUP, 2011). An analysis of internal consistency of the Piers-Harris 2 yielded a Cronbach's alpha of $\alpha = 0.91$ for the TOT scale, $\alpha = 0.81$ for the BEH scale, $\alpha = 0.81$ for the INT, $\alpha = 0.75$ for the PHY scale, $\alpha = 0.81$ for the FRE, $\alpha = 0.74$ for the POP and $\alpha = 0.77$ for

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the HAP scale, indicating good internal consistency throughout the domain scales (CUP, 2011).

Test-retest reliability results provided in the test manual were based on the original Piers-Harris Children's Self-Concept Scale, which is psychometrically equivalent to the Piers-Harris 2 (Piers & Herzberg, 2002). The original scale consisted of 80 items and coefficients were cited as α = 0.77 for both two- and four- month intervals between testing, indicating stability across testing (CUP, 2011). According to the review conducted by Butler and Gasson (2005), test-retest reliability for the Piers-Harris 2 reported a Cronbach's alpha coefficient of 0.69 at two weeks (N = 182) and 0.75 at ten weeks (N = 173).

Due to the relatively small sample size for the current study, a Cronbach's coefficient alpha was not determined for the instrument. A minimum sample size of 50 is recommended when calculating internal consistency, as smaller sample sizes yield results with large standard errors, which renders detection of significant results difficult (Javali, Gudaganavar, & Raj, 2011).

3.6.1.3 Validity of the Piers-Harris 2

During the development of the Piers-Harris 2, it was determined by clinical judges that the content validity would not be affected by the 20 item reduction from the original Piers-Harris to the Piers-Harris 2 (Piers & Herzberg, 2002). According to Piers and Herzberg (2002), the items in the original Piers-Harris were developed with the aim of maximising content validity. The original factor analysis conducted by Piers (1963, as cited in Piers & Herzberg, 2002) identified six clusters that became the domain scales: Behaviour, Intellectual and School Status, Physical Appearance and Attributes, Anxiety, Popularity, and Happiness and Satisfaction.

Construct validity was determined by the test developers using inter-scale correlation analysis and factor analysis (Piers & Herzberg, 2002). Inter-scale correlational analysis provides evidence that domain scales on the Piers-Harris 2 demonstrate moderate to high correlations with each other (Piers & Herzberg, 2002). The domain scales also

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correlate strongly with the overall total score (Piers & Herzberg, 2002). Convergent validity of the Piers-Harris 2 with the Coopersmith Self-Esteem Inventory was determined to be 0.85, and with the Tennessee Self-Concept Scale: 2 Child Version, 0.51 to 0.61 (Butler & Gasson, 2005).

3.6.2 Level of Physical Activity

Levels of physical activity were measured using The Physical Activity Questionnaire for Older Children (PAQ-C) (Kowalski, Crocker, & Donen, 2004) which was modified to include common South African sports (*see Appendix F*).

3.6.2.1 The Physical Activity Questionnaire for Older Children (PAQ-C)

The PAQ-C is a self-administered seven-day recall questionnaire, which assesses whether children who are in grade 3 or above have partaken in habitual moderate to vigorous physical activity in the past week. "The PAQ-C can be administered in a classroom setting and provides a summary physical activity score derived from nine items, each scored on a 5-point scale" (Kowalski et al., 2004, p. 5). A summary score was obtained, using the instructions detailed in the Physical Activity Questionnaire for Older Children (PAQ-C) manual (Kowalski et al., 2004).

3.6.2.2 Reliability of the PAQ-C

Reliability of the PAQ-C is considered to be moderate (Richardson, Cavill, Ells, & Roberts, 2011). The scale reliability was examined using Cronbach's Alpha. Testing was conducted by Crocker, Bailey, Faulkner, Kowalski and McGrath (1997). The PAQ-C was administered to (N = 215, N = 84, and N = 200) children between the ages of 8 to 16 at a public school, during the school year (Crocker et al., 1997). Scale reliability for girls (Cronbach's α = 0.83) and boys (Cronbach's α = 0.80) are considered to be acceptable, with the combined sample having a Cronbach's α value of 0.83 (Crocker et al., 1997).

A second study was conducted to determine the test re-test reliability, internal consistency and gender-sensitivity of the PAQ-C. Forty-three boys and forty-one girls (aged 9 to 14) were assessed using the PAQ-C twice during school hours with a one-week interval between assessments. The PAQ-C was relatively stable over the one-week assessment window (boys, $r = 0.75$ and girls, $r = 0.82$) (Crocker et al., 1997). Results showed that the boys were more active than the girls for both weeks, $t (82) = 1.93$, $p < 0.05$ and $t (82) = 1.97$, $p < 0.05$ respectively (Crocker et al., 1997). The results of this study show support for the test-retest reliability of the PAQ-C, as well as indicating that the PAQ-C was sensitive to gender differences in physical activity levels (Crocker et al., 1997).

As was the case with the Piers-Harris, reliability of this instrument could not be determined due to the relatively small sample size of the current study.

3.6.2.3 Validity of the PAQ-C

The measure has a consistently high validity (Richardson et al., 2011). Two studies by Kowalski, Crocker and Faulkner (1997) were conducted and showed support for the PAQ-C as a valid measure of general physical activity levels. Two independent samples ($N = 89$ and $N = 97$) of children in grades 4 to 8 completed the PAQ-C together with other physical activity measures.

The studies examined the convergent, construct, and divergent validity of the PAQ-C (Kowalski et al., 1997). The first sample comprised thirty-eight boys and fifty-one girls aged 8 to 13, who completed a Behavioural Conduct Scale, an Athletic Competence Scale, the PAQ-C, and an Activity Rating (Kowalski et al., 1997). Teachers completed a Teacher's Rating of Physical Activity questionnaire and the children completed the Moderate to Vigorous Physical Activity (MVPA) Questionnaire every day for one week (Kowalski et al., 1997).

Moderate relationships were calculated with the Activity Rating ($r = 0.63$), a one-week summation of 24-hour MVPA recalls ($r = 0.53$), and Teacher's Rating of Physical Activity ($r = 0.45$), which supported the convergent validity of the PAQ-C (Kowalski et al.,

1997). The PAQ-C's moderate correlation with Athletic Competence Scale ($r = 0.48$) provided support for the construct validity of the PAQ-C (Kowalski et al., 1997). There was no relationship between the Behavioural Conduct Scale and the PAQ-C, which supports the divergent validity of the PAQ-C (Kowalski et al., 1997).

The second study sample included forty-one boys and fifty-six girls who completed the PAQ-C, an Activity Rating, the Leisure Time Exercise Questionnaire (LTEQ), the Seven-Day Recall Interview and wore the Caltrac Motion Sensor (Caltrac) (Kowalski et al., 1997). The PAQ-C was moderately related to the Activity Rating ($r = 0.57$), LTEQ ($r = 0.41$), the Seven-Day Recall Interview ($r = 0.46$) and Caltrac ($r = 0.39$) (Kowalski et al., 1997). These results support the validity of the PAQ-C.

3.6.3 Academic Performance

Academic performance was measured as the mean score of each participant's school grades for the year, up to the end of their last examination period. As the data was collected at the end of the third academic term, an overall mean score was calculated for each child using the mean score for each of the three terms.

3.7 Data Collection Procedure

A meeting was held with the Vice Principal of the school, during which it was decided that a total of 80 letters would be given out to parents of four of the classes in grade 4. This was to allow for letters being misplaced by children or other unforeseen circumstances which might prevent a minimum of thirty positive responses being returned. A date was set for data collection. The letters were sent to parents / caregivers, detailing the research to be conducted at the school (*see Appendix C*). The letter described the aims and objectives of the research, as well as the data collection procedures to be followed and contact details of the researcher in the event that there were further concerns that the parent might wish to have addressed. Attached to each letter was an informed consent form (*see Appendix D*), which was to be signed by the parent / caregiver and returned to the school.

It was decided that returned informed consent letters would be collected from the children by the class teachers and given to the researcher on the date that was arranged for data collection. As only twenty-seven informed consent documents were returned on the set date, and the minimum required sample was thirty, it was determined that a further data collection date would need to be arranged. It was decided to continue with the initial data collection as the majority of the children would be attending a camp the following week, and soon after their return, the school would close at the end of the school term.

A further twenty letters and informed consent documents were distributed to children who were in a different grade 4 class. Six more informed consent documents were returned, following which, a second day of data collection was arranged with the grade 4 Head Teacher.

Data Collection, Day One

Twenty-seven children were gathered in a small hall during school assembly time, before the beginning of the school day. The researcher introduced herself and explained the aims and objectives of the procedure in age-appropriate language and gave the participants an opportunity to ask any questions. The children were given assent forms to complete (*see Appendix E*), after the purpose of the document was explained. The children were assured that they could withdraw at any time, without giving a reason, with no negative consequences. Once the assent forms had been signed and collected, the data collection proceeded.

The participants began by completing the Piers-Harris 2. The researcher read aloud the instructions printed in the test manual. The children were assured that the contents of their responses on each questionnaire would remain confidential, that the measure was not a test and that there were no right or wrong answers as the statements contain information about how a person feels and each person feels differently about different things. Confidentiality was explained to the participants in age-appropriate terms. The children were allowed to proceed at their own pace and the measure took approximately 15 minutes for all participants to complete.

The second measure to be administered was the Physical Activity Questionnaire for Older Children (PAQ-C) (adapted to include common South African sports). The participants were asked to think back over the past seven days and to remember any sports or physical activities that they had taken part in. This included any physical activity that made them breathe harder than when they were resting. They were asked to record their physical activity on the PAQ-C answer sheet. The measure took approximately ten minutes for all participants to complete. The researcher was available to answer any questions that arose during and after the administration of the questionnaires. Twenty-seven complete data sets were collected.

Data Collection, Day Two

Day two of the data collection process took place nine days later in a school classroom during school assembly time, before the start of the school day. Six participants took part in the second data collection session and the researcher took care to follow the same procedure as in the first data collection process. The researcher explained the process in age-appropriate language and explained that the children would be able to stop at any time without any consequences if they did not want to take part. The children completed and signed assent forms and the data collection proceeded.

The children completed the Piers-Harris 2 first, after being given the same instructions as the previous group. The measure took approximately 15 minutes for all six participants to complete, as with the first group. The second measure to be administered was the PAQ-C. Once again, the measure took approximately ten minutes for all participants to complete. The researcher remained available to answer any questions that arose during and after the administration of the questionnaires. Six complete data sets were collected on day two. In total, thirty-three complete data sets were collected on day one and day two.

The Grade 4 Head Teacher provided a digital copy of each participant's academic progress report for 2016. As the data were collected at the end of the school's third term, there were three sets of results per participant.

3.8 Calculating Scores of Measurement Instruments

3.8.1 Piers-Harris Scales

Raw scores were converted by the researcher to standardized t-scores (mean = 50, standard deviation = 10), using the "The Way I Feel About Myself" Autoscore™ forms ordered from the publisher (*see Appendix G*) (Piers & Herzberg, 2002). The Autoscore answer sheet contains a Profile Sheet, where raw scores are converted to t-scores. Raw scores are plotted at points in columns relating to the domain scores, and the corresponding t-score values are found along the left and right margins of the Profile Sheet in the same row as the raw score for that domain. A description of the scales follows.

3.8.1.1 Total Score (TOT)

The most reliable measure on the Piers-Harris 2, with the most research support is the TOT score (Piers & Herzberg, 2002). The TOT score is the sum total of the answers given that correlate with positive self-concept. As it is a measure of general self-concept, higher scores indicate a positive self-concept (i.e., a high degree of self-esteem) and lower scores indicate a lower self-concept or self-esteem (Piers & Herzberg, 2002).

T-Score ranges for the Total Score (TOT) scale are:

- $\leq 29T$ is very low
- 30T - 39T is low
- 40T - 44T is low average
- 45T - 55T is average
- 56T - 59T is high average
- 60T - 69T is high and
- $\geq 70T$ is very high (Piers & Herzberg, 2002).

Low Range

According to Piers and Herzberg (2002), low scores on the TOT scale ($\leq$ 39T) are typical of children with serious doubts about their own self-worth. Children with scores in this range usually lack confidence, regard themselves as being less capable than their peers, may find it more difficult to make friends, consider themselves to be unpopular and are more likely to be socially isolated (Piers & Herzberg, 2002). Children whose scores fall on or below 39T are more likely to be easily discouraged, and less likely to persevere with difficult tasks (Piers & Herzberg, 2002). Children with scores in the very low range ($\leq$ 29T) frequently report feeling anxious and having general feelings of unhappiness and should be referred for further clinical attention immediately (Piers & Herzberg, 2002). "Negative exaggeration (faking bad) is relatively rare in children, so low TOT scores usually reflect true disturbances in self-esteem" (Piers & Herzberg, 2002, p. 21).

Average Range

TOT scores that fall within the range of 40T to 59T are considered to be within normal limits (Piers & Herzberg, 2002). Children with this range of scores report self-esteem levels that are similar to that of most children in the standardisation sample (Piers & Herzberg, 2002). Scores in this range represent children who have a balanced view of the self, with integration of both positive and negative aspects of the self (Piers & Herzberg, 2002).

High Range

Scores that are equal to or higher than 60T indicate children and adolescents with a strongly positive general self-regard (Piers & Herzberg, 2002). Children who fall within this range are generally more confident in their abilities across more domains (Piers & Herzberg, 2002). These scores indicate individuals who are likely to be more motivated, more likely to persevere in the face of difficulty and are more willing to try novel tasks (Piers & Herzberg, 2002). They see themselves as more likeable and have more positive relationships with

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peers and family members, and are more likely to describe themselves as happy and fairly carefree (Piers & Herzberg, 2002).

3.8.1.2 Domain Scales

One of the major strengths of the Piers-Harris 2 is that the measure contains domain scales which allow for evaluation of children's relative strengths in different areas. Two children may have the same global self-esteem (TOT) score which falls in the average range (40T to 59T), indicating similar levels of overall self-esteem. In this scenario, one of the children could have mostly similar domain scale scores, all falling in the average range, whilst the other could have some domains with low scores and some with high scores (Piers & Herzberg, 2002).

There are six domain scales in the Piers-Harris 2, which can be summarised as follows (Piers & Herzberg, 2002):

• Behavioural Adjustment (BEH): 14-item scale that measures admission or denial of problematic behaviours.

• Intellectual and School Status (INT): 16-item scale that measures the child's evaluation of his or her own abilities in terms of intellectual and academic tasks, as well as the child's general contentment at school and expectations for the future in this area.

• Physical Appearance and Attributes (PHY): 11-item scale that measures a child's assessment of his or her own physical appearance as well as their appraisals of certain personality attributes such as ability to express one's ideas and leadership abilities.

• Freedom from Anxiety (FRE): 14-item scale that measures anxiety and dysphoric mood. This scale includes items that tap some "specific emotions, including worry, nervousness, shyness, sadness, fear and a general feeling of being left out of things" (Piers & Herzberg, 2002, p. 25).

• Popularity (POP): 12-item scale that captures the child's evaluation of his or her own social functioning.

• Happiness and Satisfaction (HAP): 10-item scale that measures a child's feelings of happiness and satisfaction with life.

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According to Piers and Herzberg (2002), the domain scales are a reflection of the assumption that self-concept is multi-dimensional. As discussed in Chapter 2 (*see 2.2.2.5*), children's global self-esteem (as reflected in the TOT score) is made up of various specific evaluations of their own feelings, abilities and behaviours (reflected in the domain scores). Implicit in this view is the assumption that children may evaluate themselves differently in various areas, for example in intellectual functioning versus popularity (Piers & Herzberg, 2002). These domain scales can be used to determine areas where a child's self-concept is stronger, as well as areas of particular vulnerability (Piers & Herzberg, 2002).

For the six subscales, T-Score ranges are:

- < 29T is very low

- 30T - 39T is low

- 40T - 44T is low average

- 45T - 55T is average and

- >56T is above average (Piers & Herzberg, 2002).

Although the main focus of the current research will be on the Global Self-esteem (TOT) scale, the Physical Appearance and Attributes (PHY) scale and the Intellectual and School Status (INT) scale, in accordance with the research hypotheses (*see 1.7.3*), a brief outline of the interpretation of all domain scores follows.

Behavioural Adjustment (BEH)

Children with scores in the low range (equal to or below 39T) see themselves as frequently causing trouble, either at home or at school with authority figures (Piers & Herzberg, 2002). Scores in the average range (40T to 55T) fall within the typical response range of the standardisation sample, and view themselves as relatively well-behaved, with minor conduct difficulties (Piers & Herzberg, 2002). Scores which fall in the above average range (greater than or equal to 56T) perceive themselves to be well-behaved and rule-compliant (Piers & Herzberg, 2002).

Intellectual and School Status (INT)

Children who score in the low range (less than or equal to 39T) are aware of a number of difficulties on academic-related tasks (Piers & Herzberg, 2002). Children in the average range (40T to 55T) have a balanced self-assessment in this area and view themselves as coping fairly well with the cognitive demands of the academic realm, but acknowledge a few difficulties (Piers & Herzberg, 2002). Those with above average scores (over 56T) are generally confident in their abilities in academic arenas, as well as in more general intellectual tasks (Piers & Herzberg, 2002).

Physical Appearance and Attributes (PHY)

Lower scores (equal to or below 39T) indicate the likelihood of low self-esteem in relation to body image and physical strength and ability (Piers & Herzberg, 2002). Scores in the average range (40T to 55T) indicate positive as well as negative self-evaluation of both physical attributes (appearance) and physical strength and abilities, with the positive evaluations outweighing the negative (Piers & Herzberg, 2002). This balanced self-appraisal is in line with that of a typical child in the standardisation sample (Piers & Herzberg, 2002). Those who score in the upper ranges (equal to or higher than 56T) are indicating general satisfaction with their physical appearance and abilities (Piers & Herzberg, 2002). They also see themselves as intelligent, physically strong and capable of leadership in games and sports (Piers & Herzberg, 2002).

Freedom from Anxiety (FRE)

Children who score in the low range on this scale (less than or equal to 39T) are recognising significant issues with dysphoric mood or a general sense of anxiety (Piers & Herzberg, 2002). Low scores may also indicate "feeling dissatisfied with one's appearance, feeling left out socially, and wishing one were different in some fundamental way" (Piers & Herzberg, 2002, p. 26). Children with average scores (40T to 55T) acknowledge mostly positive emotional states, whilst still being aware of a few difficulties related to mood (Piers & Herzberg, 2002). Above average scores (equal to or higher than 56T) indicate children

who are denying that they are concerned by feelings of sadness, nervousness, worry, or other negative mood states (Piers & Herzberg, 2002).

Popularity (POP)

Scores of 39T or below indicate children who are unhappy with their level of social functioning, are dissatisfied with their friendships or who feel socially isolated (Piers & Herzberg, 2002). Low scores may reflect shyness, lack of interpersonal skills or unpopular personality traits (Piers & Herzberg, 2002). Average scores (40T to 55T) indicate children who are mostly content with their social functioning, but may experience a few difficulties with peer interactions (Piers & Herzberg, 2002). High scores (equal to or higher than 56T) indicate children who do not feel that they are teased, who feel well-liked and who feel that their peers wish to include them in games, sports and other leisure activities (Piers & Herzberg, 2002).

Happiness and Satisfaction (HAP)

Low scores (39T and below) indicate children who feel general unhappiness and low satisfaction with themselves (Piers & Herzberg, 2002). Scores in the average range (40T – 55T) show a balanced view of general life circumstances, with acknowledgement of both positive and negative aspects (Piers & Herzberg, 2002). Children with above average scores (56T and above) evaluate their general life conditions in a positive way, with a global feeling of well-being (Piers & Herzberg, 2002).

3.8.2 Physical Activity Questionnaire for Older Children (PAQ-C)

Each of the 9 items in the PAQ-C is given a value from 1 (low) to 5 (high). The total is calculated, giving a composite score (Kowalski et al., 2004). Item 1 assesses which physical activities or sports were engaged in during the child's spare time in the past 7 days; items 2 to 7 assess the frequency of physical activity during school breaks (recess/lunch), after school, in the evenings and on the weekend for the previous week; item 8 assesses *level* of physical activity for each day of the past week during free time; item 9 assesses the

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frequency of physical activity for each day of the previous week; and item 10 determines whether there was any reason that physical activity levels in the past 7 days was unusual for any reason (Kowalski et al., 2004).

The mean of these 9 items is calculated, to give the final PAQ-C activity score:

- 1 indicates low physical activity

- 3 indicates moderate physical activity

- 5 indicates high physical activity (Kowalski et al., 2004).

3.8.3 Academic Performance

Academic performance was measured using the grades in each participant's academic progress report for 2016. The academic progress reports measure each child's academic achievement as a percentage per school subject for each school term, as well as an overall mean score for each term's grades. The grade 4 school subjects are:

- English First Language

- Afrikaans First Additional Language

- Mathematics

- Life Skills

- Natural Sciences and Technology

- Social Sciences: Geography & History

3.9 Data Analysis

Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS)$^{®}$ Version 23. Data analysis consisted of a combination of descriptive and inferential statistics. Descriptive statistics include the mean, standard deviation, range of scores, skewness and kurtosis (Pallant, 2010). Tests of normality were conducted to determine whether the data were parametric or non-parametric (Pallant, 2010), following which, a correlational analysis was performed, using Spearman's Rho.

3.10 Ethical Considerations

Written permission for conducting the study was obtained from the Operational Head of the school. Ethical approval was granted by the University of Pretoria. The University of Pretoria subscribes to specific laws, policies and guidelines when working with children, as outlined in the document compiled for the University of Pretoria's Department of Educational Psychology (Human-Vogel, 2007). The researcher stringently applied the ethical guidelines outlined by the university ethics committee.

3.10.1 Voluntary Participation

"Voluntary informed consent is universally accepted as a precondition for scientific research involving human beings" (Marshall et al., 2006, p. 1989). Voluntary participation means that the research participants are aware that they may withdraw from the research procedure at any point, for any reason, with no adverse consequences (Gravetter & Forzano, 2012). In order to ensure that participation in the current research met the criteria for voluntary informed consent, the researcher followed the procedures outlined below.

3.10.2 Informed Parental Consent

According to Gravetter and Forzano (2012), there are international guidelines for ensuring that ethical procedures are followed in research, with specific requirements for obtaining informed consent. In line with these guidelines, a letter was sent to each parent (the term "parent" refers here to the legal guardian of the child) which introduced the researcher, the research topic and detailed the procedures which would be followed (*see Appendix C*). A contact telephone number was provided, in the event that any parent or guardian had any questions for the researcher. Each parent was required to sign an Informed Consent document (*see Appendix D*), giving consent for their child to take part in the study.

3.10.3 Child's Assent

For persons who are not legally capable of giving informed consent, researchers are required to provide an age-appropriate explanation, and acquire the individual's assent (Gravetter & Forzano, 2012). After detailing the procedure and the limits of confidentiality to the participants in age-appropriate terminology, there was an opportunity for the children to ask the researcher any questions. All issues which arose were addressed in an age- and developmentally-appropriate manner. The children were assured, once again using age-appropriate language, that they had a right to refuse to participate for any reason at any time without prejudice. Each participant then signed an Assent Form (*see Appendix E*), agreeing to participate in the research study.

3.10.4 Privacy

All precautions have been taken to ensure that any personal data collected from the children will be kept confidential and that any personally-identifying information has not been included in the final report. The concept of confidentiality was explained to the participants in age-appropriate language and any uncertainties were further elucidated. All research documents have been stored securely, as per University of Pretoria policy and data files containing personally-identifying data have been encrypted and password-protected.

3.10.5 Trust

As children are particularly vulnerable in a research study due to the unequal power relationship between children participants and adult researchers, special care was taken to ensure that no pressure to participate was placed upon the children by the researcher.

3.11 Conclusion

This chapter discussed the research methodology utilised in the current study. The chapter detailed the measurement tools used to collect the data as well as data collection procedures. The chapter covered ethical considerations and how the researcher dealt with

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ethical issues that arose during the course of the study. Chapter 4 will focus on the results obtained from the collected data.

CHAPTER 4

RESULTS

4.1 Introduction

As stated in 1.7.1, the primary aim of the current study is to determine if there is a correlation between levels of physical activity, self-esteem and academic achievement in grade 4 children in South Africa. Quantitative data were collected, scored and analysed. This chapter will detail the results of the data collection and analysis. The interpretation and discussion of the results will be covered in Chapter 5.

4.2 Instrument Scoring

4.2.1 Piers-Harris 2

The Piers-Harris 2 consists of 60 short statements, which are answered with either "yes" or "no". The items were completed by the participant on the front and back of the Piers-Harris 2 "The Way I Feel About Myself" Autoscore™ form (Piers & Herzberg, 2002). Answers are duplicated, using internal carbon paper, onto the scoring worksheet contained inside the answer sheet.

4.2.1.1 Calculating the Validity Scores

According to the manual (Piers & Herzberg, 2002), the Piers-Harris 2 can be marked if there are up to six invalid responses. This includes items that have been left out by the participant or where the participant has marked both "yes" and "no" for a single statement. If any single scale contains more than three invalid responses, it should not be scored (Piers & Herzberg, 2002). There were no invalid responses in the sample group.

In addition, there are two validity tests built in to the Piers-Harris 2, the Inconsistent Responding (INC) index and the Response Bias (RES) index. There are fifteen item pairs in the INC index. The researcher checks the responses recorded by the participant. An example

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is, "Item 1 = 0 and Item 47 = 1". In this example, Item 1 refers to the statement, "My classmates make fun of me" and Item 47 refers to the statement, "People pick on me". If the participant marked "no" for Item 1 and "yes" for Item 47, this would be considered to be inconsistent and the pair is scored with 1 on the INC index. The number of INC items with a score of 1 is added to give the total raw score for the INC scale (Piers & Herzberg, 2002). A raw score of 4 or more on the INC scale may indicate that the child has answered inconsistently to at least some of the statements on the questionnaire. According to Piers and Herzberg (2002), this is a somewhat arbitrary cut-off point and may require further investigation with the child when the measure is being used for assessment purposes. In the current sample, it was noted that some of the male participants marked Item 44 "I am good-looking" as "yes" and Item 49 "I have a pleasant face" as "no", which is considered to be inconsistent, using the INC scale checks. The researcher postulates that this may be due to a difference in the perceived meaning of the word "pleasant" by the male participants.

The RES index raw score is a built-in measure of the tendency for a participant to agree or disagree with the statements, regardless of the content (Piers & Herzberg, 2002). The scale is designed to balance out positively- and negatively-worded statements, with 25 items where a "yes" response indicates a positive self-concept and 35 items where a "yes" response indicates a negative self-concept (Piers & Herzberg, 2002). The RES scale can be used to assess whether the child is merely marking "yes" or "no" to most statements, irrespective of the content of the item. Higher RES scores indicate a predilection for answering "yes" and lower RES scores indicate a tendency to answer "no". Moderate response bias does not affect the validity of the Piers-Harris 2 scores, but if a child has a raw score of 40 or above (T $\geq$ 70), or 18 or below (T $\leq$ 30), results should not be interpreted (Piers & Herzberg, 2002). There were no scores in the invalid range in the sample group.

4.2.1.2 Calculating the Total and Domain Scores

The Self-Concept raw scores include both the Total (TOT) Score and the scores for the six domain scales: Behavioural Adjustment (BEH), Intellectual and School Status (INT), Physical Appearance and Attributes (PHY), Freedom from Anxiety (FRE), Popularity (POP), and Happiness and Satisfaction (HAP).

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The Autoscore answer sheet's internal scoring worksheet automatically captures the "yes" and "no" answers and converts them to scores of 0 or 1 for each item. The raw TOT score is calculated by adding up the total number of items which have a score of 1. To the right of the item response column are six columns, one for each of the domain scales. For each item which scores 1, checks are placed in the check-boxes for the domain scales which that statement encompasses, in the same row. A single item may cover one or more of the domain scales. Raw scores for each domain are calculated by counting the number of check marks in each domain scale column and recording the total on the worksheet (*see Figure 4.1 below, and Appendix H).*

Figure 4.1. Scoring worksheet for the Piers-Harris 2 (Piers & Herzberg, 2002). Copyright 2002 by Ellen V. Piers and Dale B. Harris. Reprinted with Permission.

Each Piers-Harris 2 Autoscore answer sheet contains a Profile Sheet. Raw scores are converted to T-scores and percentile ranks, which are found along the left and right margins of the Profile Sheet (*see Appendix G*). The normalised T-score is the primary standard score used to interpret the Piers-Harris 2 scores and have a mean of 50 and a standard deviation

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of 10 (Piers & Herzberg, 2002). Raw scores are plotted on the Profile Sheet and the corresponding T-score and percentile rank can be found in the same row that contains the raw score, along the left and right margins. Scores obtained for the research sample can be found in Table 4.1, which also contains demographic data collected using the Piers-Harris 2 answer sheet for each participant.

Table 4.1

Piers-Harris 2 T-Scores (Including Sample Demographic Data)

Participant	Validity Scales		Total	Domain Scales						Gender	Age		Race / Ethnicity			
	INC	RES	TOT	BEH	INT	PHY	FRE	POP	HAP	M / F	Months	Days	Black	White	Asian	Other
1	53	63	49	49	48	58	43	47	59	m	122	11			1	
2	43	61	44	46	40	58	46	50	47	m	121	7		1		
3	43	50	66	49	65	65	65	60	59	m	127	22		1		
4	43	48	60	62	65	52	51	60	59	f	124	3	1			
5	43	61	49	62	51	52	39	39	47	f	128	9		1		
6	43	56	47	49	42	52	43	44	47	m	133	3	1			
7	43	38	45	54	51	35	51	39	47	f	123	16		1		
8	43	54	61	54	59	65	54	50	59	m	116	25		1		
9	53	43	51	46	59	45	58	50	47	m	116	27	1			
10	43	58	53	54	59	58	46	47	59	f	128	6		1		
11	43	50	61	62	59	58	58	50	59	f	116	26	1			
12	53	48	63	62	54	65	54	60	59	m	125	26	1			
13	43	46	66	49	59	65	65	68	59	f	121	18	1			
14	60	46	66	62	59	58	58	60	59	m	117	22				1
15	60	56	44	46	46	45	46	47	51	f	126	19	1			
16	43	50	66	62	59	65	54	60	59	m	125	17				1
17	53	56	60	49	59	58	54	54	51	f	122	29	1			
18	53	61	42	49	46	45	31	41	37	f	117	15			1	
19	53	46	58	54	51	58	58	54	59	m	123	1				1
20	53	60	47	49	40	58	43	50	47	f	120	13				1
21	43	38	63	62	54	58	65	60	59	m	129	3		1		
22	53	52	46	46	44	45	51	41	51	f	125	8		1		
23	43	61	41	41	38	45	41	41	47	f	119	22	1			
24	43	48	69	62	65	65	58	60	59	f	126	0				1
25	53	43	55	54	59	48	54	50	59	f	120	22	1			
26	53	43	63	62	59	52	65	50	59	m	119	25		1		
27	53	46	58	49	59	58	48	60	51	m	133	16		1		
28	60	50	45	46	36	52	43	50	43	m	133	14				1
29	43	43	69	62	65	58	65	60	59	f	124	7	1			
30	60	54	58	46	54	65	54	50	59	m	126	1		1		
31	43	54	55	46	48	65	51	54	59	m	123	0				1
32	43	50	55	62	65	48	46	50	59	f	126	9		1		
33	43	46	42	54	42	40	41	39	51	m	133	7		1		

Interpretation Guide

TOT Scale

≥ 70T	Very High
60T - 69T	High
56T - 59T	Hi Avg
45T - 55T	Average
40T - 44T	Low Avg
30T -39 T	Low

Domain Scales

≥ 56T	Above Avg
45T - 55T	Avg
40T - 44T	Low Avg
30T - 39T	Low
≤ 29T	Very Low

RES

	Valid
	Invalid

INC

	Valid
	Invalid
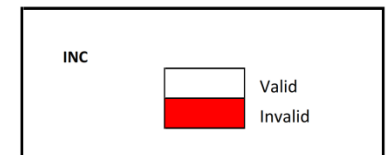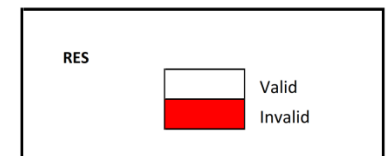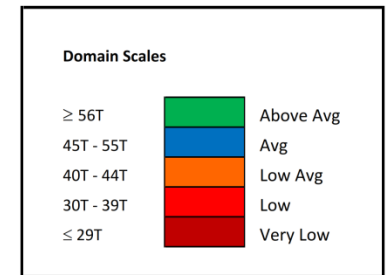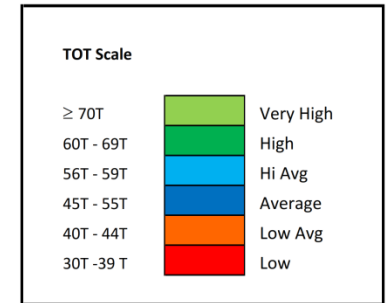
4.2.2 Physical Activity Questionnaire for Older Children (PAQ-C)

The PAQ-C (*see Appendix F*) contains 9 items relating to physical activity and one item (Item 10), which records whether the participant's physical activity for the previous seven days was different from their usual level of activity for any reason.

Item 1 contains a list of common South African sports, as well as a space for participants to include any physical activities that they take part in, which are not listed. Items which were added to the original PAQ-C list under "Other" by participants included rock climbing (participant number 3), cheerleading (participant number 5), BMX (bicycle motocross) (participant number 19), "jumping on trampoline" and Dodgeball (participant number 21), "helping my Dad cut down trees" (participant number 33), gym circuit training (participant number 30), and dirt-biking and Parkour (participant number 28). According to the World Freerunning Parkour Federation (WFPF), Parkour is defined as "the act of moving from point "a" to point "b" using the obstacles in your path to increase your efficiency" (WFPF, n.d., para. 2). Items on this scale were scored as follows:

- 1 = 0 times in the past seven days
- 2 = 1 - 2 times in the past seven days
- 3 = 3 - 4 times in the past seven days
- 4 = 5 - 6 times in the past 7 days and
- 5 = 7 or more times in the past 7 days.

Scores were added together and divided by the number of activities listed (where participants had added other activities, as above, the number of items was adjusted accordingly) to give a mean score for Item 1.

Items 2 to 7 contained items relating to level of physical activity in the past seven days during Physical Education (PE) classes (Item 2), first break time (Item 3), lunchtime (Item 4), right after school (Item 5), evenings (Item 6) and weekend (Item 7). Items were scored on a scale of 1 – 5, where 1 = no activity and 5 = very active. Item 8 asked the participant which of five sentences describe them best. The sentences ranged from, "All or most of my free time was spent doing things that involve little physical effort", which

receives a score of 1, to "I very often (7 or more times last week) did physical things in my free time", which receives a score of 5. The totals from items 2 – 8 are added together and divided by the total number of items (7) to give a mean score.

Item 9 is a measure of how often the participant did physical activity on each day of the previous week. "None" receives a score of 1, "A little" receives a score of 2, "Medium" equals 3, "Often" is scored as 4 and "Very often" scores 5. The totals for each day are added together and divided by 7 to provide the mean total for Item 9.

The summary score is calculated using the value from 1 – 5 for each of the items in Items 1 – 9 and calculating the mean score. The resulting score is the PAQ-C activity summary score. A score of 1 indicates low levels of physical activity and a score of 5 indicates a high level of physical activity. Item 10 asks whether the participant was sick in the last week or whether anything prevented them from doing their normal physical activities, and this can be used to determine if a participant had an unusual level of activity in the previous week, but this is not included in the summary score (Kowalski et al., 2004).

4.2.3 Academic Achievement Scores

Academic achievement was determined using Academic Progress Reports provided by the school. As the research took place at the end of Term 3, each child had three term averages. Term averages were calculated by the school as the mean score of the percentages attained in each of the school subjects.

4.3 Descriptive Statistics

Data from all three measures were checked by the researcher for errors, and it was determined that there were no out-of-range values on any of the variables. Descriptive tests were performed using SPSS v.23. Descriptive statistics are used for a number of reasons, including checking the variables in case there is a violation of the assumptions which underlie the statistical techniques that will be used to address the research questions

(Pallant, 2010). Descriptive statistics include the mean, standard deviation, range of scores, skewness and kurtosis (Pallant, 2010).

4.3.1 Tests of Normality

Initially data were tested to determine whether it was normally distributed. An assessment of the assumption of normality is the first step in data analysis. "If the assumption of normality is violated, interpretation and inference may not be reliable or valid" (Razali & Wah, 2011, p. 21). Thus, it is important to test this assumption before conducting further statistical procedures. The Kolmogorov–Smirnov test, the Shapiro-Wilk test, and the Lilliefors test (Razali & Wah, 2011) are commonly used goodness-of-fit tests to determine normality.

The Shapiro-Wilk Test is more suitable for smaller sample sizes (less than 50) (Razali & Wah, 2011). The output value of the Shapiro-Wilk test lies between zero and one with small values leading to the rejection of the assumption of normality whereas a value of one indicates normality of the data (Pallant, 2010). To interpret the results of the Shapiro-Wilk test, if the significance value of the test is greater than 0.05, the data is normal, whereas if it is below 0.05, the data deviate significantly from a normal distribution (Pallant, 2010).

4.3.2 Descriptive Statistics for Piers-Harris 2 Scores

The scores that the current research focuses on are the TOT (Total Self-Esteem) score, the PHY (Physical Appearance and Attributes) score and the INT (Intellectual and School Status) score. Descriptive statistics for these three scales will be discussed.

It was determined that data from the Piers-Harris 2 were not normally distributed. For the TOT score, the significance value of the Shapiro-Wilk test was 0.044, thus less than 0.05, so the sample scores for the TOT scale were not normally distributed. For the INT scale, the significance value was 0.013, so the sample scores of the INT scale were not normally distributed. The significance value of the sample scores on the PHY scale was 0.007, so the

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sample scores on the PHY scale were not normally distributed. For results of the Tests of Normality on Piers-Harris 2 results, see Table 4.2.

Table 4.2

Test of Normality on Piers-Harris 2 Results

	Shapiro-Wilk		
	Statistic	Df	Sig.
TOT	.933	33	.044
INT	.914	33	.013
PHY	.904	33	.007

4.3.2.1 TOT Scale

The TOT scale had a mean of 55.06T with a standard error of 1.54 and a standard deviation of 8.83. The TOT scale T-scores ranged from 41T to 69T with a median score of 55T. The mean score for the girls on this scale was 53.88T (*SD* = 9.49) and the mean score for boys was 56.18T (*SD* = 8.29).

Results showed that the majority of children in the sample (39.39%) scored in the High range (60T – 69T), 21.21% were boys and 18.18% were girls (*see Table 4.3*). Second highest, at 36.36%, fell in the Average range (45T – 55T), 15.15% were boys and 21.21% were girls. 15.15% fell within the Low Average range (40T – 44T), 6.06% were boys and 9.09% were girls. 9.09% of the sample fell within the High Average range (60T – 69T), and all 9.09% were boys. There were no scores in the Very High range (≥70T), or in the Low range (30T – 39T).

Table 4.3

Piers-Harris 2 TOT Scores (with Scores by Gender)

	Total Participants	% of Total	No. of Boys	% Boys	No. of Girls	% Girls
Low Avg.	5	15.15	2	6.06	3	9.09
Avg.	12	36.36	5	15.15	7	21.21
High Avg.	3	9.09	3	9.09	0	0
High	13	39.39	7	21.21	6	18.18

4.3.2.2 INT Scale

The INT scale had a mean of 53.30 with a standard error of 1.52 and a standard deviation of 8.75. Scores on the INT scale ranged from 36T to 65T with a median score of 54T. The mean score for the girls on this scale was 54.44T (*SD* = 9.32) and the mean score for the boys was 52.24T (*SD* = 8.32).

Results showed that the majority of children in the sample (48.48%) scored in the Above Average range ($\geq$ 56T), 21.21% were boys and 27.27% were girls (*see Table 4.4*). Second highest, at 30.30%, fell in the Average range (45T - 55T), 18.18% were boys and 12.12% were girls. 15.15% fell within the Low Average range (40T - 44T), 9.09% were boys and 6.06% were girls. 6.06% of the sample fell within the Low range (30T - 39T), and 3.03% were boys and 3.03% were girls. There were no scores in the Very Low range ($\leq$ 29T).

Table 4.4

Piers-Harris 2 INT Scores (with Scores by Gender)

	Total Participants	% of Total	No. of Boys	% Boys	No. of Girls	% Girls
Above Avg.	16	48.48	7	21.21	9	27.27
Avg.	10	30.30	6	18.18	4	12.12
Low Avg.	5	15.15	3	9.09	2	6.06
Low	2	6.06	1	3.03	1	3.03
Very Low	0	0.00	0	0.00	0	0.00

4.3.2.3 PHY Scale

The PHY scale had a mean of 54.97 with a standard error of 1.43 and a standard deviation of 8.23. Scores on the PHY scale ranged from 35T to 65T with a median score of 58T. The mean score for the girls on this scale was 52.19T (*SD* = 8.30) and the mean score for the boys was 57.59T (*SD* = 7.47).

Results showed that the majority of children in the sample (57.58%) scored in the Above Average range ($\geq$ 56T), 36.36% were boys and 21.21% were girls (*see Table 4.5*). Second highest, at 36.36%, fell in the Average range (45T - 55T), 12.12% were boys and 24.24% were girls. 3.03% fell within the Low Average range (40T - 44T), all of whom were boys. 3.03% of the sample fell within the Low range (30T - 39T), all of whom were girls. There were no scores in the Very Low range ($\leq$ 29T).

Table 4.5

Piers-Harris 2 PHY Scores (with Scores by Gender)

	Total Participants	% of Total	No. of Boys	% Boys	No. of Girls	% Girls
Above Avg.	19	57.58	12	36.36	7	21.21
Avg.	12	36.36	4	12.12	8	24.24
Low Avg.	1	3.03	1	3.03	0	0.00
Low	1	3.03	0	0.00	1	3.03
Very Low	0	0.00	0	0.00	0	0.00

4.3.2.4 Differences between Gender on Domain Scales

Although not a focus of the current study, some gender differences between scores were noted on the domain scales and will be discussed briefly in Chapter 5. Due to the limited scope of the study and the fact that it was correlational in design, a decision was made not to determine whether there were statistical differences between genders. As a result, only descriptive statistics were examined.

On the Behavioural Adjustment (BEH) scale the mean score for girls was higher (M = 53.94T, SD = 7.22) than for boys (M = 52.82, SD = 6.69) and on the Intellectual and School Status (INT) scale girls scored higher (M = 54.44T, SD = 9.32) than boys (M = 52.24T, SD = 8.32). Boys scored higher than girls on the Physical Appearance and Attributes (PHY) scale (M_{boys} = 57.59T, SD = 7.47; M_{girls} = 52.19T, SD = 8.30), on the Freedom from Anxiety (FRE) scale (M_{boys} = 52.94T, SD = 8.03; M_{girls} = 49.94T, SD = 9.21), on the Popularity (POP) scale (M_{boys} = 52.82T, SD = 6.43; M_{girls} = 49.81T, SD = 8.73), as well as on the Happiness and Satisfaction (HAP) scale (M_{boys} = 55.00T, SD = 5.83; M_{girls} = 53.13T, SD = 6.83)

Table 4.6

Gender Differences in Piers-Harris Mean Scores

Piers-Harris Domain Scales Mean T-Scores by Gender							
	TOT	BEH	INT	PHY	FRE	POP	HAP
Mean Scores for Girls	53.88	53.94	54.44	52.19	49.94	49.81	53.13
SD_{girls}	9.49	7.22	9.32	8.30	9.21	8.73	6.83
Mean Scores for Boys	56.18	52.82	52.24	57.59	52.94	52.82	55.00
SD_{boys}	8.29	6.69	8.32	7.47	8.03	6.43	5.83

4.3.2.5 Differences between Racial / Ethnic Groups

Although differences between racial / ethnic groups were not a focus of the current study, Piers and Herzberg (2002) briefly discuss differences in racial / ethnic diversity in the norm groups used in the development of the original Piers Harris versus during the development of the Piers Harris 2. This prompted a brief analysis of the data for the current sample group. Due to the limited scope of the study and the fact that it was correlational in design, a decision was made not to determine whether there were statistical differences between racial / ethnic groups. As a result, only descriptive statistics were examined.

There were some differences in mean scores across different racial / ethnic groups in the global self-esteem scores as well as on some of the domain scales. Although the number of Asian participants in the sample was small (n = 2), scores for this group were lower than for the rest of the sample in all scales, except for the Physical Appearance and Attributes

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(PHY) scale. As the sample itself is relatively small (N = 33), differences observed here may be idiosyncratic, rather than indicative of the population and should be interpreted with caution. Participants in the category "Other", which included Mixed Race and Indian participants, had the highest overall levels of self-esteem (TOT), the highest mean score for the PHY scale (M = 60.14T, SD = 5.01), BEH scale (M = 54.43T, SD = 7.57), POP scale (M = 55.43T, SD = 4.58) and HAP scale (M = 55T, SD = 6.93). Black participants (n = 11) had the second highest TOT scores (M = 56.09T, SD = 9.22), the highest INT scores (M = 55T, SD = 9.06), highest FRE scores (M =53.55T, SD = 7.97). White participants (n = 13) had the second highest HAP scores (M = 54.38T, SD = 5.38), PHY scores (M = 53.77T, SD = 9.61), INT scores (M = 54T, SD =8.16) and BEH scores (M = 53.85T, SD = 6.44).

Table 4.7

Race / Ethnicity Differences in Piers-Harris Mean Scores

Piers-Harris 2 Mean Scores with Standard Deviations by Race / Ethnicity							
	TOT	BEH	INT	PHY	FRE	POP	HAP
Black Participants	56.09	52.91	55.00	53.73	53.55	53.09	54.27
SD	9.22	7.84	9.06	7.59	7.97	8.13	5.61
White Participants	54.08	53.85	54.00	53.77	51.62	48.85	54.38
SD	8.18	6.44	8.16	9.61	8.80	7.83	5.38
Asian Participants	45.50	49.00	47.00	51.50	37.00	44.00	48.00
SD	4.95	0.00	1.41	9.19	8.49	4.24	15.56
Other Participants	58.00	54.43	51.14	60.14	52.14	55.43	55.00
SD	9.56	7.57	10.64	5.01	6.77	4.58	6.93

4.3.3 Descriptive Statistics for PAQ-C Scores

Tests of normality for the sample (N = 33) on the PAQ-C scale showed that scores were normally distributed. The significance value of the Shapiro-Wilk test was 0.571, which is greater than 0.05. For results of the test of normality on the PAQ-C scores, see Table 4.8.

Table 4.8

Test of Normality on PAQ-C Results

	Shapiro-Wilk		
	Statistic	df	Sig.
PAQ-C Tot	.973	33	.571

The mean score was 3.04 with a standard error of 0.11 and a standard deviation of 0.64. The scores ranged from 1.84 to 4.14 and the median score was 3.01. Scores for the PAQ-C had a mean of 3.04 with a standard deviation of 0.642. The mean score for boys on the PAQ-C was 3.31 (*SD* = 0.61) and the mean score for girls was 2.75 (*SD* = 0.56). The frequency distribution histogram for scores obtained in the PAQ-C can be seen in Figure 4.2.
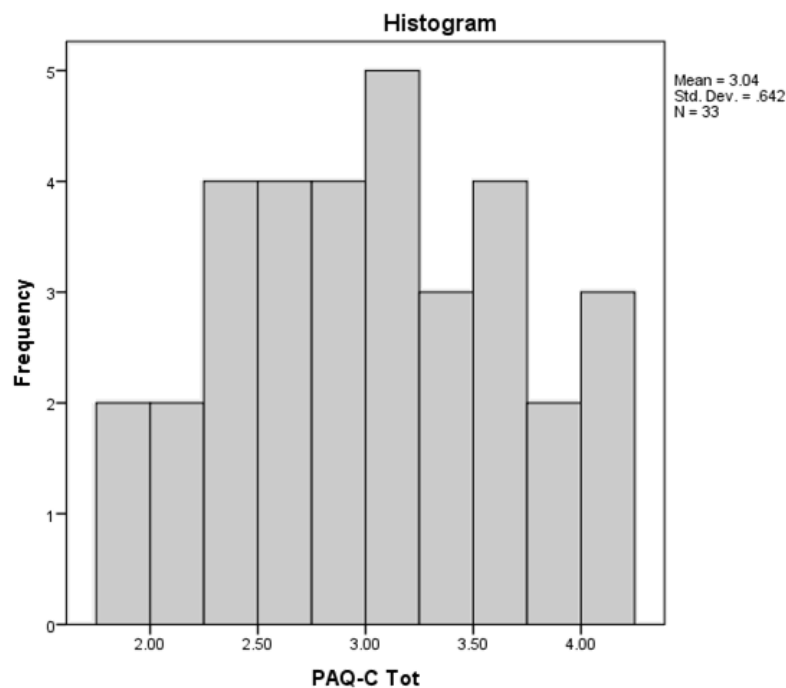
Figure 4.2. Frequency Distribution of PAQ-C Scores.

4.3.4 Descriptive Statistics for Academic Achievement Scores

The Shapiro-Wilk Test showed the Academic Achievement scores were normally distributed. The significance value was calculated to be 0.546, which is greater than 0.05 (*see Table 4.9*).

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Table 4.9

Test of Normality on Academic Achievement Results

	Shapiro-Wilk		
	Statistic	Df	Sig.
Academic Mean	.972	33	.546

The mean Academic Achievement score for the sample (N = 33) was calculated as 75.19 with a standard error of 1.21 and a standard deviation of 6.96. The scores ranged from 60.33 to 90.00, with a median score of 75.00. The mean score for girls was 77.46 (*SD* = 5.46) and the mean score for boys was 73.76 (*SD* = 7.60). See Figure 4.3 for a histogram displaying the frequency distribution of Academic Achievement scores.
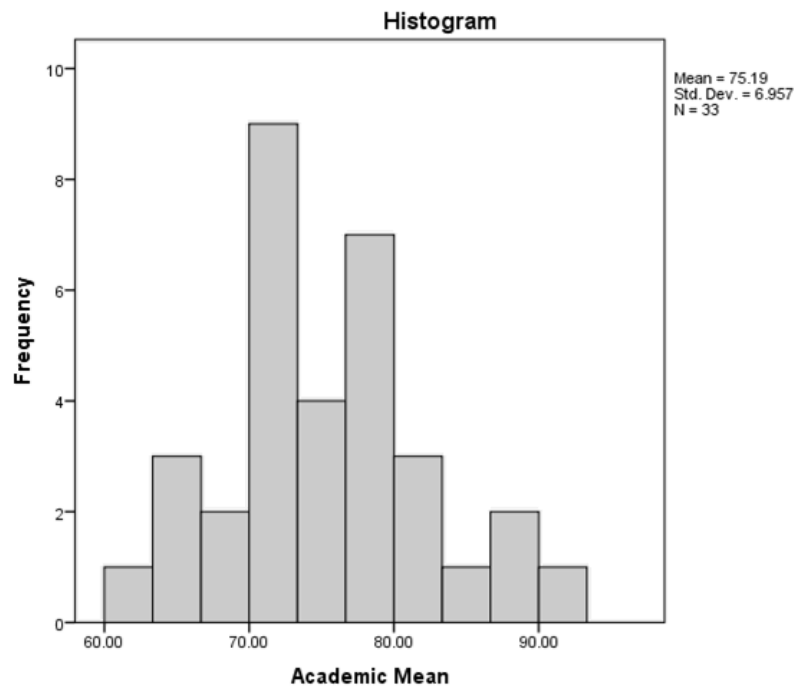
Figure 4.3. Frequency Distribution Histogram for Academic Achievement Scores

4.4 Description of the Relationship between Variables

The objective of the current research is to determine whether there is any relationship between the variables physical activity, self-esteem and academic achievement and, if so, to determine the strength and direction of the relationship. A correlational

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analysis was used to describe the strength and direction of a linear relationship between two variables (Gravetter & Forzano, 2012). As it was determined that the results obtained from the Piers-Harris 2 scales were not normally distributed (*see 4.3.2*), non-parametric testing was used (Pallant, 2010). The non-parametric alternative to a Pearson Correlation is the Spearman Rank Order Correlation (rho) (Pallant, 2010). Spearman's correlation (r_s) is used to determine the strength and direction of the monotonic relationship between two variables, instead of the strength and direction of the linear relationship between two variables, as determined by Pearson's correlation coefficient (Gravetter & Forzano, 2012).

The statistical significance of a correlation is important to interpret the strength of a correlation (Gravetter & Forzano, 2012). A statistically significant result means that a correlation found in the sample data is unlikely to have been produced by chance and there is a greater likelihood that there is a real relationship within the population (Gravetter & Forzano, 2012).

4.4.1 Physical Activity and Self-Esteem

One of the primary objectives of the current research is to determine whether a relationship exists between physical activity and self-esteem. A correlational analysis, using Spearman's rho was conducted on scores from the physical activity scale (PAQ-C) and the total self-esteem scale of the Piers-Harris 2 (TOT) (*see Table 4.10*). A two-tailed test of significance was used, to test for the possibility of a relationship in both directions (Gravetter & Forzano, 2012). Results showed r_s = 0.297 with *Sig.* = 0.093 (*N* = 33).

Table 4.10

Correlation between PAQ-C and TOT

			PAQ-C
Spearman's rho	**TOT**	Correlation Coefficient	0.297
		Sig. (2-tailed)	0.093
		N	33

4.4.2 Physical Activity and Academic Achievement

A further objective of the current research is to determine whether a relationship exists between physical activity and academic achievement. A correlational analysis, using Spearman's rho was conducted on scores from the physical activity scale (PAQ-C) and the Academic Achievement scores (*see Table 4.11*). A two-tailed test of significance was used, to test for the possibility of a relationship in both directions (Gravetter & Forzano, 2012). Results showed r_s = - 0.059 with *Sig.* = 0.742 (*N* = 33).

Table 4.11

Correlation between PAQ-C and Academic Achievement

			PAQ-C
Spearman's rho	**Academic Achievement**	Correlation Coefficient	-0.059
		Sig. (2-tailed)	0.742
		N	33

4.4.3 Self-Esteem and Academic Achievement

A third objective of the current research is to determine whether a relationship exists between self-esteem and academic achievement. A correlational analysis, using Spearman's rho was conducted on scores from the total self-esteem scale of the Piers-Harris 2 (TOT) and the Academic Achievement scores (*see Table 4.12*). A two-tailed test of significance was used, to test for the possibility of a relationship in both directions (Gravetter & Forzano, 2012). Results showed r_s = 0.420 with p = 0.015 (*N* = 33), which is statistically significant at the 0.05 level (2-tailed).

Table 4.12

Correlation between TOT and Academic Achievement

			Academic Achievement
Spearman's rho	**TOT**	Correlation Coefficient	0.420[*]
		Sig. (2-tailed)	0.015
		N	33

[*]Correlation is significant at the 0.05 level (2-tailed)

4.4.4 Physical Activity and Physical Appearance and Attributes (PHY)

An analysis was conducted to determine whether a relationship exists between levels of physical activity (PAQ-C) and the PHY (Physical Appearance and Attributes) domain scale on the Piers-Harris 2. A correlational analysis, using Spearman's rho was conducted on scores from the PHY domain scale and the PAQ-C scores (*see Table 4.13*). A two-tailed test of significance was used, to test for the possibility of a relationship in both directions (Gravetter & Forzano, 2012). Results showed r_s = 0.486 with *Sig.* = 0.004 (*N* = 33), which is statistically significant at the 0.01 level (2-tailed).

Table 4.13

Correlation between PAQ-C and PHY

			PAQ-C
Spearman's rho	**PHY**	Correlation Coefficient	0.486[**]
		Sig. (2-tailed)	0.004
		N	33

[**]Correlation is significant at the 0.01 level (2-tailed)

4.4.5 Intellectual and School Status (INT) and Academic Achievement

An analysis was conducted to determine whether a relationship exists between scores on the Intellectual and School Status (INT) domain scale and Academic Achievement scores. A correlational analysis, using Spearman's rho was conducted on scores from the PHY domain scale and the PAQ-C scores (*see Table 4.14*). A two-tailed test of significance

was used, to test for the possibility of a relationship in both directions (Gravetter & Forzano, 2012). Results showed r_s = 0.562 with *Sig.* = 0.001 (*N* = 33), which is statistically significant at the 0.01 level (2-tailed).

Table 4.14

Correlation between INT and Academic Achievement

			Academic Achievement
Spearman's rho	**INT**	Correlation Coefficient	0.562[**]
		Sig. (2-tailed)	0.001
		N	33

[**]Correlation is significant at the 0.01 level (2-tailed)

4.5 Conclusion

In this chapter, the results of the quantitative data analysis were provided. The results show three significant relationships. The first statistically significant correlation was between the results of the Piers-Harris 2 Self-concept scale (TOT) and Academic Achievement. The second statistically significant result was between the results of the Physical Activity Questionnaire for Older Children (PAQ-C) and the Physical Appearance and Attributes (PHY) domain scale on the Piers-Harris 2. The third significant correlation was between the Academic Achievement scores and the Intellectual and School Status (INT) domain scale on the Piers-Harris 2. There was no statistically significant correlation between the PAQ-C scores and the total self-esteem score (TOT) on the Piers-Harris 2 and there was no statistically significant correlation between the PAQ-C scores and the Academic Achievement scores.

These results will be integrated and interpreted in Chapter 5. The discussion will consider the aims and objectives of this research study. Chapter 5 will include strengths and limitations of this study, together with recommendations for future research.

CHAPTER 5

DISCUSSION OF FINDINGS, LIMITATIONS OF THE STUDY, RECOMMENDATIONS FOR FUTURE RESEARCH AND CONCLUSION

5.1 Introduction

This chapter presents the interpretation and integration of the data which were analysed in the previous chapter. The chapter begins with an overview of the aims and objectives outlined in Chapter 1. The discussion which follows will focus on the results described in Chapter 4, the relationships between physical activity, self-esteem and academic achievement, and will examine the results in light of the research question as well as the research hypotheses. The chapter will conclude with limitations of the current study, as well as recommendations for future research.

5.2 Review of Aims and Objectives

Chapter 1 discussed the primary aim of the study, which was to determine if there is any correlation between levels of physical activity, self-esteem and academic achievement in grade 4 children in South Africa. The objectives for the research were to determine whether there is a correlation between levels of physical activity and level of self-esteem, to determine whether there is a correlation between levels of physical activity and academic achievement and to determine whether there is a correlation between level of self-esteem and academic achievement.

5.3 Discussion of Results

5.3.1 Piers-Harris 2 Results

This study focuses on the results obtained by participants on the global self-esteem (TOT) scale as well as the results on two of the domain scales, namely the Physical Appearance and Attributes (PHY) scale and the Intelligence and School Status (INT) scale.

Although these three scales are the main focus of the current study, some interesting results on other domain scales may also be discussed where relevant.

5.3.1.1 Results on the TOT Scale

The global self-esteem score (as measured by the TOT scale) is a reflection of scores obtained by participants across all the domain scale scores (*see 3.8.1.1 and 3.8.1.2*). For this reason, when discussing the results on the TOT scale, scores obtained by participants on all domain scales will form part of the discussion.

As may be expected, participants who had scores in the High and High Average range on the global self-concept (TOT) scale also had scores in the High and Average score ranges for all domain scales. This echoes the findings of Brown (1998), and Brown and Marshall (2006) (*see 2.2.4*), who found that people who have higher feelings of self-worth across more domains evaluate themselves more positively, experiencing a higher level of self-worth than those with low self-esteem. Children with scores in this range also had lower levels of anxiety and higher levels of happiness, as evidenced in the high Freedom from Anxiety (FRE) and Happiness (HAP) scores (*see Table 4.1*). Scores in the High range on the Piers-Harris 2 TOT scale indicate individuals who are confident in their abilities across more than one domain, who have strongly positive self-regard and who are most likely to describe themselves as likeable, happy and worry-free (Piers & Herzberg, 2002). Scores in this range accounted for 39% of the current sample.

Participants whose scores on the TOT scale were in the lower range of the Average scores and in the Low Average range show greater variation in the scores in all the domain scales. Participants who had scores which fell in the Average range, who also had domain scores which fell in the Low range may support the notion that only domain scores in arenas which are deemed important to the individual have an impact on the global self-esteem of that individual. For example, Participant number 5 has a TOT score of 49T, which falls in the Average range, but also has a popularity (POP) score that falls in the Low range (39T). This may indicate that being popular is not particularly important to Participant number 5. Participant number 7 also has a global self-esteem score (TOT) which falls in the Average

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range (45T) but has a POP score of 39T (which falls in the Low range) as well as a Physical Appearance and Attributes (PHY) score of 39T, also in the Low range. This may indicate that popularity and physical appearance and attributes may not be important to the individual. Participant number 33 also has a POP score of 39T (in the Low range), but in this case, a TOT score of 42T, which falls in the Low Average range. This may be an indication that being popular is an important area for this participant, in terms of global self-esteem.

In her work on the causes and consequences of low self-esteem in children and adolescents, Harter (1993b) found a relatively high correlation (r = 0.70) between domain-specific evaluation in areas that were important to the subject and their global self-esteem, whilst there was a relatively low correlation between domain-specific evaluation in areas considered unimportant and their self-esteem (r = 0.30). Thus, a child's self-esteem may not be affected by a lack of competence in an area which is not considered to be important to the child. Further research incorporating qualitative methods such as interviews would be necessary to verify these assumptions with the current sample group.

5.3.1.2 Gender Differences

Although gender was not a major theme in the literature, there are some interesting differences between genders that warrant some discussion and perhaps further investigation in future research. The majority of participants in the current study scored in the High range on the total self-esteem scale (TOT), with more boys (21.21%) than girls (18.18%) in this range. This was followed by the Average range, with 36.36% of participants' scores falling in this range (21.21% of girls and 15.15% of boys). There were more girls in the Low range (9.09%, compared to 6.06% of boys).

Although earlier studies, for example by Hattie (1992) and Wylie (1979), failed to show significant differences in total self-concept between genders, more recent studies using the Piers-Harris 2 have found that there are differences in specific aspects of self-concept (Piers & Herzberg, 2002). In a 2002 study by Lewis and Knight on gifted children in grades 4 - 12, it was shown that there were gender differences in three of the Piers-Harris domain scales. These included the Behaviour (BEH) scale, the Intellectual and School Status

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(INT) scale and the Freedom from Anxiety (FRE) scale. In the current sample, scores on these scales support the findings by Lewis and Knight (2002), with girls scoring higher on Behaviour (BEH) and Intellectual and School Status (INT) and boys scoring higher on the Freedom from Anxiety (FRE) scale (*see Table 4.6*). The current research also found that there was a gender difference in the mean TOT score, with boys scoring higher than girls.

5.3.1.3 Differences across Racial / Ethnic Groups

As mentioned previously in 4.3.2.5, differences in levels of self-esteem across racial / ethnic groups are not a focus of the current study. Some differences were noted, however, which merit a brief discussion and which may warrant further investigation in future research.

The norms of the original version of the Piers-Harris Children's Self-Concept Scale were gathered from a sample which was homogenous, in terms of ethnic composition (Piers, 1984). Between when the original Piers-Harris scale was published by Piers in 1963 and the revision of the manual in 1984, more than 25 studies using the scale in ethnically diverse populations had been published (Piers & Herzberg, 2002). Piers (1984) conducted a thorough review of these studies and determined that ethnicity does not appear to be a noteworthy element of self-concept (Piers & Herzberg, 2002). The aforementioned literature implies that children in some ethnic groups may be exposed to more stressors including racial discrimination, difficulties in school relating to instruction in a language other than their mother tongue or, when immigrants, adjusting to the culture of the new country (Piers & Herzberg, 2002). The researchers note that these stressors may be alleviated when there are appropriate support structures in place. The norm group for the Piers-Harris 2 was ethnically diverse and results suggest that the scores can be interpreted for different ethnic groups without using separate norms (Piers & Herzberg, 2002).

According to Piers & Herzberg (2002), cultural differences should also be taken into account in certain instances. In some cultures, it is considered boastful to say positive things about oneself (Piers & Herzberg, 2002). Although the current sample group was small and there were only two Asian participants in the sample, the markedly lower scores by these

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two participants could be due to differences in cultural response styles, although this is a very tentative postulation and results may be idiosyncratic. In East Asian cultures, modesty is a prevailing norm, especially in regard to explicit positive self-statements (Cai et al., 2010).

The results of the current study suggest that the children with the highest total self-concept scores and most of the highest results for the domain scales were children who chose "Other" when filling in demographic information on the Piers-Harris 2 (*see Table 4.7*). "Other", in the context of the sample group, referred both to children of Mixed Race and to those who are of Indian descent. Second highest in global self-esteem were the Black participants and third were White participants.

Sprecher, Brooks and Avogo (2013), in a study examining race and gender differences in self-esteem, describe what has been termed *Black self-esteem advantage* (p. 264). According to Sprecher et al. (2013), hundreds of studies in the U.S.A. have found that Blacks and "people of color" (p. 264) have higher self-esteem than other racial groups, especially in adolescence and young adulthood. Studies by McClure, Tanski, Kingsbury, Gerrard and Sargent (2010) and Bachman, O'Malley, Freedman-Doan, Trzesniewski and Donnellan (2011) found similar results. Two earlier meta-analyses on self-esteem and race found similar results (Gray-Little & Hafdahl, 2000; Twenge & Crocker, 2002) and the findings of the current research support the notion that Blacks and people of colour have higher self-esteem levels than other racial groups.

5.3.1.4 Results on the INT Scale

The Piers-Harris 2 INT scale consists of 16 statements which assess how the child feels about his or her ability to cope with intellectual and academic tasks (Piers & Herzberg, 2002). The items cover both general satisfaction with school and academic accomplishments as well as expectations about future achievement (Piers & Herzberg, 2002). Statements on this scale are:

> I am smart, I get nervous when the teacher calls on me, I am well-behaved in
> school, I am an important member of my family, I am good in my
> schoolwork, I am slow in finishing my schoolwork, I am an important

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member of the class, I can give a good report in front of the class, In school I am a dreamer, I often volunteer in school, my friends like my ideas, my classmates in school think I have good ideas, I am dumb about most things, when I grow up I will be an important person, I forget what I learn, I am a good reader. (Piers & Herzberg, 2002, p. 22)

As hypothesized by Shavelson et al. (1976), the relationship between the two constructs seems to be due to the specific academic component of self-esteem or self-concept, rather than the more general global self-concept. In the current sample, there was a strong positive correlation between INT and TOT (r_s = 0.799), which was statistically significant at the 0.01 level. This suggests that in the current sample, a high intellectual self-concept was positively linked to a higher global self-esteem level. Research has shown weak links between intelligence test scores and scores in measures of self-concept (Black, 1974; McIntire & Drummond, 1977). In the current sample, there was a strong positive correlation between INT and Academic Achievement Scores (r_s = 0.562), statistically significant at the 0.01 level. This implies that children in the sample who do well at school also have a high level of intellectual self-concept and, for the current sample, were also more likely to have higher total self-concept scores.

Research by Hansford and Hattie (1982) found a low correlation (r = 0.212) between academic achievement and self-esteem (*see 2.4*). Generally-speaking, though, researchers have found at least moderate positive correlations between intelligence, academic achievement and self-concept scores (Piers & Herzberg, 2002). As discussed in *2.4*, multiple studies suggest a positive link between global self-esteem and academic achievement in children although the researchers caution that correlation does not equal causation and the relationships between the constructs are not clear (Alves-Martins et al., 2002; Baumeister, 2005).

Small gender differences were found on the INT scale for the current sample group, with girls scoring a mean of 54.44T (*SD* = 9.32) and boys scoring a mean of 52.24T (*SD* = 8.32). The mean scores for Academic Achievement for girls was also slightly higher (*M* = 77.46, *SD* = 5.46) than it was for boys (*M* = 73.76, *SD* = 7.60). This suggests that for the

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current sample, girls appear to be more confident of their abilities in intellectual and school pursuits than the boys, which may be either a cause or a consequence of the girls in the sample achieving better academic results than the boys.

5.3.1.5 Results on the PHY Scale

The Piers-Harris contains 11 items on the Physical Appearance and Attributes (PHY) scale, which assess how a child feels about his or her appearance and qualities such as leadership and games or sports ability (Piers & Herzberg, 2002). The items on the scale are:

I am smart, My looks bother me, I am a leader in games and sports, I am strong, My friends like my ideas, I have nice hair, My classmates in school think I have good ideas, I am good-looking, I am popular with boys, I have a pleasant face, I am popular with girls. (Piers & Herzberg, 2002, p. 22)

Results showed that the majority of children in the sample (57.58%) scored in the Above Average range, suggesting that most of the children in the sample group are generally happy with their physical appearance and physical aptitude (Piers & Herzberg, 2002). There was a relatively strong, statistically significant correlation (r_s = 0.486, $p < 0.01$) between scores on the PHY scale and scores in the Physical Activity Questionnaire for Older Children (PAC-Q), suggesting that those children who scored higher on the PHY scale were also more physically active.

Research supports the link between specific physical self-perceptions and self-confidence, performance and involvement in physical activity and sport (Crocker, Eklund, & Kowalski, 2000; Fox & Corbin, 1989; Marsh, Richards, Johnson, Roche, & Tremayne, 1994; Sonstroem, 1997b). A study by Crocker et al. (2000) investigated the relationship between physical self-perception and physical activity in Canadian children aged 10 to 14 years. Results of the study showed correlations between four physical self-perception domains (body attractiveness, strength competence, physical condition and sport competence) and levels of physical activity (Crocker et al., 2000). The results of Crocker et al. (2000) were consistent with a 1998 study by Hagger, Ashford and Stambulova investigating the physical self-perceptions and physical activity participation by Russian and British children.

Results in the current study are consistent with the findings of the research by Hagger et al. (1998) and Crocker et al. (2000) and may be because children who spend more time engaged in physical activity are more likely to perceive themselves as competent in physical domains as a result of the additional physical activity, or it may be that those who already perceive themselves as more physically competent are more likely to engage in physical activity (*see 2.3.1*).

Babic et al. (2014) conducted a meta-analysis and review of physical activity and physical self-concept in children and adolescents. The review encompassed the results from 64 studies and found that perceived physical competence was most strongly correlated with increased physical activity (r = 0.30, p < 0.001) and that a significant relationship has been reliably established between physical activity and physical self-concept. The meta-analysis demonstrated that general perceived competence, physical self-concept and perceived fitness may act as both determinants and outcomes of physical activity behaviour in youth (Babic et al., 2014). This lends support to the model of self-esteem and physical self-concept proposed by Sonstroem and Morgan (1989) and further described by Sonstroem (1997b). In this model, self-esteem can either be seen as a motivational *determinant* of physical activity or as an *outcome* of physical activity (Sonstroem, 1997a, 1997b). Babic et al. (2014) were careful to note that despite the breadth of their meta-analysis, they were unable to determine causality.

In the current study, there were differences in mean scores on the PHY scale across gender, with boys scoring higher (M = 57.59T, SD = 7.47) than girls (M = 52.19T, SD = 8.30) in the current sample. This was consistent with the difference in scores between genders in the PAQ-C, with boys scoring a mean of 3.31 (SD = 0.61) and girls scoring a mean of 2.75 (SD = 0.56), indicating that boys were more active than girls and that they feel more confident in their physical appearance and attributes.

Numerous studies show that boys report being more physically active than girls (Hayes, Crocker, & Kowalski, 1999; Kowalski et al., 1997; Ross & Pate, 1987; Sallis, 1994; Sallis et al., 1992). Further studies show evidence that boys score better on measures of physical self-perception (Biddle & Armstrong, 1992; Hayes et al., 1999; Whitehead & Corbin,

1997). The meta-analysis conducted by Babic et al. (2014) concluded that gender was a significant moderator between physical activity and physical self-concept.

5.4 Discussion of Physical Activity Questionnaire for Older Children (PAQ-C) Results

Scores on the PAQ-C scale indicate that children in the sample are moderately active (M = 3.04) and that girls (M = 2.75) were less active overall than boys (M = 3.31). This echoes results found in international studies using large sample groups across various cultures, using multiple methodologies (e.g., Riddoch et al., 2004, Trost et al, 2002, Verloigne et al., 2012).

5.5 Discussion of Academic Achievement Results

Mean Academic Achievement scores for the sample group were relatively high (M = 75.19, SD = 6.96), with scores ranging from 60.33 to 90.00. As discussed in 5.3.1.4, the mean scores for Academic Achievement were slightly higher for girls (M = 77.46, SD = 5.46) than for boys (M = 73.76, SD = 7.60). Similar results were found in studies by Eccles, Wigfield, Harold and Blumenfeld (1993) who found that there were differences between the genders for different subjects, with girls scoring better in reading, language and music subjects and boys scoring better in mathematical subjects. A meta-analysis of gender differences in scholastic achievement conducted by Voyer and Voyer (2014) determined that the female advantage was consistent across the time-period from 1914 to 2011 and that the advantage was observed across all fields of study. Further analysis of the data from the current sample would be necessary to compare these findings with those found in the current sample, but this is not within the scope of the current research. Voyer and Voyer (2014) suggest that much research is still needed to determine the factors underlying gender differences in school performance as well as potential causes.

5.6 Correlations

5.6.1 Research Hypotheses

As outlined in 1.7.3, the hypotheses for the current research were stated as follows:

Null Hypothesis 1: There is no correlation between levels of physical activity and self-esteem scores.

Research Hypothesis 1: There is a correlation between levels of physical activity and self-esteem scores.

Null Hypothesis 2: There is no correlation between levels of physical activity and academic achievement.

Research Hypothesis 2: There is a correlation between levels of physical activity and academic achievement

Null Hypothesis 3: There is no correlation between self-esteem scores and academic achievement

Research Hypothesis 3: There is a correlation between self-esteem scores and academic achievement.

5.6.2 Relationship between Self-Esteem and Physical Activity

The data analysis of the correlation between self-esteem, as measured by the Piers-Harris 2 TOT scale, and levels of physical activity (as measured by the PAC-Q) showed that there was a small positive correlation between the two variables (r_s = 0.297 and p = 0.093), but that this was not statistically significant. Although a meta-analysis conducted by Gruber (1986) on the relationship between the two constructs showed an overall correlation of 0.41 between physical activity and self-esteem over twenty-seven studies (*see 2.3.1*), this was not evident in the current sample. This may be as a result of the small sample size or as a due to inaccuracy in self-reported levels of physical activity in children (Baranowski et al., 1992). Suggestions for minimising the effects of this limitation in future research are

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discussed in 5.7 below. For this reason, the researcher fails to reject the null hypothesis, which states that there is no correlation between levels of physical activity and self-esteem scores.

5.6.3 Relationship between Levels of Physical Activity and Academic Achievement

The data analysis of the correlation between levels of physical activity, as measured by the Physical Activity Questionnaire for Older Children (PAQ-C), and academic achievement scores showed that there was no statistically significant relationship between the scores on the two measures. Spearman's rho for the current sample was calculated as r_s = -0.059 (p = 0.742). For this reason, the researcher fails to reject the null hypothesis.

Results from the current study do not corroborate results described in the literature (*see 2.3.2*). Although multiple studies have reported a positive correlation between participation in sports and academic achievement (e.g.: Bluechardt et al., 1995; Field, Diego, & Sanders, 2001; Holland & Andre, 1987; Otto & Alwin, 1977; Stevenson, 1975), and between physical fitness and academic achievement (Castelli, Hillman, Buck, & Erwin, 2007; Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Fedewa & Ahn, 2011; Lees & Hopkins, 2013; Wittberg, Cottrell, Davis, & Northrup, 2010), this was not the case for the current sample. The findings of Coe et al. (2006) suggest that children who performed moderately vigorous physical activity were more likely to have significantly higher grades (p < 0.05) than those students who did little or no *vigorous* physical activity and the authors found that the *level of intensity* of the physical activity mattered. This may be one possible explanation for the lack of a significant correlation between levels of physical activity and academic achievement in the current sample. The research participants may not be doing high enough intensity physical exercise. A limitation of the PAQ-C is that it relies on self-report of physical activity of children, it does not give an objective indicator of intensity of physical activity and it is not a measure of physical fitness (*see 5.7*).

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5.6.4 Relationship between Self-Esteem Scores and Academic Achievement

The data analysis of the correlation between self-esteem scores, as measured by the Piers-Harris 2 TOT scale, and academic achievement scores showed that there was a statistically significant relationship ($p < 0.05$) between the scores on the two measures. Spearman's rho for the current sample was calculated as $r_s = 0.42$ ($p = 0.015$). For this reason, the researcher tentatively rejects the null hypothesis in favour of the research hypothesis as results suggest a statistically significant positive correlation between self-esteem scores and academic achievement for the current sample.

Findings in the current study appear to be supported by the literature on the topic (*see 2.4*). Multiple studies have suggested a positive link between global self-esteem and academic achievement in children, but according to Alves-Martins et al. (2002), the relationship is complex and lacks clarity. Baumeister (2005) reiterates that in this instance, correlation does not equal causation. Marsh and O'Mara (2008) suggested that whilst academic self-concept had a measurable reciprocal effect on academic achievement and educational attainment, global self-esteem had no effect, a finding which may be supported by the current research. As discussed in 5.3.1.4 above, academic self-concept, reflected in the INT scores, shows a statistically significant ($p < 0.01$) positive correlation with global self-esteem (TOT) ($r_s = 0.799$) and INT scores show a statistically significant ($p < 0.05$) positive correlation with academic achievement scores ($r_s = 0.42$). As stated in 2.4, high self-esteem may be dependent on academic achievement when academic achievement is important to the self. Further qualitative research would be necessary with the current sample group to determine whether this was the case for the participants in the sample.

5.7 Limitations of the Study and Recommendations for Future Research

Keeley and Fox (2009) suggest that cross-sectional and correlational research designs limit the conclusions that can be drawn. Keeley and Fox (2009) recommend that controlled intervention studies would be necessary to investigate cause and effect. Multiple studies suggest links between global self-esteem, physical activity and academic achievement in children, but the relationship is multifaceted and lacks clarity. To investigate more fully the

relationships between these constructs, it is suggested that a qualitative component be added to the current design in future studies investigating these constructs. This would allow for more specific conclusions to be drawn about the nature of the relationships between the variables, and not merely the strength and direction of any relationship that is found.

As the emphasis of the current study was to determine whether there was a relationship between levels of physical activity, self-esteem and academic achievement, the research design was a correlational study. The focus was not to determine whether there were statistically significant differences between genders or racial / ethnic groups and, for this reason, only descriptive statistics were examined. It is suggested that future studies follow a more exploratory or descriptive design and incorporate tests of comparison to determine statistical differences.

The current sample was drawn from a private school in Randpark Ridge, in Johannesburg. Although research into self-esteem has suggested that socio-economic status (SES) is not a factor in self-esteem levels (Piers & Herzberg, 2002), a comparison study with other South African grade 4 children in government schools as well as schools in lower SES areas and in other provinces within South Africa may contribute to a fuller understanding of the variables affecting self-esteem in the South African context. In contrast to the assertion by Piers and Herzberg (2002), an earlier study by Osborne and LeGette (1982) did find lower self-esteem scores with lower socio-economic status and suggest that there are likely to be complex factors involved.

Findings in the current sample corroborated findings in international studies with regard to racial / ethnic groups. Of particular interest was the finding that Black people and people of colour have higher levels of self-esteem, when compared with other race groups (Bachman et al., 2011; Gray-Little & Hafdahl, 2000; McClure et al., 2010; Sprecher et al., 2013; Twenge & Crocker, 2002). A qualitative study investigating the factors which positively impact self-esteem levels in this group would add to the body of knowledge on this topic and may provide clues as to how to increase self-esteem across all racial / ethnic groups.

A limitation of the present study is the use of a self-report measure of physical activity. Baranowski et al. (1992) suggest that self-report measures, such the Physical Activity Questionnaire for Older Children, may be less accurate due to participants' inability to accurately recall physical activity over a particular period. For the purposes of this study, a self-report measure such as the Physical Activity Questionnaire for Older Children (PAQ-C) may be less accurate than a wearable activity tracker such as FitBit™. Wearable activity trackers allow large amounts of data to be collected, such as daily activity duration and intensity, caloric expenditure etc. (Evenson, Goto, & Furberg, 2015). This would add a more reliable, objective measure of both duration and intensity of children's physical activity which would, in turn, provide greater insight into individual differences and would help increase precision. The use of such a device was beyond the scope of the present study.

Some interesting results were seen in the domain scores of the Piers-Harris 2 which may provide opportunities for further research. Among these were the observation that lower global self-esteem (TOT) scores, lower scores on the Intellectual and School Status (INT) scales and lower levels of popularity each appeared to be related to higher anxiety levels appeared to be related somewhat to higher anxiety levels (measured by the FRE scale). These variables were not within the scope of the current research but may warrant further investigation in the South African context.

Finally, due to the small sample size used in the current study, it is suggested that the present findings should be interpreted with some caution and that future research should focus on a larger sample. The ability to generalise the findings in the current study were further limited by the small sample size.

5.8 Conclusion

The discussion presented in this chapter suggests that self-reported physical activity levels had a small but not statistically significant positive relationship with self-esteem in grade 4 children in a private school in South Africa. A small sample size and the lack of precision of the self-report measure of physical activity may have contributed to this result, which is inconsistent with findings in the literature. A larger sample size and a more

accurate physical activity tracker may counteract these limitations. The results of this study showed no relationship between physical activity and academic achievement in the current sample. One possible reason for this result, which appears to contradict literature on the relationship between the variables, may be that the self-report physical activity measure used did not adequately account for intensity of physical exercise. The chapter highlighted the findings of the current study with regard to self-esteem and academic achievement in grade 4 children in a private school in South Africa. It appears that academic achievement has a statistically significant relationship with self-esteem, and scores on the Intellectual and School Status domain scales suggest that this may be because self-esteem was contingent on academic achievement for the current sample. Finally, limitations of the research were discussed, with recommendations for how future research could counteract these limitations.

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Faculty of Humanities

Department of Psychology

APPENDICES

Appendix A. Letter to School

10 February 2016

Dear Sir / Madam

I am conducting research amongst 10 year old school children in South Africa and I'm looking for a school that would be willing to allow me to conduct the research at their school. The research is for my Masters in Counselling Psychology dissertation. The basics of the research are that I will be investigating whether there is a link between self-esteem, academic performance and physical activity levels amongst 10 year old children in South Africa. I am hoping that the research will show that there **is** a link and that increased physical activity is linked to improved academic performance and higher levels of self-esteem, so that attention will be given to making physical education in schools a priority again.

My sample size will be 40 participants.

The brief outline of the procedure is as follows:
- Children will complete an age-appropriate, internationally-developed self-concept questionnaire (which should take a maximum of 30 minutes, even for slow respondents)
- Children will complete a self-report questionnaire of the amount of physical activity they're routinely engaged in, which should take approximately 10 minutes to complete.
- A copy of each child's most recent academic results will be needed

All information will be kept confidential and full written informed consent will be required from a parent or caregiver, as well as assent from the child, to participate in the research. There is no anticipated risk to the participants.

I have attached a copy of the research proposal. In order for it to be submitted to the University of Pretoria's Ethics Committee for final approval, I will need a permission letter from a school, to conduct the study at the school.

If you have any further questions, please do not hesitate to contact me on ▬▬▬▬▬ or at loraine.dryden@gmail.com

Yours sincerely

Loraine Dryden

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Fax: +27(0)12 4203479

Supervisor:
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Appendix B. Permission Letter from School

CURRO

Aurora

31 August 2016

To whom it concern,

RE:PERMISSION GRANTED TO CARRY OUT RESEARCH AT CURRO AURORA INDEPENDENT SCHOOL.

I hereby confirm that **Loraine Dryden, ID Number –** ███████████ has been granted permission to carry out her research here at Curro Aurora Independent School.

All information **must be kept strictly confidential** and there must be **no personally identifying information linked to any result with any specific child.**

Yours Faithfully

Mr Colston Veater
Head: Primary School

Appendix C. Letter to Parents

Dear Parent

Re: The correlation between levels of physical activity, academic performance and self-esteem in grade 4 children in South Africa

I am a Master's in Counselling Psychology Student at the University of Pretoria, conducting research into the correlation between how physically active children are and their levels of self-esteem in several areas. I am also interested in whether levels of physical activity and self-esteem have any correlation with academic achievement. Grade 4 children have been selected as the focus of the study as studies show that if there is any intervention in factors that influence self-esteem positively at this age, there is a benefit that can be seen by age 13.

I will be conducting this research at your child's school. The brief outline of the procedure is as follows:

- Children will complete an age-appropriate, internationally-developed self-concept questionnaire (which should take a maximum of 20 minutes)
- Children will complete a self-report questionnaire of the amount of physical activity they're routinely engaged in, which should take approximately 10 minutes to complete.
- A copy of each child's most recent academic results will be required.

All information will be kept confidential and full written informed consent will be required from a parent or caregiver, as well as assent from the child, to participate in the research. There is no anticipated risk to the participants. Participation in the study is completely voluntary and the participants may withdraw at any time, for any reason, with no consequences.

Results of the study will be made available to participants and participants' parents / guardians upon request, although no personally-identifying information on any participant will be included in the results. Results of the self-esteem measure may suggest possible areas for growth and development, in which case, children will be given appropriate referral details.

For any questions, please do not hesitate to contact me on ▇▇▇▇▇▇▇ or at loraine.dryden@gmail.com

Yours sincerely

Loraine Dryden

Humanities Building, Room 11-02   **Researcher:**   **Supervisor:**
University of Pretoria   **Loraine Dryden**   **Dr Nicoleen Coetzee**
Private Bag X20, Hatfield 0028   **loraine.dryden@gmail.com**   **nicoleen.coetzee@up.ac.za**
Republic of South Africa   **Telephone: +27 (0)82 413 1041**   **Telephone: +27 (0)12 4202919**

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Appendix D. Parental Consent Form

Title of Study:
The correlation between levels of physical activity, academic performance and self-esteem in grade 4 children in a South African private school.

Purpose of the Study:
The aim of the study is to examine the factors of levels of physical activity and self-esteem, as well as academic performance to determine whether there is any correlation between the three. Grade 4 children have been selected as the focus of the study as studies show that if there is any intervention in factors that influence self-esteem positively at this age, there is a benefit that can be seen by age 13.

Role of the Participant:
• Children will complete an age-appropriate, internationally-developed self-concept questionnaire (which should take a maximum of 20 minutes)
• Children will complete a self-report questionnaire of the amount of physical activity they're routinely engaged in, which should take approximately 10 minutes to complete.
• A copy of each child's most recent academic results (school report) will be required.

Information:
The information gleaned from the above process will be used as the basis for a Masters in Counselling Psychology dissertation. This dissertation will be disseminated in hardcopy and electronic formats and may be accessible on the University of Pretoria's website. The information may be utilized to publish academic articles.

All information will be kept **strictly confidential** and there will be **no personally identifying information to link any result with any specific child**. Names of participants will not be used and any identifying information will be disguised. The focus will be on the data gathered and demographic variables and not on any individual's responses.

Data will be stored on the researcher's personal computer during the research process and information will be password-protected to prevent unauthorised access. Thereafter, information will be stored at the University of Pretoria's Department of Psychology for a period of 15 years, in accordance with the regulations of the University.

Humanities Building, Room 11-02   **Researcher:**   **Supervisor:**
University of Pretoria   **Loraine Dryden**   **Dr Nicoleen Coetzee**
Private Bag X20, Hatfield 0028   **loraine.dryden@gmail.com**   **nicoleen.coetzee@up.ac.za**
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Benefits to Participants:

If there are any areas for concern in any specific child's responses (a particularly low score in a particular self-esteem area), a brief confidential report will be prepared for the parent and recommendations will be made for professional assistance in the appropriate field / area. The Researcher will be available for any questions at any time during or after the study.

Researcher:

The privacy and confidentiality of participants will be respected at all times. Participation in this study is completely voluntary and participants can withdraw from the study at any time. If participants withdraw, all records pertaining to that participant will be destroyed. If any of the participants feel that they would like to discuss any issues raised by the testing process, the researcher will be available and will be able to refer the participants or parents to a relevant professional, should the need arise. The researcher's cellular number and e-mail address will be given to the participants so that they may contact her regarding the study for the duration of the research process.

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Parental Consent Form

Title of Study:
The correlation between levels of physical activity, academic performance and self-esteem in grade 4 children in a South African private school.

Informed Consent Form

I, ……………………………………………………………………………………. (parent / guardian) of

…………………………………………………………………………………………. (child's name) hereby freely give

permission for my child to take part in this study. The purpose of the study has been explained to me to

my satisfaction. I give my permission for the results of the study to be used for research purposes.

Parent / Guardian's full name (please print): …………………………………………………………………………..

Parent / Guardian's signature:

………………………………………………………………..

Date: …………………………………………………..

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Appendix E. Child Assent Form

Assent Form

I am a student at the University of Pretoria. Today, I would like to learn more about how you feel about yourself and about which sports or exercises you do.

I will give you two questionnaires to fill in:
- The first one will ask you some short questions about how you feel about yourself.
- The second one will ask you to think about which sports or exercises you have done in the last 7 days.

There are no wrong answers and this is not a test. This is just to learn more about you.

If you want to stop answering the questions you can tell me and I will not be cross with you.

If you want to help me to understand more about how you feel about yourself, please write your name below:

Your Name: …………………………………………………………………………………………………..

Today's Date: ………………………………………………………………………………………………….

Researcher: Loraine Dryden

The study has been explained verbally to the participants in language appropriate to their developmental stage. With the verbal conversation, the researcher has determined that the child has full understanding of the process.

Signature of Researcher: ……………………………………………………………………………

Date:………………………………………………………………………………………………………

Appendix F. Physical Activity Questionnaire for Older Children (PAQ-C)

Physical Activity Questionnaire

Name:

Age:

Sex: ☐ M   ☐ F

Grade:

Teacher:_____

We are trying to find out about your level of physical activity from *the last 7 days* (in the last week). This includes sports or dancing that make you sweat or make your legs feel tired, or games that make you breathe hard, like tag/catchers, skipping, running, climbing, and others.

Remember:

1. There are no right and wrong answers — this is not a test.

2. Please answer all the questions as honestly and accurately as you can — this is very important.

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Department of Psychology

1. Physical activity in your spare time: Have you done any of the following activities in the past 7 days (last week)? If yes, how many times? (Tick only one box per row, like this ☑.)

Activity	1-2	3-4	5-6	7 or more times
Skipping	☐	☐	☐	☐
Rowing /canoeing	☐	☐	☐	☐
In-line skating	☐	☐	☐	☐
Tag / Catchers	☐	☐	☐	☐
Walking for exercise	☐	☐	☐	☐
Cycling	☐	☐	☐	☐
Jogging or running	☐	☐	☐	☐
Aerobics	☐	☐	☐	☐
Swimming	☐	☐	☐	☐
Baseball, softball	☐	☐	☐	☐
Dancing	☐	☐	☐	☐
Rugby	☐	☐	☐	☐
Tennis	☐	☐	☐	☐
Skateboarding	☐	☐	☐	☐
Soccer	☐	☐	☐	☐
Touch Rugby	☐	☐	☐	☐
Volleyball	☐	☐	☐	☐
Hockey	☐	☐	☐	☐
Basketball	☐	☐	☐	☐
Netball	☐	☐	☐	☐
Athletics	☐	☐	☐	☐
Cricket	☐	☐	☐	☐
Karate / Judo / Martial Arts (other)	☐	☐	☐	☐
Gymnastics	☐	☐	☐	☐
Other:	☐	☐	☐	☐
Other:	☐	☐	☐	☐
Other:	☐	☐	☐	☐

2. In the last 7 days, during your physical education (PE) classes, how often were you very active (playing hard, running, jumping, throwing)? (Check one only).

I don't do PE ☐
Hardly ever ☐
Sometimes ☐
Quite often ☐
Always ☐

3. In the last 7 days, what did you do most of the time *at first break time*? (Check one only).

Sat down (talking, reading, doing schoolwork) ☐
Stood around or walked around ☐
Ran or played a little bit ☐
Ran around and played quite a bit ☐
Ran and played hard most of the time ☐

4. In the last 7 days, what did you normally do *at lunchtime* (besides eating lunch)? (Check one only).

Sat down (talking, reading, doing schoolwork) ☐
Stood around or walked around ☐
Ran or played a little bit ☐
Ran around and played quite a bit ☐
Ran and played hard most of the time ☐

5. In the last 7 days, on how many days *right after school*, did you do sports, dance, or play games in which you were very active? (Check one only).

None ☐
1 time last week ☐
2 or 3 times last week ☐
4 times last week ☐
5 times last week ☐

6. In the last 7 days, on how many *evenings* did you do sports, dance, or play games in which you were very active? (Check one only).

None ☐
1 time last week ☐
2 or 3 times last week ☐
4 or 5 last week ☐
6 or 7 times last week ☐

7. *On the last weekend*, how many times did you do sports, dance, or play games in which you were very active? (Check one only).

None	☐
1 time	☐
2 - 3 times	☐
4 - 5 times	☐
6 or more times	☐

8. Which *one* of the following describes you best for the last 7 days? Read *all five* statements before deciding on the *one* answer that describes you.

☐ A. All or most of my free time was spent doing things that involve little physical effort

☐ B. I sometimes (1 - 2 times last week) did physical things in my free time (e.g. played sports, went running, swimming, bike riding, did aerobics)

☐ C. I often (3 - 4 times last week) did physical things in my free time

☐ D. I quite often (5- 6 times last week) did physical things in my free time

☐ E. I very often (7 or more times last week) did physical things in my free time

9. Mark how often you did physical activity (like playing sports, games, doing dancing or any other physical activity) for each day last week.

	None	A Little	Medium	Often	Very Often
Monday	☐	☐	☐	☐	☐
Tuesday	☐	☐	☐	☐	☐
Wednesday	☐	☐	☐	☐	☐
Thursday	☐	☐	☐	☐	☐
Friday	☐	☐	☐	☐	☐
Saturday	☐	☐	☐	☐	☐
Sunday	☐	☐	☐	☐	☐

10. Were you sick last week, or did anything prevent you from doing your normal physical activities? (Check one).

Yes	☐
No	☐

If *yes*, what prevented you? _____

Reference:

The Physical Activity Questionnaire for Older Children (PAQ-C) and Adolescents (PAQ-A)

Kowalski, K., Crocker, P., & Donen, R. The Physical Activity Questionnaire for Older Children (PAQ-C) and Adolescents (PAQ-A) Manual. College of Kinesiology, University of Saskatchewan.

Kent C. Kowalski,
Ph.D. College of
Kinesiology University
of Saskatchewan

Peter R. E. Crocker,
Ph.D. School of Human
Kinetics University of
British Columbia

Rachel M. Donen, Bsc.
Honours College of
Kinesiology University of
Saskatchewan

PIERS-HARRIS 2

Ellen V. Piers, Ph.D., Dale B. Harris, Ph.D., & David S. Herzberg, Ph.D.

PROFILE SHEET

Name (or ID#): _Julia_

Age: _9_   Gender: ☐ Male   ☒ Female

REMOVE THIS SHEET BEFORE COMPLETING FORM

%ile	T	INC	RES	TOT	BEH	INT	PHY	FRE	POP	HAP	T	%ile
>99	≥80	≥7	≥52								≥80	>99
	79	6	51								79	
	78		50	60							78	
	77		48–49								77	
	76		46–47								76	
	75	5	45								75	
>99	74		44								74	>99
99	73		43								73	99
	72		42	59							72	
98	71		41								71	98
	70	4	40								70	
97	69		39	58							69	97
96	68		38						12		68	96
	67										67	
95	66		37	57							66	95
93	65	3				16	11	14			65	93
92	64		36								64	92
90	63		35	56							63	90
88	62				14						62	88
86	61		34	55							61	86
84	60	2	33	54					11		60	84
82	59					15				10	59	82
79	58		32	53			10	13			58	79
76	57										57	76
73	56		31	52							56	73
69	55			51							55	69
66	54		30		13	14		12	10		54	66
62	53	1		50							53	62
58	52		29	49			9				52	58
54	51			48		13		11		9	51	54
50	50		28	47					9		50	50
46	49			46	12						49	46
42	48		27	44–45		12	8	10			48	42
38	47			43					8	8	47	38
34	46		26	42	11	11		9			46	34
31	45			41			7				45	31
27	44			39–40		10			7		44	27
24	43	0	25	38	10			8		7	43	24
21	42			37		9	6				42	21
18	41			36	9			7	6		41	18
16	40		24	34–35		8	5			6	40	16
14	39			33	8			6	5		39	14
12	38		23	31–32		7	4				38	12
10	37			30	7			5		5	37	10
8	36			28–29	6				4		36	8
7	35		22	27		6	3	4		4	35	7
5	34			26		5					34	5
	33		21	24–25	5			3	3	3	33	
4	32		20	22–23		4	2				32	4
3	31		19	21	4			2	2		31	3
	30			19–20						2	30	
2	29		<18	17–18	3	3	1		1		29	2
	28			16	2			1			28	
1	27			15		2				1	27	1
<1	26										26	<1
	25										25	
	24										24	
	23							0			23	
	22										22	
	21										21	
<1	≤20						0				≤20	<1

	%ile	T	INC	RES	TOT	BEH	INT	PHY	FRE	POP	HAP	T	%ile
❼	Raw Score		1	21	52	14	12	7	14	11	10		Raw Score
	T-Score		53	33	56	62	48	45	65	60	59		T-Score

Validity Scales ❾ Self-Concept Scales

W-388A

WPS Test with Confidence

Appendix H. Piers-Harris 2 Scoring Worksheet

SCORING WORKSHEET (ITEMS 1–31)

Inconsistent Responding Index
Check box if:

☐ **Item 1** = 0 and **Item 47** = 1
☐ **Item 2** = 0 and **Item 42** = 1
☐ **Item 3** = 1 and **Item 41** = 0
☐ **Item 4** = 1 and **Item 40** = 0
☐ **Item 5** = 0 and **Item 43** = 1

☐ **Item 7** = 0 and **Item 10** = 1

☐ **Item 9** = 1 and **Item 51** = 0

☐ **Item 14** = 1 and **Item 20** = 0

☐ **Item 18** = 0 and **Item 21** = 1
☐ **Item 19** = 0 and **Item 27** = 1

☐ **Item 26** = 0 and **Item 39** = 1

☐ Item 29

☐ **Item 31** = 0 and **Item 35** = 1

Item	No	Yes	BEH	INT	PHY	FRE	POP	HAP
1.	**1**	0					☐	
2.	0	**1**						☐
3.	**1**	0					☐	
4.	**1**	0				☐		
5.	0	**1**		☐	☐			
6.	**1**	0				☐	☐	
7.	**1**	0		☐		☐		
8.	**1**	0			☐	☐		☐
9.	0	**1**			☐			
10.	**1**	0				☐		
11.	**1**	0					☐	
12.	0	**1**	☐	☐				
13.	**1**	0	☐					
14.	**1**	0	☐					
15.	0	**1**			☐			
16.	0	**1**		☐				
17.	**1**	0				☐		
18.	0	**1**	☐	☐				
19.	**1**	0	☐					
20.	**1**	0	☐					
21.	**1**	0		☐				
22.	0	**1**		☐				
23.	**1**	0				☐		
24.	0	**1**		☐				
25.	**1**	0		☐				
26.	0	**1**		☐	☐			
27.			☐					
29.						☐		☐
31.	0	**1**				☐		☐