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The Importance of Gross Motor Coordination in Adolescent Boys Self-Perceptions and Level of Physical Activity

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THE IMPORTANCE OF GROSS MOTOR COORDINATION IN ADOLESCENT BOYS SELF-PERCEPTIONS AND LEVEL OF PHYSICAL ACTIVITY

By

NICK SLOAN

Thesis submission for partial fulfilment for the award of Bachelor of Science (Sports Science) with Honours

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ABSTRACT

To date there has been limited research addressing the psychosocial consequences of poor coordination in Australian adolescent boys. The implications of failing to meet the expected physical standards of their peers, teachers and parents, can result in low self-esteem and subsequent withdrawal from participation (Lintunen, 1995). According to Harter's (1981) Theory of Competence Motivation, low motor competence is likely to lead to low self-perceptions in the athletic domain. Research with children (Rose, Larkin & Berger, 1997) has demonstrated that poor coordination is more pervasive, influencing many aspects of children's self-esteem. However limited research has addressed the pervasiveness of poor motor competence on self-perceptions in adolescents. This study tested whether a) perceived competence and global self-worth, b) perceived importance of athletic competence and c) level of physical activity varied with levels of motor coordination in a sample of adolescent boys aged 13-15 years (N = 72). All participants completed Harter's (1988) Self-Perception Profile for Adolescents (SPPA), the accompanying Importance Rating Scale, and the Physical Activity Questionnaire for Adolescents (PAQ-A) (Kowalski, Crocker & Kowalski, 1997) and were divided into low (n = 15), moderate (n = 43) and well-coordinated (n= 14) groups based on their scores for the McCarron Assessment of Neuromuscular Development (MAND) (McCarron, 1982). The results of the one way between group ANOVAs showed that the poorly coordinated group had lower perceptions of athletic competence \(F(2, 69) = 7.77, p < .01\) and romantic appeal \(F(2, 69) = 6.55, p < .01\) than their more well coordinated peers. The low coordination group also placed less importance on athletic competence \(F(2, 69) = 3.86, p < .01\) and lower levels of physical activity \(F(2,69) = 5.92, p < .01\) than their same aged peers. These findings with adolescents support the predictions of Harter's theory. Considering the importance of athletic competence for the engagement of physical activity (Lintunen, 1995), there are clear implications for addressing the needs of adolescent boys who are disadvantaged by poor coordination.
USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.
DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;

(ii) contain any material previously published or written by another person except where due reference is made in the text; or

(iii) contain any defamatory material

Signature

Date 06/12/03
ACKNOWLEDGMENTS

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CHAPTER ONE

INTRODUCTION

Background to the Study

To date there has been a paucity of research outlining the effects of poor coordination on adolescent boys. While several studies indicate that children with poor coordination tend to exhibit lower perceptions of competence (Cantell, Smyth & Ahonen, 1994; Rose, Larkin & Berger, 1998), heightened anxiety, and external perceptions of control (Cantell et al., 1994) and low perceptions of social support (Rose et al., 1998), little is known about adolescent boys. Research in Finland has examined the negative implications of poor motor competence in adolescents (Lintunen, 1995) and a study by Larkin and Parker (1997) identified a trend showing that Australian adolescents with poor coordination are less physically active. However, there remain gaps in knowledge of the links among self-perceptions, importance ratings, and level of physical activity with adolescents. Importantly, there is substantial evidence with primary school children to suggest that poorly coordinated individuals not only have lower self-perceptions but also are less intrinsically motivated towards physical activity (Rose, Larkin & Berger, 1997). This study addressed the importance of psychosocial issues associated with low motor competence problems in adolescent boys and the possibility that they may engage in less active lifestyles than their better coordinated peers.

Significant research has been conducted into identifying and classifying those individuals whose movement difficulties cannot be traced to intellectual or neurological impairment (Cermak, Gubbay, & Larkin, 2002). The clinical term used in the classification of these individuals is developmental coordination disorder (DCD). Teachers and workers in this area also use other terms such as poor coordination, low motor competence, and low motor coordination. Less
compassionately their peers may refer to children with DCD as 'clumsy', 'unco', and 'spaz'. The physical implications of poorly developed motor skills such as clumsiness may be apparent. Importantly the negative effects on self-perceptions in children’s lives can be particularly detrimental to their psychosocial health (Harter, 1999). One of the areas of concern for researchers is that children who exhibit movement difficulties are typically evaluated alongside those who possess culturally normative movement patterns (Causgrove Dunn, 2000). Hence, the resulting physical awkwardness that develops from these movement difficulties is likely be a significant factor in the psychosocial make up of children and may even continue through to adolescent years. Of particular relevance to this study is the lack of remediation available to adolescents with poor motor coordination and the psychosocial problems that may result.

Researchers have worked to establish theoretical frameworks to improve understanding of the relationship between self-perceptions and participation motivation. This understanding is important if we are to encourage youth participation in physical education, sport and physical activity. One model identified by researchers, as being important in examining the psychosocial outcomes of motor incompetence is Harter’s (1981) Competence Motivation Theory. This theory predicts that failure in a particular competence domain will lead to low perceptions of competence in that domain. This in turn is likely to lead to the attenuation of behaviour in that domain. Hence by following Harter’s (1981) model, an individual low in competence in the athletic domain, is likely to have low self-perceptions in athletic situations and will tend to withdraw from physical activity. In contrast, by demonstrating competence through mastery experiences, an individual is predicted to be more intrinsically motivated to continue participation. Hence self-perceptions and the importance placed on competence in a particular domain may be a strong predictor of physical activity. The major purpose of this research was to examine how adolescent boys who differ in level of motor competence differ in level of perceived competence not only in the athletic domain but across other domains that contribute to their self-esteem and global self-worth. Several studies (Cantell et al., 1994; Rose et al., 1997) have indicated that low motor competence in children can lead to low self-perceptions in the athletic domain. The work by Rose et al.
demonstrated that the effect of low MC extends beyond the athletic domain to other aspects of children’s lives.

The second major focus of this study was to examine whether adolescent boys who differ in level of motor competence also differ in level of physical activity. The results of a developmental study on self-perception and exercise by Lintunen (1995) in Finland suggest that there are positive psychosocial benefits to be gained from increased involvement in physical activity. Furthermore, studies demonstrate clearly the importance of motor control to children’s perception of competence (Cantell et al., 1994) and motivation to exercise (Causgrove Dunn, 2000). Clear evidence was cited indicating that children with poor coordination placed less overall value on their worth than did their better-coordinated peers (Rose, et al., 1998). With the exception of work by researchers such as Larkin and Parker (1997) there has been a limited number of studies undertaken with adolescents with low motor competence in Australia. The current study will extend the aforementioned findings to this less researched group, adolescents.

This study aims to provide a better understanding of the significance of motor competence on adolescent boys' psychosocial lives. In addition it serves to increase our knowledge of the links between level of motor competence, self-perceptions, and level of participation in physical activity.

Significance of the Study

This study is important from both theoretical and practical perspectives. Theoretically, it has been based upon Harter’s (1981) widely accepted, important motivational model in social psychology that has clear applications to movement. Yet according to Harter (1999) application of this model to adolescent motor behaviour is under researched. From a practical viewpoint, the findings of this research will help teachers, coaches and parents to gain a deeper understanding of the effects of poor motor competence on the psychosocial health of children. Only with such understanding can effective diagnosis, remediation and appropriate physical activity programs be provided for all adolescents who experience motor difficulty.
Theoretical Significance

According to Harter’s (1981) Competence Motivation Theory, self-esteem is a multi-dimensional construct incorporating perceptions of competence in physical, social, and scholastic domains. In addition, it incorporates a concept of global self-worth that is the overall value a person places on him/herself. Harter's model predicts that success in a particular domain will lead to high perceptions of competence that in turn will lead to high motivation to engage in activities specific to that domain. Harter’s theory also suggests that importance placed on competence in a specific domain, such as the athletic, will contribute to overall global self-worth. This study aims to contribute to the understanding of the influence of DCD on self-perceptions, the importance placed on athletic competence, and level of physical activity by adolescent boys.

To date, there has been limited application of the theory to adolescent boys in the motor domain. In applying Harter’s (1981) model to this study of adolescent boys with high, moderate, or low levels of motor coordination, specific areas of concern may be addressed. It is predicted in Harter’s model that repeated failures in a particular domain, such as movement, are likely to lead to low perceptions of competence, enjoyment, and subsequent low levels of physical activity. By contrast, high motor coordination is likely to be accompanied by higher perceptions of competence and increased levels of physical activity. Furthermore, in order to protect global self-esteem, boys with low perceived athletic competence may place less importance on physical activity. This would have cause for concern in those boys not seeking a physically active lifestyle. On the other hand, if it remains important in their lives, and their real selves are not measuring up to their ideals, there may be lasting negative effect on their psychosocial lives. Hence, for adolescents with poor motor competence, whether or not to rank physical activity as important may represent a ‘double edged sword’.
Practical Significance

Whilst remedial programs are available to children demonstrating scholastic difficulties, problems associated with poor coordination are often largely ignored particularly at secondary school level. The attitude that such childhood problems simply go away or are no longer important may lead to misconceptions about the importance of remedial programs in young boys' lives. Furthermore there is little research on the psychological consequences of poor coordination on adolescents. In a society where so much emphasis is placed on sport, the implications of poor motor competence on both self-esteem, and importantly level of physical activity, are likely to be profound. Along with low self-perceptions in the athletic domain, research by Schoemaker and Kalverboer (1994) contends that children with poor coordination are vulnerable to problems that pervade the social, affective and behavioural aspects of their lives. As Losse et al. (1991) and Rose et al. (1997) found, it could well be that any negative influence on self-esteem is not contained to the athletic domain.

In addition to the psychosocial implications, there are potentially serious health issues associated with poor coordination. Studies have identified a link between poor coordination and reduced levels of physical activity (Larkin & Parker, 1997; O'Beirne, Larkin & Cable, 1994). The consequences of this inactivity are far-reaching and well documented. Longitudinal studies, drawing on samples from Australia and the United States, indicate that cardiovascular health disease risk factors track from childhood into adulthood (Weinberg et al., 2000). There is a raft of other health concerns associated with physical inactivity (obesity, juvenile diabetes) to which children with poor coordination may be particularly vulnerable. Considering the reports that physical activity is a major positive influence on quality of life (Berger, Pargman & Weinberg, 2002) mental health areas are also of concern for those who are physically inactive.

The level of importance children place on being athletically competent has repercussions for their levels of physical activity. Harter (1999) suggests that some children are able to compensate for their physical inadequacies by placing less importance on athletic competence. This use of 'buffering' or 'discounting' sees children adjusting their lifestyle to accommodate interests that are more representative of their abilities. Subsequently poorly coordinated children may be
more likely to pursue a non-active lifestyle in which their movement difficulties will not be exposed.

This study addresses the need for examination of psychosocial and physical activity issues associated with poor motor coordination in a little researched age group, adolescent boys. Harter's (1981) model of competence motivation provides an ideal framework with which to examine motor coordination, self-perceptions, importance rating and level of physical activity in a sample of adolescent boys.

Purpose of the Study

The purpose of this study is three-fold:
1. To examine differences in perceptions of competence and global self-worth in adolescent boys who differ in level of motor competence.
2. To examine differences in importance placed on athletic competence by boys who differ in level of motor competence.
3. To examine differences in level of physical activity in adolescent boys who differ in level of motor competence.

Research Questions

Research Question One

Do adolescent boys of low, moderate, and high levels of motor competence differ in perceptions of competence in the (a) athletic, (b) social acceptance, (c) physical appearance, (d) work, (e) romantic, (f) behavioural, (g) scholastic (h) friendship domains, and (i) global self-worth?

Research Question Two

Do adolescent boys of low, moderate, and high levels of motor competence differ in level of importance placed on athletic competence?
Group 2: Boys with moderate coordination (Moderate): This group consisted of those whose score for GMC on the MAND falls within one SD of the mean.

Group 3: Boys with high coordination (High): This group was made up of those whose score for GMC was one SD above the mean on the MAND. As with the low group, three subjects whose scores placed them marginally outside one SD, were included to ensure adequate sample size.

Perceived Competence & Global Self-Worth

Perceived competence refers to an individual’s beliefs about his/her ability to succeed in a particular domain (Ferrer-Caja & Weiss, 2000). Harter (1981, p. 216) defines self-esteem as a multi-dimensional perception of one’s ability in a particular domain. For adolescents this construct represents an individual’s domain specific self-esteem and is made up of perceptions of (a) scholastic competence, (b) social acceptance, (c) athletic competence, (d) physical appearance, (e) job competence, (f) romantic appeal, (g) behavioural conduct, and (e) close friendship. In addition to domain specific perceptions of competence there is global self-worth. This is defined by Harter (1988) as an individual’s perception of their worth as a person and is measured independent of the other domains of Harter's SPPA (1988). However, the perceptions of competence in specific domains and the relative importance placed on these domains by the individuals are likely to influence their overall sense of worth.

Physical Activity

Physical activity is any bodily movement produced by skeletal muscles and resulting in energy expenditure (Bouchard, 1997). For the purposes of this study the level of physical activity will be calculated according to the Physical Activity Questionnaire for Adolescents (PAQ-A) (Kowalski, Crocker & Kowalski, 1997). This PAQ-A, developed at the University of Saskatchewan is a 7-day recall used to assess physical activity levels during the school year. The validity of the instrument has been confirmed in research conducted by Kowalski et al. (1997).
Limitations of the Study

The limitations of this study are as follows:

1. Participants were from a boy's private school. The specificity of this population is likely to limit the ability to generalise the results to the wider population. However there is no evidence to date to suggest differences in MAND scores for this and other populations. Differences in self-esteem may be different in this group due to perceived level of social support and other contributory factors. However it is difficult to predict the degree of influence within the scope of this study.

2. The design of the MAND incorporates evaluation of both fine and gross motor skills to provide an overall Neuro Muscular Developmental Index (NDI). For the purposes of this study, which focussed on sport and physical activity, only a measure of gross motor coordination was employed as an indication of motor competence. While it is recognised that fine motor coordination may have some influence in success at sport, gross motor coordination is more likely to have the major influence.

3. Due to the cross-sectional design of the study causality cannot be implied.

4. The voluntary nature of this study may have resulted in some boys with poor coordination choosing not to participate.

5. The use of Harter's (1981) model was limited to measurements of Perceived Competence, Global Self-worth and Importance placed on Athletic Competence, excluding the remaining variables. Whilst important in the discussion of findings, the scope of this study did not permit examination of other variables in her model (anxiety, motivation, social support, and perception of control).
CHAPTER TWO

REVIEW OF LITERATURE

Introduction

Motor competence is developed throughout an individual's lifespan and is influenced by a number of factors, such as the level of social support provided and their biological development (Gallahue & Ozmun, 1998). Researchers have demonstrated that primary school children with poor coordination exhibit lower perceptions of competence, heightened anxiety, and lower motivation to exercise (Cantell et al., 1994; Losse et al., 1991; Rose at al., 1988). Longitudinal studies suggest that individuals with poor coordination are less likely to engage in physical activity (Lintunen, 1995). However little is known of the influence of poor motor competence on self-perceptions of adolescents, whether it is limited to the athletic domain or if it pervades other aspects of their lives.

This review of literature will be presented in the following order (a) characteristics of poor coordination, (b) Harter's model - a theoretical framework, (c) perceived competence and global self-worth, (d) perceived competence, global self-worth and poor coordination, (e) importance placed on domain specific competencies, (f) level of physical activity and (g) summary.
Characteristics of Poor Coordination

Poor coordination is a term used synonymously with developmental coordination disorder (DCD). Other terms used to describe poor coordination in children include developmental dyspraxia (D) and clumsy child syndrome (CCS) (Miyahara & Register, 2000). The variety of terms used to describe children affected by this disorder is systematic of the traditional identification problems associated with poorly coordinated children (Miller, Missiuna, Macnab, Malloy-Miller, & Polotajko, 2001). Unhappily, these individuals are often labelled as 'clumsy' and other derogatory terms adding to the problems they face on a daily basis.

Identification and Classification of Poor Motor Competence (DCD)

Researchers have identified a syndrome of poor coordination that develops due to movement difficulties demonstrated by physically awkward children (Causgrove Dunn & Watkinson, 1994). These children are typically described as being clumsy or awkward and are identifiable by their lack of proficiency in fundamental movement tasks, such as running, catching and balance. The Diagnostic and Statistical Manual of Mental Disorders Fourth Edition DSM-IV-R, (APA, 1994) describes DCD as a disorder in which the impairment in development of motor coordination cannot be explained by any known physical disorder or mental retardation. More specific diagnostic criteria stipulate that the motor delay associated with DCD must interfere significantly with academic progress and other activities associated with daily living (APA, 1994).

Hoare and Larkin (1991, p. 114) describe individuals diagnosed with DCD as being of normal intellectual function and having no obvious physical impairment. There are varying theories as to the causes associated with DCD. Gubbay (1975) provides a range of potential causes, including genetic predisposition to degeneration of the brain to metabolic disorders, deficits in visual perception, and neural dysfunction caused by prenatal, birth and postnatal stress. An extensive review by Dewey (2002) adds deficits in kinaesthetic perception impairment of sensory integration as potential underlying causes of DCD. Larkin and Hoare (1991) suggest
that children with parents or siblings who suffer from DCD may be more likely to inherit these characteristics. However this may not necessarily be the result of an inherited problem but a consequence of the family favouring interests that avoid physical activities. While international statistics suggest that DCD affected children represent 5–6 percent of the school aged population (APA, 1994), studies on an Australian sample indicate the incidence could be as high as 10–20% domestically (Larkin & Hoare, 1991), a figure that represents a significant portion of children in Australia.

Research is divided on whether DCD remains a problem beyond adolescence. Findings by Hall (1988) and Knuckey and Gubbay (1983) suggest that DCD is largely isolated to childhood. Knuckey and Gubbay (1983) did however identify a group demonstrating a severe level of clumsiness that had not overcome their awkwardness beyond adolescence. Cantell et al. (1994) found that the likelihood of DCD pervading beyond childhood was related to the severity of the problem. This supports the findings of Knuckey and Gubbay (1983) in that in extreme cases, DCD can be an ongoing problem into adolescence and through to adulthood.

**Psychosocial Implications for Children and Adolescents with DCD**

While the physical impairment associated with this condition is obvious to onlookers, psychosocial consequences are often overlooked. The effect on other aspects of children’s behaviour has recently therefore become of particular interest to researchers. Wright (1997) suggests these children are vulnerable to poor concentration and are likely to demonstrate distractibility and a heightened fear of failure. Research by Wall (1982) suggests that clumsy children experience difficulty in covering up poor motor performance in game situations, owing to the nature of participation in the motor domain. The common result of this lack of competence is ridicule from their peers and potential exclusion in the future due to their poor performance. The frustration and embarrassment felt by these children may result in a cessation of participation in physical activity, particularly from those that include group participation, in order to avoid future ridicule.

Cantell et al. (1994) identified a range of difficulties experienced by children with poor motor development. These are (a) under achievement at school, (b) lack
of concentration, (c) behavioural problems, (d) low self-esteem, (e) poor social competence, and (f) a lack of physical hobbies. This is supported in research conducted by Miller et al. (2001), who also add reduced participation in structured and unstructured physical activities to the list of problems faced by children affected by DCD. It appears therefore that children with poor coordination lack the basic skills for integrating with their more culturally normative peers. There is evidence to suggest that there may be other repercussions beyond participation in physical activity, affecting the individual’s ability to express themselves through movement and degrading their opportunities for social integration. Are adolescents with poor motor coordination vulnerable to the same difficulties, or do these problems dissipate with maturity? Do their problems extend beyond the athletic domain? Clearly there is a need for research with this age group.

Harter’s Theory – A Theoretical Framework

The introduction of Harter’s (1981) Competence Motivation Theory into the field of social psychology has provided researchers with an important instrument to aid understanding of engagement in domain specific activities. The multi dimensional and hierarchical approach to self-esteem adopted by Harter allows for the measurement of domain specific perceptions of competence. Her model predicts that success in mastery attempts in a particular domain (such as movement) will result in high perceptions of competence and an increased motivation to continue participation in that activity (see Figure 1). By contrast Harter predicts that failure at mastery attempts results in low perceptions of competence and a decrease in motivation to continue participation. Harter’s model also has implications for anxiety/intrinsic pleasure, motivational orientation, social support, and perceptions of control, which in total could be examined in a larger scale research project. However such extensive data collection was not possible within the scope of this study. Figure 1 indicates those aspects of Harter’s model that were examined for the current study.
Figure 1. Adapted model of Harter's (1981) Competence Motivation Theory indicating variables for the current study.
between global self-worth and any of the other domains. In addition each of the other sub domains correlated more strongly with perceptions of physical competence than global self worth, highlighting the importance of perceived physical competence to an individual. Social psychologists and sports scientists now favour this multi dimensional approach over the traditional uni dimensional view of self-esteem (Boyd, Weinmann, & Yin, 2002).

Fox (1992) deems perceptions of competence in the physical domain to be an important determinant of global self-worth. Harter’s (1981) model predicts that success in a particular domain will lead to high perceptions of competence that in turn will lead to lead to high motivation to engage in activities specific to that domain. This theory is supported in research by Weiss (1987), which suggests that a child’s perception of their physical competence is an important determinant of their future level of physical participation.

Satisfaction and enjoyment also have been identified as being two key factors in motivating children to participate in physical activity (Carleton & Heinrich, 2000). Importantly to researchers, both of these factors are influenced by an individual’s confidence in their own ability. This confidence develops as the skill level associated with a particular task increases.

Results of studies by Malina (1992) indicate that children have a reasonably accurate perception of their actual physical competence. These self-perceptions tend to become less positive but more realistic with maturity (Digeldis & Papaloannou, 1999). When a child fails constantly to complete a specific motor task their perceived competence is reduced. Rose et al. (1998) argue that this results in the child being less intrinsically motivated to try again, as there is little satisfaction to be derived from repeated failures. Their research on self-perceptions with primary school children (Rose et al., 1988), supports Harter’s (1981) predictions that suggests that repeated failures in a particular competency will lead to lower perceptions of competence and a reduced intrinsic motivation to participate in that activity (refer to Figure 1). The implication of this reduced motivation is the increased risk of withdrawal from future participation in the activity (Causgrove Dunn, 2000). In addition, this lack of motivation is often manifested as inappropriate behaviour (Waronsky & Waronsky, 2000).
As a rule failure to achieve a satisfactory level of competence at a young age may also have an impact on the motivation to participate in activities at future ages (Malina, 1992). Conversely children with higher perceptions of competence are more enthusiastic about participation, apply more effort and persist for longer periods in their attempts at task mastery (Chase, 2001b; Chen & Darst, 2001; Hulya Asci, Nazan Kosar, & Kin Isler, 2001). Clearly this has implications for adolescents who may be even more vulnerable to negative psychosocial outcomes of poor coordination.

An individual’s motor competence may also have repercussions for their perceptions of physical appearance. Schoemaker, Hijlkema and Kalverboer (1994) suggest that in competitive societies such as Australia where so much emphasis is placed on sport, skilfulness and success in this area are highly valued. Children lacking in motor competence are vulnerable to perceptions that they don’t meet with the physical appearance standards set by their better-coordinated peers. This in turn is likely to have implications for their perceptions of global self-worth. Low self-esteem stemming from an individual’s perception of their body image can lead to social anxiety and withdrawal from group related activities, such as sports (Fox, 2000). On the other hand, Cantell et al. (1994) found that problems associated with low motor competence were limited to the athletic domain. However, studies show that by the age of 11 children have developed an opinion of whether or not they are attractive to the opposite sex (Fox, 1997). In addition they have determined which appearance factors are important in their environment and have started rating themselves on these features (Fox, 1997). Just how important the effect of coordination is on adolescent perceptions of physical appearance is not clearly understood. It could well be that with this athletic competence and development of romantic attachment, the issue of perceptions of physical appearance may be even more important than in childhood (Harter, 1999).

It is important to gain an understanding of the relationship among the self-perception domains and their contribution to global self-worth. Research by Harter (1999) determined that perceptions of competence in the athletic domain contributed less to global self-worth than did perceptions in other domains. Harter’s evidence suggests that perceptions of physical appearance, social acceptance and scholastic competence all contributed more to the overall value individuals place on themselves. Furthermore, the level of social support an individual perceives they are
receiving also has implications for their global self-worth (Rose & Larkin, 2002). There is a clear need to examine the contributions of these domains to the self-esteem of Australian adolescent boys with poor coordination.

**Gender, Motor Competence and Self-perceptions**

Whilst this study does not examine gender differences, it is important to consider aspects of self-esteem that may have particular relevance for adolescent boys. Research by Burns (1981) on an Australian sample supports that of Lintunen (1995) in suggesting that boys have a more positive self-concept than girls. These differences in self-concept however tend to be weighted toward the athletic domain, with boys placing higher importance on competence in this area than girls. Richman and Shaffer’s (2000) research reports that greater participation in sport by individuals from a mixed-gender sample prior to entering college predicted higher self-esteem. For the female portion of the sample however, the researchers found that while sport promoted aspects of the female’s psychosocial lives (e.g. favourable body images), sport participation had little overall affect on self-esteem.

Evidence suggests that differences in level of motor competence favour boys over girls (Ruiz Perez, Graupera, & Gutierrez, 2001). However with this comes a degree of expectation pertaining to boy’s physical abilities (Ruiz Perez et al., 2001). The increased societal pressures placed on boys to succeed at athletic pursuits are most likely the reason for boys tending to display higher perceptions of competence (Causgrove Dunn & Watkinson, 1994; Lintunen, 1995). The significance of these pressures is only realised when due to poor motor competence, boys perceive that they are failing to reach the expected level of performance. In this respect girls tend to escape the same level of pressure, as the expectations placed on them are more realistic. Increased understanding of the association of self-perceptions and physical activity with poor motor coordination with older age groups of boys will increase awareness that adolescents may not simply ‘grow out’ of their problems.
Perceived Competence, Global Self-Worth and Poor Coordination

Children who exhibit movement difficulties are typically measured against those with culturally normative movement patterns (Causgrove Dunn, 2000). The resulting physical awkwardness that develops from these movement difficulties is thought to be a significant factor in the psychosocial make up of children (Causgrove Dunn & Watkinson, 1994).

By following the predictions of Harter's (1981) competence motivation theory (refer to figure 1), an individual poor in mastery of a specific competence (i.e., physical ability), is likely to have low self-perceptions in athletic situations, lower intrinsic motivation to participate, and will tend to withdraw from physical activity. In addition this lack of motivation is often manifested as inappropriate behaviour (Waronsky & Waronsky, 2000) or the child becoming passive and withdrawn (Cantell et al., 1994). Conversely, by demonstrating competence through mastery experiences an individual is intrinsically motivated to continue participation.

The unfortunate cycle created by this situation is that the very medium, through which these children may improve their skills, is no longer available to them. Kalverboer (1990) describes this as a “negative downward spiral”. The lack of practice, which results from withdrawal, has a negative affect on potential development and can lead to an erosion of the children's existing skill levels (Causgrove Dunn & Watkinson, 1994). Reductions in perceived levels of competence have negative implications for other elements of the children's psychological well being, such as self-esteem. Implications also exist for children's perceptions of social competence and tend to result in increasingly lower levels of physical activity and consequent levels of physical fitness.

Research by Digeldis & Papaloannou (1999) found that the development of motor skills and athletic competence amongst boys was important in the acquisition of social status. Social comparison of sporting skills amongst children is inevitable and can be psychologically damaging for individuals with poor physical competence (Shapiro & Ulrich, 2001). For children with motor development deficiencies that affect their academic and athletic competence, the ongoing emphasis of evaluation based on the performance of their peers can be damaging to their perception of self-worth (Shapiro & Ulrich, 2001).
Furthermore studies conducted by Rose et al. (1997) clearly demonstrate the importance of motor control to a child’s perception of competence. Clear evidence was reported indicating that poorly coordinated children placed less overall value on their selves than did their better-coordinated peers (Rose & Larkin, 2002). In addition, studies with young children by Rose et al. (1997) have demonstrated that low motor competence can lead to low self-perceptions in the athletic domain. While it might be logical to predict that poor coordination will be associated with low perceptions in the athletic domain, it is possible that it may also affect self-perceptions in the social and scholastic domains as well as perceptions of global self-worth (Rose et al., 1997). Intervention studies however are not so conclusive, with studies by Fox (2000) failing to establish measurable increases in self-esteem through exercise programming. Problems arise in the application of these findings to adolescents. Aside from the work of researchers such as Larkin and Parker (1997), Lintunen (1995) and Cantell et al. (1994), there has been limited research into the effects of poor coordination on adolescent boys’ psychosocial health and links to level of physical activity.

Importance Placed on Domain Specific Competencies

According to Harter (1981) the importance an individual places on specific domains is a significant determinant of global self-worth. In order to protect self-esteem, individuals with low perceived competence in a specific domain may place less importance on activities associated with that domain. For instance individuals who are low in athletic ability may try to protect their global self-worth by placing less importance on perceptions of competence in the athletic domain. Harter (1981) suggests these measures are taken as individuals act to compensate for a lack of ability in a certain domain, so as to not to let their overall self-worth suffer. Rose and Larkin (2002) suggest that in domains such as movement, that are culturally dominant, individuals may find the importance more difficult to discount. This may result in an erosion of their self-esteem.

The use of ‘buffering’ or ‘discounting’ has potentially either positive or negative consequences for the individual. By discounting the importance of athletic competence, individuals are protecting their overall self-esteem and may choose to
avoid physical activity. However they are then more vulnerable to the problems associated with lack of physical inactivity. In contrast, in a society where so much importance is placed on sport, it is difficult for adolescents, particularly boys, not to place some degree of importance on athletic competence. If they do place importance on physical ability and perceive low competence, then according to Harter (1981) their global self-worth will suffer.

The value of the scales developed to measure importance ratings used in the prediction of self-esteem, have been questioned by some researchers. Marsh and Hattie’s (1996) findings led them to contend that little was to be gained by incorporating the results of importance ratings when measuring self-esteem. Rather they contended the use of self-perception profiles alone was sufficient. However Harter (1999) maintains, and is supported by Fox (1997) that we can gain a richer understanding of an individual’s self-esteem by examining importance ratings.

Level of Physical Activity

The need to maintain some degree of physical activity through adolescence and into adulthood has been well documented. The real benefits of physical activity such as moderation of cholesterol and triglyceride levels, blood pressure and heart rate are one positive aspect of exercise participation (Boyd, 2002). Haggar, Ashford, and Stambulova (1998) highlight the importance of physical activity in influencing children’s psychological well-being and increasing the likelihood of adherence to regular physical activity as adults.

Of more interest to sport psychologists however are the psychological benefits for individuals who engage in regular physical activity. These benefits include reductions in anxiety and depression and the influence on perceptions of competence in specific competency domains, such as perception of social acceptance and physical appearance (Berger, Pargman & Weinberg, 2002; Boyd et al., 2002; Harter, 1981).
Level of Physical Activity and Poor Coordination

For most adolescents, the opportunities to participate in physical activity are presented through physical education, sport at school, and within community teams. The emphasis in sport and physical education on selection based on athletic ability, leads to individuals with poor coordination developing negative perceptions about their sporting prowess. Furthermore in cultures heavily influenced by sport, their position in the environmental social hierarchy may also be affected (Digeldis & Papaloannou, 1999). This serves to dissuade those individuals with motor competence deficiencies from continuing participation beyond those compulsory years in order to avoid future embarrassment.

In the results of a developmental study on self-perception and exercise, Lintunen (1995) highlights the problems associated with withdrawal from physical activity. She contends that there are positive psychosocial benefits to be gained from increased involvement in physical activity. Children whose levels of physical activity are low are missing out on the benefits associated with an active lifestyle.

Summary

Far from being a problem that children are likely to grow out of, the likelihood of an individual carrying DCD and associated psychosocial problems into adolescence and beyond is very real. By following the predictions of Harter's model, the literature suggests that continued failure in the movement domain is likely to lead to a withdrawal from physical activity and may have contributory effects on an individuals overall self-esteem. The foregoing research has demonstrated that children affected by DCD have lower perceptions of athletic competence. In addition researchers have shown that for this population, other aspects of their psychosocial lives are vulnerable. The present study is important in determining whether problems related to self-esteem in children exist for adolescent males with poor coordination. It also examines the extent to which this group of individuals differ from their peers in the importance they place on athletic competence. Considering the reports in the literature of the importance of engagement in physical
activity and the central role played by movement in the lives of young people, there are clear ramifications of poor coordination for levels of physical activity.
CHAPTER THREE

METHODOLOGY

Design

A cross-sectional design was employed with the independent variable (GMC) formed by partitioning scores from the MAND into three groups (high, moderate and low), and performing one-way ANOVAs across each of the dependent variables, including: (a) importance placed on physical activity, (b) level of physical activity, (c) scholastic competence, (d) social acceptance, (e) athletic competence, (f) job competence, (g) romantic appeal, (h) behavioural conduct, (i) close friendship, and (j) global self-worth. The complete design of the study including research questions, all measures, variables and data analysis is provided for reference in figure 2.
<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Variables</th>
<th>Instrument</th>
<th>Measures</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do adolescent boys of low, moderate and high levels of coordination differ in perceptions of competence in the nine domains of the SPPA?</td>
<td>Level of Motor Coordination</td>
<td>MAND (McCarron, 1982)</td>
<td>Gross Motor Coordination</td>
<td>(2) Pearson’s Product Moment Correlation (3) One-way ANOVAS</td>
</tr>
<tr>
<td></td>
<td>Individual Differences</td>
<td>Individual Student Profile Form</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Do adolescent boys of low, moderate and high levels of coordination differ in level of physical activity?</td>
<td>Level of PA</td>
<td>PAQ-A (Kowalski, Crocker, &amp; Kowalski, 1997)</td>
<td>- Organised PA - Recreational PA - School based PA - Qualitative opportunity to express feelings on PA</td>
<td>(2) Pearson’s Product Moment Correlation (3) One-way ANOVAS</td>
</tr>
<tr>
<td></td>
<td>Degree of importance placed on Athletic Competence</td>
<td>Harter’s (1988) Importance Rating Scale</td>
<td>- Importance placed on athletic competence</td>
<td>(1) Cronbach’s Alpha (internal reliability consistency) (2) Pearson’s Product Moment Correlation (3) One-way ANOVAS</td>
</tr>
</tbody>
</table>

**Figure 2.** Illustration of research design including research questions, variables, measures and related data analysis.

**Participants**

The participants in this study were year nine male physical education students (N=72), aged between 13-15 years, attending a metropolitan Catholic boys school. Recruiting for these subjects occurred through direct contact with the college’s academic and student bodies. This included a formal presentation of the study to the
the assessment of individual profiles within each group. Harter (1998) highlights the importance of conducting these profiles in order to allow for any within group variability.

**Importance Placed On Athletic Competence**

The importance placed on athletic competence was evaluated by Harter's (1988) Importance Rating Scale (IMP), an extension of the SPPA (refer to Appendix B). The IMP asked the participants to rate their perceptions about the importance of having competence in specific domains. The athletic importance subscale comprises of two items that specifically relate to perceptions of athletic competence. In addition, one open question has been added to this scale.

**Level Of Physical Activity**

Participants' physical activity levels were measured using the Physical Activity Questionnaire for Adolescents (PAQ-A) (Kowalski, Crocker, & Kowalski, 1997) (refer to Appendix C). This questionnaire was developed and validated in research conducted by Kowalski, Crocker and Kowalski (1997). The PAQ-A asked participants to record their participation in leisure physical activity for the previous seven days and is used to determine the general physical activity levels during the school year. The instrument contains nine items measurable on a five-point scale that provide a summary total activity score for participants. Some minor adjustments were made to the questionnaire to make it more aligned to an Australian population. Specifically, leisure activities listed as potential pursuits for the participants were altered to reflect sports more indicative of an Australian population. For example, the activity 'tag' on the original questionnaire was altered to 'chase', a description more familiar to the participants, engaged in the present study. Attached to the PAQ-A was an open-ended question. This question "How do you feel about participation in physical education, sport classes and sports days" was included to enable the participants to provide a more qualitative perspective.
Stage Two: Contact With the School

Initial approaches were made to the Principal and Head of Physical Education Department of the school selected for the project. During the ensuing meetings the requirements and dynamics of the study were discussed in addition to the requirements of the researcher (refer to Appendix D - Teacher Information Briefing).

Stage Three: Distribution of Parental Permission Forms

The researcher distributed the participant consent and information forms to 110 boys. This group comprised the entire ninth grade from the college (refer to Appendices E & F - information and informed consent handouts). Boys who agreed to participate were asked to complete all forms (including the consent form signed by their parents/guardians) and return these to their form teacher two weeks later. The researcher assigned a number to each participant that was placed on the consent forms and the questionnaire on collection of the returned forms. The researcher then detached the consent form and filed it separately from the questionnaire. Assessment lists were subsequently drawn up with consideration given to the number of participants and the contact time made available to the researcher by the college.

Stage Four: Administration of Questionnaires

The first session was utilised to administer the SPPA (1988), the IMP (1988) and the PAQ-A (1997). This session and all testing thereafter were undertaken with the aid of a research assistant who was skilled in all testing protocols and procedures. The researcher administered questionnaires to groups of ten boys at a time, facilitating greater control of the session and ensuring each subject received a high level of attention. Students completed a roll check to ensure inclusion of only those individuals who had parental permission for testing. Prior to their administration, the researcher explained the purpose of the questionnaires as outlined in the test manuals. Care was taken to ensure this was carried out in a non-evaluative manner so the participants did not feel obliged to give socially desirable answers. The researcher again described the questionnaire as a survey, not a test, with no right or
wrong answers. Each participant was provided with a booklet containing the combined statements and response sheets for recording his responses.

The researcher then continued with the procedure of reading aloud each item in the questionnaire. The researcher then informed the participants that they could withdraw from the study at any time and were free to ask questions while answering the questionnaire. The researcher and assistant were able to provide assistance to individual's requesting help in answering items. On completion of the questionnaires the participants were informed that they may contact the researcher to discuss the results of their questionnaire at a later date.

In order to alleviate any possible inconvenience to the faculty, the researcher administered the questionnaires in accordance with the requirements of the school. This resulted in testing being carried out in a number of locations, determined by the type of sport in which the boys were participating. Of the boys tested, 57 were able to complete the questionnaires under classroom conditions provided in the school gymnasium. However 15 boys completed their questionnaires on the school bus, while stationary, at the site of their sport. Care was taken to ensure the conditions under these circumstances were as controlled as possible, with regards to seating arrangements, provision of a surface to write on, and the parking of the bus in a position such that distractions were minimised. No negative feedback was received or observed from any of the boys tested under these conditions.

Stage Five: Administration of the MAND

Following completion of the questionnaires, the researcher and assistant, previously trained in the use of the MAND, administered the test individually to each subject to assess levels of gross motor coordination. The research assistant was responsible for administering the quantitative items (grip strength and standing broad jump) from the MAND. Testing took place in quiet, sheltered locations, either in the school gymnasium or playing fields. This was necessitated by the student bodies' distribution between the two locations for their sporting curriculum. Testing of the subject group took place over a two-month period and followed the administration of
the questionnaires. The participants took approximately twenty minutes to complete the questionnaires.

Caution was taken to ensure testing was conducted independent of the student body to ensure no embarrassment on the participants’ behalf. Consideration was given to confidentiality and the physical safety of the participant, and participants were free to withdraw from the study if at any stage they felt uncomfortable. Three individuals accepted this option during the MAND evaluation and therefore were not included in the study.

Stage Six: Analysis and Storage of Data

The data was entered into SPSS (2000) for windows. Analysis was performed and the results recorded. The data was stored in a locked cabinet and all hard copies, disks, and computerised data will be destroyed after a period of 5 years. The follow up to the study entailed a presentation of results to relevant faculty at the college in addition to provision of an outline of the findings of the study.

Data Analysis

Data was analysed using SPSS for windows and presented using word processing software on a PC. The statistics used in this study to calculate the results were based on the following steps.

1. Based on their scores on the MAND, the participants were divided into three groups; low, moderate and high. The low group (N = 15) comprised those boys whose score on the MAND was more than one standard deviation below the mean (corresponds to a score of 6.4). In order to facilitate a more tenable sample size, three participants whose scores (6.6) were marginally outside this criteria were included in the low group. The high group (N = 14) comprised those participants whose scores were more than one standard deviation above the mean (corresponds to a score of 10.4). As with the low group, three participants whose scores (10.4) were marginally outside the criteria were included to increase the N. The remainder of participants (N =
43) made up the moderate group. Their scores on the MAND ranged from 6.8–10.0. All scores for groupings were based on gross motor scores for the MAND.

2. Preliminary data analysis included Cronbach’s (1951) alpha, which was used to test for internal reliability consistency on the nine domains of Harter’s (1988) SPPA.

3. Pearson’s Correlation between the independent variable (GMC) and all dependent variables (IMP, PA, Sch, Soc, Ath, Phy, Job, Rom, Beh, Fre, and GSW) were performed as the preliminary analysis to each research question.

4. In order to answer research questions one, two and three, a series of one way ANOVA’s with post hoc comparisons (Tukey HSD) were performed to compare each of the three motor coordination groups scores on each of the dependent variables.

5. Follow up data analysis: Though not part of a research question, individual profiles of two participants from the group with low coordination were compiled using the Individual Student Profile Form from Harter’s (1988) SPPA. This was done to provide follow up information on within group differences of self-perception in the group with low coordination.
Table 1

Cronbach alpha coefficients reported by Harter (1988) and Rose, Blackmore and Embrey (2002) and the present study

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scholastic competence</td>
<td>.82</td>
<td>.73</td>
<td>.68</td>
</tr>
<tr>
<td>Social acceptance</td>
<td>.81</td>
<td>.71</td>
<td>.73</td>
</tr>
<tr>
<td>Athletic competence</td>
<td>.84</td>
<td>.72</td>
<td>.81</td>
</tr>
<tr>
<td>Physical appearance</td>
<td>.86</td>
<td>.70</td>
<td>.76</td>
</tr>
<tr>
<td>Job competence</td>
<td>.82</td>
<td>.72</td>
<td>.46</td>
</tr>
<tr>
<td>Romantic appeal</td>
<td>.82</td>
<td>.72</td>
<td>.66</td>
</tr>
<tr>
<td>Close friendship</td>
<td>.82</td>
<td>.73</td>
<td>.68</td>
</tr>
<tr>
<td>Behavioural conduct</td>
<td>.78</td>
<td>.73</td>
<td>.30</td>
</tr>
<tr>
<td>Global self-worth</td>
<td>.85</td>
<td>.66</td>
<td>.69</td>
</tr>
</tbody>
</table>

With the exception of job competence and behavioural conduct, the reliability coefficients for the current study all fall between 0.66 and 0.81, being generally comparable with that of previous research with some differences observed. Firstly, reliability coefficients reported by Harter (1988) are highest across all domains, followed by those reported by Rose et al. (2002). The reliability coefficients for this study were lowest overall. Alpha levels for job competence and behavioural conduct are particularly low in the present study. However, considering that other researchers found these subscales reliable and that comparisons were to be made with other findings, these were included in the analyses. It is recommended that more in depth analysis in these subscales be carried out in future research. All other internal consistency reliabilities were at an acceptable level, with athletic competence being the highest.

Possible explanations for the discrepancies among the three studies may be due to differences in sample sizes and gender dynamics. Harter (1988) used male and female participants with N of 651. Rose et al. (2002) used only female participants (N = 118), while the current study used only males (N = 72). The study by Rose et al. also employed a sample of more limited age range (15-17 years).
age range for the present study includes younger participants (13-15 years) for whom dimensions of behavioural conduct and job competence may be less stable and thus less reliably measured. Also, it might be that perceptions of physical appearance, social acceptance, athletic competence, and global self-worth are more reliable in a male population within this age range. That is, these domains may be more stable within males of this age than within a mixed or female population. Likewise job competence and behavioural conduct seem to be less reliably measured by these scales when only boys comprise the sample.

Intercorrelations among Subscales of the SPPA and Motor Coordination, Importance Rating and Level of Physical Activity

The overall sample correlations among the variables of MC and PA, IMP, and SPPA are presented in Table 2. The highest correlations occurred for athletic competence, romantic appeal and global self-worth. Athletic competence correlated positively with level of physical activity ($r = 0.53$), importance placed on physical activity ($r = 0.45$), and romantic appeal ($r = 0.51$). It also correlated with gross motor competence ($r = 0.39$) and perceived social acceptance ($r = 0.35$) to a lesser extent.

Romantic appeal correlated with social acceptance ($r = 0.48$), athletic competence ($r = 0.51$), physical appearance ($r = 0.59$), and global self-worth ($r = 0.44$) and to a lesser degree with level of physical activity ($r = 0.38$), importance placed on physical activity ($r = 0.30$), and gross motor competence ($r = 0.28$). Global self-worth correlated most with physical appearance ($r = 0.51$) and then romantic appeal ($r = 0.44$) and behavioural conduct ($r = 0.33$).

There was a lower positive relationship between gross motor competence and social acceptance ($r = 0.28$) and importance place on physical activity and physical appearance ($r = 0.24$). Overall, level of physical activity correlates slightly with social acceptance ($r = 0.32$) and physical appearance ($r = 0.32$). Extremely low (almost zero) correlations were observable between scholastic and athletic competence ($r = 0.01$) and perceived scholastic and gross motor competence ($r = 0.01$) in addition to behavioural conduct and level of physical activity ($r = 0.001$).
Table 2
Pearson's Correlation Matrix Between Motor Competence (MC), Level of Physical Activity (PA), Importance Placed on Athletic Competence (IMP), and Perceptions of Competence for the overall (N = 72) Population

<table>
<thead>
<tr>
<th>Variables</th>
<th>Self Perception Profile for Adolescents</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC</td>
<td>PA</td>
</tr>
<tr>
<td>MC</td>
<td>.28**</td>
</tr>
<tr>
<td>PA</td>
<td>.16</td>
</tr>
<tr>
<td>IMP</td>
<td>-.06</td>
</tr>
<tr>
<td>Sch</td>
<td>.35**</td>
</tr>
<tr>
<td>Soc</td>
<td>.35**</td>
</tr>
<tr>
<td>Ath</td>
<td>.33**</td>
</tr>
<tr>
<td>Phy</td>
<td>.08</td>
</tr>
<tr>
<td>Job</td>
<td>.14</td>
</tr>
<tr>
<td>Rom</td>
<td>.16</td>
</tr>
<tr>
<td>Beh</td>
<td>.05</td>
</tr>
<tr>
<td>Fri</td>
<td>.04</td>
</tr>
<tr>
<td>GSW</td>
<td></td>
</tr>
</tbody>
</table>

Note: *p<.05, **p<.01
Note: MC (motor competence), PA (level of physical activity), IMP (importance placed on athletic competence), Sch (perceived scholastic competence), Soc (perceived social acceptance), Ath (perceived athletic competence), Phy (perceived physical appearance), Job (perceived job competence), Rom (perceived romantic appeal), Beh (behavioural conduct), Fri (close friendship), and GSW (perceived global self-worth)
The Difference Among The Coordination Groups on PA, IMP and Self-perceptions

Results for the one way ANOVA’s between MC and PA, MC and IMP, and MC and Sch, Soc, Ath, Phy, Job, Rom, Beh, Fri and GSW are presented in Table 3.

Table 3

Results of the ANOVAs showing means and standard deviations for each of the scales

<table>
<thead>
<tr>
<th></th>
<th>Low (N = 15)</th>
<th>Moderate (N = 43)</th>
<th>High (N = 14)</th>
<th>Between Groups F</th>
<th>Sig P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA</td>
<td>2.3 (0.7)</td>
<td>3.0 (0.7)</td>
<td>3.1 (0.8)</td>
<td>5.92**</td>
<td>.004</td>
</tr>
<tr>
<td>IMP</td>
<td>2.4 (0.5)</td>
<td>2.9 (0.6)</td>
<td>2.9 (0.8)</td>
<td>3.86*</td>
<td>.026</td>
</tr>
<tr>
<td>Sch</td>
<td>2.8 (0.7)</td>
<td>2.8 (0.6)</td>
<td>2.7 (0.6)</td>
<td>0.10</td>
<td>.909</td>
</tr>
<tr>
<td>Soc</td>
<td>2.8 (0.6)</td>
<td>3.0 (0.6)</td>
<td>3.2 (0.6)</td>
<td>1.65</td>
<td>.199</td>
</tr>
<tr>
<td>Ath</td>
<td>2.3 (0.6)</td>
<td>2.8 (0.7)</td>
<td>3.3 (0.6)</td>
<td>7.80**</td>
<td>.001</td>
</tr>
<tr>
<td>Phy</td>
<td>2.4 (0.8)</td>
<td>2.9 (0.6)</td>
<td>2.8 (0.6)</td>
<td>2.67</td>
<td>.077</td>
</tr>
<tr>
<td>Job</td>
<td>2.9 (0.5)</td>
<td>3.0 (0.5)</td>
<td>2.7 (0.7)</td>
<td>2.13</td>
<td>.126</td>
</tr>
<tr>
<td>Rom</td>
<td>2.2 (0.6)</td>
<td>2.8 (0.6)</td>
<td>2.8 (0.6)</td>
<td>6.55**</td>
<td>.002</td>
</tr>
<tr>
<td>Beh</td>
<td>2.8 (0.5)</td>
<td>2.8 (0.6)</td>
<td>2.5 (0.6)</td>
<td>1.78</td>
<td>.177</td>
</tr>
<tr>
<td>Fri</td>
<td>2.7 (0.7)</td>
<td>3.0 (0.5)</td>
<td>2.9 (0.6)</td>
<td>2.20</td>
<td>.120</td>
</tr>
<tr>
<td>GSW</td>
<td>2.8 (0.6)</td>
<td>3.0 (0.5)</td>
<td>3.0 (0.6)</td>
<td>.65</td>
<td>.526</td>
</tr>
</tbody>
</table>

Note: * significant at .01, ** significant at .001

Individual participant means are displayed in Appendix G. The ANOVA revealed main effects for perceived athletic competence and perceived romantic appeal (see Table 3). Post hoc analyses (Tukey HSD) indicated that the group with low motor competence had significantly lower perceptions of athletic competence than the better-coordinated groups. The moderate and high groups did not differ significantly from each other. In addition there was a significant main effect of motor coordination for importance placed on athletic competence and level of physical activity. Post hoc analysis indicated that the better-coordinated groups
placed significantly higher importance on athletic competence and demonstrated higher levels of physical activity than the group with low coordination. Perceived physical appearance was approaching significance (p = 0.077) with the group mean trends reflecting those of level of physical activity, athletic competence and romantic appeal.

The means for the moderate and high groups are significantly higher than those demonstrated by the low group (refer to Figure 5). There was little spread in mean values of PA, IMP, Ath, and Rom for the groups with poor and moderate coordination, while there is a greater spread in results for the high group suggesting more variability in their responses across these domains. There is only a marginal difference in mean results across the moderate and high groups for PA, IMP, and Rom with the highly coordinated group going against the trend with IMP by recording a higher mean for the moderate group. Perceptions of athletic competence follow a more linear trend with the difference between the moderate and high groups larger than that of the other three variables.

![Figure 5. Mean values for variables demonstrating significant main effects.](image-url)
The standard deviation (SD) in scores recorded by the high group in both physical activity and importance placed on physical activity was 0.8 suggesting a greater spread of scores. A similar SD was recorded for the low group in physical appearance. This might highlight the need for further research into the psychometric properties of the SPPA for this sample. Another interesting observation pertaining to the high group was the means for these boys in the job and behavioural domains were lower than were their more poorly coordinated peers.

Individual Profiles of Individuals Within the Poor Coordination Group

Individual profiles were developed for two of the participants from the group of boys with poor coordination (refer to Figure 6). This procedure was conducted briefly, post hoc to the main data analysis. These profiles were undertaken in order to demonstrate examples of within group variability. In the view of both Harter (1999), and Fox and Corbin (1989), such profiling is important if researchers are to gain deeper understanding of individual self-perceptions which may be clouded when findings are based on statistical analysis of large samples.

Participant B’s results follow the predicted means for perceived domain competencies in this group. Participant A however demonstrates higher perceptions of athletic competence, social acceptance, romantic appeal, physical appearance and behavioural conduct, despite having a lower overall perception of global self-worth. Furthermore participant A places a higher level of importance on athletic competence than does participant B.
Individual profiles of two participants with DCD indicating within group differences

Figure 6. Individual student profiles as illustrated by Harter’s (1988) Self-Perception Profile for Adolescents.
CHAPTER FIVE

DISCUSSION

Overview

There were three major purposes to this study. The first was to examine the differences in perceptions of competence and global self-worth in adolescent boys who differ in level of motor competence. Secondly this study sought to examine differences in importance placed on athletic competence by boys who differ in level of motor competence. The final purpose of this study was to examine differences in level of physical activity in adolescent boys who differ in level of motor competence.

The following discussion is presented in four sections. These are (a) findings of the correlation analysis (b) the differences in perceived competence and global self-worth between boys with low moderate and high levels of motor competence (c) the influence of motor coordination on the importance adolescent boys place on athletic competence, and (d) the importance of gross motor coordination to adolescent boy's levels of physical activity.

Interrelationship Among Perceptions of Competence, Global Self-Worth, Motor Competence, Importance Ratings and Physical Activity

Initially a correlation analysis was carried out to examine the relationships among the nine domains of Harter's (1988) SPPA and level of motor competence (MC), importance placed on athletic competence (IMP) and level of physical activity (PA).

The analysis revealed that social acceptance correlated with perceptions of romantic appeal ($r = 0.48$), perceived athletic competence ($r = 0.35$), and more
moderately with global self-worth ($r = 0.23$). Perceived physical appearance was highly correlated to perceived romantic appeal ($r = 0.59$) and global self-worth ($r = 0.54$), while perceived athletic competence correlated highly with romantic appeal ($r = 0.51$), physical appearance ($r = 0.33$), and more moderately with global self-worth ($r = 0.25$). The correlations for the present study were comparable to those reported by Harter (1988) excluding those involving global self-worth, which Harter did not report. These results are consistent with Harter’s (1999) findings that self-perceptions appear to fall into two groups of relationships. The first being those more likely to be dependent on peer feedback (athletic, physical appearance, social acceptance, close friendship, and romantic appeal). These domains also relate to global self-worth. The second cluster of relationships identified by Harter includes those domains more related to parental feedback (scholastic, behavioural and global self-worth). This finding is important when later considering the results for the differences between coordinated groups on self-perceptions.

When the correlations coefficients between Harter’s (1988) self-perception domains and MC, PA, and IMP are examined, it is notable that the significant relationships occur among the sub domains that are more dependant on peer feedback (social acceptance, physical appearance, athletic competence and romantic appeal). The analysis among motor competence and the domains of the SPPA revealed that MC correlated with perceived athletic competence ($r = 0.39$) and more moderately with perceived romantic appeal ($r = 0.28$), and social acceptance ($r = 0.28$). PA was highly correlated to athletic competence ($r = 0.53$), social acceptance ($r = 0.32$), physical appearance ($r = 0.32$), and romantic appeal ($r = 0.38$). In line with the previous sets of results, IMP correlated highly with athletic ($r = 0.45$), romantic ($r = 0.30$), and more moderately with physical appearance ($r = 0.24$). Considering the importance of peer support, these findings add weight to the argument that adolescents with poor coordination are likely to feel marginalised by their peers and may feel less overall self-worth.

Furthermore, the results of the correlation analysis give a clear indication of the pervasiveness of poor coordination on other aspects of adolescent boys’ psychosocial lives. In the current study motor competence, importance placed on athletic competence and level of physical activity were significantly related to perceptions of romantic appeal and social acceptance. This supports the findings of
Digeldis and Papaloannou (1999) who found that the development of motor skills and athletic competence was important in the acquisition of social status amongst boys. However, the results of the current study contrast somewhat with research conducted in Finland (Cantell et al., 1994; Lintunen, 1995), with respect to the more socially orientated competencies. Cantell and her colleagues found that adolescents with poor coordination did not differ significantly from their better-coordinated peers in perceptions of social acceptance and romantic appeal. Their lower self-perceptions were contained within the athletic domain. These researchers suggest that this containment may be due to the fact that physical education in Finnish schools places less emphasis on competitive outcomes than in other Western cultures. For example, in a sport competitive, orientated society such as Australia, sporting contexts still emphasise ego rather than mastery goals. Athletic ability, beating others and winning at all costs remains an ethos favourable to an elite group of individuals (Coakley, 2002). Furthermore, Coakley suggests that many societies continue to organise their dominant sports around the power and performance model rather than sport and recreation based on pleasure and participation.

While the purpose of the preliminary correlation analysis was to provide a background to relationships among the variables examined in this study, they are strongly supportive of the findings for the main research questions that addressed differences between coordination groups.

Level of Gross Motor Coordination, Perceived Competence and Global Self-Worth

The first research question asked ‘Do adolescent boys of low, moderate, and high levels of coordination differ in perceptions of competence in the (a) athletic, (b) social acceptance, (c) physical appearance, (d) work, (e) romantic, (f) behavioural, (g) scholastic (h) friendship domains, and (i) global self worth?’
While preliminary correlation analysis was utilised to examine any relationships between the variables, this study employed a one way ANOVA to explore the differences between groups of low, moderate and high levels of coordination across the nine domains of Harter’s SPPA. The analysis revealed that of the nine domains, perceived athletic competence ($F(2, 69) = 7.77, p < 0.01$) and romantic appeal ($F(2, 69) = 6.55, p < 0.01$) showed significant main effects. Post hoc analyses indicated that the group with poor coordination had significantly lower perceptions of competence in these domains than did the better-coordinated groups. Importantly, the moderate and highly coordinated groups did not differ significantly from each other. It is the group of adolescent boys with motor difficulties that stand apart and are disadvantaged from their peers.

These results support those of Rose et al. (1997), Schoemaker and Kalverboer (1994), and Losse et al. (1991) that suggests that the influence of poor motor coordination is likely to permeate other aspects of an individual’s self-esteem. While the findings for Rose and colleagues, Schoemaker and Kalberboer, and Losse et al. demonstrated a more far reaching effect of poor coordination, the current study has shown that the problems associated with movement difficulties in adolescents extend beyond the athletic domain. This finding demonstrates the importance of movement as explained by White (1959). He contends that motility is the means by which an individual is able to exert an influence on the environment. Poor coordination will limit the extent to which an individual is able to interact with their environment and according to White, this is likely to have a prevailing influence on all aspects of a person’s self-esteem. In other words, motor competence is central to the psychosocial health of an individual.

**Perceived Athletic Competence**

Harter (1988) uses this subscale to ‘tap into’ an adolescent’s perception of his/her athletic ability. An example of one of the items tested is “Some teenagers do not feel that they are very athletic BUT Other teenagers feel that they are very
“athletic” (Harter, 1988, p. 7). In the athletic domain, the group with poor coordination had significantly lower perceptions of competence than their better-coordinated peers. There was no significant difference between the other two groups. These results are consistent with the predictions of Harter’s (1981) model of competence motivation. Her model predicts that individuals, who repeatedly fail at mastery attempts in a particular domain, will demonstrate low perceived competence in that domain. In other words, boys affected by DCD find little success in participating in physical activity and sport, and subsequently are likely to perceive low perceptions of competence in the athletic domain. Hence a cycle of failure, resulting in a lack of participation and opportunity to increase actual skills is a likely scenario. These theories are supported by the findings of Rose et al. (1997), Cantell et al. (1994) and Schoemaker & Kelverboer (1994) who found clear evidence that low motor competence in children can lead to low perceptions of athletic competence. While no longitudinal evidence is provided in this study, there are clear indications that the problem does not go away for adolescents.

Thus this study extends the range of knowledge in this area to a largely neglected group, adolescent boys, that are particularly vulnerable to the influence of peer comparison. Harter (1999) highlights athletic competence as one of four domains susceptible to peer influence. Boys whose athletic competence falls short of required standards are open to ridicule and taunts from their peers. Often these boys are ostracised or marginalised into groups outside of those whose better coordination makes them more socially ‘desirable’. Schoemaker and Kalverboer (1994) theorise that these negative reactions are likely to result in not only reduced perceptions of competence in the athletic domain, but also in the development of social relationships. In order to alleviate feelings of embarrassment, boys with low athletic competence are likely to withdraw from environments that will contribute to their lack of confidence, such as organised sport and physical education at school. Indeed the means by which these boys can improve their level of coordination, namely practice, is effectively taken away from them, which may result in further degradation of their already poor skills.
Perceived Romantic Appeal

As with athletic competence, perceived romantic appeal is one of the domains in which Harter (1988) suggests adolescents are vulnerable to peer influences. Items measured on this sub scale include perceived attractiveness to those in which an individual is romantically interested and whether an individual feels they would be fun and interesting on a date. An example of one of the items on this sub scale is “Some teenagers are not dating the people they are really attracted to BUT Other teenagers are dating those people they are attracted to” (Harter, 1988, p. 8). The use of the word ‘attractive’ has clear connotations for physical appearance. The results of the preliminary analysis indicated that romantic appeal was highly correlated to physical appearance, and motor competence, suggesting adolescent boys with movement difficulties may be susceptible to low perceptions in these domains.

The analysis of variance supported the findings for the correlation analysis, indicating that individuals demonstrating moderate or high levels of coordination were likely to have higher perceptions of romantic appeal. By contrast, boys with poor coordination had significantly lower perceptions of romantic appeal than their peers. This is partly explained by Fox (1997), who notes that the physical self is the vehicle by which an individual communicates with the outside world. As such it is the interface for social functions such as communication and interacting with the opposite sex. In contrast Finnish research (Cantell et al., 1994) found that adolescents who were poorly coordinated expressed no more dissatisfaction with their body image, or romantic appeal than did their peers. Considering the cultural context however, it is more likely that a society such as Australia that promotes athleticism and competition so fiercely will cause its children with DCD to demonstrate these low perceptions of competence. Additionally, a culture based strongly on an outdoors, coastal lifestyle in which more of the body is likely to be exposed (shorts singlets and midriff tops are popular forms of attire), may draw more attention to those with movement difficulties whose body may not be in such ‘good shape’. In contrast, adolescents with poor coordination in Finland are less likely to have as many problems with their body image because for most of the year, their climate prohibits such exposure of their bodies to their peers.

Indeed it is highly likely that adolescent boys affected by DCD may perceive that their movement difficulties make them unappealing to the opposite sex. This is
a domain in which Harter (1999) suggests one's peers have an enormous influence. Boys with poor coordination are likely to demonstrate some of the physical characteristics associated with an inactive lifestyle. These boys may have problems with grooming, dressing and moving in a manner perceived as being attractive to their peers. While their better-coordinated peers may move with the confidence afforded by their athletic ability, the tag of 'spunk' or 'hottie' is unlikely to be attached to boys affected by DCD. Furthermore they are unlikely to have developed the social confidence that comes with positive peer input. In a society that encourages peer comparison, in conjunction with the importance of being athletically competent, adequate reasoning is presented for the poorly coordinated group having low overall perceptions of romantic appeal. The implications for body image of adolescent boys with poor coordination are obvious and need to be addressed. Fox (1997) compounds the importance of the physical self in overall self-esteem by affirming that it has strong correlations with global self-worth across an individual's lifespan. The findings of this research are clear. Adolescent boys with movement difficulties are at a social disadvantage in relation to romantic appeal. In fact this is a problem they are unlikely to have encountered in childhood.

Perceived Physical Appearance

As with the athletic competence and romantic appeal subscales, perceived physical appearance is within the domain cluster Harter has identified as being vulnerable to peer influence. While the ANOVA revealed no significant result for perceived physical appearance, the difference between the means was approaching significance \(F(2, 69) = 2.67, p = 0.077\). As with perceived athletic competence and perceived romantic appeal, the mean for the group with poor coordination was lower than that of the better-coordinated groups. Fox's (2000) research suggests an individual with poor coordination is particularly vulnerable in the perceived physical appearance domain. Schoemaker et al. (1994) contend that competitive societies, which emphasise sporting elitism, leave children with poor coordination vulnerable to perceptions that they don't meet the required physical standards of the culture. Physical appearance falls into this category. Furthermore, Fox (1997) found that by the age of 11, children are capable of determining which appearance factors are
placed a higher level of importance on athletic competence than his contemporary did.

Harter (1998) explains the importance of conducting these profiles. She suggests they allow for any within group variability and are of particular importance when considering remediation. Clearly there are many factors that may influence an individual’s response. For example, social support (parents, teachers, classmates, and friends) and the school environment. Due to the scope of this study, these variables were not examined. However the results from this comparison clearly show that in addition to the significant differences observable between groups, there is also the likelihood of within group differences. Hence, it would be erroneous to suggest all adolescents are at risk. The use of profiling is of particular importance to professionals (teachers, sports scientists, and occupational therapists) working with children with DCD, in this area to ensure the problems salient to each individual are addressed.

Gross Motor Coordination and the Importance Placed on Athletic Competence

The second major question posed by this study asked ‘Do adolescent boys of low, moderate, and high levels of coordination differ in level of importance placed on athletic competence?’

Differences in Importance Placed upon Athletic Competence among Low, Moderate and High Coordinated Groups

Harter’s (1988) Importance Rating Scale was used in order to evaluate level of importance placed on athletic competence by boys differing in levels of motor coordination. According to Harter and Fox (1997) the use of such a scale can assist understanding in how individuals may discount a particular domain (in this case athletic) in order to protect self-esteem. The term ‘discount’, used synonymously with ‘buffering’, describes the self-enhancement strategy employed by individuals in attaching low importance to those domains in which they perceive low competence (Harter, 1999). Harter suggests that only those domains that individual considers to
be important, will have an effect on their global self-worth. Thus individuals with poor coordination may be able to discount the importance of athletic competence, and subsequently prevent a negative influence on their overall self-esteem. The results of the one way ANOVA conducted across the three coordination groups and the importance placed on athletic competence provide strong support for Harter’s discount theory. The adolescent boys in the low group placed less importance on athletic competence ($F (2, 69) = 3.86, p < 0.01$) than did their same aged peers. The two better-coordinated groups did not differ significantly in the importance they placed on athletic competence. As with perceived athletic competence and perceived romantic appeal, this group of boys stood apart from the others in the importance they placed on athletic competence.

While Harter used importance ratings in combination with self-perceptions initially as a predictor of global self-worth, other researchers (Marsh, 1990; Marsh & Hattie, 1996) have rejected its usefulness in these terms. However, many researchers in self-esteem hold the view that even if importance rating does not predict global self-worth, it assists in deepening our understanding of how individuals rate particular areas in their life and why they will or will not participate. For example Rose and Larkin (2002) found that while importance ratings did not predict GSW, there was clear evidence that low coordinated groups differ from their better coordinated peers in the way they value and discount athletic ability. The fact that this study showed that the group with poor coordination placed less importance on athletic competency and did not show less global self-worth provides some support for Harter’s discounting theory in adolescents. Discounting, importance rating and global self-worth are little researched areas, particularly in relation to DCD.

While the results of this analysis showed no significant main effect for motor coordination and global self-worth, there are important implications for future research. The scope of this study did not allow for the evaluation of social support, perceptions of control, anxiety and motivational orientation. It is important that future research address each of these variables in relation to adolescents. The findings of this study, although limited to self-perceptions, importance rating and level of physical activity, have demonstrated that some process of discounting of low athletic ability is taking place in relation to DCD. On the one hand the results of the IMP are encouraging when considering that boys with movement difficulties are able to disregard the importance of athletic ability. However, there is a need for future
researchers to better understand the implications of this ‘discounting’. In light of the revelations that ‘motility’ has such an important pervasive effect over one’s life (White, 1971) and the importance of exercise to psychosocial health (Berger et al., 2002), there could be long term damage to an individual’s overall quality of life.

Gross Motor Coordination and Levels of Physical Activity

The third research question asked ‘Do adolescent boys of low, moderate, and high levels of coordination differ in level of physical activity?’

Differences in Level of Physical Activity among Low, Moderate and High Coordinated Groups

Thus far, the discussion of findings has presented a scenario of psychosocial disadvantage for adolescent boys with DCD. This section addresses the third research question relating to differences between the coordinated groups in level of physical activity. Results of the ANOVA relating to the third research question indicated that the group with poor coordination demonstrated significantly lower levels of physical activity ($F(2, 69) = 5.92, p < 0.01$) than their better-coordinated peers. Furthermore, the moderate and high group’s results did not differ significantly. While no causal analysis was used in this study, there are clear indicators of parallel process going on, that is consistent with Harter’s model. As with the previous research questions, these results follow the predictions of Harter’s Competence Motivation Theory. That is, repeated failure at movement attempts, mediated by low self-perceptions and a decrease in motivation, is likely to attenuate engagement in physical activity. Adolescents with poor coordination frequently disappointed with failure in the physical domain are likely to withdraw from physical activity and a downward cycle of inactivity results. Earlier research has identified a link between poor coordination and reduced levels of physical activity with this age group (O’Beirne et al., 1994). In addition the practical implications and health risks of physical inactivity have been detailed (Piko, 2000; Weinberg et al., 2000). Berger et al. (2002) also stress that mental health and quality of life issues are of particular
concern for the physically inactive. The findings in the current study present an increasingly composite picture of a process that can be likened to a downward spiral. Adolescents with poor coordination perceive low competence in several domains and place less importance on athletic ability. These findings appear from this study to be linked to less physically active lifestyles than their better-coordinated peers.

Remediation of this problem needs to start in an environment that facilitates participation for all. In order to cater for children with movement difficulties, it is important that the mechanisms be in place to ensure early identification and remediation of DCD. Research by Carleton and Henrich (2000) has found that physical education tends to be focussed towards the top five to ten percent of students in terms of skill level. Those students who enter the class with low-skilled abilities are at an enormous disadvantage and are denied the encouragement and attention needed for inclusion. This is exacerbated in a climate of competitive based power and performance sports.

Lloyd and Fox (1992) and Ntoumanis (2001) contend that physical education programs need to focus on promoting self-referenced information and task/mastery processes in order to allow all students to experience positive self-perceptions. Such elements are more likely to reduce the risk of undermining individuals perceptions of their physical competence and their intrinsic desire to engage in physical activity (Ntoumanis, 2001). There is a clear need for evaluation practices that ensure all children experience some degree of success that will promote continued participation in that activity (Carleton & Henrich, 2000). Consideration of motivational climates that lead to positive actual motor competence as well as perceived competence while simultaneously eliminating interpersonal comparison (Chase, 2001a) are likely to enhance engagement in physical activity.

The importance of physical activity to an individual’s quality of life and psychosocial health has been well documented (Berger et al., 2002). The current study focuses on a group of adolescents that may be particularly vulnerable to negative experiences. When considering that up to twenty percent of our youth may be affected by DCD (Rose et al., 1998), the long-term problems associated with a generation of physically inactive individuals become more disturbing. From this study, it seems likely that problems associated with DCD persist. The message is clear, by continuing to disregard the symptoms of DCD as laziness, clumsiness, or at
best, something that individuals will ‘grow out of’, the physical and psychosocial health of a large percentage of our youth is at risk.

Qualitative Analysis of Enjoyment in Physical Education

In addition to the importance rating scale, the participants were provided with one open question “How do you feel about participation in physical education, sport classes and sports days?” This presented the participants with the opportunity to express views about psychosocial and physical experiences in a qualitative manner. Although the scope of the study did not allow for a more comprehensive interview process, the responses to this question provided some additional insight into boys’ physical education and sport experiences. Most boys accepted the opportunity to express their opinion about the relative importance they placed on physical education. The responses were categorised according to the participants grouping with respect to motor competence.

Some of the responses by the boys in the better-coordinated groups focussed on specific aspects of their physical education experience. Such as “I enjoy it, it improves my sporting skills; and “sport and PE are fun and exciting, they help my active lifestyle”. Common words used by this group were “fun”, “enjoyable”, “healthy”, and “fit”. Somewhat surprisingly there were a number of positive comments such as “PE is good because it helps keep you fit” and “I think it is fun because we get to learn new sports” from the group with poor coordination. However there was a trend among a number of these boys who used terms like “boring” and “waste of time” to describe their physical education experience. Some were even more specific about their views; “I don’t like sport that much. I think it is not important to be very fit” and “It’s good to keep children active, but it puts pressure on the unfit, if they do not want to participate”. A number of these boys also referred to the physical education teachers as being the cause of their lack of enjoyment, perhaps highlighting the fact that educators don’t have the time or resources to devote to boys whose skills need improving. Of even greater concern is that physical education teachers are not trained in identifying these boys. This may not only result in a dismissal or disregard of the problems of DCD but use of terms
when considering the culture to which these adolescents are exposed. Secondly, the present findings demonstrated that boys with DCD rate athletic ability as less important than well coordinated boys. Considering that they did not differ in global self-worth, it is possible that discounting mechanisms to protect global self-worth are operating. The findings reinforce Harter’s (1981) theory that the use of importance ratings is relevant. They not only provide deeper understanding of the influence of poor coordination but also present a picture of a coping mechanism. This mechanism protects self-esteem but at the same time reinforces withdrawal from physical activity. The absence of remedial programs available to boys of this age and a lack of specialised teaching skills available through the education system leaves them with no attractive means of overcoming their problems.

Thirdly and perhaps most importantly, this research demonstrated that boys who differ in level of motor competence also differ in level of physical activity. The degree of physical inactivity associated with poor coordination should be of considerable concern to parents, educators, and health care providers alike. Furthermore the open question revealed that these vulnerable adolescents express negative attitudes toward participation in physical education at school, explicitly referring to it as a ‘bore’. The message for professionals in this area is clear. There is a need to identify boys with DCD prior to reaching secondary school, before a pattern of physical inactivity has been established.

**Summary Conclusion and Implications**

**Summary**

The purpose of this study was to examine the differences in self-perceptions and global self-worth, importance placed on athletic competence and levels of physical activity among adolescent boys of low moderate and high levels of motor competence. The importance of this study lies largely in the population to which it addresses. Research into the pervasiveness of DCD in adolescent boys’ psychosocial health and level of physical activity has been limited. This study found that boys with poor coordination (1) demonstrate low perceptions of competence in the athletic domain, (2) have low perceptions of romantic appeal, (3) place low importance on
athletic competence, and (4) are less likely to participate in physical activity. Furthermore, this study highlighted the importance of individual profiling by revealing the likelihood of within group variability in domain specific self-perceptions and global self-worth.

Conclusion

The results of this study support the previous research that suggests that the effects of DCD are likely to pervade not only perceptions of athletic competence (Cantell et al., 1994) but other aspects of an individual’s self-esteem (Losse, et al., 1991; Rose, et al., 1997). It was revealed that perceptions of athletic competence and perceptions of romantic appeal were clearly lower for boys with poor coordination and that there was also a tendency for these boys to perceive low perceptions of physical appearance. Furthermore the results support Harter’s (1981) predictions that adolescent boys with poor coordination are likely to place less importance of athletic competence and fall into a pattern of physical inactivity (Larkin & Parker, 1997). While the results of this study support aspects of Harter’s model, it is important that future research with adolescents incorporates all elements of her Competence Motivation Theory so that a bigger picture emerges.

There are also aspects of the current findings that contrast with that of previous reported literature. Studies out of Finland (Cantell, et al., 1994) found no differences in perceptions of romantic appeal and physical appearance in adolescents who differ in level of motor competence. This points to the need to be aware of cultural differences when comparing research findings from different countries. This study has also supported the use of importance ratings and indicated the importance of including qualitative methods into quantitative research where appropriate. The scope of this study allowed the use of one open question. This question alone provided rich information about the sport and physical education experiences of boys differing in levels of motor competence and provided greater insight into why this group of boys may choose to be less active.
Implications

The findings of this study produced a number of practical and theoretical implications for use by researchers, practitioners, administrators and tertiary institutions.

Harter’s (1981) model has provided an excellent framework within which to study the psychosocial and physical activity aspects of DCD. However future research needs to also apply other models more specific to the motor domain, such as those presented by Fox and Corbin (1989) and Marsh (1990). The little applied model of Movement Confidence (Griffin & Keogh, 1982) would also provide an excellent instrument for researchers in this area. The limited scope of this study allowed inclusion of the athletic subscale only in the Importance Rating Scale. Future research needs to consider the importance of extending the use of this scale to all items. It is also recommended that future studies permit utilisation of both fine and gross motor coordination and a research design that allowed for conclusions about causality. Consideration of use of LISRE causal modelling statistics or longitudinal studies would allow for this. A longitudinal study may facilitate a better understanding of the long-term effects of DCD. While the importance of considering within group differences was only a minor part of this study, the results suggest future research can benefit from this type on analysis. Furthermore the use of a more thorough qualitative element may assist future researchers in understanding the motivations of adolescent boys affected by DCD.

This research has demonstrated the importance of early identification of DCD in boys. What is clear is that the boys with poor coordination in this study have made it through primary to secondary school without their problems being addressed. Just as undiagnosed reading problems create difficulties later in life, this hidden disability, DCD also has ramifications. Training in early identification and the implementation of remedial programs for primary and secondary schools clearly needs addressing. This necessitates a rethinking of allocation of both Federal and State Government funding. Over eighty percent of funding from the Australian Sports Commission is currently allocated to elite sports. There needs to be a more equitable distribution of funds to ensure the problems associated with DCD receive the attention from professionals that they warrant.
The current emphasis in higher education institutions to produce specialists orientated towards elite level sports needs to be addressed. Attention to training not only elite coaches, but well trained movement specialists in social psychology and acquisition of motor skills will increase the body of professionals capable of addressing the needs of young people with movement difficulties. Currently only one University in Western Australia offers its expertise in the remediation of DCD affected children. The development of more specialised programs, responding to the needs of local communities, will be useful in alerting future professionals to the needs of all, not just the elite, while satisfying an urgent requirement of the local population.

Justifiably so, much of the recent research conducted in this field has been directed towards the self-esteem of girls. However, the increased pressure on adolescent boys, through the media, to satisfy unrealistic images of power and masculinity, has highlighted the vulnerability of self-esteem of adolescent boys with DCD. The establishment of ‘elite’ programs within the school system and sporting bodies outside of school results encourage an ethos of exclusivity, based on ability. Under these circumstances the better-coordinated boys receive more attention and encouragement. Boys with poor coordination are likely to be marginalised and forced to attend school carnivals as spectators, encouraging avoidance of school sport days.

The importance of the pervasive nature of DCD on adolescent boy’s self-esteem as demonstrated by this study can not be ignored. While the ability of these boys to discount the importance of athletic competence may seem fortuitous for their global self-worth, the likelihood of adopting a physically inactive lifestyle is too high a price for them to pay. The onus is on professionals and future graduates in relevant disciplines to work to establish a framework whereby these young people’s movement difficulties are identified. These difficulties must be addressed before their self-perceptions in vulnerable domains are affected. Surely the difficulties that DCD contributes to an already difficult time in a young man’s development deserve the attention of the best minds in the Sports Science discipline.
REFERENCES


Appendix A

Harter’s (1988) Self-Perception Profile for Adolescents (SPPA)
What I Am Like

Name ___________________________ Age __________ Birthday __________ Group __________________

SAMPLE SENTENCE

Really True for Me Sort of True for Me

Some teenagers like to go to movies in their spare time

BUT

Other teenagers would rather go to sports events.

3) Really True for Me Sort of True for Me

Some teenagers feel that they are just as smart as others their age

BUT

Other teenagers aren’t so sure and wonder if they are as smart.

1. Really True for Me Sort of True for Me

Some teenagers find it hard to make friends

BUT

For other teenagers it’s pretty easy.

2. Really True for Me Sort of True for Me

Some teenagers do very well at all kinds of sports

BUT

Other teenagers don’t feel that they are very good when it comes to sports.

3. Really True for Me Sort of True for Me

Some teenagers are not happy with the way they look

BUT

Other teenagers are happy with the way they look.

4. Really True for Me Sort of True for Me

Some teenagers feel that they are ready to do well at a part-time job

BUT

Other teenagers feel that they are not quite ready to handle a part-time job.

5. Really True for Me Sort of True for Me

Some teenagers do well at a part-time job

BUT

Other teenagers worry that when they like someone romantically, that person won’t like them back.

6. Really True for Me Sort of True for Me

Some teenagers are ready to do well at a part-time job

BUT

Other teenagers feel that they are not quite ready to handle a part-time job.

7. Really True for Me Sort of True for Me

Some teenagers usually do the right thing

BUT

Other teenagers often don’t do what they know is right.

8. Really True for Me Sort of True for Me

Some teenagers are able to make really close friends

BUT

Other teenagers find it hard to make really close friends.

9. Really True for Me Sort of True for Me

Some teenagers are often disappointed with themselves

BUT

Other teenagers are pretty pleased with themselves.

10. Really True for Me Sort of True for Me

Some teenagers are pretty slow in finishing their school work

BUT

Other teenagers can do their school work more quickly.

11. Really True for Me Sort of True for Me

Some teenagers have a lot of friends

BUT

Other teenagers don’t have very many friends.

12. Really True for Me Sort of True for Me

Some teenagers think they could do well at just about any new athletic activity

BUT

Other teenagers are afraid they might not do well at a new athletic activity.

66
<table>
<thead>
<tr>
<th>Really True for Me</th>
<th>Sort of True for Me</th>
<th>BUT</th>
<th>Other teenagers are not very popular.</th>
<th>Really True for Me</th>
</tr>
</thead>
<tbody>
<tr>
<td>29.</td>
<td></td>
<td></td>
<td>Some teenagers are popular with others their age</td>
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<tr>
<td>30.</td>
<td></td>
<td></td>
<td>Some teenagers don't do well at new outdoor games</td>
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<tr>
<td>31.</td>
<td></td>
<td></td>
<td>Some teenagers think that they are good looking</td>
<td></td>
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<td>32.</td>
<td></td>
<td></td>
<td>Some teenagers feel like they could do better at work they do for pay</td>
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<td>33.</td>
<td></td>
<td></td>
<td>Some teenagers feel that they are fun and interesting on a date</td>
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<td>34.</td>
<td></td>
<td></td>
<td>Some teenagers do things they know they shouldn't do</td>
<td></td>
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<td>35.</td>
<td></td>
<td></td>
<td>Some teenagers find it hard to make friends they can really trust</td>
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<td>36.</td>
<td></td>
<td></td>
<td>Some teenagers like the kind of person they are</td>
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<td>37.</td>
<td></td>
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<td>Some teenagers feel that they are pretty intelligent</td>
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<td>Some teenagers feel that they are socially accepted</td>
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<td>39.</td>
<td></td>
<td></td>
<td>Some teenagers do not feel that they are very athletic</td>
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<tr>
<td>40.</td>
<td></td>
<td></td>
<td>Some teenagers really like their looks</td>
<td></td>
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<td>41.</td>
<td></td>
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<td>Some teenagers feel that they are really able to handle the work on a paying job</td>
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<td>42.</td>
<td></td>
<td></td>
<td>Some teenagers usually don't go out with the people they would really like to date</td>
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<td>43.</td>
<td></td>
<td></td>
<td>Some teenagers usually act the way they know they are supposed to</td>
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<td>44.</td>
<td></td>
<td></td>
<td>Some teenagers don't have a friend that is close enough to share really personal thoughts with</td>
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<td>45.</td>
<td></td>
<td></td>
<td>Some teenagers are very happy being the way they are</td>
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<thead>
<tr>
<th>Sort of True for Me</th>
<th>Really True for Me</th>
</tr>
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<tbody>
<tr>
<td>BUT</td>
<td>Other teenagers are good at new games right away.</td>
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Appendix B

Harter's (1988) Importance Rating Scale (IMP)
Appendix C

Physical Activity Questionnaire for Adolescents (PAQ-A) (Kowalski, Crocker & Kowalski, 1997)
Physical Activity Questionnaire (High School)

ID: ___________________________  Date of Birth: ____________

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 dance that make you sweat or make your legs feel tired, or games that make you breathe hard, like tag, 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.

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? (Mark only one circle per row.)

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<tr>
<th>Activity</th>
<th>No</th>
<th>1-2</th>
<th>3-4</th>
<th>5-6</th>
<th>7 times or more</th>
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<tbody>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Rowing/canoeing</td>
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<td>O</td>
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<td>Jogging or running</td>
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<td>O</td>
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<tr>
<td>Aerobics</td>
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<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
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<tr>
<td>Swimming</td>
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<tr>
<td>Volleyball</td>
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</table>
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 ........................................... 0
- Hardly ever ........................................... 0
- Sometimes .......................................... 0
- Quite often ........................................ 0
- Always .............................................. 0

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

- Sat down (talking, reading, doing schoolwork)... 0
- Stood around or walked around ...................... 0
- Ran or played a little bit ................................ 0
- Ran around and played quite a bit ................... 0
- Ran and played hard most of the time ............. 0

4. 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 .................................................. 0
- 1 time last week ..................................... 0
- 2 or 3 times last week ............................ 0
- 4 times last week ................................... 0
- 5 times last week ................................... 0
8. Mark how often you did physical activity (like playing sports, games, or any other physical activity) for each day last week.

<table>
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<tr>
<th></th>
<th>None</th>
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<td>Sunday</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

9. 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? __________________________________________
RESEARCH INFORMATION FOR TEACHER BRIEFING

Research Proposal
Candidate: Nick Sloan
Supervisor: Dr. Elizabeth Rose
Title:
The Importance of Motor Competence on Adolescent boys perceived competence, global self-worth and level of physical activity

Rationale for research

One of the pressures faced by adolescent males is the demand to meet the psychosocial expectations of a sport / outdoor-orientated society. This may have serious consequences for adolescents with poor motor coordination and in term may lead to withdrawal or a lack of participation from physical activity.

To date there has been limited research addressing the psychosocial consequences of poor coordination in adolescent boys. The implications of failing to meet the expected physical standards of their peers, teachers and parents, can result in ridicule and subsequent withdrawal from participation. Before measures can be taken to develop remedial programs a link needs to be established between an individual’s perception of global self-worth and their development of motor competence. More importantly for educators, there needs to be an increased understanding of the psycho-social difficulties faced by individuals with lower developmental levels of motor control.

As part of my honours project, I wish to carry out a study that will examine the differences between perceptions of global self-worth and levels of physical activity, in adolescent boys who differ in levels of motor control.
Research Plan

Purpose of the research

The purpose of this project is two-fold:

1. Firstly, I intend to examine the differences in perceptions of competence and global self-worth in students who differ in levels of motor control. Specifically, how adolescent boys of low and high motor control differ in perceptions of competence and global self-worth.

2. Secondly, to examine how adolescent boys of low and high motor control differ in levels of physical activity. In addition I also intend to examine the relationship between levels of physical activity and an individual's perception of competence in the athletic domain.

Methods and procedures

Boys from years 9 will be assessed individually on their level of motor competence through these tests:

- Standing broad jump
- Standing on one foot (balance)
- Grip strength
- Heel-toe-line walking
- Finger-nose-finger placement

These tests will be carries out in isolation from the student's peers, adhering to the safety and procedural protocols outlined in the McCarron Assessment of Neuromuscular Development (MAND) manual. This procedure will take approximately twenty minutes per student. On the basis of these results, students can be graded according to their level of motor control.

Two questionnaires will then be administered in class under the supervision of a tester. The first questionnaire is used to establish a self-perception profile of the
individual, and the second to gauge their levels of physical activity. These tests will take approximately thirty minutes to complete.

The university ethics committee, prior to the commencement of this study, has approved these procedures. Copies of the questionnaires and protocols for the physical tests are included in the information package for each teacher.

Please feel free to contact me at the telephone numbers or address below if you have any queries regarding this study

Nick Sloan
26 Forest Walk,
Kardinya 6163
(08) 9332 6571 – 0438 061118
Dear Parent(s) or Guardian(s)

There is evidence that reveals that the level of motor competence has an influence on an individual's self-esteem and level of physical activity. However little research has been carried out on the implications of poor motor coordination in adolescents. Increasing the understanding in this area would assist education and health professionals to improve the opportunities of individuals marginalised due to their level of motor development.

I am currently undertaking my honours study at Edith Cowan University and wish to examine the association between motor competence, self-esteem and levels of physical activity in adolescent boys. The findings of this study will assist teacher and parent's understanding of the implications of poor motor development.

I will be working with physical education students from Year 9, under procedures approved by the principal, head of the physical education program, and my honours supervisor, Dr. Elizabeth Rose. All proposed procedures will have been passed by the university ethics committee prior to commencement of the study. I am now seeking your permission for your son to participate in this study.

Your sons will be required to:

1. Participate in 5 forms of physical activity (time involved would be approximately 30 minutes);
2. Answer questionnaires in class relating to self-esteem and levels of participation in physical activity (approximately 20 minutes per questionnaire).

All evaluations conducted during this study will be undertaken in absolute confidence, with any information collected to remain strictly confidential.

Boys or their parents are free to discontinue participation at any time, with such withdrawal not prejudicing any further care of the child.

If you are happy for your child to participate please read and sign the attached consent form and return by June 04, 2002.

Please feel free to contact me at the telephone numbers or address below if you have any queries regarding this study.

Your assistance with this research would be greatly appreciated. The benefits to be gained from studies such as this are far reaching and have the potential to provide a more positive learning environment for all children.

Yours sincerely

Nick Sloan

26 Forest Walk, Kardinya 6163 – (08) 9332 6571; 0438 061118
Appendix F

Form of Disclosure and Informed Consent
The Importance of Motor Competence on Perceptions of Global Self Worth and Levels of Physical Activity in Adolescent Boys

By

Nick Sloan

Bachelor of Applied Science (Sports Science) Honours
Edith Cowan University

Form of Disclosure and Informed Consent

I __________________ (Participant’s Parent) have read the information provided and any questions I have asked have been answered to my satisfaction.
I agree to allow ________________ (Participant’s Name) to participate, realising that he may withdraw at any time.
I agree that the research data gathered for this study may be published provided my child is not identifiable.

Signature ___________________________ Date: ___________________________

(Participant’s Parent)

Signature ___________________________ Date: ___________________________

(Participant)

Signature ___________________________ Date: ___________________________

(Researcher)
Appendix G

Individual Participant Means
### HARter's SppA

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