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A Longitudinal Examination of the Contribution of Perceived Motor Competence and Actual Motor Competence to Physical Activity in 6 to 9 Year Old Children

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CHAPTER ONE

THE PROBLEM

Background and Context

Physical activity contributes to the optimal development of many physical, physiological, educational, social and psychological functions in children and youth (Bauman, Bellew, Vita, Brown & Owen, 2002). There is also growing evidence that regular physical activity participation in childhood and adolescence facilitates a physically active lifestyle in future years and is important for health, physical wellbeing and lifestyle disease prevention (Hands, Parker & Larkin, 2001; Trost, 2003). For example, sufficient physical activity limits unhealthy weight gain, strengthens bones and muscles, improves some types of cholesterol, and enhances psychosocial health (Strong, Malina, Blimkie, Daniels, Dishman & Gutin, 2005).

In early childhood a number of factors have been identified, proposed or hypothesised as key contributors to children's physical activity levels. As physical activity is a learned behaviour and can be changed or modified (Sallis, Berry, Broyles, McKenzie & Nader, 1995), what key factors contribute to physical activity behaviour in a developing child?

Physical activity is determined or influenced by a variety of factors (Sallis et al., 1992). No one variable or category of variables was expected to account for most of the variance in children's physical activity. However, these factors may have varying degrees of influence at different times in a child's development (Sallis et al., 1992; Hands, Parker & Larkin, 2001). The application of the dynamic systems theory to cognitive and motor development views behaviours as emergent from the complex and changing interactions of factors and are not solely pre determined through maturation (Thelen & Smith, 1994). The interaction of these factors at different stages of development may support and "enable" physical activity behaviours, whilst some will limit or "constrain" physical activity levels.

Several theoretical models have been proposed to explain the factors that influence physical activity behavior, however few have been developed specifically for children (Welk, 1999). Lindquist, Reynolds and Goran (1999) provided a hierarchal framework that identified “determinants” or factors that affect children’s physical activity behaviour at four levels - physiological factors such as age, gender and actual motor competence (AMC), psychological factors such as motivation and perceived motor competence (PMC), sociocultural factors such as parents and family structure and ecological factors such as the physical environment. The focus of the current study is to investigate the influence of a physiological determinant, AMC, and a psychological determinant, PMC, on physical activity in young children.

Actual motor competence is the mastery of physical skills and movement patterns that enable enjoyable participation in physical activities (Castelli & Valley, 2007). In movement development, the acquisition of proficient fundamental motor skills in early childhood serves as a foundation for building complex motor skills later in life. Early development of competence in motor skills has the potential to establish a healthy habit of physical activity participation (Garcia, Garcia, Lloyd & Lawson, 2002). Perceived motor competence is an individual’s awareness and belief of their capability to perform both gross and fine motor tasks (Rudisill, Mahar & Meaney, 1993). Feelings of perceived competence are experienced when performance outcomes are positive and an individual’s perception of their own competence towards a task or activity serves to motivate the individual and increase persistence (White, 1959; Harter, 1978, 1982; Ulrich, 1987).

Previous research has examined the relationship between PMC and AMC (Biddle, Page, Ashford, Jennings, Brooke & Fox, 1993; Boucher, Doescher & Sugawara, 1993; Rudisill, Mahar & Meaney, 1993; Raudsepp & Liblik, 2002), however the focus was on boys and girls 9 years old and above. Findings from these studies reveal a moderate yet significant, relationship between PMC and AMC for boys and girls which strengthen as children become older (Roberts, 1984).

Older children and adolescents ranging from 10 to 16 years old who have higher perceived competence participate in more physical activity, than those with lower perceived competence (Telama, 1998; Carroll & Loumidis, 2001). For both children

and adolescents, a strong and positive belief about one's competence leads to greater enjoyment and commitment to continue the activity than those with lower perceived competence (Weiss & Ferrer-Caja, 2002).

Children with movement difficulties or low motor competence tend to be vigorously active less often (Li & Dunham, 1993; Bouffard, Watkinson, Thompson, Dunn & Romanow 1996). However, these studies have primarily examined children with Developmental Coordination Disorder (DCD) and children with disabilities rather than typically developing children.

Past research has highlighted the important role that, separately, PMC, AMC and physical activity play in a child's development. However, whilst some researchers have examined the relationship between perceived and actual motor competence, and others have investigated the relationship between motor competence and physical activity in children with DCD, little research has investigated the evolving relationship between PMC, AMC and physical activity levels in typically developing young children.

Welk (1999) and Stodden et al. (2008) have both proposed models conceptualising determinants influencing physical activity in youth. Both agreed on a lack of knowledge and of understanding the changing influence of these factors with development and their subsequent relationships with physical activity. However separately, they purported the importance of different types of competence in influencing physical activity behavior.

Welk's (1999) Youth Physical Activity Promotion model (YPAP) categorised the five most commonly reported determinants/correlates of physical activity into a) personal, b) biological, c) psychological, d) social and e) environmental. Determinants were then classified into factors that predispose, enable and reinforce physical activity behavior, with the intention to emphasise those that are most likely to be causally related to activity and those that are more yielding to change. The YPAP model suggested biological factors such as physical skills and competence act as enabling factors. This means youth who are physically fit and skilled are more likely to seek out opportunities to be active, whereas children who are less skilled

and fit are less likely to achieve the same level of activity. Predisposing variables, including self-efficacy and perceived competence, collectively increase the likelihood that a person will be physically active on a regular basis. Reinforcing factors included family, peer, and coach influence. Welk (1999) proposed that while direct effects of biological factors (such as skill competence) on activity behavior are possible, indirect effects through the child's perception of competence are perhaps more likely. He stated "with respect to competence, evidence shows that children's perceptions of competence *may be* [italics added] more important than actual ability" (p. 14).

On the other hand, Stodden et al. (2008) argued that the development of actual motor skill competence is important in its own right. Their conceptual model focused on the developmental and dynamic nature of motor skill competence and its role in promoting physical activity over time. Young children's early physical activity might drive their development of motor skill competence. As young children demonstrate variable levels of physical activity and motor competence, they proposed the relationship between the two will be weak at this point in time. However, in the transition from middle to late childhood, environmental and individual factors operating in early childhood will compound over time, resulting in a stronger relationship between physical activity and motor competence. In addition, this emergent relationship is mediated by a variety of other factors, including perceived motor competence.

Clearly, there is no consensus on the influence of AMC or PMC in the development of children and youth's physical activity behavior. Therefore, the intention of this study was to assess a new conceptual model which is based on Welk (1999) and Stodden et al.'s (2008) models, to identify what has the greater influence on emerging levels of physical activity in young children, actual or perceived motor competence? Neither Welk's (1999) or Stodden et al.'s (2008) models had specified age or considered possible gender differences in the development of competencies and resultant relationships with physical activity. Additionally, one aim of the current study is to specifically concentrate on 6- to 9-year-old children in order to examine more closely age and gender changes in actual and perceived motor competence and physical activity in young children.

Purpose of this Study

The purpose of this study was to examine the relationship between PMC, AMC and physical activity in young children, aged 6 to 9 years old. Specifically, the focus is the contribution of PMC and AMC on the emergence of physical activity levels in young boys and girls.

The underlying assumption of this study is that behaviours emerge from complex and changing interactions of factors, an application of the dynamic systems theory.

Through the mixed-longitudinal design of the research, a single cohort of 6- to 9-year-olds (N = 201) were recruited and tracked across four data collections in 18 months, the objective was to identify the developmental changes in this relationship and how this contributed to physical activity in the early primary years.

Significance of the Study

Given the current focus on physical activity and building evidence of its importance to health, the significance of the current study seeks to provide information on the influences of self perceptions and skill competence on physical activity in young children. At present, the link between PMC, AMC and physical activity in typically developing children is not widely understood. With respect to young children, there are few studies on those younger than 9 years old investigating the influences of these variables on emerging physical activity behaviour. Very few studies have used a longitudinal study design to examine the influences on physical activity on young children. As a result, the current study will test our own model based on the models proposed by Welk (1999) and Stodden et al. (2008) to determine the contributions of perceived and actual competence to young children's physical activity levels over time.

The findings from this research may guide educational initiatives, interventions, and health promotion initiatives in primary schools to focus on factors that are most important to physical activity in these early years. Ultimately, effective interventions taking into account these factors will support children to adopt a more physically active and healthier lifestyle.

Major Research Question:

What are the relative contributions of PMC and AMC to the development of young children's physical activity levels across time?

In addressing the major research question the following questions were considered.

- Was there a relationship between AMC and PMC in young children?
- How does the relationship between AMC and PMC change with age and gender?
- How do levels of AMC and PMC relate to levels of physical activity for boys and girls?
- Were there differences for age and gender for physical activity, PMC and AMC?
- Were there specific ages for boys and girls in the early primary years which can be identified as significant for changes in the relationship between PMC, AMC and physical activity?

Major Hypotheses:

In addressing the main research questions, the following hypotheses were proposed.

1. Boys will record higher physical activity levels than girls across all age groups.
2. Boys will record higher PMC scores than girls across all age groups.
3. Boys will record higher AMC scores than girls across all age groups.
4. AMC will be significantly related to PMC in boys and girls.

5. Boys and girls with higher PMC and higher AMC will have higher physical activity levels.
6. AMC, PMC, age and gender will be predictors of physical activity behaviour in young children.

Delimitations

1. This research project was delimited to 6-, 7- and 8-year-old boys and girls. This is because the principal focus is on the physical activity behaviours of young primary school children.
2. Medically unfit children who were unable to regularly participate in physical education classes and activities at school were excluded from the study.
3. The location of primary schools invited to participate in the study were representative of a geographic spread of the Perth metropolitan region.

Limitations

1. The sample for this study was limited to children from middle socio economic primary school areas and therefore results may not be generalisable to broader socio demographic areas.
2. Although young children are often inconsistent when performing motor skills and performance can be affected by such factors as level of motivation, feeling tired or unwell and attention span. It was anticipated the size of the sample and global motor skill score would lessen the effect of fluctuating performance.
3. A limitation of the mixed-longitudinal study design is greater probability of missing or incomplete data due to multiple data collection cycles.

Definition of terms

Actual Motor Competence (AMC)

Motor competence has been defined as an individual's capability to master physical skills and movement patterns that enable enjoyable participation in physical activities (Castelli & Valley, 2007).

Fine Motor Skills

The ability to perform movements with smaller muscles, usually involving manipulation of small objects with hands and fingers (Payne & Isaacs, 2002).

Fundamental Movement Skills

Fundamental movement skills are the basic movement patterns involving different body parts and are the foundation movements to the more specialised, complex skills used in play games, sports, dance, gymnastics, outdoor education and physical recreation activities. Fundamental movement skills can be separated into locomotor skills such as running and jumping, object control skills such as throwing and catching, and balance skills such as line or beam walking (Payne & Isaacs, 2002).

Gross Motor Skills

The ability to perform movements with larger muscles, usually involving movement of the body through space or manipulation of larger objects (Payne & Isaacs, 2002).

Motor Development

Motor development has been defined as the changes in movement behaviour over the lifespan and the processes that underlie these changes (Payne & Isaacs, 2002).

Perceived Motor Competence (PMC)

Perceived competence is an individual's belief of how capable they are in various achievement domains (Weiss & Amorose, 2005). Perceived motor competence is an individual's awareness of their ability to perform both gross and fine motor tasks (Rudisill, Mahar & Meaney, 1993).

Physical Activity

Any bodily movement produced by skeletal muscle that results in energy expenditure (Casperan, Powell & Christensohn, 1985). Physical activity is the observable feature in different aspects of play, the explicit expression of the developing child (Hands, Parker & Larkin, 2001).

Self concept

Self concept is an individual's self description which is based on his/her self-perceptions. These perceptions are formed through experience with and interpretations of one's environment (White, 1959).