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Parental Influences and the Relationship to their Children's Physical Activity Levels

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ABSTRACT

International Journal of Exercise Science 10(2): 205-212, 2017 Engaging in a physically active lifestyle relates positively to current health and reduces chances of chronic diseases in the future. Given escalating health care costs, it is paramount to reduce illnesses associated with a lack of physical activity and thus critical to identify factors that influence physical activity - especially in children, with the opportunity for a lifetime impact. One of these influencing factors may be parents/guardians. The intent of this study was to examine the relationship between children's physical activity levels and parental factors including parental physical activity, support/encouragement, restrictiveness, and self-reported participation. Data was collected from 15 child-parent pairs with children ranging in age from 7 to 10 years. Daily physical activity levels were determined from pedometer data using a Piezo SC-Step Pedometer. Number of steps and moderate and vigorous physical activity were extracted from the pedometers and levels of support/encouragement, restrictiveness, and participation were quantified from parents' self-reported responses to a questionnaire created for this study. Pearson Product correlation analyses were carried out between: the children's and parent steps ($r = -0.069$; $p = 0.597$); children's steps and parent's self-reported encouragement/support ($r = 0.045$, $p = 0.563$); children's steps and parents' self-reported restrictiveness ($r = -.0254$, $p = 0.820$); and children's steps and parents' self-reported participation ($r = -0.002$, $p = 0.503$). The lack of significant relationships among these variables implies that more complex interactions occur between children and their parents regarding physical activity with children's participation influenced by other factors.

KEY WORDS: Pedometers, restrictive parenting, exercise, steps

INTRODUCTION

Physical activity refers to any movement produced by skeletal muscles that results in energy expenditure, and can be measured quantitatively using metabolic equivalents or step-counts (9). As such, physical activity is an encompassing term that includes exercise, training, participating in sport, active play and active transportation. Secular trends for increasing levels of sedentary behavior and low levels of physical activity result in only 7% of children aged 5 to

17 years engaging in the recommended 60 minutes of moderate to vigorous physical activity (MVPA) a day (1). This recent report identifying children's low level of physical activity also noted, that: North Americans value efficiency - doing more in less time - which may be at odds with promoting children's physical activity and health (1). To promote an environment that allows children to reach the minimum physical activity recommendations, it is paramount for influencing factors to be identified.

Reduced use of active transportation, decreased levels of spontaneous active play (especially outdoor play), and decreased school physical activity and physical education, has resulted in low levels of physical activity and high levels of sedentary time in children and youth (specifically, ages 5-17 years) (3). One of the most prominent influences on children's physical activity levels may be their parents/guardians (referred to as parents, hereafter). Parents serve as role models for their children, logistical supporters (financially and otherwise), encouragers, and as co-participants (2). Parents also act as guardians and can either promote or restrict children's activity. As the literature suggests, more controlling and restrictive parents relate to children with lower physical activity levels (7). The varying domains of parental influence may have lasting effects on their children's physical activity with numerous studies reflecting the importance of parental involvement and encouragement specifically (2).

The intent of this study was to examine the relationship between physical activity levels in parents and their children as well as the various influences parents have on their children's physical activity. If highly related, encouraging not only children's physical activity but also their parents' physical activity and how, when, and in what manner parents encourage their children to be physically active could have an emerging influence on increasing physical activity levels in children.

METHODS

Participants

Using convenience sampling, parents and their children aged 7 to 10 years old from a local afterschool physical activity program were invited to participate in this study. In total fifteen child-parent pairs consented providing a total of 30 participants (see Table 1). Research Ethics Board approval from the local university was obtained prior to data collection.

Table 1. Participant Characteristics

	Parent	Child
Males	n= 4	n= 7
Females	n= 11	n= 8
Age	Not Available	7 yrs = 5 8 yrs = 5 9 yrs = 3 10 yrs = 2

Protocol

Parents were asked to complete a 17-item self-report questionnaire regarding their child's participation in physical activity and the various ways they might influence it. This questionnaire was developed specifically for this study with questions about (1) parent's support/encouragement, (2) restrictiveness (willingness to allow children to play actively outside) and (3) personal participation in physical activity. An example of a question related to support/encouragement is: "I arrange to get my child to and from his/her sporting events and/or after school programs". An example of a question regarding restrictiveness is: "I feel it is safe for my child to play outside". For these two types of questions, a 5-point Likert scale was used with responses ranging from strongly disagree to strongly agree. Parental participation was determined from questions like: "How often, in a typical week, do you participate in physical activity or exercise?". Response options included "Never/rarely, 1-2 times, 3-4 times, 5-6 times, and Daily". Responses to each section of the questionnaire were scored 1 to 5 with higher values given to positive affirmation of children's physical activity (such as higher levels of support, and/or higher levels of physical activity participation). Upon receipt of the completed questionnaire, the child and parent were asked to wear pedometers (Piezo Step RX, StepCount) for all waking hours for seven days, excluding all water-based activities (i.e., bathing, swimming, etc.). Parents were also asked to record any non-wear time for themselves and for their child as well as the time the pedometer was put on in the morning and taken off at night.

Statistical Analysis

For each child and parent in the study, their moderate-vigorous intensity activity and total number of steps were recorded and averaged over the number of days collected (3 to 7 days) to provide an overall summary or indication of their level of physical activity. Although each child-parent pair were asked to wear their pedometer for seven days, participants' data were still included in the analyses provided there were at least three complete (10+ hours) days of pedometer data. To determine the relationship between parent and child physical activity levels, a one-tailed Pearson Product correlation analyses was conducted between the parent and child's average steps per day with an α -level of $p \leq 0.05$ to determine significance.

To address the secondary purposes of this study, data obtained via the questionnaires were examined in greater detail. The parents' Likert-scale responses to the questionnaire were totalled for each section of the questionnaire with total scores ranging from a possible 5 to 20 points for support/encouragement and 5 to 15 for restrictiveness and self-reported participation. Pearson Product correlations were then used to determine the correlation coefficients between these variables and the children's average steps per day with significance set at $p \leq 0.05$. All data analyses were conducted using SPSS version 20.

RESULTS

Although 17 parent-child pairs consented to participate in this study, only the data from 15 parent-child pairs were included in the data analyses because one child lost the pedometer and

another set was not returned. As previously mentioned for inclusion in the study, parents needed to complete the questionnaire and parents and children had to provide at least three days of sufficient pedometer data (minimally 10 hours). In fulfilling these requirements, 30 participants or 15 parent-child pairs were included in the data analyses.

On average, parents took 8438.13 ± 2758.67 steps per day while their children took 13077.00 ± 3026.93 steps. There was no significant correlation between the average number of steps for parents and their children ($r = -0.069$; $p = 0.597$) as shown in Figure 1.

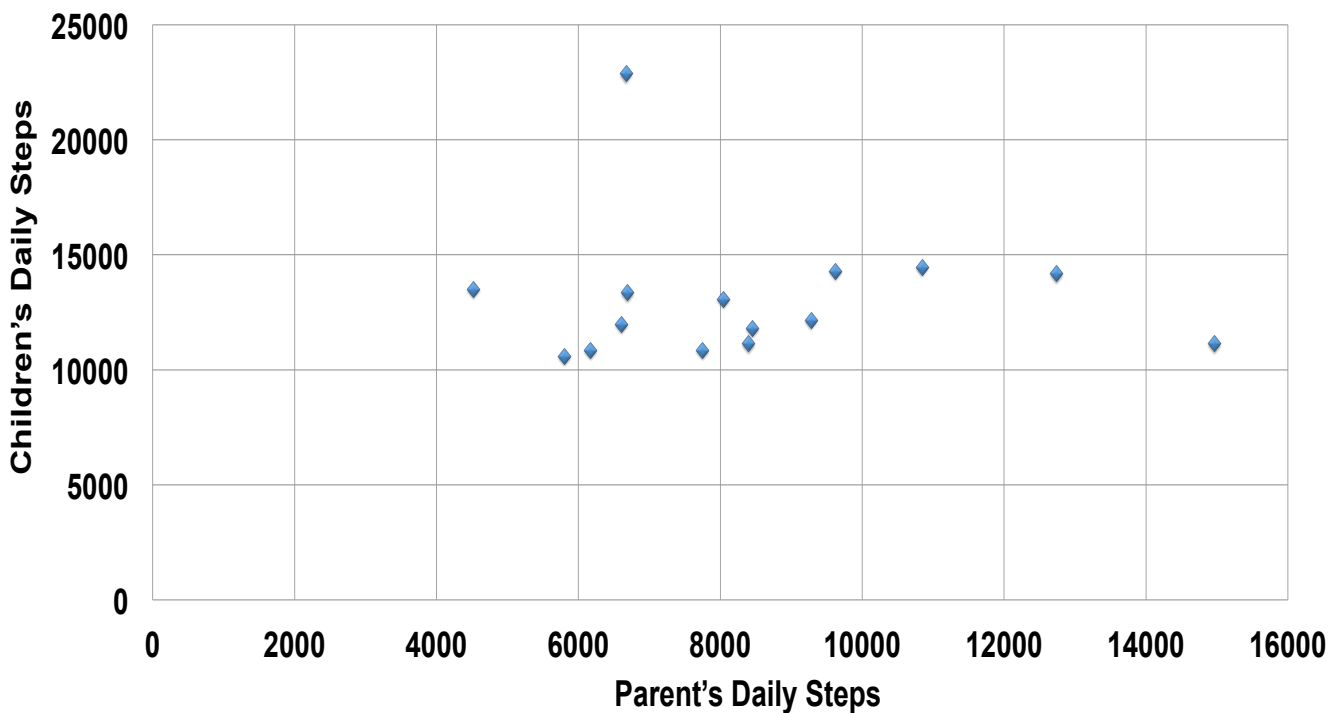


Figure 1. Scatterplot of Children's and Parent's Average Number of Steps per Day.

A Pearson Product Correlation Analyses between children's number of steps per day and the various measures of parental influence (see Table 2) were then conducted. It was found that there were no relationships between (a) children's steps and parent's self-reported support/encouragement ($r = 0.045$, $p = 0.564$), (b), children's steps and parent's self-reported restrictiveness ($r = -.0254$, $p = 0.820$), or (c) children's steps and parent's self-reported participation/co-participation in physical activity ($r = -0.002$, $p = 0.503$).

Table 2. Average (\pm standard deviation) self-reported scores for parental support/encouragement, restrictiveness and participation from 15 parents of children ages 7 to 10 years.

Parental Influence Variables	Scores (mean \pm SD)
Parental Support/Encouragement (/20)	18.53 \pm 2.26
Parental Restrictiveness (/15)	10.93 \pm 2.89
Parental Participation (/15)	10.20 \pm 2.24

DISCUSSION

The purpose of this study was primarily to determine the relationship between parents and their children's physical activity. A secondary purpose was to determine the relationship of other parental factors (encouragement/support, restrictiveness and self-reported participation/co-participation) with children's physical activity levels. The lack of significant relationship between children and their parents' physical activity might suggest that the basis of children's activity does not lie primarily in parental factors and their role modeling. Other influences such as intrinsic motivations to be physically active might play more prominent roles than once perceived.

Although on average, the children (\sim 13,000 steps/day) exceeded the minimum recommendations of 12,000 steps per day, their parents (\sim 8,400 steps/day) did not meet the recommended 10,000 steps per day (3). A possible explanation for this data might be that in some instances, such as sporting practices or tournaments, parents drive their child to participate but when their child is partaking in the physical activity, parents are in most instances, spectators. For most of the day, some parents engage in high amounts of sedentary time (as required by their jobs). These low levels of physical activity are confirmed with only 15% of Canadians adults meeting the minimum physical activity requirements of 150 minutes of MVPA per week (1). Children on the other hand have recess, and in some instances afterschool programs that allow for higher levels of physical activity. The parent's lower levels of physical activity while their children are active may help to explain the lack of support for the hypothesis that parents and children's physical activity levels would be related. Perhaps there might be a more complex interconnection between parental modeling of physical activity and children's level of physical activity than expected. With lower levels of physical activity, rates of chronic and acute health concerns increase, making it paramount for attention to be given to identify possible factors connected to children's physical activity.

It is important to note the lack of variance in children's steps (as most were between 10,000 and 15,000 steps per day) while the adult steps showed considerable variability ranging from about 4,000 to 15,000 steps per day. In other words, the children in our study were accumulating a similar number of steps each day. This suggests these children were equally physically active despite differences that may exist among them such as sport participation and/or parental factors. There was a much larger fluctuation in the parents' step counts and therefore also in their level of physical activity.

A closer look at the individual data shows that only three parents, or 19% of the sample obtained more than 10,000 steps per day while nine children (or 56%) had over 12,000 steps

per day. Further, in this study, every child obtained the recommended minimum amount of 60 minutes of moderate or more intense physical activity per day (as determined by the time of pedometer steps greater than 100 per minute). The parents were also on pace for acquiring the minimum recommendations of 150 minutes of moderate or more intense physical activity per week (assuming their steps were obtained in bouts of at least ten). This paradox of the parents attaining the physical activity recommendations according to minutes of MVPA but not reaching the recommended number of steps/per day could possibly be explained by parents who are extremely active for two or more hours one day, and are less active through the rest of the week (or something similar).

It should be noted that the sample of children in the study was more physically active than the general population. With 56% of children in the study obtaining more than the recommended steps per day, it is difficult to draw reasonable conclusions reflective of the general populace where only 7% of 5 to 17 year olds achieve the minimum physical activity requirements. As such, within a 'normal' population, parental factors may play a more prominent role in the development and/or adherence to their children's physical activity.

The lack of relationship between parents' self-reported support/encouragement of their children's physical activity was surprising, given previous research (2, 10). The results indicate that although parents' self-reported considerable supportive and encouraging behaviours, it did not relate to their children's physical activity. Parental support, particularly positive encouragement and interpersonal actions are critically important towards children's physical activity (10, 12). It has also been suggested that physical activity interventions should focus on improving parental encouragement specifically increasing positive tangible support, such as helping and teaching certain techniques; however, the results of the present study do not support this suggestion (11, 12). Contrarily, the results of our study suggest parental support and encouragement may not play as a significant role as once thought.

Many parents in our study self-reported high levels of financial support as they noted their children attending sporting programs and afterschool programs; however, the correlation between this influence and children's level of physical activity was non-significant. A prevailing theme to understand this complexity is to note that the sample selected in this study was more active than the population, and that despite the overwhelming parental support/encouragement, it did not relate to their children's level of physical activity.

Another hypothesis not supported in this study was that less parental control or restrictiveness would relate to higher physical activity rates in children. This finding is also surprising because up until this point, advocates for physical activity promotion in children, particularly those for outdoor play, have said that allowing children to be more creative and explorative is paramount to permitting them to be more physically active (6, 7). It is possible; however, that with the influences of technology and social media that less restrictive parents are giving their children more freedom, just to have their children "hang-out" with friends, playing gaming systems or watching television. Realistically, parents do not always know what their children

are doing with friends when away from their supervision, and this could be one theory that could explain the lack of a correlation.

Equally surprising was the lack of significant relationship between the parents' self-reported participation and children's level of physical activity primarily because children often do what they see. By this notion, a higher level of parental participation in physical activity should then relate to higher levels of physical activity in children. It has been speculated that higher levels of parental co-play could relate to higher levels of children's physical activity because children might enjoy playing with their parents (8). However, some children report that parents are too rule-driven when they play together, and that parental games are not as fun as children's games (5). This lack of enjoyment of being physically active together could contribute to the lack of correlation between parents and children's physical activity levels.

The sample size for this study was relatively small, with only 15 child-parent pairs providing complete data and may be a limitation, particularly as the participants were localized in a smaller demographic and came from the same afterschool physical activity program. As such the findings are limited to children 7 to 10 years of age and their parents. It is also important to identify cultural aspects of the study, which could also pose limitations; as participant experiences may have been affected by a North American culture. Self-report questionnaires are inherently limited by their nature of self-report and the potential for bias to present oneself as a good parent who does all they could/should for their children. More female (11) than male (4) parents provided data for this study, and parental age was not taken into consideration, both potential limitations. Further research could ensure a balanced representation of parent participants as well as data collection from a larger age range of children and family situations (single parent, lower income, younger/older parents, different BMIs, etc.).

Future studies should consider children's motivations for being physically active as well as identifying possible influences of how different parenting styles (e.g., supportive, authoritative) might affect physical activity in children. Further, it may be worth exploring the children's perceptions of how their parents' involvement may affect their overall activity levels. What is not clear is the impact of parental influences, particularly interrelated in relation to peer influences and how much of a role they play in children's adherence and physical activity participation. It may be that parents think they are positive role models for their children's physical activity and that they think they are supportive and encouraging when in fact they may not be, or may not have as great an influence as they think as found in this study. Given that only 7% of children aged 5 to 17 years are meeting the minimal physical activity guidelines (3), there is a high importance to identify possible factors that influence physical activity for current and long term health, something must be done.

In conclusion, the lack of significant relationships found between parents and their children's physical activity in the data suggests that there is more to children's physical activity levels than parental support/ encouragement, restrictiveness and participation. Clarity and an objective evaluation of this relationship may lead to a better understanding, which may lead to

more effective physical activity promotion in children. Maybe it is time that we begin to change the way we think about physical activity, as the theories engrained in our minds are not the same as the realities being produced.

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