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The Impact of Co-active Coaching on Physically Inactive 12 to 14 Year Olds in Ontario

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Abstract

This study assessed the impact of life coaching on physical activity participation, self-efficacy, social support, and perceived behavioural control among physically inactive youth between the ages of 12 and 14 years in London, Ontario. The multiple-baseline across participants single case-experimental design study consisted of five 12 to 14 year olds. Six coaching sessions were conducted over two months by a certified professional Co-active coach. Physical activity increased for one participant while the other participants' physical activity remained unchanged. No significant changes occurred in self-efficacy, social support, and perceived behavioural control with specific regard to becoming more physically active. Results indicted no consistent intervention effects for physical activity. Furthermore, coaching may not be appealing to youth of this age group given the difficulties experienced obtaining the necessary number of participants and the low levels of participant commitment throughout the study.

Keywords: youth; physical activity; self-efficacy; social support; life coaching

Introduction

Many health benefits are attributable to regular physical activity (Baranowski et al., 1992; Sallis et al., 1992), yet the prevalence of a sedentary lifestyle remains high among Canadian youth (Irving, Adlaf, Allison, Paglia, Dwyer, & Goodman, 2003; Statistics Canada, 2005). Sedentary behaviours have led to many preventable chronic diseases and premature deaths (Pate et al., 1995), thereby placing an unnecessary burden on the Canadian health care system (Katzmarzyk & Janssen, 2004). Approximately 48% of Canadian youth between the ages of 12 and 14 years are not physically active enough to see potential health gains when compared to the standards specified by the Canadian Community Health Survey (Canadian Fitness and Lifestyle Research Institute, 2005; Statistics Canada, 2005).

Another great concern is that Canadian youth have become less physically active because they continue to choose more sedentary activities over physical activity (Luke et al., 2004). During a typical week in 2004, Canadian youth between the ages of 12 and 17 years engaged in approximately 5.8 hours of video games and computer activities (Canadian Fitness and Lifestyle Research Institute, 2005) and watched an average of 14.1 hours of television (Luke et al., 2004). Furthermore, in 2003,

youth spent an average of 5 hours per day sitting at school (Canadian Fitness and Lifestyle Research Institute 2003 Capacity Study, 2005).

It is important to understand what constitutes an intervention that will increase physical activity in youth effectively. Youth who are physically active are more likely to become physically active adults (Ryan & Dzewaltowski, 2002; Trudeau, Laurencelle, & Shephard, 2004; Trudeau & Shephard, 2005). In turn, adults who are physically active are more likely to enjoy the many accompanying health benefits (Katzmarzyk & Janssen, 2004).

A variety of curricular, non-curricular, and life-style management interventions have been examined for their effectiveness to increase physical activity (Dishman & Buckworth, 1996; Jago & Baranowski, 2004; Trudeau & Shephard, 2005). Dishman and Buckworth (1996) conducted a meta-analysis of various interventions to increase physical activity and found behaviour modification-based interventions to be most useful for a variety of individuals, including youth. A new and innovative behaviour modification intervention is Co-active coaching (Whitworth, Kimsey-House & Sandahl, 2007). Co-active coaching is a specific form of life coaching that utilizes several "health behaviour change elements such as: personal values; goal setting; self-defined issues; empowerment; self confidence; reinforcement; and self-efficacy" (Irwin & Morrow, 2005, p. 29). The term c*o-active* refers to the nature of the coaching relationship in which a unique alliance between the coach and the client is designed for the purpose of meeting the client's needs (Whitworth, Kimsey-House, & Sandahl, 2007). Additionally, Co-active coaching has a fundamental theoretical base that is associated with behaviour change theories (Irwin & Morrow, 2005).

Co-active coaching is theoretically grounded in at least three identified behaviour theories: Social Cognitive Theory (Bandura, 1986); Theory of Reasoned Action (Fishbein & Ajzen, 1975); and Theory of Planned Behaviour (Ajzen, 1988). Social Cognitive Theory explains how behavioural patterns are acquired and maintained. The theory's focus is on the use of both reinforcements and expectations to understand behaviour. This style of coaching utilises several constructs from the Social Cognitive Theory that include: expectations; expectancies; self-efficacy; reinforcement and acknowledgement (Irwin & Morrow, 2005). The Theory of Reasoned Action explains a person's voluntary behaviour (Fishbein & Ajzen, 1975) while the Theory of Planned Behaviour addresses a person's control over making conscious decisions (Ajzen, 1988). Together, the theories of Reasoned Action and Planned Behaviour suggest a person's behaviour is determined by his or her intention to perform that behaviour; structured by his or her attitude toward the behaviour and his or her subjective norm (Ajzen, 1988). Irwin and Morrow (2005) contend that coaching helps tap into these constructs through the use of exploring the client's values, perspectives and choices, and internal self-talk. In this client-centred form of coaching, the coach's main function is to ask questions that help the client access their own answers, and this was deemed suitable for work with adolescents who may prefer a more autonomous-supportive style of conversation (Wong et al., 2002). For a full review of the Co-active coaching model please refer to Whitworth, Kimsey-House, and Sandahl (1998) and Whitworth, Kimsey-House, Kimsey-House, and Sandahl (2007). Within this article, the terms coach or coaching will be used to refer to the specific style of Co-active coaching, which was used in this study.

Given that coaching, a form of behaviour modification, is grounded in behaviour change theories (Irwin & Morrow, 2005), it would seem to have the potential to change the physical activity behaviours of youth. This study assessed the impact of coaching on the physical activity participation, self-efficacy, social support, and perceived behavioural control among physically inactive youth between the ages of 12 and 14 years in London, Ontario.

Methodology

The participants in this multiple-baseline across-participants single-case experimental design study consisted of three females and two males between the ages of 12-14 years in London, Ontario. To be included in the study, participants needed to be: 12-14 years of age with parental consent; inactive, meaning they engaged in moderate or high intensity activity for less than 30 minutes per day on three or fewer days per week (Sallis & Patrick, 1994); on no medication or physician supervised treatment preventing their participation in physical activity; interested and willing to participate in coaching; and able to speak English fluently. Fictitious names for participants were created to protect their anonymity, and a brief profile of each subject is provided below.

Participant 1: Maria
Maria was a 14-year old girl. She enjoyed going to school and socializing with friends. Maria also enjoyed dancing. She got a ride to school every day.

Participant 2: Judy
Judy was a 14-year old girl. Judy was extremely social and enjoyed spending time with her friends. She was not physically active except for walks in the park and to her school bus stop.

Participant 3: James
James was a 12-year old boy. He was completely bilingual and did not enjoy going to school. James was preoccupied with the fact that his family was moving to a major city in Canada. He went to swim class once a week.

Participant 4: Kristen
Kristen was a 14-year old girl. She enjoyed lounging around the house. Kristen went to an aerobic exercise class once a week and walked her family's dog occasionally.

Participant 5: Kevin
Kevin was a 12-year old boy. He enjoyed playing with action figures and included them in all his activities. Kevin enjoyed reading and studying different subjects in school. Kevin attended a weekly swim class.

Measures

Physical activity was measured using an adapted version of the previously validated Previous Day Physical Activity Recall (PDPAR), a self-report questionnaire designed to measure physical activity in youth (Weston, Petosa, & Pate, 1997). Of all self-report physical activity recall instruments, the one-day recall has been deemed most valid for this age group (McMurray et al., 2004; Weston, Petosa, & Pate). In order to measure all physical activity bouts during a weekday, the tool was adapted to include the times for recess, physical education class, and transportation to and from school. For a weekend day, the instrument measured physical activity from 7:00 a.m. to 11:30 p.m.. The PDPAR was segmented into 30-minute blocks between the hours of 3:00 p.m. and 11:30 p.m. for weekdays and 7:00 a.m. and 11:30 p.m. for weekend days. It required the recall of activities over the previous day and used contextual cues to enhance recall. Items were listed on the questionnaire and grouped into the following categories: eating; work; after school/spare time/hobbies; transportation; sleeping/bathing; school; and physical activities and sports (Weston, Petosa, & Pate). Respondents entered the number that corresponded with the activity performed during each 30-minute time period. For each block, respondents rated the intensity of the activity using the following descriptors: very light (e.g., slow

breathing and little or no movement); light (e.g., normal breathing and movement); medium (e.g., increased breathing and moderate movement); and hard (e.g., hard breathing and quick movement) (Weston, Petosa, & Pate). Each intensity level was assigned a metabolic equivalent value (MET) (1 MET = 1 kcal/kg/hour) obtained from physical activity energy lists (Ainsworth et al., 2000; American College of Sports Medicine, 1990; Blair, 1984; Bouchard, Tremblay, Leblanc, Lorties, Savard, & Theriault, 1983; McCardle, Katch, & Katch, 1981). Only MET scores equal to or greater than three, the moderate level of physical activity needed for health gains, were tabulated at the end of the questionnaire to determine the level of physical activity for each child (Weston, Petosa, & Pate). Physical activity level was expressed in number of hours per day.

The 15-item self-efficacy questionnaire, designed by Saunders et al. (1997), measured coaching's impact on a youth's confidence to be physically active. Each question measured self-efficacy along a 5-point Likert scale, with confidence ratings ranging from 1 (Disagree a lot) to 5 (Agree a lot). The questionnaire asked the youth about support seeking self-efficacy, barriers self-efficacy, and positive alternatives self-efficacy. Both the Theory of Reasoned Action (Fishbein & Ajzen, 1975) and Social Cognitive Theory (Bandura, 1986) provided the framework for the construction of statements for this questionnaire. The questionnaire has been deemed reliable (Saunders et al.) and valid (Dishman et al., 2002; Motl et al., 2000).

The 5-item social support questionnaire (Saunders et al., 1997) measured the extent of social support the youth received to be physically active. Each question measured the amount of social support during a typical week along a 6-point Likert scale, with social support ratings ranging from 0 (None) to 4 (Daily) and the option of answering 'Don't Know'. The questionnaire had a test-retest reliability of .86 (Saunders et al.; Ward, Dowda, Trost, Felton, Dishman, & Pate, 2006).

The 4-item perceived behavioural control questionnaire measured perceptions of ease or difficulty with being physically active (Saunders et al., 1997). Each question measured perceived behavioural control along a 5-point Likert scale, with perceived behavioural control ratings ranging from 1 (Very Easy) to 5 (Very Difficult). The questionnaire has been deemed to be both reliable and valid (Dishman et al., 2002; Motl et al., 2000).

Procedure

The multiple-baseline single-case experimental design has been deemed to be an effective and experimentally reliable method to assess changes in behaviour (Kazdin, 1982). A key advantage to the study design is the small number of participants required.

Advertisements were placed strategically in many locations (such as a local newspaper, Boys & Girls Club, several churches, hospitals and clinics, and public libraries) to attract both youth and parental attention. Five boys and girls responded to the recruitment advertising, met the eligibility requirements and confirmed their interest in participating in the study. These individuals became the study participants. Ethical approval was granted through the University of Western Ontario's Office of Research Ethics.

Participants completed all assessments at their respective homes. Assessments, letters of information, and consent forms were dropped off at the participants' homes one week before the study began. During the first assessment, participants filled out the self-efficacy, social support, perceived behavioural control questionnaires, and the PDPAR. In accordance with the multiple-baseline across-participants study design, each participant completed a different number of baseline assessments (Kazdin, 1982). Participants 1, 2, 4, and 5 received coaching after three, five, seven, and nine baseline

assessments, respectively. Participant 3 followed the identical study design as participant 4. During assessments two through nine, only physical activity was measured. These physical activity assessments were filled out for Tuesdays, Thursdays, and Saturdays. All active coaching sessions were conducted over the telephone with a Certified Professional Co-active Coach, hereafter referred to as the coach. The coach held a PhD in the health sciences, with expertise in wellness, health promotion, and lifestyle behaviour change. The first coaching session, called the in-take session, lasted 1 hour. During this session, the coach and participant co-created and co-designed their working partnership, referred to as the 'designed alliance' (Whitworth, Kimsey-House, & Sandahl, 1998, p. 3). This alliance was a 'container' for the coach-participant relationship and was constructed to meet the needs of the participant. It was a dynamic 'container,' one that changed continually over time, to make the coaching relationship as effective as possible (Whitworth, Kimsey-House, & Sandahl, 1998). The remaining five coaching sessions were approximately 30 minutes in length and were conducted once a week. Coaching sessions involved elements of the four cornerstones of the coaching model and included holding the participant as fully capable; addressing the participant's whole life; attending to the participant's agenda; and making adjustments to the designed alliance as needed (Whitworth, Kimsey-House, & Sandahl, 1998). Additionally, the coach utilized the five contexts of the model (listening, using intuition, being curious, self-managing, and working to help move the client forward in action and/or intensifying his/her learning). Participants were called one day prior to each coaching session and reminded about their appointment. On the day of their coaching appointment, participants called the coach at a predetermined telephone number. When a participant forgot to call at the scheduled time, the researcher telephoned and reminded the participant of his or her session. Participants 1, 2, 4, and 5 received six coaching sessions, while participant 3 only received five sessions due to an apparent lack of commitment and interest. Participants also received a reminder telephone call each day the physical activity assessment needed to be completed. This helped ensure that participants continually filled out their physical activity assessments. Physical activity assessments were filled out three times per week for the duration of the coaching sessions. At the beginning of each week, the three completed PDPARs were collected and participants were given three empty PDPARs to fill out for the following week.

At the end of the sixth coaching session, participants 1, 2, 4, and 5 filled out nine, seven, five, and three follow-up PDPAR assessments, respectively. Again, participant 3 followed the identical study design as participant 4. The total length of the study for each participant was 11 weeks.

At the end of the study, participants filled out the self-efficacy, social support, and perceived behavioural control questionnaires and answered six qualitative questions that were audio recorded and transcribed verbatim to ensure accuracy and allow proper coding. Interviews lasted between 2- to 3- minutes and were conducted over the telephone after all questionnaires had been completed and collected. The first two questions asked about the physical activity support the youth obtained while he or she received the intervention. Questions three through six examined what the participant liked and disliked about the coaching experience and what was learned while participating in the intervention.

Analysis

Visual inspection was used to examine physical activity data collected during the three phases of the study (Kazdin, 1982). Baseline, intervention, and follow-up each represented a different study phase. Visual inspection is a technique used to reach a judgment about the reliability and consistency of the intervention effects by examining visually the graphed data (Kazdin). To determine whether an intervention effect occurred, this technique also takes into consideration changes in means, levels, and trends across the different study phases. Changes in means reflected whether different study phases

had different calculated physical activity means. Changes in levels reflected whether changes in physical activity occurred between the last assessment at the end of one phase and the first assessment of the next phase. Changes in trend reflected the slope of the data in each phase and whether increases or decreases occurred in physical activity. The trend line, or sometimes referred to as the celeration line, was drawn according to the split middle technique outlined by Kazdin. Lastly, changes in the latency of change illustrated the length of time needed to observe an effect on physical activity once Co-active coaching was introduced and taken away. Self-efficacy, social support, and perceived behavioural control data were evaluated for their pre- and post-intervention results using paired t-tests.

Interviews conducted at the end of the intervention were audio recorded and transcribed verbatim. To ensure that each interview was conducted in the same manner, a semi-structured interview guide was used with each participant. To further enhance the trustworthiness of the data, a number of steps were utilised, as suggested by Guba and Lincoln (1989). Specifically, member-checking was used throughout each interview to facilitate credibility. Also, two researchers independently performed inductive content analysis and compared results in service of confirmability. Nvivo software was used to code and analyze the transcripts for categories and common themes (i.e., inductive content analysis as described by Patton, 1987). Both the interview process and inductive content analysis were documented to ensure that other researchers have the opportunity to understand the specific processes used throughout the investigation (i.e., to facilitate dependability).

Results

1) Physical Activity

Visual inspection indicated no change in physical activity for participant 1 across the three different phases. Physical activity levels fluctuated consistently throughout the entire duration of the study. Further statistical analyses detected wide variability in physical activity patterns. Physical activity data for participants 1, 2, 3, 4, and 5 is presented in Figure 1. Participant 1's mean physical activity decreased from 3.00 hrs/day in the baseline phase to 2.21 hrs/day in the intervention phase and to 2.22 hrs/day in the follow-up phase. The baseline level of 4.5 hrs/day decreased to 2.29 hrs/day in the intervention phase and .94 hr/day in the follow-up phase. This was a 50% and 79% decrease in level, respectively. Furthermore, the baseline slope of x4.5, where x represents an accelerating slope, decreased to ÷2.22, where ÷ represents a decelerating slope, in the intervention phase and x2.00 in the follow-up phase. Collectively, these results do not indicate an increase or a decrease in physical activity across the three different phases.

Visual inspection indicated no increase or decrease in physical activity across the three different phases for participant 2. Physical activity levels fluctuated consistently throughout the entire duration of the study, especially on data measure 15. This may have skewed the result of the intervention trend. Further statistical analyses detected wide variability in physical activity behaviours. Participant 2's mean physical activity increased from 2.10 hrs/day in the baseline phase to 2.21 hrs/day in the intervention phase and to 2.50 hrs/day in the follow-up phase. The baseline level of .91 hrs/day increased to 3.41 hrs/day in the intervention phase and 2.33 hrs/day in the follow-up phase. This was a 274% and 156% increase in level, respectively. Furthermore, the baseline slope of ÷1.51 decreased to ÷1.56 in the intervention phase and increased to ÷1.33 in the follow-up phase. Collectively, these results do indicate a definitive increase or decrease physical activity.

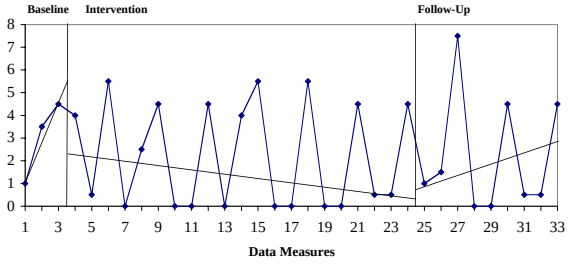
No changes in physical activity were detected through the use of visual inspection. Physical activity scores fluctuated heavily on data measures 4 and 12 and may have skewed the results of both the baseline and intervention trends. Further statistical analyses detected wide variability in physical

activity patterns. Participant 3's mean physical activity decreased from .71 hrs/day in the baseline phase to .61 hrs/day in the intervention phase and to .40 hrs/day in the follow-up phase. The baseline level of 1.19 hrs/day decreased to .90 hrs/day in the intervention phase and 0.00 hrs/day in the follow-up phase. This was a 24% and 100% decrease in level, respectively. Furthermore, the baseline slope of x2.00 decreased to ÷3.50 in the intervention phase and increased to x7.00 in the follow-up phase. Collectively, these results do indicate a definitive increase or decrease physical activity.

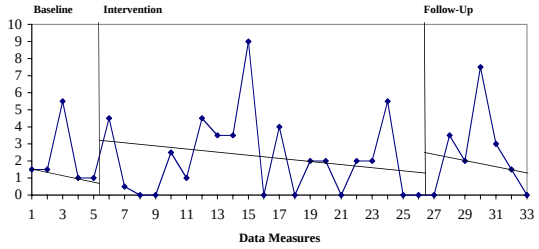
Visual inspection indicated no increase or decrease in physical activity across the three different phases. Physical activity scores remained constant throughout the study for participant 4. Further statistical analyses indicated variability in the amount of physical activity performed. Participant 4's mean physical activity increased from 1.21 hrs/day in the baseline phase to 1.76 hrs/day in the intervention phase and decreased to 1.20 hrs/day in the follow-up phase. The baseline level of 2.50 hrs/day decreased to 1.50 hrs/day in the intervention phase and increased to 3.50 hrs/day in the follow-up phase. This was a 40% decrease and a 40% increase in level, respectively. Furthermore, the baseline slope of x4.50 decreased to 1.00 in the intervention phase and decreased to ÷13.00 in the follow-up phase. Collectively, these results do indicate a definitive increase or decrease physical activity.

The use of visual inspection did indicate an increase in physical activity across the baseline and intervention phases for participant 5. A potential latency effect in physical activity data may have occurred after data measure 27 as physical activity increased in the follow-up phase. Statistical analyses indicated wide variability in the physical activity data with an increase in physical activity in the follow-up phase. Participant 5's mean physical activity increased from 1.33 hrs/day in the baseline phase to 1.49 hrs/day in the intervention phase and to 2.50 hrs/day in the follow-up phase. The baseline level of 1.25 hrs/day decreased to .55 hrs/day in the intervention phase and increased to 2.00 hrs/day in the follow-up phase. This was a 56% decrease and 60% increase in level, respectively. Furthermore, the baseline slope of 1.00 increased to x2.82 in the intervention phase and x2.00 in the follow-up phase. Collectively, these results do indicate an increase in physical activity.

To summarise, physical activity increased for participant 5, while the other participants' physical activity remained the same.



Participant 1



Participant 2

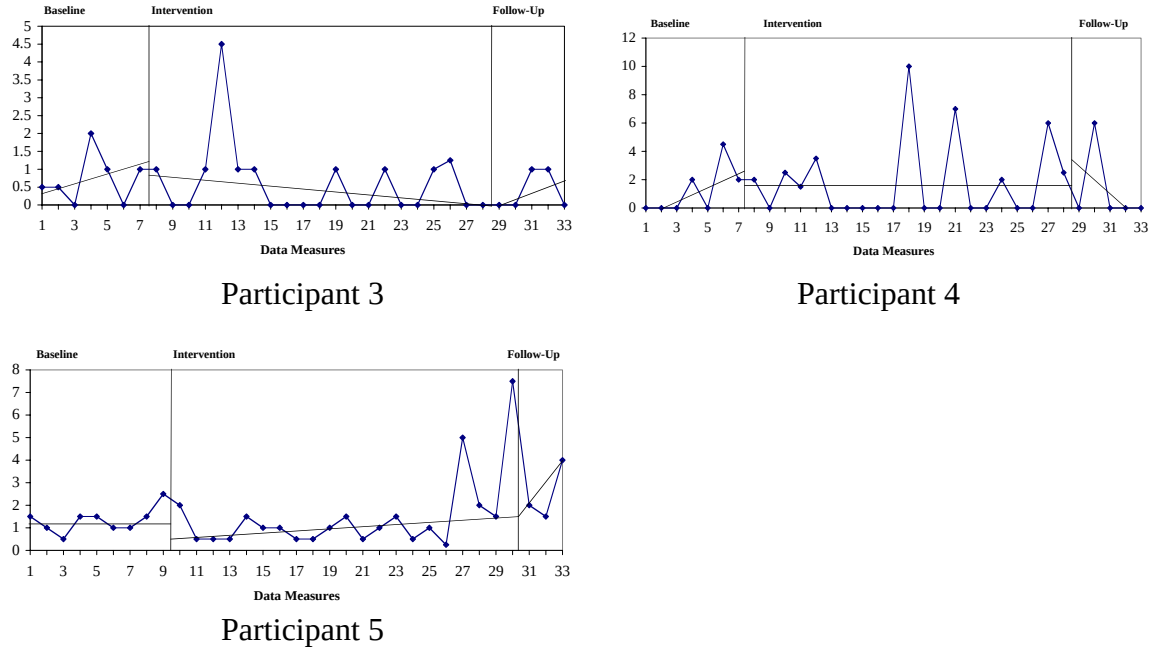


Figure 1: Graphed data of amount of time spent performing physical activity equal to or above a moderate level of intensity for participants 1, 2, 3, 4, and 5. The vertical lines indicate when the intervention was implemented (intervention phase) and when it was withdrawn (follow-up phase).

2) Psychosocial Variables

Paired *t*-tests were used to compare mean scores for pre- and post-intervention psychosocial variables.

Mean scores for all three forms of self-efficacy increased from pre- to post-intervention. The mean scores for support seeking self-efficacy increased from 3.60 pre-intervention to 3.77 post-intervention, yet results of the paired *t*-test failed to reach significance (t = -.58, p = .60).

The mean scores for barriers self-efficacy increased from 2.65 pre-intervention to 2.85 post-intervention, yet results of the paired *t*-test failed to reach significance (t = -.57, p = .60).

The mean scores for positive alternatives self-efficacy increased from 3.05 pre-intervention to 3.45 post-intervention, yet results of the paired *t*-test failed to reach significance (t = -1.43, p = .28).

Social support to be physically active was stratified into three categories: male family members; female family members; and child family members. The mean scores for male support decreased from 1.32 pre-intervention to 1.00 post-intervention, but the results of the paired t-test only approached significance (t = 2.36, p = .08).

The mean scores for female support decreased from 1.40 pre-intervention to .92 post-intervention, yet

the results of the paired *t*-test only approached significance ($t = 2.33$, $p = .08$).

The mean scores for child support remained the same between pre- and post- intervention.

The mean difference between the pre- and post- intervention perceived behavioural control scores was .00.

To summarise, there were no significant changes from pre- to post-intervention in self-efficacy, social support, and perceived behavioural control to be physically active.

Post-Intervention Interview Common Themes

The post intervention interviews conducted with the participants indicated several common themes about coaching, parental involvement in physical activity, and the study design and methodology.

a) Liked Talking with the Coach
Three participants stressed throughout their interviews that they enjoyed talking with the coach and discussing several body-related issues. One participant stated, "I thought they [coaching sessions] were helpful. It was good to talk about physical activity and certain body issues." Also, another said, "Well, I thought they [coaching sessions] were good and planned-out well."

b) Learned Importance of Physical Activity
Four participants indicated that being physically active is important to health and well-being. One participant stated, "I learned that physical activity is very important. I should take care of myself and be as active as possible." Another made similar comments about treating the body with greater care. She stated, "Um, I learned to treat my body a little bit better and be a little bit more active. Encourage myself and push myself." A third indicated, "… if you're physically active then you have more energy to do more." Lastly, another stated, "Um… it is better to [have] healthy eating [habits] and be more active."

c) No Change in Parental Involvement in Physical Activity
All five participants indicated that their parents' involvement in their physical activity did not change. When one participant was asked about what had changed about his parents' involvement in physical activity, he responded, "Well, they haven't [changed], they haven't done anything about my physical activity. They haven't helped." Another answered in much the same way. She stated, "Um, my parents aren't really as much into my activity … nothing really [changed]. Basically the same."

d) Disliked Filling in the Physical Activity Questionnaire
All five participants indicated that they disliked filling in the physical activity questionnaire. When one participant was asked what she liked least about the study, she indicated, "Having to fill out the charts every day." Another stated, "Um, just for, for every part, to like remember to like write it every day that you had to… ." Lastly, one participant indicated that she did not like the questionnaire because it did not have enough options to reflect her actual activity level. She stated, "I didn't like filling out the questionnaires because not all days were available to be filled out. Also, I wasn't in Phys. Ed. this semester, so it may have looked like I was less active."

Discussion and Conclusion

This research study evaluated the impact of coaching on the levels of physical activity and psychosocial variables in youth between the ages of 12 to 14 years in London, Ontario.

An analysis of physical activity and patterns of sedentary activity revealed several results. Levels of physical activity increased for participant 5; however, the other participants' physical activity remained the same. The lack of change in psychosocial variables can be attributed to several factors and these are discussed below.

A lack of change in physical activity may have been due to the inherit limitations of the PDPAR. Although the PDPAR has high reliability and validity and has been used widely in studies that involved children and youth, like all other self-report questionnaires, the instrument is still vulnerable to recall errors, deliberate misrepresentation, social desirability, and other biases (Sirard & Pate, 2001). Researchers have deemed that of all self-report physical activity questionnaires, the one-day recall is the most reliable and valid for this age group (McMurray et al., 2004; Weston, Petosa, & Pate, 1997). Participants in this study simply may have over reported their physical activity throughout the entire study, thereby inflating their levels of physical activity consistently throughout the duration of the study. Physical activity inflation is quite common with self-report questionnaires because of the inherent limitations and also the 30-minute block of time design used by the PDPAR (Shephard, 2003). For instance, a participant may have reported swimming for one block of time at a high intensity; however, it is not clear how much of that 30-minute block was actually devoted to swimming. During that block of time, the participant may have also been in the change room, showering, or socializing. Also, the PDPAR may not have been sensitive enough to detect changes in the amount of physical activity each participant performed. Because physical activity was recorded for only three days a week, participants may have been more active on different days that were not monitored.

The lack of change in physical activity may be attributed to the difficulties experienced with recruitment. Because the participants waited as long as two months before they began the intervention, they already may have started to improve their physical activity levels before they entered the study. Also, sheer knowledge and anticipation of being in an intervention designed to measure its impact on physical activity may have improved participants' physical activity levels even before the start of the study. Although stringent study recruitment requirements were used for admission into the study, participants initially may have indicated they were more physically inactive than they actually were at the start of the intervention. For the baseline phase, participants 1 and 2 reported levels of physical activity above the minimum guidelines stipulated by *Canada's Physical Activity Guide for Youth* (Health Canada, 2002). Participants 3, 4, and 5 reported levels that were slightly below the recommended levels for the baseline phase.

The number of sessions or the length of time the intervention lasted may not have been sufficient to impact changes in physical activity and psychosocial variables. Several studies that have measured physical activity and psychosocial variables have noted changes only after several months (Reynolds et al.,1990; Stone, McKenzie, Welk, & Booth, 1998). Perhaps changes in physical activity and psychosocial variables were not identified because more coaching sessions over a longer period of time are needed for the desired impact.

The type of methodology used for this study also may have been responsible for the lack of observed change in physical activity and psychosocial variables (Kazdin, 1982). In certain cases, a small number of baseline measures were obtained which may not have reflected a true representation of a participant's physical activity level. With regard to the psychosocial variables, a limitation for this analysis was the small sample size. Due to such small power, large differences would have to be detected in order to obtain a significant result.

Inductive content analysis of the post-intervention interviews revealed that three participants enjoyed discussing health issues with the coach, and four participants learned that being physically active was important to good health and well-being. Although several participants indicated they learned about the importance of physical activity, such knowledge may not have carried over to their actual levels of physical activity. Several researchers have deemed that beliefs in health and well-being contribute only minimally to increased levels of physical activity (O'Connell, Price, Roberts, Jurs, & McKinley, 1985; Sallis, Haskell, Fortmann, Vranizan, Taylor, & Solomon, 1986). Because four participants indicated learned knowledge of physical activity and only one participant improved his physical activity levels, beliefs in health and well-being did not seem to contribute to improved physical activity. These results are consistent with previously reported research (O'Connell, Price, Roberts, Jurs, & McKinley, 1985; Sallis, Haskell, Fortmann, Vranizan, Taylor, & Solomon, 1986).

Although participants mentioned they enjoyed discussing health issues with the coach, challenges experienced during participant recruitment and with participant adherence indicated that coaching may not be an appropriate intervention for youth of this age. Great efforts were made for two months to recruit participants; however, only 5 participants confirmed their interest to participate. With regard to study adherence, nearly all participants forgot to call the coach throughout the study. Several reminder calls were required for them to call the coach at their appointment times. Also, this lack of interest in coaching may have been due, in part, to a lack of support from the parents. Because all participants indicated that no changes occurred with their parents' involvement in their physical activity, parents overtly may not have supported their child's involvement in the coaching intervention; this perceived lack of support may have influenced their children's motivation to stay involved in the coaching. Furthermore, participants indicated in their post-intervention interviews that they did not enjoy filling out the PDPAR three times per week. Because the need to fill out the PDPAR was perceived as a burden, participants may have lost interest in other aspects of the study, such as attending their coaching sessions on time.

Lastly, this study illustrates important considerations that must be addressed when coaching youth. First, youth may not perceive a need for coaching or realize that certain behaviours ought to be addressed. With respect to physical activity, youth in this study may not have considered physical inactivity to be a serious concern with immediate consequences. Ultimately, a lack of concern may have been the reason no participants adhered to a regimented coaching schedule. Future research and current coaches may wish to examine the impact of coaching on changing different behaviours that are perceived to be more serious with immediate and tangible consequences. Second, parents hold a great deal of control over their children and are perceived to be influential figures that can promote behaviour change in their lives. Coaches should consider involving both youth and parents in coaching sessions. Such an inclusion may improve the likelihood of successful behaviour changes, strengthen parent youth relations, and session attendance. Lastly, the length of the coaching experience should be increased because researchers have deemed that changes in psychosocial variables are observed after a longer period of time than two months. Coaches may wish to alter their practices so that youth clients

commit to an intervention duration longer than two months in order to see meaningful results in terms of behaviour change.

Regardless of the limitations, the current study provides important information about the use of coaching to improve physical activity and psychosocial variables in youth between the ages of 12 to 14 years. Only one participant increased his physical activity and no participant's physical activity declined. Given the high prevalence of physical inactivity in this age group, interventions that target physical inactivity are needed desperately. This is the first study known to examine the impact of coaching on physical activity and psychosocial variables on youth between the ages of 12 and 14 years. Because this study had 5 participants, wide generalizations cannot be made about the use of coaching in this population. Coaching *may* not be an appropriate intervention for increasing physical activity for youth of this age; however, further rigorous research is warranted.

References

Ainsworth, B. E., Haskell, W. L., Whitt, M. C., Irwin, M. L., Swartz, A. M., Strath, S. J., O'Brien, W. L., Bassett, D. R. Jr., Schmitz, K. H., Emplaincourt, P. O., Jacobs, D. R. Jr., & Leon, A. S. (2000) Compendium of Physical Activities: an update of activity codes and MET intensities, *Medicine and Science in Sports and Exercise*, 32(9), S498-S516.

Ajzen, I. (1988). *Attitudes, personality, and behavior*. Chicago: Dorsey Press.

American College of Sports Medicine. (1990) *Guidelines for exercise testing and prescription* (4th ed.), Philadelphia: Lea & Febriger.

Bandura, A. (1986) *Social foundations of thought and action: A social-cognitive theory*, Englewood Cliffs, NJ: Prentice Hall.

Baranowski, T., Bouchard, C., Bar-Or, O., Bricker, T., Heath, G., Kimm, S. Y. S., Malina, R., Obarzanek, E., Pate, R., Strong, W. B., Truman, B., & Washington, R. (1992) Assessment, prevalence, and cardiovascular benefits of physical activity and fitness in youth, *Medicine and Science in Sports and Exercise*, 24(supplement 6), S237-S247.

Blair, S. N. (1984) How to assess exercise habits and physical fitness. In J. D. Matarasso, S. M. Weiss, & J. A. Herd (Eds.), *Behavioural Health: A Handbook of Health Enhancement and Disease Prevention* (pp. 424-447), New York: Wiley.

Bouchard, C., Tremblay, A., Leblanc, C., Lorties, G., Savard, R., & Theriault, G. (1983) A method to assess energy expenditure in children and adults, *American Journal of Clinical Nutrition*, 37, 461-467.

Canadian Fitness and Lifestyle Research Institute. (2005, accessed 17/10/2006) 2004 Physical Activity Monitor, http://www.cflri.ca/eng/provincial_data/pam2004/canada.php

Canadian Fitness and Lifestyle Research Institute. (2005, accessed 01/12/2005) 2003 Capacity Study Communicating the benefits of physical activity for children: A parent's perspective, http://www.cflri.ca/cflri/cflri.html

Dishman, R. K., & Buckworth, J. (1996) Increasing physical activity: a quantitative synthesis, *Medicine and Science in Sports and Exercise*, 28, 706-719.

Dishman, R. K., Motl, R. W., Saunders, R. P., Dowda, M., Felton, G., Ward, D. S., & Pate, R. R. (2002) Factorial invariance and latent mean structures of questionnaires measuring social-cognitive determinants of physical activity among black and white adolescent girls, *Preventive Medicine*, 34, 100-108.

Fishbein, M., & Ajzen, I. (1975) *Belief, attitude, intention and behavior: An introduction to theory and research*, Reading, MA: Addison-Wesley.

Guba, E.G. & Lincoln, Y.S. (1989) *Fourth generation evaluation*, London: Sage.

Health Canada. (2002, accessed 17/10/2006) Canada's Physical Activity Guide for Youth, http://www.phac-aspc.gc.ca/pau-uap/paguide/child_youth/resources.html#7

Irving, H. M., Adlaf, E. M., Allison, K. R., Paglia, A., Dwyer, J. J. M., & Goodman, J. (2003) Trends in Vigorous Physical Activity Among Ontario Adolescents, 1997-2001, *Canadian Journal of Public Health*, 94(4), 272-274.

Irwin, J. D., & Morrow, D. (2005) Health promotion theory in practice: an analysis of Co-active coaching, *International Journal of Evidence Based Coaching and Mentoring*, 3, 29-38.

Jago, R., & Baranowski, T. (2004) Non-curricular approaches for increasing physical activity in youth: a review, *Preventive Medicine*, 39, 157-163.

Kazdin, A. E. (1982) *Single-case research designs: Methods for clinical and applied settings*, New York: Oxford University Press.

Katzmarzyk, P. T., & Janssen, I. (2004) The economic costs associated with physical inactivity and obesity in Canada: an update, *Canadian Journal of Applied Physiology*, 29, 90-115.

Luke, A., Philpott, J., Brett, K., Cruz, L., Lun, V., Prasad, N., & Zetaruk, M. (2004) Physical inactivity in children and adolescents CASM AdHoc committee on children's fitness, *Clinical Journal of Sport Medicine*, 14(5), 261-266.

McCardle, W. D., Katch, F. I., & Katch, V. L. (1981) *Exercise Physiology*, Philidelphia: Lea & Febiger.

McMurray R. G., Ring, K. B., Treuth, M. S., Welk, G. J., Pate, R. R., Schmitz, K. H., Pickrel, J. L., Gonzalez, V., Almedia, M. J. C., Young, D. R., & Sallis, J. F. (2004) Comparison of two approaches to structured physical activity surveys for adolescents', *Medicine and Science in Sports and Exercise*, 36, 2135-2143.

Motl, R. W., Dishman, R. K., Trost, S. G., Saunders, R. P., Dowda, M., Felton, G., Ward, D. S., & Pate, R. R. (2000) Factorial validity and invariance of questionnaires measuring social-cognitive determinants of physical activity among adolescent girls, *Preventive Medicine*, 31, 584-594.

O'Connell, J. K., Price, J. H., Roberts, S. M., Jurs, S. G., & McKinley, R. (1985) Utilizing the health belief model to predict dieting and exercising behavior of obese and nonobese adolescents, *Health Education Quarterly*, 12(4), 343-351.

Pate, R. R., Pratt, M., Blair, S. N., Haskell, W. L., Macera, C. A., Bouchard, C., Buchner, D., Ettinger, W., Heath, G. W., King, A. C., Kriska, A., Leon, A. S., Marcus, B. H., Morris, J., Paffenbarger, R. S., Patick, K., Pollock, M. L., Rippe, J. M., Sallis, J., & Wilmore, J. H. (1995) Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine, *Journal of the American Medical Association*, 273, 402-407.

Patton, M. (1987) *How to Use Qualitative Methods in Evaluation*, London: Sage.

Reynolds, K. D., Killen, J. D., Bryson, S. W., Maron, D. J., Taylor, C. B., Maccoby, N., & Farquhar, J. W. (1990) 'Psychosocial predictors of physical activity in adolescents', *Preventive Medicine*, 19, 541-551.

Ryan, G.J., & Dzewaltowski, D. A. (2002) 'Comparing the relationships between different types of self-efficacy and physical activity in youth, *Health Education and Behavior*, 29, 491-504.

Sallis, J. F., Haskell, W. L., Fortmann, S. P., Vranizan, K. M., Taylor, C. B., & Solomon, D. S. (1986) Predictors of adoption and maintenance of physical activity in a community sample, *Preventive Medicine*, 15(4), 331-341.

Sallis, J. F., & Patrick, K. (1994) Physical Activity Guidelines for Adolescents: Consensus Statement, *Pediatric Exercise Science*, 6, 302-314.

Sallis, J. F., Simons-Morton, B. G., Stone, E. J., Corbin, C. B., Epstein, L. H., Faucette, N., Iannotti, R. J., Killen, J. D., Klesges, R. C., Petray, C. K., Rowland, T. W., & Taylor, W. C. (1992)

Determinants of physical activity and interventions in youth, *Medicine and Science in Sports and Exercise*, 24(supplement 6), S248-S257.

Saunders, R. P., Pate, R. R., Felton, G., Dowda, M., Weinrich, M. C., Ward, D. S., Parson, M. A., & Baranowski, T. (1997) Development of questionnaires to measure psychosocial influences on children's physical activity, *Preventative Medicine*, 26, 241-247.

Sirard, J. R., & Pate, R. R. (2001) Physical activity assessment in children and adolescents, *Sports Medicine*, 31(6), 439-454.

Shepard, R. J. (2003) Limits to the measurement of habitual physical activity by questionnaires, *British Journal of Sports Medicine*, 37(3), 197-206.

Statistics Canada. (2005, accessed 01/12/2005) Physical activity, by age group and sex, household population aged 12 and over, http://www40.statcan.ca/l01/cst01/health46.htm?sdi=physical%20activity

Stone, E. J., McKenzie, T. L., Welk, G. J., & Booth, M. L. (1998) Effects of physical activity interventions in youth: Review and synthesis, *American Journal of Preventive Medicine*, 15, 298-315.

Trudeau, F., Laurencelle, L., & Shephard, R. J. (2004) Tracking of physical activity from childhood to adulthood, *Medicine and Science in Sports and Exercise*, 36, 1937-1943.

Trudeau, F., & Shephard, R. J. (2005) Contribution of school programmes to physical activity levels and attitudes in children and adults, *Sports Medicine*, 25, 89-105.

Ward, D. S., Dowda, M., Trost, S. G., Felton, G. M., Dishman, R. K., & Pate, R. R. (2006) Physical activity correlates in adolescent girls who differ by weight status, *Obesity*, 14(1), 97-105.

Weston, A. T., Petosa, R., & Pate, R. R. (1997) Validation of an instrument for measurement of physical activity in youth, *Medicine and Science in Sport and Exercise*, 29, 138-143.

Whitworth, L., Kimsey-House, H., & Sandahl, P. (1998) *Co-Active coaching: New skills for coaching people toward success in work and life*, California: Davies-Black Publishing.

Whitworth, L., Kimsey-House, K., Kimsey-House, H., Sandahl, P. (2007) *Co-Active Coaching: New Skills for Coaching People Toward Success in Work and Life (2nd ed.)*, California: Davies-Black Publishing.

Wong, E.H., Weist, D.J., Cusick, L.B. (2002) Perceptions of support, parent attachment, competence and self-worth as predictors of motivational orientation and academic achievement: an examination of sixth- and ninth-grade regular education students. *Adolescence*, 37.

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